
FIGIS – FIRMS Methodological Workshop

1-5 July 2002, FAO Headquarters, Rome

REPORT OF THE WORKSHOP

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1. INTRODUCTION

The FIGIS-FIRMS Methodological Workshop convened at 9.30 on 1st July 2002 in the Ethiopia Room at FAO Headquarters. Dr Serge Garcia, Director Fisheries Resources Division, welcomed the participants (*Appendix 1*) and noted that this is the first FIGIS-FIRMS workshop to consider issues arising from the preliminary development of the Fisheries Resources Monitoring System (FIRMS) within the FAO Global Fisheries Information System (FIGIS). He outlined (*Appendix 2*) the origins of the call by the first meeting of the FAO Advisory Committee on Fisheries Research (ACFR) in 1999 for an improved method to report on the state of world fisheries. In response to this, the ACFR had established a Working Party on Status and Trends in Fisheries, which would consider institutional and technical means to approach this issue. FAO responded to the findings of that Working Party and the recommendations of ACFR by directing the FIGIS project to address ways in which partnerships could be established for the implementation of FIRMS. The FIGIS project was also asked to develop specific case studies with some institutions to test preliminary approaches to a global system for fisheries resources monitoring, at the outset looking at the issues of inventories of fish stocks, resources and fisheries.

The methodological workshop had been designed 1) to anticipate the framework of discussions that might be addressed following the establishment of a FIRMS Steering Committee (that would comprise partners), 2) to enable information on the FIGIS-FIRMS approach to be discussed by information and subject specialists, 3) for the FIGIS project to receive feedback on the case studies, 4) to discuss further developments, in particular in data and metadata standards, and 5) to prepare follow up workplans.

The draft agenda was discussed and adopted (*Appendix 3a*). The structure of the workshop was outlined using a draft annotated agenda (*Appendix 3b*), noting that both case-study participants and new participants were present and that very considerable work needed to be undertaken to achieve the above objectives. This work would be conducted through 1) presentations (documents and presentations listed at *Appendix 4*), including feedback from the case-study participants and suggestions from new participants, and 2) separate working group sessions that would address the following substantive agenda items:

- Requirements and Conceptual Design
- Development of Standards
- Maintenance of FIRMS information
- Workplans for contributing to FIRMS

In addition, the workshop was requested to continuously consider two major issues throughout the course of discussions: Information Management Policy and Quality Assurance.

Noting that several institutional participants and individuals have been involved in deliberations of the ACFR Working Party, the conduct of case studies and early discussions about the development of FIRMS, the workshop adopted the following suggestions for maintaining the conduct of the workshop.

- *Co-Chairpersons*: Michael G. Hinton (Inter-American Tropical Tuna Commission), days 1 and 2; Hans Lassen (International Commission for Exploration of the Sea), days 3 and 4; jointly convening the final session on day 5 for adoption of the report.
- *Facilitator and Rapporteur*: David Evans
- *Session and subject rapporteurs*: Robert Branton, Phaik Ean Chee, David Die, Richard Grainger, Barbara Marshall, Berger Oelofsen, Conor O'Kane, and David Ramm.
- *Working group facilitators*: Alexis Bensch, Denis Berthier, Yves Jaques, Olivier Roux, and Marc Taconet.

2. REQUIREMENTS AND CONCEPTUAL DESIGN

The international context

Fisheries status and trends information is key to sound policy-making and management and it also commands a high level of public interest. A draft *Strategy for Improving Information on Status and Trends of Capture Fisheries* was agreed by a Technical Consultation, which met in Rome during 25-28 March 2002. The draft Strategy has been elaborated within the framework of the Code of Conduct for Responsible Fisheries and, like the Code, is voluntary with no new legal obligations. It proposes to reinvigorate data collection and research, and the assembly and dissemination of information. It will be considered for adoption by the FAO Committee for Fisheries in 2003. The Strategy's objectives are to:

- provide a framework for improvement of knowledge of fishery status and trends for improved policy-making, management and sustainable resource use;
- allow States, Regional Fishery Bodies (RFBs) and FAO to cooperate better in the assembly of information on status and trends in a more systematic way using modern technology and to disseminate this through FIGIS; and
- build capacity in developing countries to participate in the Strategy.

The guiding principles for the Strategy are sustainability, provision of the best scientific evidence, participation and cooperation, objectivity, transparency, timeliness and flexibility. It specifies a number of required actions.

- Capacity building in developing countries through technical assistance, technology transfer, training and scientific cooperation and the implementation of cost-effective and sustainable data collection, analysis, reporting, and information exchange to fulfil national needs, as well as those of RFBs and FAO.
- To enhance capacities to extend coverage for data collection, validation and analysis for small-scale and multi-species fisheries, which are often not well monitored and which may be underestimated and underrepresented. To develop innovative approaches and guidelines.
- Expand the scope of information where necessary for management responsibilities, (e.g. climatic, ecosystem and socio-economic factors) and to develop indicators of sustainable development.
- Support compilation of a global inventory of fisheries and fish stocks as a basis to improve the completeness of status and trends information. Develop definitions, form, content, and methods for the inventory and then implement them. FAO and RFBs should establish processes for scientific oversight of inventories and status and trends information.
- Support the development of FIGIS to facilitate systematic synthesis of status and trends information from national to regional and global levels. Data exchange protocols should be established, and quality assurance and transparency should be provided for, through partnership agreements. Provide the best information available to FIGIS, ensuring quality assurance through review processes, and to conduct pilot projects, workshops and training to implement FIGIS processes.
- Participate in development of criteria and methods to ensure information quality and security and apply them. FAO should facilitate the development of guidelines for quality assurance, transparency and security of information.
- Seek and agree arrangements to facilitate provision and exchange of status and trends information, and define roles and entitlements of partners, including in relation to information quality, transparency and confidentiality.
- Working groups, which assess status and trends of fisheries, are recognized as an important mechanism for enhancing quality and transparency of information and they provide important opportunities for capacity building. States should formalize arrangements for such a mechanism to analyse fisheries data for the evaluation of status and trends and should ensure participation from developing countries.
- States should monitor systems for data collection, analysis and reporting in order to ensure their sustainability in meeting the needs of national policy-making and management and the requirements of RFBs and FAO.

If adopted by COFI, the Strategy should provide a solid framework for partnerships to facilitate the systematic flow of information on status and trends of fisheries from national to regional and global levels, including through FIGIS. The Strategy also aims to renew national commitment to collect, analyse and share information and to motivate development partner agency support for capacity building in developing countries.

The workshop noted this background and acknowledged that convening the workshop was timely and responsive to a globally recognised need for which there is growing support, including in the further development of FIGIS-FIRMS.

Participation

- ***The FIRMS draft partnership agreement:***

Following a general presentation of the draft FIGIS-FIRMS Partnership Agreement that had been prepared in response to the call for a voluntary, but defined, mechanism to further the objectives of FIGIS, there was considerable discussion about the nature and limits to participation. The workshop considered whether it would be useful to have access from within FIRMS to various databases, for example, the OBIS trawl survey or taxonomic databases, or to alternative opinions developed by NGOs or non-partner institutions. The workshop was clear that national institutions (nominated by national governments) and the regional fishery bodies that represent them, i.e. those with a legal mandate to monitor and/or manage fisheries on an ongoing basis in their respective areas of competence, would constitute the partners. The possibility of NGOs or other institutions providing data for inclusion in FIGIS-FIRMS, or becoming partners, was rejected. The consensus view was that information from NGOs, non-partner institutions, and other interested individuals should be channelled through the appropriate partner institution.

- ***Role of the FIGIS-FIRMS Steering Committee (FSC):***

The workshop was unable to clearly define the bounds of the technical problem that the FSC faces in implementing FIGIS-FIRMS. The workshop view was that the FIGIS-FIRMS Steering Committee needs to provide guidance on the level of detail that needs to be included in FIGIS-FIRMS, and at which point users should be directed to other original information sources, such as websites of RFBs and national institutions.

- ***The Stocks and Resources inventory: Strategic issues***

The meeting considered strategic issues in relation to Stocks and Resources and Fisheries inventories, including consideration of:

- The scope of the inventories developed to date, including case studies.
- Consistency, sustainability, timeliness and usability of data types in systematic ways to enable their incorporation within FIGIS databases.
- Criteria for data sources that respond to quality assurance requirements which would include issues of 1) Comprehensiveness and the identification of missing elements, 2) Validity of data sources, 3) Aggregation levels; and 4) Perceptions of data types that would be broader than simple academic definitions.

It was noted that these considerations may differ between institutions; in particular the possible insular views of countries in comparison to those of regional bodies.

Participants review of the case studies, sources of information and future scope for involvement

The workshop considered the views and progress with participation of institutions that have been involved in the cooperative development of FIGIS-FIRMS and the views, sources of information and scope for involvement of other participants. Summary results of these discussions are at Appendix 5.

The FIGIS system: main design principles

The workshop was presented with summaries of the proposed design principles, concepts and strategies of FIGIS, and the FIGIS team emphasised the need for appropriate feedback.

The FIGIS-FIRMS technical team identified several items as topics to be discussed in the working group sessions including:

- The concepts of Stocks and Resources and possible confusion between the two, which arises due to the scientific definition of a stock.
- The need to accommodate human communities and socioeconomic inputs to management recommendations.
- The extent to which the historical data needs to be included.
- The extent to which information on IUU fishing should be included. There was a general view that if fisheries exist, they should be in the inventory, irrespective of their legality.

Definitions and conceptual design

The following concepts as drafted by FIGIS were presented to the workshop, including:

- **Stock and resources:**
Stock and resources are elements with close affinity, with the difference between them not always being clear. Stocks are often identified by scientists, and subject to assessment. Resources will always be exploited by humans, and often include a political context.
- **Species Classification:**
Species or species groups of species will be used to define a resource.
- **Area Classification:**
Descriptions of areas that have relevance to management can be split into three types; 1) Environmental, 2) Competence 3) Statistical. Resolution of a single type of area can be coarse; overlaying other types of area can focus the resolution of the area described.
- **Stock Structure and typologies:**
Relationships are established between stocks and resources in the FIGIS System through species and area, and through forced linkages. Stocks are often the end point of descending a topic tree from resource at the regional level to stock at the local level.
- **Quality assurance:**
It was proposed that the responsibility for quality assurance of the contents of information provided to FIGIS-FIRMS rests solely with the Partners.

Working Group Sessions: Detailed evaluations of current approaches

Two sets of working group sessions were undertaken on requirements and conceptual design (*Appendix 6*) during which participants addressed the following main themes:

1. Towards realistic approaches to standardised Stocks and Resources and Fisheries Inventories

- Working Groups 1a and 1b: Stocks and Resources Inventory
- Working Groups 1c and 1d: Fisheries Inventory

2. Harmonized Information Structure: review of structure, definitions and required reference data

- Working Group 2a: Exploitation, Assessment, Indicators, Status and Trends -
- Working Group 2b: Fisheries and Management (Stocks and Fisheries views)
- Working Group 2c: Stock Profiles
- Working Group 2d: Socio-economic topics

Summary of key findings and recommendations

During each working group session participants addressed specific questions against the background of presentations and papers and general discussion.

Key findings and recommendations (*Appendices 6b-6d*) included:

- **Stock and resources:**

The workshop requested that FIGIS redefine the basic tree structure to originate at a level of *Management Unit* instead of stock. Key fields for defining management units include area of competence and species. This approach recognizes that the basic unit of fisheries and management occurs with the harvesting of fish from single or multiples of species, and not at the stock level. This redefined approach allows incorporation of information on fisheries, which harvest from one or many species or stocks, and thus inclusion of information from a wide variety of sources ranging from well documented commercial fisheries to fisheries where detailed data are not available. The approach also removes the propensity for incorrect use of the standard term 'stock' when referring to what is actually a 'management unit'.

- **Species Classification:**

The workshop requested that species, with standard codes (external or system assigned) available for individual and mixed species groups, be included in the primary key for a management unit (see above).

- **Area Classification:**

The workshop requested that area classifications be included in the key definition of management units. It was recognized that these classifications might be based on various criteria, for example areas for an RFB, for EEZs, or for community competence.

- **Stock Structure and typologies:**

The workshop recommended changes in the proposed tree for "stock structure" as part of the proposal that incorporates the concept of management unit. It was noted that attempts to enlarge the revised structure (e.g. inclusion of geographical, jurisdictional, and environmental types) requires input from partners at an early stage.

- **Quality assurance:**

Schemes: The workshop agreed that the internal quality assurance schemes of the partners should be transparent and that information on them should be available to all users, though it need not be fully documented in FIGIS.

FIGIS tools: The workshop agreed that FIGIS tools should include security mechanisms to keep identified inconsistencies in the contributions of partners under confidential private access until they are resolved.

In addition to the recommendations noted above, the workshop recommended that FIGIS-FIRMS should not facilitate the inappropriate comparisons of analyses of status and trends or management advice, as might occur when results of analyses are separated from the associated interpretative text. FIGIS-FIRMS should also identify standard definitions for stock status and trend indicators such as being developed for use in the implementation of the precautionary approach. The system should clearly differentiate between scientific/biological and management advice. The workshop recommended that FIGIS-FIRMS should design support for reporting environmental and socioeconomic inputs to management decisions in addition to the biological inputs.

3. DEVELOPMENT OF STANDARDS

This agenda item began with several presentations on metadata and controlled vocabularies (thesauri). The presentations all stressed the needs for strict definitions and adherence to such standards for successful implementation of the FIGIS system. In the following discussion it was fully recognised that FIGIS must establish such standards and, as a guiding principle, should use existing standards wherever possible and, when extensions cannot be avoided, build such extensions on

existing standards.

Standardisation is desirable and is welcomed, but FIGIS-FIRMS should accept that some partners may not have adopted standards and it could be difficult to obtain compliance with FIGIS-FIRMS standards on them. FIGIS-FIRMS should continue to try to develop standards, but in many areas there are no standards and it is unlikely that full standards will be developed. FIGIS-FIRMS should accept and work around this situation, recognising that there are differences in institutions, particularly in developing countries.

The meeting also noted that efforts would be well spent in attempting to achieve harmonization where concepts are different. Resolving such conflicts could be a long process and should take place under the auspices of the FSC. As a start for such a process (and this is also required in other contexts of the FIGIS development) potential partners should provide FIGIS with their terminology in current use.

As a guide for FIGIS there was a presentation of the experiences gained when developing, and now maintaining, the Agricultural Metadata standards for document-like resources (AgMES). A paper on CWP experiences also was used as background for the discussion. The FIGIS team explained the internal process that has been necessary within FAO for developing and maintaining standards so far.

When establishing information exchange standards, the meeting recommended that FIGIS analyse from top down because it was recognised that there is often agreement on the use of terms and concepts on a general level, while more detailed concepts and terms may be used differently in different organisations. This point was raised specifically when discussing the metadata aspects, but the principle would apply generally.

Thesauri

For the data supplier and data receiver there may often be different interpretations of seemingly identical terms, in particular where there is not an agreed standard (thesauri). In cases where there are commonly used terms but it is known that there are different interpretations, the Thesauri could note this term as '*Not controlled*'. However, this was recommended by the presenter as best to be avoided, if possible. In addition, not every term listed may have a specific definition. Contextual definitions need to be associated with the term.

Metadata proposal

Technical issues of harmonisation can be relatively simply overcome using XML. Also, translation and processing using XML is technically simple.

Information on institutional use of metadata (which may be unique to them) needs to be well documented and readily available.

Arising from this, the workshop agreed that there are issues that need further work, including:

- How to review, evaluate and cope with possible differences in the use of metadata standards between partner institutions, i.e. what is a reasonable approach to this?
- How to ensure that the technical issues are handled between FIGIS-FIRMS and partners. One possible mechanism would be to set up a technical discussion group (website) and the submission of individual partner terminologies and definitions.
- Evaluation (test and trial) with a few volunteers. The technology can be quickly learned.

A central part of FIGIS-FIRMS is the information exchange standards and the rights and responsibilities for the introduction of new extensions, e.g. codes or modifications of standards. This is closely related to ownership of FIGIS-FIRMS. The discussion of maintaining standards therefore included a discussion of this ownership. While it is recognised that at this point in time it is more a problem of defining a fundamental set of standards (a baseline) than to introduce changes to this (non-established) standard, the longer term issues should be addressed at an early stage to avoid major problems later. A baseline is needed before the system can be implemented, but this baseline could be extended over time.

Concerning the ownership of FIGIS-FIRMS the question is whether the owner is the FSC, the FIGIS-

FIRMS partners or FAO? This was phrased as “does the FIGIS-FIRMS steering Committee administer the program or do they coordinate it?”. In answering this question it was considered that the FSC could be similar to Coordinating Working Party on Fishery Statistics, but dealing also with non-statistical issues. CWP operates on consensus and its member agencies are not obliged to implement agreed standards. However, under FIGIS-FIRMS the systems may simply not function unless such agreed standards are adhered to. Also, there are questions concerning the acceptance of new partners, their internal standards and how these relate to FIGIS-FIRMS.

The functions and responsibilities assigned to the FIRMS Steering Committee need to be resolved as part of the partnership agreements. Under the present proposal for a partnership agreement FSC is given a free hand to develop its own rules of procedure. While the partnership agreements may differ between agencies on some points, this section will have to be common to all agreements. The partnership agreements need to be studied in detail by individual organizations.

It was considered that FIGIS-FIRMS could usefully draw on the experiences with maintaining standards gained through the ASFA partnership. FAO supplies the Secretariat and there is a board meeting discussing all aspects of maintaining thesauri and database maintenance.

Working Group Sessions: Development of Standards

Four working groups on the development of standards were established;

- Working Group 3a: Methods and Approaches to ensure data exchange and workflow - Spatial Data.
- Working Group 3b: Methods and Approaches to ensure data exchange and workflow - Non-spatial Data.
- Working Group 3c: Maintenance, evolution and update of Fisheries standards.
- Working Group 3d: Validation, amendment, and additions to proposed metadata standards.

The reports of these groups are found in *Appendix 6*.

Summary of key findings and recommendations

Concerning spatial data, the basic recognition is that there are several systems in use for different purposes, and that these systems are non-compatible. While it is technically easy to map data in these systems, if the basic data are not given in sufficient detail the resulting map can be misleading, particularly when combining data from different sources as is the intention in FIGIS-FIRMS. It was recognised that partners should strive towards using compatible systems, but also that compatible systems for historic data would not always be possible.

When presenting spatial data, an individual data provider should use the appropriate geographical system. An important part of the FIGIS-FIRMS system would be the ‘shape files’ associated with the use of maps. Exchange protocols of such information must be part of the FIGIS-FIRMS standards. Local organisations should make sure that the detailed maps that they might develop for their own use conform to existing map systems.

On non-spatial thesauri, a salient point that will need to be discussed and resolved by the FIRMS Steering Committee is the mechanism to allow regional or national standards to be fitted into FIGIS-FIRMS. Taking the vessel type classification as an example, and the lack of ‘canoes’ term inside it, two options were envisaged:

- Option one would be that partners should make requests to the Coordinating Working Party on Fishery Statistics (CWP) for the addition of the appropriate terms that they feel are needed, although this might be a lengthy process;
- A second more flexible option would consist of a recognition by the FSC that there are regional standard classification systems that can be certified and established as standard encoding schemes to link to. This certification scheme would impose some constraints, such as stability, and the ability to maintain relationships between a regional thesaurus and an international thesaurus.

4. MAINTENANCE OF FIRMS INFORMATION

This session consisted of several presentations by FIGIS staff followed by a discussion period and two simultaneous working group sessions.

Overview of FIGIS presentations

The presentations dealt with the general architecture of the FIGIS system and the specific tools that fit the architecture. The FIGIS system recognises that it is, and is structured to work as, a distributed system with many different partners, each holding data in different databases (or otherwise). The FIGIS group, therefore, will have little control over how FIGIS database content is manipulated. Data in the FIGIS system will need to be loaded and maintained by professionals belonging to many different organisations, and who may be programmers, subject specialists or other information system specialists.

Within FIGIS, XML is the core format for data and information input, output and exchange. The FIGIS team is currently identifying and evaluating XML-based tools for all categories of editors. Within the FIGIS team two different software editors have been commonly used. XML can be created from scratch using a simple text editor (e.g. NOTEPAD), by converting documents (e.g. WORD) or by exporting data from databases (e.g. Oracle). FIGIS database maintenance is achieved by extracting data from the database into XML formatted files, editing the XML files and then loading them back into the FIGIS database. Simple NOTEPAD type editors or specialized software (e.g. XMLSpy, DreamWeaver) can be used to create or edit the XML files. FIGIS plans to develop procedures for the automatic transformation of template MS-WORD documents to XML through the use of RTF (rich text format) and XSL style sheets. On-line editing of content via an Internet Browser is being developed. It is expected that the FIGIS database will also be provided on a CD, thereby allowing off-line editing.

Summary of discussion

During discussions the following points were made:

- While XML editors are fairly inexpensive, a proliferation of software should be avoided as commercial software costs may seriously limit the ability of some partners to effectively participate in the FIGIS project. This is in line with the general FAO policy to avoid proprietary software wherever possible.
- It was also noted that for most commercial software it is not sufficient to indicate the general product of e.g. Internet Browsers. In many cases the FIGIS system will only work with certain versions and therefore version numbers must be clearly identified. The FIGIS group indicated that they try as far as possible to ensure full upward compatibility from a baseline. At present for the Internet Browser this is IE version 4.5 and Netscape 4.7.
- It was also recognised that many standards, such as RTF, have dialects, and such quasi-standards might cause problems when applying this approach across a range of word processors, e.g. WORD (several versions), WordPerfect.
- XML does not handle binary data very well, therefore images may be best provided as linked PNG files.
- A key element to maintenance is to ensure transparent updates of the FIGIS reference tables. These tables could be provided to partners via a restricted IP-address on the FAO website.

The distributed nature of the FIGIS system implies that FIGIS will not be able to set standards in a vacuum. The realities of existing standards of partners (and their system sites) will always need to be recognized. The final standards will therefore be a major topic for resolution by the FIGIS-FIRMS Steering Committee.

Working Group Sessions: Maintenance of FIRMS Information

Two working groups were established to consider the maintenance of FIRMS information. (*Note: these*

were convened in parallel to two working groups on the development of workplans for contributing to FIGIS-FIRMS, reported under section 5 below.)

- Working Group 4a: Requirements for maintenance of information -1
- Working Group 4b: Requirements for maintenance of information - 2

Summary of key findings and recommendations

The Workshop approved the report of the working group that considered the issue of refining maintenance requirements of FIGIS-FIRMS (Appendix 6d). In the following plenum discussion, it was noted that the participating organisations use different languages for dissemination of information and that the same information may appear in several languages, including non-official FAO languages. Within the FIGIS system each partner may need to maintain control over the language(s) to be used for dissemination of the portion of the information for which they are responsible. The FIGIS team indicated that all control vocabulary, including metadata, might be available in three languages (English, French, Spanish), but that this has not yet been tested.

There should be synchrony between the websites of FIRMS and partners and this should be part of information management policy.

5. CONTRIBUTING TO FIRMS: WORKPLANS

Two working groups were established to reflect on the next steps for each organisation's further participation in FIGIS; those that have already undertaken some preliminary cooperative work (existing partners) and those that are new to participation in FIGIS (new partners). Each working group considered typical plans for the implementation of any next step, including objectives, outputs, tasks, prerequisites and time scales.

- **Working Group 4c:** Beyond case studies – beginning the process of contributing to FIRMS
- **Working Group 4d:** Implementation of an inventory of stocks and fisheries

Summary of key findings and recommendations

The working group reports are in Appendix 6d. The workshop firmly noted that these work plans did not constitute a commitment from the organisations.

- **Workplans for existing partners - beyond case studies**

As part of the working group conclusions, the following was stressed;

- The meeting had thoroughly discussed some restructuring of the presentation tree. There is an urgent need to conclude this discussion and partners should provide input during the following 6 months to allow FIGIS to modify the current tree and consolidate a new version. This is a prerequisite for partners to start submitting information to FIGIS.
- Standards for FIGIS shall be made available through the CWP web page. Standards, guidelines and codes for standardization between data suppliers and FIGIS should be undertaken. Email subscriber (Chat) groups should be set up immediately to discuss this.
- Institutions should review if their hardware and software are compliant with FIGIS.
- The FIGIS software may be used both at the general level in FAO, but there is also a possibility to use FIGIS software within each organisation. For this purpose, FIGIS software will be sent for evaluation and review to interested parties. This will be done as soon as FIGIS Version 3.0 is released, which is now in its final development stages.
- If there is a request for a documented case study, it can be put into the web by FIGIS under version 3.

Reflecting on the typical implementation plan outlined in Appendix 6d, the participants were asked to consider and report back on their possible contribution to FIGIS and how such a plan might fit their objectives and internal work plans.

- **Workplans for Future Partners**

Before providing a case study to FIRMS, a preliminary evaluation is required of the interest and eligibility of an institution to become a partner in FIRMS. The first step would be to make an inventory of fishery/stock/resource for which the organisation could provide information.

Partnership Agreement

At the end of this session there was a discussion of the arrangements for reaching partnership agreements. It was noted that an appropriate opportunity to discuss this topic might be the interregional meeting of RFBs to be held immediately following COFI in March 2003. It was also noted that CWP had been proposed as a vehicle for establishing FIRMS and its Steering Committee. CWP is meeting in late January 2003, and it was the intention of the CWP secretariat to ensure that interested potential partners be invited to this meeting. This would then include all partners that until now have taken an active interest in the establishment of FIRMS.

The meeting asked the CWP secretariat and FAO to coordinate the discussions to be held at the various meetings to allow an efficient process for the development of the partnership agreements.

6. OTHER MATTERS

The workshop noted that there remain issues (*Appendix 7*) of Information Management Policy and Quality Assurance that need to be considered by the FIGIS-FIRMS Steering Committee. It was suggested that the FIGIS team should explore the possibility of a meeting of an Interim Steering Committee around the time of the March 2003 meeting of COFI.

7. ADOPTION OF THE MEETING REPORT

The Workshop adopted the report of the FIGIS-FIRMS Methodological Workshop.

8. APPENDIXES

Appendix 1: List of participants

Appendix 2: Welcome address and introduction

Appendix 3a: Agenda

Appendix 3b: Annotated agenda

Appendix 4: List of documents and presentations

Appendix 5: Summary of comments on institutional case studies and sources of information that may contribute to FIGIS-FIRMS by potential institutional partners

Appendix 6: Summary of Working Groups

6a. Overall structure and subject areas

6b. Summary results of Working Groups 1a-1d

6c. Summary results of Working Groups 2a-2d

6d. Summary results of Working Groups 3a-3d

6e. Summary results of Working Groups 4a-4d

Appendix 7: Information Management Policy and Quality Assurance

Appendix 1: List of participants

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Appendix 2: Welcome address and introduction – Dr S Garcia, Chief, FIRM

Ladies and gentlemen, dear colleagues and friends,

I am very pleased to welcome you to Rome and to FAO. I wish you a cooler week than the one we just had and hope you will find some time to enjoy this beautiful city. I also wish to thank you for coming to participate with us in the development of the most ambitious global fisheries resources monitoring system ever designed.

Fisheries are in many ways at a vital crossroad and expected to develop into modern systems of sustainable use of natural resources or disappear. While effective management is the only effective way towards sustainable use, efficient information and communication systems can contribute substantially to smooth the transition towards modern fisheries.

FAO member countries, NGOs, and the public at large, have asked, repeatedly, for an improved worldwide system of information on the state of world resources. The development of the Fisheries Resources Monitoring System (FIRMS) as a part and core of the Fisheries Global Information System (FIGIS) initiated in the December 1999 **ACFR Working Party on Fisheries Status and Trends**. The idea to develop a worldwide, collaborative monitoring system for fisheries resources implied tackling two challenges of institutional and technological nature.

- Institutionally, it was necessary to set up a network of collaborative agencies and centres of excellence to develop and maintain the system. This implied also developing an agreed framework for such activities, specifying requirements, rights and responsibilities;
- Technically, it was necessary to develop web-based computer tools not available on the market, to develop a support system with the appropriate functionality, tools etc., and necessary to efficiently serve the network. This had severe implications in terms of costs, human skills, internal organization, etc.

The project followed both tracks in parallel:

- On the institutional side, MOUs have been established with 8 institutions to develop jointly case studies and this meeting will provide an opportunity for their critical review. We have also been discussing the content for a partnership agreement and drafts have been elaborated and discussed with the secretariats of the institutions concerned and are ready for submission to Governing Bodies and authorities.
- On the technical side, information structures, thesauri, and functionality have been developed for query systems, on-line inputting, editing, security, information sharing and re-use, etc. Part of the FIGIS system is already open to the public. Part will be tested with you.

When the FIRMS collaborative network will be an institutional reality, it will be piloted by a formal Steering Committee. In many ways, the present meeting is a forerunner of such a Steering Committee, the only but important difference being that the participants do not yet have a mandate from their institutions. For this reason, it is understood that none of the agreements being made this week will be binding on any of you or your institutions. The report we will adopt at the end will:

- simply reflect the consensus of the technicians on the various matters;
- provide the technical bases around which the FIRMS steering committee will organise governance of the system, in terms of information management policy, including aspects of quality assurance standards, and standards maintenance.

No commitment will be made or implied and it is fully understood that the outcome of this meeting will be discussed for endorsement or otherwise by your organizations.

As you may have noticed, the participants of the about 20 institutions represented here fall into two groups:

- The “Veterans” who have been involved since the beginning of the process and are already familiar with FIRMS means and aims. This group contains fisheries experts as well as information technology specialists.
- The “newcomers” which participate in FIRMS activities for the first time. These are mainly fisheries experts.

This duality is a difficulty and a challenge for the meeting as you do not all start with the same background and knowledge. It is also an opportunity, however, to review what is already taken from granted while newcomers are exposed to it. It is an opportunity for more active exchange between veterans and newcomers and we count on those who are already familiar with the process to assist those who face it for the first time.

We will do our best in order not to lose anyone in the process. The agenda has been developed so as to hopefully overcome this problem. It will focus our work on a few specific points at a time, with a progression through the agenda that may be felt rather slow by some of you already familiar with the system. Please bear with us and help us bring the newcomers fully on board.

The **General Objectives** of the meeting are to:

- Develop the conditions for the partners to start contributing as soon as possible;
- Expand further the inventory of stocks, resources and fisheries.

The expected **Outcomes** of this meeting are to:

- Consolidate and validate the information architecture and design about **Stocks, Resources and Fisheries**. Find how much consensus we have on the information tree.
- Set-up an organisation for the **maintenance of standards**;
- Provide the technical elements for a draft **information management policy** including **quality assurance**;
- Establish realistic workplans towards **effective contributions of information** to the common system by the partners and towards **expanding the inventory**. The latter can be done through MOUs.

The **method of work** for this meeting is proposed as follows:

- We will have a **Chairman** to preside on the debates, assisted by a **facilitator** to make suggestions, stimulate discussions, and keep track of partners comments and proposals;
- The various subjects will be introduced through short presentations;
- Time will be generously available for exchanging views and open debate, through 5 or 6 break-out sessions;
- Round tables will allow participants to express their expectations.

I hope that this way of proceeding will allow you to feel fully satisfied with the meeting and I am sure that I can count on your collaboration to help all of us meet our joint expectations. I wish to thank you all again for the time and competence you have agreed to put in a collaboration we value very much and wish you a very successful meeting.

Appendix 3a: Agenda

1. OPENING OF THE MEETING

- 1.1. Welcome address
- 1.2. Logistics aspects
- 1.3. Procedural aspects
- 1.4. Round table presentation - expectations from participants

2. REQUIREMENTS AND CONCEPTUAL DESIGN

- 2.1. The international context: Requirements expressed
- 2.2. The FIGIS system: main design principles
- 2.3. The FIRMS draft partnership agreement
- 2.4. The Resources and Stocks inventory
- 2.5. Proposed strategy for the implementation of a stocks and fisheries inventory
- 2.6. Partners review of the FIGIS stock and resources inventory
- 2.7. Extending the stock inventory
- 2.8. Proposed definitions and conceptual design
- 2.9. The Fisheries inventory: purposes, issues, and proposed solutions
- 2.10. Towards realistic approaches to a resources, stocks and fisheries standardised inventory
- 2.11. Documenting stocks and Fisheries: the application of standard topics, classifications and terms
- 2.12. Critical review of case study by data owners
- 2.13. Proposed harmonised information structure and needs for standards
- 2.14. Review of definitions and required reference data
- 2.15. The management of updated information

3. DEVELOPMENT OF STANDARDS

- 3.1. International standards
- 3.2. Metadata standards
- 3.3. International thesauruses and classifications in the fisheries domain
- 3.4. FIGIS Metadata proposal
- 3.5. Ensuring data exchange workflows
- 3.6. Opportunities
- 3.7. Needs and issues
- 3.8. Working out solutions
- 3.9. Developing agreed standards
- 3.10. Existing experiences
- 3.11. Organisation applicable in the case of FIGIS-FIRMS

4. MAINTENANCE OF FIRMS INFORMATION

- 4.1. Overall architecture: workflow steps and tools
- 4.2. Tools addressing specific workflow steps
- 4.3. Refining maintenance requirements

5. CONTRIBUTING TO FIRMS: WORKPLANS

6. ADOPTION OF THE MEETING REPORT

Appendix 3b. FIGIS-FIRMS Methodological Workshop – Annotated Agenda

1. OPENING OF THE MEETING

Monday 1st July - 9.00

<i>Time</i>	<i>Item</i>	<i>Topic and duration</i>	<i>Who</i>	<i>Content</i>	<i>Document</i>
9.00	1.1	Arrival of participants 30 mins			None
9.30	1.2	Welcome address 10 mins	Garcia	Meeting Context - Objectives - Expected outcomes	None
	1.3	Logistics 5 mins	Taconet		None
	1.4	Procedural aspects 5 mins	Taconet		None
	1.5	Round table presentation 30 mins	Participants	Introduction and expectations of participants	5

2. REQUIREMENTS AND CONCEPTUAL DESIGN

Monday 1st July morning - 11.00

<i>Time</i>	<i>Item</i>	<i>Topic and duration</i>	<i>Who</i>	<i>Content</i>	<i>Document</i>
REQUIREMENTS					
11.00	2.1	The international context 15 mins - 10 mins discussion	Grainger	The requirements of interest to FIRMS evolving from international consultations (ACFR, FAO strategy for Fisheries Status and Trends), in particular : - why stock inventory - why and how monitoring small scale fisheries - what are requirements that are quality related	6
	2.2	The FIGIS system : main design principles 15 mins - 10 mins discussion	Taconet	FIRMS as a sub-system of FIGIS. The general guidelines driving the FIGIS design (integration, ownership, streamlining, improved quality, single entry point,...) are illustrated.	FIGIS Brochure
	2.3	The draft FIRMS partnership agreement 15 mins - 10 mins discussion	D. Evans	Why is a partnership agreement needed; and what is the partnership framework	Presentation and 8

Monday 1st July afternoon - 14.30

Time	Item	Topic and duration	Who	Content	Document	
14.30	2.4	THE STOCKS AND RESOURCES INVENTORY The inventory, related standards (conceptual level), feedback, and further development				
	2.5	Proposed strategy for the implementation of Stocks and Fisheries inventory 15 mins - 10 mins discussion	Taconet	How to develop a consistent database, i.e. containing stocks or fisheries units: - responding to quality assurance criteria : sustainability; timeliness; peer review. - serving the purpose of a monitoring system, i.e. revealing the discrepancy between monitored/managed (sizeable – manageable entities) and known to exist. - reference to typology of units : regularly monitored – episodically – academically defined	7	
	2.6	Partners review of the FIGIS stocks inventory 90 mins	Core partners' representatives	FAO - SPC – NAFO – ICCAT – ICES – GFCM – CECAF – IOTC – IATTC – DFO – NMFS representatives make a critical review of the inventory developed under their ownership. Validation of the design – possible oversights, or issues to be taken care of.	None	
	2.7	Extending the stocks inventory 60 mins	Newcomers' representatives	Representatives of institutions not having been involved in the FIGIS development to date present needs, sources and approaches applicable in their region, both for the inventory at regional and national level. These presentations should provide elements of a strategy to further extend the inventory.	None	
	2.8	PROPOSED DEFINITIONS AND CONCEPTUAL DESIGN				
		Stock and Resource concepts 10 mins	Bensch	Ref. to the FI glossary Stocks and Resources definitions, and their interpretation into a system concept.	9	
		Species classification 5 mins	Gentiloni			
		Area classification 5 mins	Berthier			
		Stock structure 10 mins	Bensch			
		Stock typologies 10 mins	Bensch	A way to develop a controlled inventory responding the needs of FIRMS		
		Associated quality assurance scheme 10 mins	Taconet	The conditions prevailing for the creation a stock object are set by the FIRMS partnership. They are centred around the ownership concept.		

Tuesday 2nd July morning - 9.00

Time	Item	Topic and duration	Who	Content	Document
9.00	2.10	The Fisheries inventory 25 mins	Taconet	Requirements behind the need for a fisheries inventory, and issues to be addressed in order to proceed with a fisheries inventory: diversity of definitions; diversity of perspectives (biologists; economists; managers) ; number of defining criteria. Illustrations given of the diversity of perspectives.	10, 10a, 10b
		30 mins	debate	Broadening the perspective: definitions, sources and approaches applicable in participants' regions.	None
	2.12	Towards realistic approaches to a resources, stocks and fisheries standardised inventory. 90 mins	break out session	WG1a and 1b : Stocks and Resources inventory WG1c and 1d : Fisheries inventory - finding consensus on main criteria and approaches applicable for a Fisheries inventory - Setting-up the elements of a plan of action applicable in the different regions	
	2.13	30 mins	break-out session reports		

14.00	2.15	Documenting stocks and Fisheries: the application of standard topics, classifications and terms.		This section discusses the Documenting of inventoried resources objects.	None
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Tuesday 2nd July afternoon - 14.30

	2.16	Introduction	Taconet		
	2.17	Critical review of case studies, by data owners. 80 mins		FAO - SPC – NAFO – ICCAT – ICES – GFCM – CECAF – IATTC – NMFS the critical review should provide arguments for the validation / amendment of the design, and the need for agreed terminologies	None
	2.18	Other comments. 30 mins			
	2.19	Proposed harmonised information structure and needs for standards. 15 mins	Taconet	The presentation based on a hierarchical diagram, lays emphasis on : - topics looking similar which need to be differentiated - fields which may need to be standardised Reference is made to definitions proposed for topics	None
	2.20	Review of structure, definitions, and required reference data 60 mins	break-out session	WG 2a – Exploitation, assessment, indicators and Status and trends WG 2b – Stock Profiles WG 2c – Fisheries Management WG 2d – Socio-economic topics to review the proposed definitions and structure, and indicate minimum input requirements, and the need for agreed terminologies, possible sources and approaches for development.	
	2.21	Documenting stocks and Fisheries in FIRMS : the management of updated information 15 mins	Roux	- Why different observations on a same object - What possible issues with the management of observations - Which quality assurance rules are suggested - layout : dissemination options	11
	2.22	30 mins	debate or break-out	Strive to answer a number of questions: which information management rules should be proposed as FIRMS information management policy ?	

3. DEVELOPMENT OF STANDARDS

Wednesday 3rd July morning: 9.00

<i>time</i>		<i>Topic and duration</i>	<i>Who</i>	<i>What and message to deliver</i>	<i>Document</i>
9.00	3.1	Introduction 5mins	Taconet	Scope behind the wording "Standards" (Metadata, thesauruses and classifications, terms definitions), and what is at stake in the case of FIRMS.	
	3.2	International standards			
	3.3	MetaData standards (dc, ags) 20 mins + 15 mins discussion	Salokhe	- what is meant by Metadata, why Dublin Core (dc) and Agricultural Standards (ags) are important international initiatives, and what are their expected benefits - what is XML	12
	3.4	Introducing thesauri and vocabularies 15 mins + 15 mins discussion	Fisseha	- Thesauruses and taxonomies are the second component for standards - there are different ways of organising vocabularies references.	13

	3.5	FIGIS Metadata proposal 15 mins + 15 mins discussion	Jaques	- FIGIS is proposing standard for fisheries data exchange consistent with international Meta data standards. This metadata proposal responds to needs expressed by partners, it is application oriented. Its properties are presented	14
11.00	3.6	Ensuring data exchange workflows			
	3.7	Introducing opportunities	M. Taconet	The FIGIS Metadata proposal should be seen as a unique opportunity (because it's probably unique for fisheries data worldwide) to consolidate a standards base line	
	3.8	Needs and issues through a few flashes 15 mins (5 mins each)	Taconet Berthier Roux	On thesauruses and classifications, the situation is different : there is full recognition of their existence at local level - illustrations of the type of needs, benefits, and issues met with the exchange and integration of data prepared using thesauruses from different sources - introduces the need and problems of mapping local standards against international ones	15
	3.9	Methods and approaches to ensure data exchange workflows 90mins	break-out session	WG3a and 3b Further development of metadata standards (validation/amendment/additions to proposed metadata standards) – subject specialists WG3c Further development of interoperability between existing non-spatial standards, thesauri, classifications – information specialists WG3d Spatial concepts and definitions in the development of reference systems – thesauri, classifications, coding, grids, etc) – GIS and information specialists <i>WGs should highlight the issues to be addressed with the mapping of thesauruses, and propose various approaches – tools – methods.</i>	
	3.10	proposed solutions	optional agenda item	there are various tools and methodologies under development for the mapping of thesauruses - Reference table management system - Glossary - FiStatXML - FIGIS'ML – GIS - Ontologies	16a, 16b

Wednesday 3rd July afternoon : 14.00

14.00	3.11	Developing agreed standards		The aim is to agree on the organisation required for the progressive consolidation and dissemination of FIGIS-FIRMS standards. The session will be introduced referring to existing approaches	17
	3.12	The ags experience 15 mins	Gauri/ Keizer	- organisation set-up by GIL for ags proposals	17a
	3.13	The CWP experience 15 mins	Crispoldi - Garibaldi	- role of Coordinating Working Party (CWP) on fishery statistics in maintaining standards	17b
	3.14	The FIGIS experience 15 mins	Roux – Gauri - Jaques	- needs and issues to share a single set of Metadata in FIGIS internal group - the need to set-up a maintenance policy : broad guidelines	17c,18
	3.15	Participant experiences 15 mins			None
	3.16	Organisation applicable in the case of FIGIS-FIRMS 75 mins	break-out session	WGs to be decided (annotated agenda will be updated)	
	3.17	45 mins	Reports of break-out sessions		

4. MAINTENANCE OF FIRMS INFORMATION

Thursday 4th July morning: 9.00

<i>time</i>		<i>Topic and duration</i>	<i>Who</i>	<i>What and message to deliver</i>	<i>Document</i>
9.00	4.1	Maintenance of FIGIS-FIRMS information:		This is the critical aspect to be addressed for system sustainability. Different approaches are envisioned to respond a range of requirements.	
	4.2	Overall architecture, workflow steps and tools 15 mins + 5 mins disc.	Roux	Introducing the overall picture: how the architecture and the various workflow steps and tools are answers to a set of requirements.	19a, 19b
	4.3	word to XML convert 10 mins + 5 mins disc. xml editing and preview 10 mins + 5 mins disc. upload – on line editing 10 mins + 5 mins disc.	Servan/ Aubert Gentiloni Roux	Basic demonstration should provide participants insights to the type of technology involved.	
	4.4	Refining maintenance requirements 60 mins	break-out sessions	WGs to be decided (annotated agenda will be updated)	
	4.5	30 mins	report of break-out sessions		

5. WORKPLANS AND REPORT ADOPTION

Thursday 4th July afternoon : 14.00

<i>time</i>		<i>Topic and duration</i>	<i>Who</i>	<i>What and message to deliver</i>
14.00	5.1	Contributing to FIRMS: Workplans		Previous steps should have given the assets to the participants for actively contributing in the development of a workplan

	5.2	90 mins	break-out session	WGs to be decided (annotated agenda will be updated)
	5.3	90 mins	report of break-out sessions	

Friday 5th July morning: 9.00

9.00	5.4	Meeting Report writing Friday morning		
	5.5	Small working groups to be established on demand Friday morning		Presentation of specific tools having been discussed or briefly presented during the previous sessions, on demand

6. Review and Adoption of meeting report

Friday 5th July afternoon: 14.00

14.00	5.6	Review and adoption of the meeting report 90 mins		
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Appendix 4: List of documents

Number	Title
FIGIS/2002/1	General Announcement
FIGIS/2002/2	Provisional Agenda
FIGIS/2002/3	Annotated Agenda and Time Table
FIGIS/2002/4	List of Documents
FIGIS/2002/5	List of Participants
The International Context: The Need for a Fishery Resources monitoring System	
FIGIS/2002/6	FAO Strategy for Fisheries Status and Trends reporting - Grainger
FIGIS/2002/7	Proposed Strategy for the Implementation of Stocks and Resources Inventory - Taconet
FIGIS/2002/8	The Draft FIRMS Partnership Agreement - Taconet - Evans
FIGIS/2002/9	Stocks and Resources Information Architecture and Related Definitions - Taconet - Berthier - Bensch - Gentiloni
FIGIS/2002/10a	FIGIS-FIRMS Fisheries inventory: Purpose, issues faced, and proposed solutions - Taconet - Grainger
FIGIS/2002/10b	Fisheries Management Systems: Topic tree and proposed definitions - Taconet
FIGIS/2002/11	The Management of up-dated Information in FIGIS-FIRMS - Roux
International Metadata Standards: Dublin Core and Agricultural Metadata Standard Initiatives:	
FIGIS/2002/12	Establishing Metadata Standards - Salokhe
Introducing Thesauri and controlled Vocabularies:	
FIGIS/2002/13	Introduction to terminology-based Information Management Standards - Fisseha
The FIGIS XML Metadata proposed Standard	
FIGIS/2002/14	- FiMES: Introduction to the Fisheries Metadata Element Set - Jaques
FIGIS/2002/15	Needs, Issues and Benefits of Thesauruses Interoperability – Roux
Overview of different Tools addressing Interoperability and/or involved in the Workflow:	
FIGIS/2002/16a	FiStatXML - Shatz - Jaques
FIGIS/2002/16b	The Fishery Ontology Service (FOS) - Fisseha
Experiences in the development of standards	
FIGIS/2002/17a	The Ags Experience - Salokhe
FIGIS/2002/17b	The CWP Experience - Crispoldi
FIGIS/2002/17c	The FIGIS Experience - Roux
Developing agreed standards: A Proposed Standards Maintenance Policy	
FIGIS/2002/18	FiMES Extensibility - Jaques
Maintenance of FIGIS-FIRMS Information: Overall Architecture, Workflow Steps and Tools	
FIGIS/2002/19a	Feeding and Maintaining Data in FIGIS - Roux
FIGIS/2002/19b	FIGIS FiMES and XML Source/Version Control Guidelines - Jaques

Appendix 5: Summary of comments on institutional case studies and sources of information that may contribute to FIGIS-FIRMS by potential institutional partners

FAO - Case study: Tuna resource fact sheets

For tuna and tuna-like species the Resources inventory fact sheets were designed with four levels in mind; 1) All species, 2) Commercial/non-commercial, 3) Species and 4) Stocks. For general application fewer levels might simplify the inventory process.

SPC - Case study: Western and Central Pacific Yellowfin tuna

The preparation of an inventory for Western and Central Pacific Yellowfin tuna by the SPC Oceanic Fisheries Programme had been successful. New information is now available for updating the fact sheets and the OFP is waiting for instructions on how to update and integrate this information.

NAFO - Case study: Monitored stocks inventories

Inventories for 23 NAFO-monitored stock units were prepared. For two of these stock units (Cod in Divisions 3N and 3O and northern shrimp in Division 3M) the content of the STACFIS and Scientific Council reports were processed into fact sheets against the harmonized stocks template.

ICCAT – Case study: Atlantic albacore

The Species Executive Summary Reports allowed enumeration of 8 stocks. Two of these (north Atlantic albacore and south Atlantic albacore) were processed into fact sheets, which were then aggregated into a further fact sheet for overall Atlantic Albacore. A question was raised about the use of FIRMS in maintaining the availability of historical fact sheets.

GFCM – Case study: Monitored stocks

The Scientific Advisory Commission (SAC) Report was processed into a few high level aggregations of 10-15 monitored stocks. The enumeration methodologies were outlined: working groups enumerate and then select stock units for peer review by the SAC, concentrating on priority species. Other sources of information available to GFCM include FAO regional reviews and the PopDyn database.

CECAF – Case study: Working Group Reports

Inventories and related information were developed from Working Party reports for the northwest area of CECAF. In the future the Demersal, Pelagic and Artisanal Working Groups of the Scientific Sub-Committee would provide information upon which fact sheets might be developed. There is also the potential to use the results of the FIAS project similarly.

IATTC – Case study: Bigeye tuna in the eastern Pacific Ocean

A preliminary fact sheet was developed for bigeye tuna. It was noted that substantial information on principal market tuna species is available for fact sheet processing, but that more detailed information would be available through the IATTC website, including vessel registries and other public domain data. It was also noted that IATTC provides direct management recommendations and regulations to member Parties through resolutions of the Commission, and that the Commission is involved in the development of an ecosystem approach to management.

DFO – Case study: Enumeration of 163 stocks

It was noted that assessments of natural stocks are undertaken independently on a regional basis within Canada. These stock status reports are placed directly on the DFO website (reflecting DFO scientific views). The reports are also passed to the Fisheries Resources Conservation Council (an NGO) and are used to reflect industry views and offer advice on TACs. Both these could provide basic source information for the preparation of stock fact sheets.

NMFS – Case study: summer flounder

A fact sheet was produced for the summer flounder. This species was chosen as it had a large

geographical range and is a major component of both commercial and recreational fisheries. NMFS noted that:

- There is potential for misinterpretation of terms: the example given was that a stock defined by NMFS as fully exploited has been reported in the wider media as overexploited.
- There are concerns on the maintenance of data quality standards.
- Habitat and environmental regimes should be included in FIGIS domains.
- There needs to be harmonisation in the representation in FIGIS of shared stocks. Where there is joint management of a stock, the agreed view should have pre-eminence within FIGIS.

SPC

SPC noted that the largely artisanal nature of reef fisheries has required the development of novel approaches to assessment in which an island is regarded as its own entity within an environment. Comparative approaches have been made across 11 countries, taking a multidisciplinary approach combining information specialists, fisheries specialists and socio economic specialists.

As part of the multidisciplinary approach, indicators that link ecosystem status to fisheries status are being defined. Over the next five years SPC are looking to develop non-capture indicators, such as fish microhabitat to indicate resource status. It was noted that the inventory structure as it stands would not represent these new approaches, but the FIGIS team was keen to embrace this type of information.

Southern African Development Community/Regional Fisheries Information System (SARFIS)

A large potential source for FIGIS from the SARFIS project is the shared stock review being carried out in the region, involving a literature review and questionnaire that would be followed by a workshop to promote the development of effective, collaborative strategies and frameworks for management of shared fisheries resources in the SADC region. The final report of the workshop could be made available to FIGIS. The SARFIS project has also produced its own Metadata Authoring Tool (MATT) that is currently being used in Namibia, Republic of South Africa, Angola and Mozambique. There are plans to implement it further across the SADC region. The formation of the new SADC Food, Agriculture and Natural Resources (FNAR) Directorate in Botswana was seen as opportunity to implement regional data standards that could complement FIGIS.

GFCM

GFCM has been developing socio-economic indicators to complement ecological indicators that have been prevalent so far. Many development agencies are investigating use of socio-economic indicators, including the EU, which has developed a framework. Examples of alternative indicators that GFCM has developed include: 1) Average age of fishers, 2) Average activity, 3) Share of wealth from fishery.

ADRIAMED

The Adriatic Sea is a very productive area with a long history of exploitation. Stocks are shared between 4 countries. Scientists produce a list of prioritised species. There is now agreement to do the assessment in a joint way, whereas previously it was done separately. All these assessments are placed on a web site and so would be available to FIGIS.

CCAMLR

CCAMLR's management and conservation of Antarctic marine living resources is based on an ecological and precautionary approach. Approximately 30 fisheries are presently managed in CCAMLR's Convention Area (Southern Ocean; Areas 48, 58, 88). The Commission has not yet considered CCAMLR's participation in FIGIS.

Much of the information required by FIGIS is already published regularly. However, this data may require some manipulation to fit into the FIGIS format. It would be essential that any re-formatting did not result, inadvertently, in published information being interpreted or taken out of context. It was not

clear, at this stage, how alternate views, if any, would be presented on FIGIS and how these views may be addressed or harmonised.

WECAFC

WECAFC has no mandate to manage; it undertakes monitoring and assessment at the resource level, not at the stock level. Principal sources of direct information for FIGIS would be the Scientific Advisory Groups Stock Status Reviews. A future source for FIGIS might be the Caribbean Regional Fisheries Organisation, currently being established in the region. There was concern raised about conflicting units being developed by other organisations. The example given was NMFS on coastal pelagics.

FAO support to Western Indian Ocean coastal states

It is believed that stock status reports were valuable in getting countries to take the first steps towards management. It was felt that it might be difficult to get some countries to sign up to the partnership agreements for FIGIS, particularly in the Persian Gulf area without assistance from FAO.

SEAFO and Namibia

SEAFO is currently in the process of being established, and could benefit from the guidelines used by FIGIS for its own information systems. There are two programmes involved in the Benguela current that runs from South Africa to Angola.

- *BENEFIT* - an established scientific programme collecting environmental information, but is not involved in stock assessment.
- *BCLME* - a programme which is based on the large marine ecosystem approach

The SADC protocol on fisheries was cited as an instrument that may be used to promote the adoption of some of the principles of FIGIS in the region. It was noted that SADC with the involvement of the SARFIS project, may be an appropriate institution to enter a partnership agreement with FIGIS. It was noted that Namibia and the Republic of South Africa had been operating extensive rights based management systems, information on which might be added to FIGIS.

SEAFDEC

SEAFDEC noted that FIGIS could draw on many source, including the annually published Fisheries Statistical Bulletin containing data collected from 11 countries in the South China Sea area. Its statistical programme currently focuses on improvements of national statistical systems in the ASEAN region, particularly for four member countries of ASEAN (Cambodia, Lao PDR, Myanmar, and Vietnam). SEAFDEC has also published reports on collaborative fishery resource surveys conducted in the South China Sea area. SEAFDEC has developed the Digitised Atlas which appears in the SEAFDEC website, showing information on oceanographic data, fisheries resources and distribution, fisheries statistics, and fishing gear and methods. A new initiative, on information collection for sustainable management of pelagic fisheries in the South China Sea area, may also be a potential source of information for FIGIS.

FIAS

Results from the project statistical database are available to FIGIS. The Project uses an ecological approach, particularly using trophic levels for stock assessment. It was proposed that Metadata should contain some quantitative measures on the quality assurance processes performed on the data.

Appendix 6: Summary of Working Groups

Appendix 6a: Overall working group structure and subject areas

WORKING GROUP SESSIONS

Tuesday 2nd July 2002

Title: Towards realistic approaches to standardised Stocks and Resources and Fisheries Inventories

- **Working Groups 1a and 1b:** Stocks and Resources Inventory
- **Working Groups 1c and 1d:** Fisheries Inventory

Wednesday 3rd July 2002

Title: Harmonized Information Structure: review of structure, definitions and required reference data

- **Working Group 2a:** Exploitation, Assessment, Indicators, Status and Trends -
- **Working Group 2b:** Fisheries and Management (Stocks and Fisheries views)
- **Working Group 2c:** Stock Profiles
- **Working Group 2d:** Socio-economic topics

Thursday 4th July 2002

Title: Data standards and information exchange flows

- **Working Group 3a:** Validation, amendment, additions to proposed metadata standards
- **Working Group 3b:** Maintenance, evolution and update of Fisheries Standards
- **Working Group 3c:** Methods and approaches to ensure data exchange and workflow – *Spatial data*
- **Working Group 3d:** Methods and approaches to ensure data exchange and workflow – *Non-spatial data*

Title: Maintenance of information and development of workplans

- **Working Group 4a:** Requirements for maintenance of information
- **Working Group 4b:** Requirements for maintenance of information
- **Working Group 4c:** Beyond case studies – beginning the process of contributing to FIRMS
- **Working Group 4d:** Implementation of an inventory of stocks and fisheries

Appendix 6b - Summary results of Working Groups 1a-1d

Title: Towards realistic approaches to standardised Stocks and Resources and Fisheries Inventories

The workshop considered the proposals on Stocks and Resources and Fisheries Inventories and the findings of working groups 1a, 1b, 1c and 1d, which were convened to address key questions and to prepare their views for further consideration in the development of FIGIS-FIRMS. Their responses and views are harmonized below.

Working group 1a and 1b: Stocks and Resources Inventory

Q1. Is the presented Stocks and Resources Inventory comprehensive?

The working group review was based on an evaluation of the proposed topic tree, not on a detailed inventory. It noted that an assessment of comprehensiveness is dependent on partners' needs and definitions, but it will also be dictated by the ability of partners to provide information that satisfies its mandate and jurisdiction. It also noted that improved comprehensiveness might evolve over time through updates and additions. Consequently, the structural model should be able to cope with a dynamic evolution of inventory elements.

Q2. What are the criteria for selection of stock units that will be included in FIRMS?

The criteria for the selection of each stock unit are dependent on the decision of the partner. The primary criterion is that a stock unit is harvested, although over time other criteria may be added, including economic, food security or social. It was noted that the structural model (topic tree) should be revised to take into account the differences between marine fisheries, freshwater fisheries and aquaculture; ideally with a separate structural model for each, but ensuring functional links where there are commonalities, e.g. wild species also used for aquaculture.

Q3. What are the attributes of a stock that may be used to uniquely identify and validate a stock?

A revision of the terminology and higher structure of the proposed Stock-Resource object was considered, including the use of a defined object called a **Management Unit**. In consequence the unique identifiers of this object would be:

- **species identifier** (including multiple species codes, according to standard classifications), noting that if multiple species are unidentified in information reports, the partners should provide a list of likely species associated with the identified area.
- **jurisdiction identifier** (defined by area of competence, legal/rights at national/international levels, environmental elements and other attributes).

Q4. What processes need to be undertaken for the agreement of a stock unit (management unit) for inclusion in FIRMS?

- Each partner has the primary mandate and legal jurisdiction to agree inclusion. Dissenting/alternative views should have already been dealt with at a lower level.
- Inclusion within the FIRMS framework is dependent on agreement by the partners.

Working group 1c and 1d: Fisheries Inventory

Q1. What approaches would apply to the identification of a Fishery for inclusion in FIRMS?

- The fishery concept fundamentally gathers indication of human fishing activity, including from economic, management, biological/environmental and technological viewpoints.
- These various viewpoints indicate that there will be a need to deal with multiple sources of information, which sometimes will be in conflict with each other. Thus, a fishery is a

convenient place to put alternative views. The tool should assist detecting various opinions where there is overlap.

- Distinguish between fisheries where stocks and resources (management units) have been, or have not been, defined.
- Use a flexible concept in the structural model, since there would be various definitions of fisheries by partners. It is important that each partner clearly identify one unique definition per fishery, which can either use an existing definition or can be added to the system.
- Use stakeholder views of the nature of a fishery rather than an academic concept
- Two approaches are foreseen: the first would consist of directly generating fishery records referring to one partner's selected definition. The second would consist of listing fishery units revealed through different disciplinary approaches (i.e. the multifaceted concept), which would then require a validation process.

Q2. Is the presented Fishery Inventory comprehensive?

No inventory was presented; therefore this question does not apply. However, note should be taken of minor fisheries; 1) those not be presently managed, especially destructive or illegal activities, and 2) those under co-management arrangements or community managed fisheries. Case studies or ad-hoc reports on these types of fisheries would be required.

Q3. What are the criteria for selection of a fishery that will be included in FIRMS?

- A fishery's start and end date should be part of its attributes. The tracking of a fishery's dynamic change over time - its history - should also be considered in selection criteria.
- Consider grouping of fisheries when the detail is too complex.
- Include experimental or new fisheries.
- A fishery should be validated for inclusion, provided that a minimum level of documentation exists about the fishery that justifies its existence, i.e. enough information should be available for others to evaluate appropriateness of inclusion.

Q4. What are the attributes of a fishery that may be used to uniquely identify and validate a fishery?

- In addition to the proposed identifying criteria, the concept of '*Party*' should be added: including that of community, group of stakeholders, etc. The time dimension should also be part of the fishery's identifiers.
- A minimum of two set of parameters should be set to uniquely identify a fishery. It was felt that area should be compulsory, plus at least one other (or more) from species/groups, or fishing activity parameters (gears, communities, etc...). Another view was that a fishery is a claim to a Resource, reflecting human activity, so the key 'fishing activity' should be compulsory.
- Other attributes should be included, such as date of fishery activity and links to previous fishery stages or ancestor fisheries.
- It was mentioned that a management unit can be a particular case or type of a fishery.

Q5. What processes need to be undertaken for the agreement that a fishery will be included in FIRMS?

Two processes are necessary:

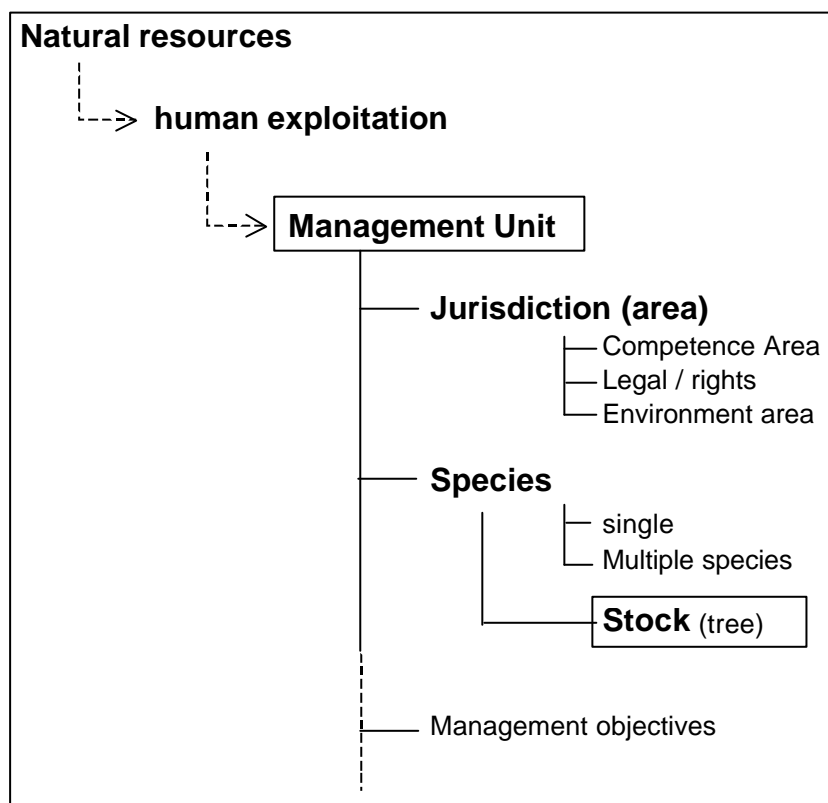
- **a registration process:** an indication that a fishery exists on a particular species/group and/or in a particular area. This process can make use of different disciplinary approaches.
- **An agreement or validation process:** internal harmonization for inclusion rules should be decided at national or regional levels. Such inclusion rules would always include a consensus viewpoint drawn from biological, environmental, economic, social and operational fisheries perspectives. However, where conflicting views on a Fishery definition occur at a regional level, these must be resolved before inclusion. Therefore, the tool should offer a security mechanism to keep these inconsistencies under private access (i.e. not public through the FIGIS system) until they are resolved. The notion of risk indicators would be helpful in the process of making information public.

Recommendations:

Taking the working group findings into account the workshop suggested that:

1. Revision of the Stocks and Resources and Fisheries Inventory schemes should be undertaken, identifying **Management Units** as the primary key for marine, freshwater and aquaculture resources (see diagram below), the structural models for which should be separately constructed.
2. Management Units should be uniquely identified with at least 2 key attributes: **jurisdictional identifiers** and **species identifiers**, although consideration of other attributes need to be made, including *inter alia* management unit objectives.
3. **Species identifiers** should include methods for coding of single or multiple species groups.
4. **Jurisdiction identifiers** would also have a number of characteristics including area of competence, legal/rights (national/international), environmental and other elements.
5. The definition and inclusion of Fisheries in FIRMS should be the sole responsibility of the partners (national or regional) reflecting the policy decision about ownership of the information.

Diagram: **The 'Management Unit' Primary key schematic for all aquatic natural resources**



Appendix 6b - Summary results of Working Groups 2a-2d

Title: Harmonized Information Structure: review of structure, definitions and required reference data

Working Group 2a: Exploitation, Assessment, Indicators, Status and Trends

Q1. Do you agree with the general structures (topic trees) for Stocks and Resources?

Within the assessment section of the tree, scientific advice should be a branch but only at the level of results, not within it. An 'area coverage' field should be added to the exploitation indicator branch.

Q2. Within this focus do topic labels reflect the internal structures and definitions contained in Document 9? What is missing? Are there alternative, expanded, or refined hierarchies that might also be used?

Resource status and trends may sometimes be the direct output of the assessment but sometimes not. It would be best if it represented a synthesis of trends. On the scientific advice definition, it was suggested that the latest part of the definition should be eliminated, and only issues related to the methods and data collection should be included, not management implications.

Q3. What parts of the topic tree require the adoption of international standards?

The need to develop standards comes from the need to communicate data and to query FIGIS databases appropriately. It may be possible to develop standard terminology for the assessment section of the tree, although different institutions often use different definitions. On the other hand, for management advice there are different definitions, thus standards for terms are not available now, and up until those have been developed data cannot be included. Thus, terms should be clearly a reference to the owner of the data, and there should be no attempt to standardize terms related to the status of stock such as overfishing, lightly fished, etc.

Q4. Is there a case for establishing working priorities for the development of standard terms and definitions during the next phase of FIRMS development?

Present partners may provide FIGIS with their own standards. FIGIS could then do an analysis of how much overlap or conflict there is between definitions. This should be complemented with research of appropriate standards for small scale and developing country fisheries, both of which are not well represented within the present partners. Whenever there are no comprehensive standards for some part of the FIGIS tree (e.g. management advice) FIGIS should provide a standard, but also contain a link between the information in that part of the tree and the standards used by the owner of the information.

Q5. What sources for standards and definitions are available?

Discussed further in plenary.

Working Group 2b: Fisheries and Management (Stocks and Fisheries views)

Q1. Do you agree with the general structures (topic trees) for Fisheries and Management?

This working group examined the structure of the topics trees for Fisheries and Management, and the definition of related terms. The general structure of the stocks-resources, fisheries and management systems topic trees was sound and comprehensive. After having examined with more focus the management section of these trees, the working group found it good but stressed that the management resolution (or decision) would have to be added, and would logically reside in the management system domain. From a practical point of view, management decisions would sit at the top of the tree. How far down the tree a partner would go, or which part of the tree a partner would

use, would depend on the partner's role in fisheries and management. For example, an RFB may be able to provide information on fisheries and management within its competence, but may not be able to provide information on post-harvesting. That information may be sourced from Member countries. As another example, a partner may not be able to provide information on scientific advice (from the assessments) for various reasons, possibly because of a paucity, clarity or transparency of the basis of the management advice.

2. Within this focus do topic labels reflect the internal structures and definitions contained in Document 10a and 10b? What is missing? Are there alternative, expanded, refined hierarchies that might also be used?

The working group also considered whether or not the topics trees should include feedback information to partner; for example, the opinion of FAO as to the use of local regulations in partner's management of their own fisheries. It was concluded that the existing structure could provide a form of feedback in cases where similar fisheries were assessed and/or managed by different partners. Such information would allow partners to compare their contribution/approach with that of others.

The group acknowledged that the decision mechanism is generally elaborated along a sequence of steps: scientific advice is obtained first, including from different bodies offering different types of advice, and representing biological, socio-economic, environmental or stakeholder view points. Then management advice is compiled integrating the various disciplinary advices, and then finally considered by decision makers. Various data owners are thus involved in the process.

The definitions examined were generally found to be adequate. However the working group proposed changes to the definition of '*scientific advice*' and '*management advice*'. Within the context of the Stock-Resource object, the working group agreed that scientific advice should be devoid of consideration of management and political issues, as well as socio-economic issues, and the advice should focus on stock status and trends. The definition should also include some measure of risk as required for a precautionary approach. The revised wording for this definition is as follows.

'Scientific advice: *Advice provided by assessment. The advice is of strictly scientific nature, focusing on stock status and trends, i.e. separate from any management, socio-economic and political consideration. It may deal with tools to be used, or options available to achieve management objectives with respect to stock recovery, associated...'* The working group did not develop wording for the risk assessment element of management advice.

The working group revised the use of the phrase '*status and trends*'. It was agreed that the term '*status*' is strictly a management term, while the term '*trends*' could be used in both the management context (trends in CPUE) and scientific context (trends in biomass). The working group broadened the definition for management advice as follows.

'Management advice: *by contrast ... management advice, by necessity, will take into account a broader spectrum of issues including those recommendations...'* The working group recognised that the definitions in papers 9 and 10 would need to be extended or revised to reflect the changes and discussion arising from the workshop.

Q3. What parts of the topic tree require the adoption of international standards?

and

Q4. Is there a case for establishing working priorities for the development of standard terms and definitions during the next phase of FIRMS development?

and

Q5. What sources for standards and definitions are available?

In relation to the development of standard terms and definitions, and international standards, the working group agreed on the following points.

Where feasible, FIGIS definitions should be taken from existing and widely used definitions, such as those listed in the FAO glossary. In such cases, reference to the source of the definitions should be

provided. It was recognized that there would be terms for which a standard definition would be difficult to provide. Global authorities such as the CWP should guide the development of FIGIS terminology. The working group also hoped that the FIGIS terms and definitions would become International terminology. However, it was recognized that the establishment of FIGIS standards as international standards would be a lengthy process, and would depend on the widespread use of FIGIS. It was agreed that the development of a registry of management terms was not desirable or recommended.

Working Group 2c: Resource and Stock Profiles

Q1. Do you agree with the general structures (topic trees) for Resource-Stocks?

The working group agreed with the basic content and structure of the topic tree with a few exceptions.

In the Stock-Resource profile section, where the information is more stable and subject to less frequent changes, it is recommended that identification of the evidence for geographical distribution be included.

It was determined that Biological Parameters should be placed under both Species-Habitat Biology and under a specific section under Stock-Resource Features.

- Under species habitat biology, the more static items such as natural mortality, taxonomic observations, biometrics, etc should be allowed.
- A new branch of the topic tree should be added, under the 'Features' part, for more variable information, and would include the variety of parameters, which change with assessments.

It should be stressed in the definition that all of the items included under Stock-Resource Profile should pertain only to a specific context of the Stock-Resource Object.

Q2. Within this focus do topic labels reflect the internal structures and definitions contained in Document 10a and 10b? What is missing? Are there alternative, expanded, refined hierarchies that might also be used?

Answered in Q1.

Q3. What parts of the topic tree require the adoption of international standards?

and

Q4. Is there a case for establishing working priorities for the development of standard terms and definitions during the next phase of FIRMS development?

Taxonomic names, species codes, gear codes, vessel types, areas, etc should receive the highest priority. The more difficult classifications are for exploitation indicators, assessment methods, stock and fisheries identifiers, and management units. Clear and precise definitions for each term as it relates to FIRMS are essential, i.e. a harmonized terminology.

Q5. What sources for standards and definitions are available?

Standards selection should preferably follow a hierarchy, such as;

- a. Internationally defined and used standards (such as metric system...)*
- b. FAO or United Nations system standards*
- c. FIRMS partners home-made or adopted standards*

The process would be to look down this hierarchy for the required standard. If none were found, the FIRMS steering committee members should research and select a standard. In any case, the adoption of a given standard should be made by consensus amongst the FIRMS partners.

The following questions were also raised, and the working group felt they had to be stressed and the FIGIS project and partners should address them. Will there be a required level of information in the FIRMS module? If so, how would it be set? By who? And based on which criteria?

Q1. Do you agree with the general structures (topic trees) for Fisheries and Management?

The group identified needed additions and changes to the structure. They are outlined below.

Q2. Within this focus do topic labels reflect the internal structures and definitions contained in Document 10a and 10b? What is missing? Are there alternative, expanded, refined hierarchies that might also be used?

From a socio-economic point of view, the group determined that COMMUNITY needed to be added as a management unit and/or management authority. This element is needed as many management plans consider communities as a functional management unit.

Within Fishery Identity, COMMUNITY should also be added as an exploitation unit reference, and as a description element within exploitation unit. This is needed within the identity as the exploitation unit may be a community, and it must also be described within the exploitation unit container.

Within Institution, JURISDICTION is needed as an element, because within a management system there may be multiple jurisdictions for multiple stocks managed by different institutions (e.g. coastal state management within state boundaries versus national management within EEZ and/or RFM management for trans-boundary stock.)

Fishing parameters should be removed from fishing practices, and consequently added to the exploitation and post harvest MACROECONOMIC and SOCIAL indicators. These parameters did not seem to be part of the profile of a fishery, but rather indicators that would fall within the features.

Within FISHERY FEATURES, the addition of FISH CONSUMPTION would allow for the inclusion of information on fish consumption, which may be needed as an assessment indicator.

Q3. What parts of the topic tree require the adoption of international standards?

The elements within the IDENTITY block should use international standards wherever possible. We suggest the use of CWP and ISO now and in the future. Wherever the goal is to positively identify an item the system should strive to use international standards.

Q4. Is there a case for establishing working priorities for the development of standard terms and definitions during the next phase of FIRMS development?

Yes. We recommend that a subgroup of qualified economists and social anthropologists be convened to develop standard terminology and definitions.

Q5. What sources for standards and definitions are available?

There are numerous sources at national and international levels but in many cases the sub panel would need to review and standardise some of the methodology and terminology that would be used as these sources often do not converge.

Appendix 6c - Summary results of Working Groups 3a-3d

Working Group 3a: Validation, amendment, additions to proposed metadata standards

Q1. Is organisation by domain a valid working model?

Organisation by domain seems the only reasonable model, although in some cases the linkages are not clear in the more complex domains, e.g. within Management Systems the linkages to Fisheries and Stocks are not readily apparent until going much further into the tree.

Q2. Are there information domains that are missing or wrong?

Socio-economic, ecological and climatic domains should be added. Also, the functional groups for species and species groups must be expanded to contain views that are less biologically orientated. Given the possible similarities between the Stocks and Resources domains, investigation should be made to see whether it is possible to integrate these two domains into one.

Q3. Is a global fisheries standard for data a valid concept? If not, what are the alternatives?

It is important to separate databases and document-like data when considering this problem.

For existing databases, an alternative would be that each partner encodes data in their own standard and reference tables are created in order to map different standards to one another. This may be more efficient.

For document-like data, given the fact that much of this data is not currently encoded in structured documents, it is preferable to begin by using standards, particular for classification systems, thesauri and controlled lists.

Noting that many information specialists believe that there are too many standards, it is suggested that work begins by creating a glossary of terms based on the assumption that there is no agreement on the definition of them. From that glossary, partners can work to find a consensus of meaning.

Q4. Should the system allow for variable levels of detail in the topics? If so, how variable? Is there a minimum required detail, and if so what is it?

There must be a minimum required, particularly for the identity blocks to ensure proper object identification, and also within other levels to ensure homogenous outputs. Too much detail may also be of limited value. If the style sheets do not support high levels of detail for reasons of homogenous output, then some details may not be shown. Attention must be paid to determining the correct level of detail for different domains and data sources.

Q5. Do we have consensus on the high level structure of IDENTITY - PROFILE – FEATURE? If not, what is our level of consensus? How else could it be organised? Are there high level structures missing?

It is clear that the IDENTITY structure is important, but the validity of PROFILE and FEATURE are less clear. Often, information does not fit neatly into categories of 'permanent/impermanent'. If the FEATURE block is used to update and store histories and versions, what happens when data in the PROFILE section needs updating? As there seems to be frequent disagreement as to whether data belongs in the PROFILE or FEATURE structures, this may be an indication that these structures are mis-designed.

Q1. Who will maintain the repository, and what does maintenance imply?

Generally the standards to be used would be the existing CWP/ISO standards. It may be necessary to define new standards but this would be the work of the Steering Committee (SC). The CWP would be the repository for the standards. The maintenance of the standards implies the holding of the alpha copy, and the knowledge between the partners of the process by which modifications can be requested.

Q2. What will be the process for change requests?

The steering committee is the body, which decides upon changes. No changes can be made unless permitted by the steering committee. The process for changes is: a partner makes a request for a change to the steering committee, which then publishes an advance notice before a steering committee meeting. The change is then discussed and adopted or rejected by the steering committee. Changes must be adopted by consensus.

Q3. Should change requests be analysed and dealt with by impact? What are the different kinds of impacts that change requests generate?

New additions to the structure are probably not problematic. Problematic changes are those which:

- change the hierarchy of the structure
- make the system less user friendly
- make previously transparent data unavailable
- require the modification of the databases of other partners

The partner who is making a request for the change should provide adequate documentation and strong justification for the change. This documentation should also include potential impacts on the structure of FIGIS, but does not require documentation of the impact on the systems of other partners. FIGIS/FAO may be requested to provide technical support to a partner regarding the justification and documentation process.

Q4. How will we arbitrate between conflicting change requests?

- Arbitration is a function of the steering committee
- The steering committee will establish its own rules and procedures
- Changes are made by consensus
- Depending upon the nature of the change requested (i.e. problematic or non-problematic) it may be possible to 'fast-track' the change or establish ad hoc working groups to assist in the resolution of conflicts.

Q5. What are the differences between extension and modification of the element set and how should policy differ based on the change requested?

This is described above and relates to the degree to which the change requested is problematic or not. The steering committee has to approve all changes but may choose the method by which the change is enacted (e.g. bug fixing). Minor changes to the system may be allowable provided they do not interfere with the expected functioning of the system, or significantly alter the structure of the system.

Q6. Who will define the meanings of the elements and structures and by what process can we agree on those definitions?

A preliminary activity is to establish a list of labels (terms) which have a variety of differing definitions. The list should be circulated and partners provide their specific definitions. This list is then resolved for the purpose of FIGIS (it should be noted that this process is neither quick nor cheap).

Q7. How will the element set be disseminated?

Dissemination is a function of FIGIS.

This WG was convened to address key questions related to spatial data, mainly the choice of geographical classifications (FIGIS and Parties related).

Initially, a presentation of the geographical classifications integrated in the FIGIS framework (FAO areas, 5x5 and 10x10 squares, political boundaries, EEZ, large marine ecosystems), and also a review of several Regional Fisheries Bodies geographical classifications was made.

Consequently, several approaches were discussed with the main goal of interrelating the different geographical classifications. All the approaches considered the pros and cons of its implementation. Finally each of the questions presented in doc (WG3c) were answered. The responses are shown below.

Q1. Do you agree with the choices of classifications chosen for FIGIS/FIRMS? Examples of classifications chosen: FAO areas, 5 and 10 degrees grids, political boundaries, EEZ, Large Marine Ecosystems.

Yes – no additional comment.

Q2. Do you think other classifications should be included? If yes, which ones? And should the list of classifications be open?

Yes. Nevertheless, the system should have a high degree of flexibility and be open enough to include other geographical classifications requested by the Parties.

Q3. For classifications not included in FIGIS, and used by partners for reporting, at what level should the mapping be done? Who should be responsible for the maintenance of the mapping?

The publishing rules and schemes for reporting are subject to the ownership rights of the partners. Consequently the level of detail in mapping should be defined by each partner, according to their own reporting/publishing specifications.

Q4. Which types of classifications can be defined? Statistical – Jurisdiction/competence – Environmental - Management

The maintenance of the mapping system between geographical classifications should be managed by FIGIS. Nevertheless new classifications or updates requested by any party should have included (in a clear format) the definition of each element of the classification.

Q5. Should partners follow CWP recommendations and results regarding classifications?

Yes

Q6. Should FIRMS use or link to external thesauri? e.g. ASFA, AGROVOC, FI Glossary, etc. Are there other candidate thesauri?

The group considered the question not relevant for the problem in debate.

Q1. Do you agree with the choices of classifications chosen for FIGIS/FIRMS? *Examples of classifications chosen: ISSCAAP, ISSCFG, ISSCFV.*

Yes, agree.

Q2. Do you think other classifications or lists of other standard terms should be included? If yes, which ones? And should the list of classifications be open?

Other international standards, e.g. ISO (either ISO2 or ISO3) could also be used. The list of classifications should remain open if there are no existing classifications and there is a need for a new branch of the FIGIS tree. The Meeting also discussed about Glossary to be used in FIGIS: Glossary should be harmonized. In the case that there's more than one definition for the Glossary, link should be made to definition of each Partner.

Q3. For classifications not included in FIGIS, and used by partners for reporting, at what level should the mapping be done? Who should be responsible for the maintenance of the mapping?

It should be recognized that in some cases (e.g. in developing countries) the adoption and use of standard and/or national agency classifications may not be well developed. In case there arise non-standard classifications that are not included in FIGIS but which are used by partners for national reporting, Partners to FIGIS may request additional classifications. However, whether classifications are added to FIGIS will be decided by the Steering Committee. Through this mechanism new classifications may be created on approval of the Partners, for example a classification may be requested when a Partner reports detailed qualitative information about local vessel types, which is not captured in standard classifications.

Q4. Do the partners agree on following the CWP recommendations and results regarding classifications?

Yes, however, it was also noted that the Coordinating Working Party on Fishery Statistics process for classification should be made widely known and the standards easily accessible.

Q5. Should FIRMS use or link to external thesauri? e.g. ASFA, AGROVOC, FI Glossary, etc. Are there other candidate thesauri?

Yes, these links should be made. Other candidate thesauri are possible: e.g. CWO.

Appendix 6d - Summary results of Working Groups 4a-4d

Title: Maintenance of information and development of workplans

Working Groups 4a and 4b: Requirements for maintenance of information

Q1. What methods for maintenance of information can be identified, including initial data supply, data management and updating within the FIRMS module of FIGIS? *Examples: direct system-to-system communication, offline XML creation, online data modification.*

- There was approval for the tool presented previously. The Online tool is the most appropriate for small-scale changes, such as typos. The Standalone tool was more appropriate for large scale reworking of documents.
- The FiStatXML tool was discussed as an appropriate tool for statistical data, including transfers of databases or updates to databases.

Q2. What are the tools or technical requirements for the supply, management and updating of data? *Examples: standalone creation of XML content, online uploading and/or editing of information...*

- Working group thought that it would be appropriate for the FSC to consider whether they would purchase software licences, and distribute them to the partners.
- There was a commitment to use open source technologies, where appropriate, but only where there is a clear benefit to the partners.

Q3. What workflow constraints and/or information validation steps would you identify/require? Where are the constraints?

- Final validation was always with the owner.
- The group felt that many of the constraints were inherent in the technology, particularity in the production of XML.
- 'Is there a requirement for a fast tracking of the validation process?', was a question raised by the FIGIS team.
- A major constraint raised was the question of what language the data/documents are supplied in. The example given from the group was the experience of CCAMLR, which included Russian in it official languages.

Q4. What human and other resources requirements/constraints would you identify? *Examples: training, technical staff, computers, communications...*

- Financial constraints were identified as the main constraint.
- The problem was raised of continuity of technical knowledge after training had been provided. This is critical were someone leaves a small organisation, and is a common problem in developing countries.

Q5. What would be your needs in the domain of training, documentation, help...? *Examples: websites, dictionaries, on-site trainings, examples...*

- FIGIS should provided documentation targeted at least three levels of users. There needs to be discussion in FSC to identify the target levels of user.

Sub-title: Contributing to FIRMS – elaboration of workplans

Working Groups 4c: Beyond case studies – beginning the process of contributing to FIRMS

i.e. those participants that have already been involved in case-studies and for whom the next step is to formulate a plan to begin trial contributions and additional inventories.

The following was elaborated as a typical workplan, including one key objective, with associated outputs and tasks, including time-scales, deadlines, prerequisites, and likely resources (human, infrastructural and financial, where possible). Likely resources were not full addressed by the working group and not presented in the table below.

Project Title: Beyond case studies – beginning the process of contributing to FIRMS			
Objective: Starting effective contributions			
		<i>Deadline:</i>	
Output 1	Finalised FIGIS stock-resource module version 3, including all ongoing case studies, and published over the Web as a prototype.	15 th October 2002	Prerequisite: Partners authorisation to publish on the web
Tasks:	1.1 FIGIS team ends the on-going development work	end July 2002	FIGIS team
	1.2 partners review the results	end August 2002	IATTC - NMFS - ICES - ICCAT - SPC - GFCM
Output 2	List of standard classifications disseminated over the web - through the Coordinating Working Party on Fishery Statistics home page entry point	1 st October	
Tasks:	2.1 Development of the Coordinating Working Party on Fishery Statistics home page, including a connection to the FIGIS reference table management system	1 st October	FIDI - FIGIS team
	2.2 Help developed for the retrieval of specific classifications	1 st October	FIGIS team
Output 3	Standardised lists of terms, and revised tree	1 st January 2003	
Tasks:	3.1 Two Email discussion lists established, for conceptual and technical aspects	12 th July	FIGIS team IATTC - NMFS - ICES - ICCAT - SPC - GFCM
	3.2 Lists of fields requiring standardisation hence submission of terms by partners elaborated and distributed	12 th July	IATTC - NMFS - ICES - ICCAT - SPC
	3.3 Preliminary revised version of the tree	31 st July	FIGIS team
	3.4 Submission of list of terms and related definitions by partners	1 st September	IATTC - NMFS - ICES - ICCAT - SPC
	3.5 Harmonisation work from confrontation of terms supplied - activity developing with results being discussed in parallel on the mail	1 st January 2003	FIGIS team
	3.6 Final version of the tree dispatched for comments	30 th November	FIGIS team
	3.7 Feedback from partners interested on proposed standard lists of terms and revised tree (DTD)	October - November - December	IATTC - NMFS - ICES - ICCAT - SPC
Output 4	Tools prepared at the level of partner institutions		Prerequisite: decisions made as to which XML editor software are going to be purchased
	4.1 Prepare and dispatch documentation on a variety of XML editing tools, particularly their compatibility with possible systems. This may include survey of partners capabilities	31 st July	FIGIS team
	4.2 Prepare a decision at institution's level	12 th July	IATTC - NMFS - ICES - ICCAT - SPC

Output 5	Partners having understood XML technology, and implied skills and processes		
	5.1 Updated training guidelines elaborated and dispatched to interested partners	15 th September	FIGIS team
	5.2 Version 3 case studies sent to interested partners, together with hands-on training guidelines	15 th September	FIGIS team Prerequisite: version 3 consolidated
	5.3 Partners self training		IATTC
	5.4 Rome, or on-site, training		FIGIS trainer - partner's scientist, editor and/or webmaster
	5.5 Online editing tool beta version testing by partners	September to November 2002	Prerequisite: on-line editing tool alpha version tested
	5.6 XML document upload and on-line publishing workflow testing by partners	November to January 2003	Prerequisite: alpha version tested by FIGIS team
Output 6	FIGIS software evaluated by partners, for possible installation on their system		Prerequisite: version 3 consolidated
	6.1 Adequate Documenting of FIGIS software version 3	31 st October 2002	FIGIS team
	6.2 Software Package sent to interested partners	31 st October 2002	FIGIS team
Output 7	Contributions started by partners		Prerequisite: Partnership agreement established, standard DTD agreed
	7.1 Rome, or on-site, training	During 2003	FIGIS trainer - partner's scientist, editor and/or webmaster

The following was elaborated as a typical scheme for the development of a case study, including key objectives, outputs and tasks and time-scales.

Objectives:

The objectives of the case study are:

- Initiate inventory of stocks/resources and fisheries.
- Evaluate the capability of the institution to be a partner (information provider).
- For the institution: evaluation the interest in further collaboration.
- For FIGIS: test whether alternative fisheries, resources, etc. can be entered into the FIGIS system properly.

Outputs:

- *Output 1:* A completed case study entered into the FIGIS system.
- *Output 2:* FIGIS improved to allow different types of fisheries, resources to be accommodated.
- *Output 3:* Evaluation of the institutions ability to collaborate as a partner of FIGIS.

Tasks:

- *Task 1:* Initiate inventory of stocks/resources and fisheries and Identify the fishing system which will be the topic of the case study. The system is documented using descriptors: e.g. artisanal gillnet fishery of Vietnam, Senegal demersal fishery. FAO is requested to make specific requests for collaboration at the various relevant meetings of regional bodies as this ensures adequate institutional interest and the allocation of time and resources for the activity. Where a meeting of a regional body is not possible, then FAO should request directly to the institution (e.g. SEAFDEC).
- *Task 2:* Identify the data sources and location (e.g. an annual institution report, a data set, supporting information from studies of the fisheries).
- *Task 3:* Identify the human resources. Ensure that there is sufficient credit for the work (acknowledgement, reference). Ensure the institution delegates the work to a responsible party and that they are released to perform this function.
- *Task 4:* FIGIS should provide training material including a documented example of a completed case study.
- *Task 5:* First analysis of the data set to identify objects, information sources, relationships etc.
- *Task 6:* On the job XML training.
- *Task 7:* Adjustment of FIGIS DTD and associated references if necessary.
- *Task 8:* XML document is then entered into FIGIS.
- *Task 9:* FIGIS output tested and modification of data as necessary.
- *Task 10:* Evaluation of the case study and process of development. Evaluation of institutions interest in pursuing partnership.

Time schedule:

Estimated time:

- Inventory: draft could be produced within 2 or 3 months, and completion should require another 2 or 3 months.
- Case study: about 50-60 working days is required, spread out over a period of 6 months.

Appendix 7: Information Management Policy and Quality Assurance

Information Management Policy

The workshop considered some of the elements of an information management policy, which would in due course be developed by the FIGIS/FIRMS Steering Committee (FSC). FIGIS is a tool for disseminating information provided by the partners. Accordingly, the information management policy will need to match the policies of partners regarding their publications and the dissemination of data and documents. The information management policy would also need to consider the following elements.

- Encourage partners to submit the best scientific information.
- Maintain objectivity and transparency: ensure that information submitted by partners is not inadvertently modified during compilation and collation within FIGIS, and that the submission and use of this information is clearly documented and traceable .
- Encourage participation and cooperation: encourage participation by partners and facilitate submission of information.
- Maintain timeliness and flexibility: ensure that the information submitted is made available in a timely manner, and synchronised with information published by partners.
- Ensure that information remains under the full responsibility and control of data owners.
- Identify priorities for developments.
- Consider presentation of alternate views: identify alternate or conflicting views and information within FIGIS and develop mechanisms for addressing and/or harmonizing such views.
- Consider maintenance of history, update cycles and recovery of historical data: identify the requirements for archiving information and providing access to historic information.
- Use a single, master copy of information submitted by partners.
- Use quality indicators in metadata.
- Provide guidance on the types of information needed.
- Consider using built-in relationships to facilitate searches on related objects.
- Assign permission to users and provide restricted/secure area for staging data validation and integrity checking, and resolution of conflicts.
- Provide guidance on the types of information that may be extracted by automated routines so as to avoid 'inappropriate' use of information such as comparisons of analyses of status and trends or management advice, which may be separated from associated interpretive text.
- Identify which languages may be used by partners to submit information, as well as those languages used by FIGIS in reporting information (including consideration of languages other than those of the information submitted).
- Provide guidance on layout aspects such as the use of visual identities, logos and identity of partners, output formats and the attribution of information.
- Maintain standards.

Quality Assurance

The workshop considered two types of quality assurance (QA):

- QA of information submitted by partners; and
- Minimum QA required for the operation of FIGIS.

Partners are responsible for the information submitted and the QA associated with that information. Therefore, the veracity of this QA will depend on the needs of partners and their level of responsibility. Where appropriate, information submitted by partners may include a general description of their QA protocols.

The workshop also considered the minimum QA required for the sound operation of FIGIS. The FSC would develop these internal QA requirements, the elements of which should include, inter alia, the following key issues.

- Issues about discrepancies between sources, and related validation processes.
- Provision of training and support to partners in filling out fact sheets to ensure standardization in data provided.
- Identification of which fields are mandatory.
- Development of quality assurance indicators (both qualitative and quantitative, such as “risks indicators”)
- Indicators of reliability and timeliness.
- General guidelines for peer review.