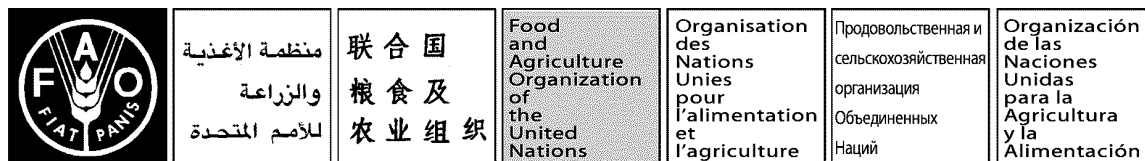


September 2008



## REGIONAL COMMISSION FOR FISHERIES

### Second Session of the Working Group on Fisheries Management (formerly Working Group on Fishery Statistics)

Cairo, Egypt, 27-30 October 2008

### SUMMARY REPORT OF IMPROVING THE UTILITY AND DIFFUSION OF FISHERIES STATISTICAL DATA AMONG RECOFI MEMBERS

#### PURPOSE

1. The purpose of the paper is to summarize fisheries statistical activities that were undertaken by the RECOFI Secretariat in the first half of 2008 with the general aim of improving the utility and diffusion of fisheries statistical data by RECOFI Members. Specific reference is made to a desk study that was conducted in May-June 2008 with the purpose of reviewing national data collection systems, facilitating harmonization and integration of fisheries statistical data at regional level, and developing simple methods for basic trend analysis of landings time series. The results of the desk study are described in information document RECOFI:WGFM2/2008/Inf.4.

#### BACKGROUND

2. At its Fourth Session held during 7–9 May 2007 in Jeddah, Kingdom of Saudi Arabia, the Regional Commission for Fisheries (RECOFI) recommended that Member countries continue their efforts to improve the cost-effectiveness and reliability of their national statistical programmes, increase the diffusion and utility of existing data and take further steps towards harmonization and integration of national fisheries statistical data at regional level. Acting upon these recommendations the RECOFI Secretariat initiated a number of follow-up actions, one of which was the preparation of a desk study and of a technical document concerning current issues of fisheries statistics in the region.

3. The report of the desk study is a comprehensive technical document that examines existing difficulties in fisheries statistics, proposes simple methodological procedures with the view of increasing the utility of existing databases, underlines the need for feedback information on statistical quality to be provided by members and, proposes short- and medium-term follow-up actions to be considered by the WGFM and the Commission for the general improvement of

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national and regional data and the promotion of cooperation and synergy in fisheries statistical activities among RECOFI Members.

## BRIEF REVIEW OF NATIONAL DATA COLLECTION SYSTEMS

4. The Commission has in the past made several requests for a systematic evaluation of the fisheries statistical programmes of its members. This evaluation, the results of which would first be communicated directly to the national authorities concerned, it has not yet taken place for a variety of reasons of which the primary two were: (i) the long vacancy of the RECOFI Secretary position and the consequent lack of follow-up and, (ii) insufficient RECOFI regular funds for such missions to be undertaken with effective duration and regional coverage. Consequently the brief review contained in this paper is limited to issues relating to the feasibility of RECOFI Members to participate in a second phase of data integration<sup>1</sup>, this time involving variables on fleet capacity and fishing effort. To be noted that the views expressed here do not constitute any criticism, positive or negative, of the performance of the ongoing national systems and the quality of obtained results, as such knowledge is still to be derived from *in situ* investigations and systematic formulation of performance and quality indicators and diagnostics.

5. RECOFI countries are at present using a variety of methods for data collection and processing, involving both census-based and sample-based schemes. The first scheme applies primarily to industrial and semi-industrial fisheries and data are directly obtained from the operators themselves, usually as part of the licensing process. The sampling approach is used for the small-scale fisheries which are generally characterized by high dispersion combined with large numbers, thus making impossible the collection of information on a complete enumeration basis. An interesting common element of the sample-based fisheries statistical systems operated by RECOFI Members is that there are instances of intense and frequent sampling which would potentially become less demanding in data collection effort while maintaining present levels of reliability and accuracy. On the other hand there are cases where sampling approaches ought to be upgraded using methodological and operational standards recently published by FAO.

6. With regards to complete enumeration approaches these involve direct reporting (i.e. landing declarations, logbooks) as well as indirect (i.e. sales receipts, market research). One problem with the direct methods concerns statistical coverage of different fleet sectors and completeness of data collected within each sector. Concerning indirect methods (which are useful for periodic cross-checking purposes), the problem is that they are at times used as a substitute to direct ones thus resulting in difficulties in obtaining data on the type and intensity of fishing operations. There are also cases where RECOFI national administrations with limited human resources cannot sustain census-based operations for the whole fishing fleet, with the result that there are always gaps in their catch reports. This difficulty might perhaps be resolved by switching from census-based to sample-based approaches, at least for important fishery sectors for which serious coverage difficulties seem to constitute a chronic problem.

7. Overall, however, and despite several difficulties in maintaining their fisheries statistical programmes, RECOFI Members have improved their data collection and reporting systems at both national and international levels. Species identification for instance has gained in precision; this can be confirmed by comparing the proportions of catches of unidentified fish before and after 2001. In both RECOFI sub-areas 51.2.0 (Gulf) and 51.3.1 (Sea of Oman) the reported catches of *Marine fish nei*<sup>2</sup> has declined significantly and this is an indication of improved statistical reporting and that much less catch is now lumped under *Marine fish nei*.

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<sup>1</sup> The first phase concerned integration of RECOFI capture time series and was accomplished in 2003.

<sup>2</sup> nei: not elsewhere indicated.

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## DATA HARMONIZATION AND INTEGRATION

8. Looking at the RECOFI fisheries statistics in a regional perspective requires that each national fisheries statistical programme becomes a component of a logical network comprising not only data but also processes and methodology. Such integration of different systems (each created through national programmes), is in general feasible when member countries use a regional set of statistical standards and apply regionally agreed definitions and classifications. Therefore, the main question at this point concerns how soon RECOFI Members will be able (using their ongoing systems as these stand at present) to proceed successfully to the next integration phase through which current annual catch statistics will be split by gear and be accompanied by fleet and effort information. Some first questions can be answered by examining feedback information provided from RECOFI national authorities and the desk study prepared a number of questionnaires to serve this purpose.

9. There are some important issues that affect the quality of integrated fishery statistics. The first concerns data coverage. National data might at times be incomplete in terms of range of variables and sectors covered. Consequently, the records in the regional dataset will contain gaps for which estimates will be required; these estimates should be based on good assumptions if they are to provide a reliable substitute to directly collected figures. A second issue relates to differences in statistical concepts and methodologies used by countries for assessing the accuracy of collected data. Methodological variations often make comparability of statistics a difficult task, especially when the degree of accuracy among national data is uneven. And a third point concerns the timeliness of national data, that is the time required for primary data to be processed into officially authorized statistical figures.

10. Although the aforementioned issues constitute a national responsibility they nevertheless have strong impact on the overall utility of regional statistics. Thus, improving data quality and timeliness and protecting the credibility of regional statistics requires interaction with countries and human effort and financial inputs invested in regional cooperation at both technical and operational levels. RECOFI has always recognized the importance of political willingness for cooperation in all fisheries issues, including fisheries information and statistics, and has been encouraging its members to pay due attention to both national and regional fisheries statistical programmes.

11. In discussing harmonization aspects at regional level it is perhaps worth clarifying a point which has been frequently debated at technical consultations and regional meetings. RECOFI Members have at times expressed concern that a regional harmonization exercise might hamper the operations of their respective national systems and cause disruption to historical data and time series. The present paper advocates that the term "harmonization" does not imply the introduction of a single and uniform statistical system across RECOFI member countries. It rather means the stepwise introduction of commonly agreed classifications with the view of making nationally-produced statistics comparable at regional level. RECOFI has in fact been able to accomplish a first level of harmonization through the establishment of a capture database. It is further pointed out that the introduction of methodological standards on a when/where-needed basis (particularly in sample-based data collection systems), will in fact benefit both RECOFI and its members, since the integrated datasets would contain data of known quality and completeness.

12. It should be noted here that harmonization of nationally-collected fisheries statistics at regional level can be achieved only progressively and only in those sectors where data are available at the required level of detail. It was mentioned earlier that the integration of annual catch data has already been achieved and that the integration process should expand to include other variables. At this stage, however, it would not be very practical to propose an all-at-once implementation of integrated databases containing monthly data on fleet, catch, effort, prices, fish size, fuel costs, etc., when it is yet not known if all RECOFI Members are in a position to participate in this exercise. This means that data types and variables on which information is to be integrated should be tailored to the capacity and structure of national fisheries and not be

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dependent on drastic changes to data collection operations that are being regularly operated by member countries. It is on the basis of these observations that the present note suggests that with regards to data harmonization and integration only two further steps be taken in the short- and medium-term, with the twofold purpose of: (i) expanding harmonization to include boat/gear classifications so as to integrate fleet capacity and annual effort at regional level; and (ii) introduce commonly used international standards in sample-based data collection operations, in order to set-up a minimum target for accuracy with regards to catch and effort estimates.

### **PATTERNS OF RECOFI LANDINGS TIME SERIES**

13. The RECOFI desk study developed two systems for basic analysis of landings time series, both available for immediate use by the WGFM Secretariat. The advantage of examining RECOFI landings as a long time series is that it provides a broad picture of the dynamic nature of the Gulf and Sea of Oman fisheries. The observed patterns highlight temporal changes between different fisheries. Such changes are most probably caused by four factors: market demand, environment/ecosystem variability, prolonged exploitation, and abrupt changes of data collection/recording schemes (the last factor having a statistical rather than exploitation meaning).

14. In analyzing time series there is a clear distinction between the terms “trend” and “pattern” or “shape”. The term “trend” is generally associated with a mathematical model that describes a relationship between the independent variable (i.e. time) and the observed variable (catch, value, etc.). This relationship, when established, permits the prediction of values of the observed variable in-between known values (this is commonly referred to as interpolation), or outside the range of observations (extrapolation to the left or to the right).

15. In general it is rather rare that all time series in a dataset can be described by a single mathematical model. Some time series may be closely linear, others may obey an exponential law of rise or decline; for others a dome- or U-shaped relationship would prove to be more suitable. In all cases there are special statistical diagnostics qualifying the goodness of fit (such as the coefficient of determination) so as for users to assess whether prediction of values is reliable, risky or not feasible at all. It would thus seem reasonable to partition any dataset of time series into groups of similar shapes before deploying fitting functions; this would mean that each separate group would subsequently be fitted by a specific model that is most likely to produce satisfactory results.

16. The RECOFI desk study developed two systems for basic analysis of landings time series resulting from the RECOFI Capture Database. The first system is called “PATTERNS” and its main function is to categorize time series into groups of similar shapes. The principal output of this program is a summary statistics of patterns without the need to go through all records and visually identify the shape of each time series.

17. The second system, called “SPECIES RANKING”, analyzes catch time series to compare the level of production of species of high importance over two different periods of time. Each species time series is split into two periods (the second consisting of the last five years) and then sorted for each period in descending order. In this manner two columns are produced showing species in two different ranking orders. It might then occur that some formerly top species has been replaced by another emerging species, or the contrary: a species that showed low catch in the past now it figures amongst the top of the list. And there might be others that maintain their position.

### **PROPOSAL FOR SHORT- AND MEDIUM-TERM ACTIONS**

18. The present paper identified two major activities relating to fisheries statistical development in RECOFI. Their total cost is estimated at US\$ 70,000. The first activity concerns the long overdue review of national fisheries statistical programmes and involves travel to all RECOFI countries (US\$ 25,000) and two months’ honorarium of an international consultant

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(US\$ 15,000). The second activity (four person/months at a cost of US\$ 30,000) is envisaged under the assumption that there will be favourable conditions for initiating a new integration exercise including annual catch and fishing effort data.

19. Two electronic documents will be made available to RECOFI Members by the WGFM Secretariat: (i) an Excel workbook entitled RECOFI\_CATCH\_FLEET\_EFFORT and, (ii) an electronic questionnaire relating to sample-based statistical standards. The RECOFI\_CATCH\_FLEET\_EFFORT worksheet will be used by members solely for indicating whether catch can be split into boat/gear components following the proposed classification scheme of three boat and eleven gear groups. Members are also invited to indicate the feasibility of supplying figures on active vessels and estimates of individual annual vessel effort. No real data need to be returned at this stage.

20. The electronic questionnaire with sample-based statistical standards contains a number of simple questions with the purpose of obtaining a general picture of RECOFI sample-based national statistical programmes with respect to:

- Extent to which registers of fishing vessels are used for statistical purposes and for the generation of spatial extrapolating factors for estimating total fishing effort;
- Whether frame surveys are also conducted for statistical purposes;
- How sampling accuracy is measured and monitored;
- Common problems in data collection (multiple use of gears, seasonal migration of fishing units).

#### **SUGGESTED ACTION BY THE WORKING GROUP**

21. The Working Group is invited to consider the major actions suggested by the present note (notably short- and medium-term proposals, use of questionnaires for harmonization of fleet and effort data, and use of the recently developed programs for analyzing landings time series), assess their feasibility in both operational and financial terms, and decide on their implementation.