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y la
Alimentación

COORDINATING WORKING PARTY ON FISHERY STATISTICS

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AGENCY REPORT

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MODIFICATIONS TO THE IOTC DATA SYSTEM SINCE CWP-18

IOTC Database

The statistical data available to IOTC come mainly from flag State reporting. The mandatory reporting standards for contracting and collaborating parties are presented in Appendix I. In addition, sampling schemes have been operating in cooperation with the local authorities to cover unreported catches.

Catch data structure

Recreational and experimental fishing catches are covered, but not fish on-grown in enclosures, as the objective of the statistics is to assess removals from wild stocks. IOTC is mandated to use best scientific estimates and all data submissions are verified for consistency and compared with any reliable alternative data sources available.

The IOTC fisheries database includes the following tables:

Nominal Catch

Annual catches for each FAO statistical area, by species and fishing gear made by vessels flying the flag of the reporting country in *live weight equivalent* (landings corrected by adding weight *losses* due to processing, loss of fluids, use as bait or food on board, etc., and by removing weight *gains* due to water absorption, ice accretion, etc.). These data are aggregated by *calendar year* for tuna and tuna-like species and non-target species (bycatch).

Discards

Discards by vessels flying the flag of the reporting country in *live weight equivalent* (discards corrected by adding weight *losses* due to predation, etc.) These data should be aggregated by *calendar year* for each FAO statistical area for both target and non-target species, by species and fishing gear. In practice, these data are virtually never reported in logbooks and may have to be estimated from samples taken at landing sites (purse seiners and some fresh-fish longliners) or from observer reports. It is likely that discard data in numbers might be more readily available from longline fisheries. From observer reports, it may be possible to obtain estimates of live releases.

Catch and effort

Catch in weight (purse seine) and/or numbers of fish (longline) of tuna and tuna-like species and gear by month, preferably raised to the total nominal catch and fishing effort. The maximum spatial aggregation should be by 1° x 1° grid area for purse seine and 5° x 5° grid area for longline. Information on the coverage rate is also requested.

Length-frequency

Length-frequency sample or raised data by species and gear in the smallest practicable time/area strata. Information on the size of the samples is also requested.

Tuna transshipment

Landings or transshipments (preferably in live weight equivalent) by vessels *not* flying the flag of the reporting country. The primary purpose of collecting these data is to estimate catches of countries *not reporting* to IOTC. It is thus important to link catches to individual vessels in order to avoid double counting. As fishers may

consider these data confidential, the raw data reported are kept confidential, with only data aggregated by flag reported.

Fishing fleet

Number of vessels catching tuna and tuna-like species by gear and size category within one calendar year. All the fishing craft operating in the Indian Ocean under the flag of the reporting country should be included. Foreign vessels chartered by or under joint venture arrangements with the reporting country should be reported *separately* using this form.

Fishing craft

Detailed listing of all tuna fishing vessels and of over 24m LOA of their characteristics (facultative for smaller vessels) flying the flag of the reporting country or operated under joint venture or charter arrangements. Reporting countries are also asked to report all foreign tuna fishing vessels that have called to their ports, irrespective of size. Where stable identifiers are absent¹, elimination of multiple counts from this listing is time consuming and involves the comparison of multiple characteristics².

Predation of longline-caught fish

As a consequence of reports from longline fisheries of 15-30 % of hooked fish being discarded due to damage attributed largely to cetaceans a new data set is being constituted of predation of longline-caught fish. While this predation is not a new phenomenon, it had not previously been reported or had been assimilated to shark damage. There are indications, nevertheless, that the level of predation in short-range longline fisheries is increasing as cetacean concentrate in the fishing grounds. These data may be recorded together with discard data and are in numbers by species as in general only the head of the fish remains.

Biological parameters

Special datasets useful for the estimation of biological parameters, such as data on size and maturity stage, length and weight and different length measurements is deposited with the Secretariat

Software repository

The Secretariat also offers a repository of software developed by scientists of the member countries for the purposes of stock assessment or data analyses in general.

Data storage and retrieval

All the statistical data tables have now been entered into an integrated MS-SQL Server database under a design that permits the storage and retrieval of data having heterogeneous spatial and temporal stratification³. The fundamental reason for this is that any attempt to “force” data into a pre-determined stratification involves a degree of analysis with a loss of information and is generally non reversible⁴. When dealing

¹ Very few fishing vessels are registered with Lloyds and transcriptions of vessels names from Asian to ASCII characters are often variable.

² E.g., LOA, Hp, GT or GRT.....

³ This system has been provided to CCSBT and ICCAT has been given the design parameters.

⁴ For example, a country might report catch-and-effort or size-frequency data on catches within its EEZ. This irregular polygon might in fact show a high degree of heterogeneity due to seasonality of fisheries in different areas, etc. In practice, IOTC keeps archive copies of original data submissions, such that it is always possible to roll back.

with data stored in their “native” format, analysts can create aggregations corresponding to any assumptions they may chose. This may make *ad-hoc* access to data more laborious, although data may also be stored under preset aggregations using standard assumptions⁵.

Estimation of non-reported catch

Longline

Sampling schemes for ice vessels

Statistical reporting from small longliners storing their fish on ice or in RSW for air shipment to sashimi markets continues to be virtually non-existent. These vessels, thought to number in the thousands, normally land their catches in a limited number of ports in Indian Ocean coastal countries⁶. At the landing ports, the fish are graded individually and packed for export. Sampling schemes have been established in Phuket (Thailand), Penang (Malaysia) and will shortly be operational in Colombo (Sri Lanka) where each port call is recorded and samples taken of the individual weight of each fish for a proportion of the landings. In many cases, bycatch species are also landed and recorded. Sub-samples are taken of lengths to establish length-weight and weight-length relationships.

It is intended to expand these sampling schemes to some other ports, notably in Indonesia⁷. Attempts are also being made to recuperate historical information, as some processing plants have records extending back to the 70s.

These data are then used to estimate the unreported catch from these fleets. In the absence of logbook information, limited spatial information is available from interviews of skippers conducted at the landing ports. Most cruises last less than a month, such that the temporal stratification is satisfactory.

Large freezer vessels

From the Fishing craft database, it is estimated that over 140 "flag of convenience" vessels in this category are operating in the Indian Ocean and do not report catches. Virtually all the albacore tuna catch from these vessels, mostly owned in Taiwan, China, are landed in Mauritius where they are recorded both with respect to weight and to size-frequency. However, it is reported that up to 60 % of the sashimi catch is transhipped at sea and it is necessary to assume that this fleet is operating in the same manner as similar vessels operating in the same area and for which data are reported. In recent years, the catch of these vessels has been estimated to be of the order of 50,000 tonnes.

Purse seine

In purse seine fisheries, a substantial proportion of the European-owned vessels are flagged in countries that do not report their catch to IOTC. In practice, however, these vessels provide logbook information to the fisheries authorities or research institutes responsible for tuna statistics in the countries of ownership. The vessels are also

⁵ For example that the spatial distribution of the catch is uniform.

⁶ The presence of an international airport with freight links to the markets is a *sine qua non* condition for the landing ports.

⁷ BPPL and CSIRO (Australia) have a similar scheme in Benoa (Bali) and are committed to provide the data to IOTC. More limited sampling is conducted seasonally by CSIRO in Mauritius.

subject to the same shore sampling⁸ as the European-flagged fleets. The data for these fleets is therefore reported to IOTC, but all the flags are aggregated into an NEI category. As the operation of these vessels is identical to those of the European fleets, the data can be considered satisfactory.

There are in addition about 10 ex-Russian purse seiners operating in the Indian Ocean. These vessels are now flagged in a number of “flag of convenience” countries and do not supply logbook data. Contact has been established with the agent for these vessels and it is hoped that data can be obtained from that source. Meanwhile, an estimate has been made on the basis of the vessel history and characteristics that the catch is about 25,000 tonnes. These vessels are known to operate in the same areas and with the same methods as the European fleets and therefore probably have the same composition of species and sizes.

Main purpose and usage of statistics

IOTC has a mandate to manage resources of sixteen tuna and tuna-like species in the Indian Ocean. The Commission also has a development mandate. The data are therefore compiled and verified prior to being integrated into the database. Subject to confidentiality procedures for data that are at a finer level of detail than those considered public domain (Appendix II), data are made available to interested users, including scientists, administrators and commercial operators.

Reporting policy in relation to nationality of catch

IOTC generally follows the policy of ascribing catches to the flag State. In cases where the catch results from charter or joint-venture arrangements based in a reporting country, the catch may be integrated with those of the reporting country. An attempt is made to fully document these occurrences.

Observer programmes

Data from some nationally-operated observer programmes are supplied to the Commission. There is a strong call for a substantial increase in the scope and coverage of these programmes. However, it is extremely difficult to place observers on longline vessels due to the small size of the fresh fish boats and the extremely long time at sea of the freezer vessels. Experiments are being conducted with automatic camera systems and may provide this type of data.

Vessel monitoring systems

IOTC does not currently have access to VMS data. Several Contracting Parties are in the process of implementing such schemes, most of which cover only EEZs in respect of foreign fishing, although domestic vessels also report position on the high seas. None of the systems appear to require real time reporting of catches⁹. An intersessional meeting of the Commission on an integrated system of control and surveillance has recommended that countries not having the financial or technical capacity to implement VMS or with large fleets of small vessels should use a hailing system in the interim.

⁸ This sampling is used to correct logbook information for weight estimation errors and to break down commercial categories into the appropriate species.

⁹ There is considerable resistance from fishers to real time reporting of catches and positions due to the fear of this information falling into the hands of competitors.

Fishery-independent data

Tagging

IOTC is the repository for all tagging data concerning tuna in the Indian Ocean. Funding is being sought for a large-scale tagging programme on tropical tunas covering the entire Indian Ocean.

Support for data collection

IOTC, in collaboration with IRD¹⁰, is involved in a major development of modular, multilingual software for recording logbook, observer and shore sampling data for tuna fisheries, providing facilities for data aggregation from multiple sites. The software will have routines for correcting logbook estimates from sample data. A vessel register is at the core of the programme which will thus be able to deal with either total enumeration or sample data. It is not intended to provide elaborate reporting or analysis routines as user requirements are likely to vary considerably. Data from a standard set of reports can therefore be exported in file formats accessible by any software users desire to draw on for analysis or detailed reporting.

This software will replace the programmes used in the longliner shore sampling schemes mentioned above.

¹⁰ Institut de Recherche pour le Développement (France).

APPENDIX I
RESOLUTION 98/01
MANDATORY STATISTICAL REQUIREMENTS FOR IOTC
MEMBERS

CATCH AND EFFORT DATA

- a) **Surface fisheries:** catch and effort data of the surface fisheries, catch weight and fishing days at least (purse seine, baitboat, troll, drift nets) should be provided to the IOTC by 1° grid area and month strata. Purse seine fishery data should be stratified by type of school. Those data should preferably be extrapolated to the national monthly catches of each gear. The raising factors used, corresponding to the logbook coverage, should be given routinely to the IOTC.
- b) **Longline fisheries:** catch and effort data of the longline fisheries should be provided to the IOTC by 5° grid area and month strata, preferably in numbers and in weight. The fishing effort should be given in numbers of hooks. Those data should preferably be extrapolated to the national monthly catches. The raising factors used, corresponding to the logbook coverage, should be given routinely to the IOTC.
- c) The catches, efforts and sizes of the **artisanal, small scale and sport fisheries** should also be submitted on a monthly basis, but using the best geographical areas used to collect and process those data.

SIZE DATA

Considering that size data are of key importance for most tuna stock assessment, length data should be routinely submitted to the IOTC on a 5° grid area and month basis, by gear and fishing mode (e.g. free/log schools for the purse seiners). Size data should be provided for all gears and for all species covered by the IOTC. Size data sampling should preferably be run under strict and well described random sampling schemes which are necessary to provide unbiased figures of the sizes taken. The exact recommended level of sampling could vary between species (as a function of various parameters), but the specific level of recommended sampling needs to be established by the working party on statistics. More detailed size data, for instance size by individual samples, should also be made available to the IOTC when requested by specific working groups, but under strict rules of confidentiality.

TIMELINESS OF DATA SUBMISSION TO THE IOTC

It is essential that all the fishery data be available in due time to allow the monitoring of stocks and analysis of the data. It is thus recommended that the following rules should be applied as standard obligation:

- a) **Surface fleets and other fleets operating in coastal zone** must provide their fishery data at the earliest possible date but **no later than the 30th of June each year** (previous year data).
- b) **Longline fleets operating in the high seas** must provide the **provisional** fishery data at the earliest date, but **no later than before June 30th** (for the previous year data). They must provide the **final estimate** of their fishery data **before December 30th each year** (for the previous year data).

The delays presently required to submit statistics could be reduced in the future because of the development of communication and data processing technologies, which should reduce the present data processing delays.

APPENDIX II
RESOLUTION 98/02
DATA CONFIDENTIALITY POLICY AND PROCEDURES

Recognizing the need for confidentiality at the commercial and organisational levels for data submitted to IOTC, the following policy and procedures on confidentiality of data will apply:

DATA SUBMITTED TO THE SECRETARIAT

The policy for releasing catch-and-effort and length-frequency data will be as follows:

- Catch-and-effort and length-frequency data grouped by 5° longitude by 5° latitude by month for longline and 1° longitude by 1° latitude by month for surface fisheries stratified by fishing nation are considered to be in the public domain, provided that the catch of no individual vessel can be identified within a time/area stratum. In cases when an individual vessel can be identified, the data will be aggregated by time, area or flag to preclude such identification, and will then be in the public domain.
- Catch-and-effort and length-frequency data grouped at a finer level of time-area stratification will only be released with written authorisation from the sources of the data. Each data release will require the specific permission of the Secretary.
 - a) A Working Party will specify the reasons for which the data are required.
 - b) Individuals requesting the data are required to provide a description of the research project, including the objectives, methodology and intentions for publication. Prior to publication, the manuscript should be cleared by the Secretary. The data are released only for use in the specified research project and the data must be destroyed upon completion of the project. However, with authorisation from the sources of the data, catch-and-effort and length-frequency data may be released for long-term usage for research purposes, and in such cases the data need not be destroyed.
 - c) The identity of individual vessels will be hidden in fine-level data unless the individual requesting this information can justify its necessity.
 - d) Both Working Parties and individuals requesting data shall provide a report of the results of the research project to IOTC for subsequent forwarding to the sources of the data.

PROCEDURES FOR THE SAFEGUARD OF RECORDS

Procedures for safeguarding records and databases will be as follows:

- Access to logbook-level information will be restricted to IOTC staff requiring these records for their official duties. Each staff member having access to these records will be required to sign an attestation recognising the restrictions on the use and disclosure of the information.
- Logbook records will be kept locked, under the specific responsibility of the Data Manager. These sheets will only be released to authorised IOTC personnel for the purpose of data input, editing or verification. Copies of these records will be authorised only for legitimate purposes and will be subjected to the same restrictions on access and storage as the originals.
- Databases will be encrypted to preclude access by unauthorised persons. Full access to the database will be restricted to the Data Manager and to senior IOTC staff requiring access to these data for official purposes, under the authority of the Secretary. Staff entrusted with data input, editing and verification will be provided with access to those functions and data sets required for their work.

DATA SUBMITTED TO WORKING PARTIES

- Data submitted to Working Parties will be retained by the Secretariat or made available for other analyses only with the permission of the source.
 - The above rules of confidentiality will apply to all members of Working Parties.
-