联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Продовольственная и сельскохозяйственная организация Объединенных Наций | Organización de las Naciones Unidas para la Alimentación y la Agricultura | منظمة الأغذية والزراعة للأمم المتحدة

COORDINATING WORKING PARTY ON FISHERY STATISTICS

Twenty- sixth Session

Sixth Meeting of the Aquaculture Subject Group and Twenty-seventh Meeting of the Fisheries Subject Group

CWP ad-hoc Task Group on "Reference harmonization for capture fisheries and aquaculture"

Rome, Italy, 15-18 May 2019

Technical background document Version 5.0

Author: Secretariat

EXECUTIVE SUMMARY

This technical document provides background, rationale and objectives to achieve the work of the Task Group. The document describes design and contents of the standard for the global harmonization for capture fisheries and aquaculture. The manuscript is updated based on feedback and contributions received from CWP members until the next CWP session. The record of detailed feedback is provided in annex 2.

The items requested for endorsement at the CWP 26 are detailed in Section 8:

- Concepts
- Data structures
- Workplan for the next intersessional period

SUMMARY OF CHANGES

(changes with respect to previous versions are marked in yellow throughout the manuscript)

Feedback and contributions were given in three occasions and changes are made accordingly:

1. Post CWP Inter-Sessional meeting held in Copenhagen, 19-22 June 2017

   - Amend objectives and update the mandate
   - Change terminology and revise definitions (catch, DSD, module)
   - Revise global data structure and add proposals for field data collection purpose

   - Add text on data exchange formats

2. Offline feedback on the version 2.0 of this document distributed to the TG from November 1st 2017 to January 19th 2018, and during the technical workshop of Tuna RFMOs (CWP parties) held from 19-22 March 2018 in Rome.
   - Change the name of the standard from "CWP standard of Data Structure Definition" to "CWP standard for reference harmonization".
   - Revise proposals and amend concepts definitions for both data structures of nominal catch, and catch effort (area, coverage, fishing capacity,..) (see attached excel file annex1 and annex 3 for detailed feedback)
   - Add proposals for revising CWP handbook's definition of fishing effort, its categories and combinations with gears
   - Add text on progress made to build CWP catalog
   - Annex 2b and 2c added

3. Remote feedback on the version 3.0 and version 4.0 of this document and proposals of data structures of the CWP standard for reference harmonization
   - Elaborate definitions of concepts used in the data structure
   - Proposals to add a concept (column) "fishing activity type/segment" to cater recreational/SSF considering SDGs14 for fisheries data. Also to add concept "coverage".
   - Add one module on fishing activity (métier), in the data structure "catch and effort", which consists of fishing gear (ISSCFG) + fishing mode + fishing vessel by types (ISSCFV) + Length classes (LOA).
   - Add a section in this present document on definitions of concepts and data structures to be checked for final offline review, and then for endorsement during the session.
   - Add Annex 2d.

Table of Contents

1. Rationale

The development of information computer technologies changed the collection' ways of fisheries statistics information from paper to electronic forms. The Excel-based questionnaires which have become widely used enforce specific standards' based reporting formats, however institutions are increasingly acquiring their own information systems with the inventive capacity to produce a multiplicity of dissemination formats. The various requirements at national, regional and global levels substantiate the need to identify a common denominator in order to streamline reporting across all levels.

In this entropy context, it appears essential to set a direction for consistency materialized by global standards, guidelines and best practices. These will be precious instruments for addressing streamlining reporting and making data interoperable between data producers and users at national, regional and global levels. In practice, the actions that require some degrees of interoperability include data transfer from one repository to another, harmonization of different data and metadata sets, creation of new information services such as virtual research environments for data dissemination [1].

The publication of fishery statistics information structured in harmonized datasets is a critical requirement to ensuring time efficient processing of statistical data in support of the best scientific advice and ultimately to improve the fisheries management of marine living resources.

CWP parties collect catch and other fisheries statistical datasets however data do not flow among these entities in a cohesive or standardized way. Exchange and timely submission of collected statistical data from national offices to the regional organizations or FAO remain a struggle for several reasons. Among them the gap in the management of statistical data and metadata between national statistical agencies and the international organizations. Therefore, it is crucial to move towards a harmonization of reference data used across datasets in a rational and efficient way and supported by commonly used standards, formats and software tools.

CWP has defined in its handbook a series of concepts used for the purpose of statistical data collection. Examples are "Country", "Flag State", "Nominal Catches", "Landed weight", "Fishing areas", "Currencies", "Time unit", etc… When building a statistical dataset, these foundational concepts provide key references for defining its various dimensions: the 'statistical concept' (eg. capture production) identifies the statistical dataset scope; the observed measure (e.g. quantity, or value) constitute one dimension; other dimensions identify the breakdown envisaged for compiling this measure, e.g. "Species", "Flag Entity", "Fishing areas", "Time unit". However when it comes to actually define the structure of a dataset (e.g column names in a CSV file), multiple variants intervene in the decision making: preferred local terminology, choice of a specific classification system and linked coding system, disaggregation levels, specific attributes to further qualify the dimension.

2. Background of the ad-hoc Task Group

CWP addressed during the inter-sessional Fishery Subject Group Meeting in February 2015 the need of a unified, coherent and harmonized fisheries data structure. The reference data need to be structured and be exchanged together with the statistical datasets to enable their identification and interoperability across different organizations' databases.

The interest and incentive of CWP parties on solving these matters have been raised and discussed during several preceding meetings. In CWP 25th plenary meeting held in FAO

headquarters (Rome, 2016) participants approved the establishment of the present ad-hoc Task Group on “Reference harmonization for capture fisheries and aquaculture statistics”.

In the same context, the collaboration of FAO with the Research Data Alliance RDA during the RDA 9th plenary meeting was an opportunity to increase the visibility of CWP as a responsible institution for fishery statistics and to present the needs for fisheries statistics data interoperability. During this meeting, an RDA Working Group on Fisheries Data Interoperability was kicked off with a main objective to develop FAO MDM activities and BlueBRIDGE services for hosting and exchanging statistical reference data.

3. Objectives of the ad-hoc Task Group

The overall aim is to present a set and structure of statistical concepts that accommodate the coding system used by CWP parties to improve the data reporting and exchange between national, regional and global organizations. Harmonization of data structures and related metadata will minimize time and costs of mapping data elements to standard terminology and will improve multilateral exchange among CWP parties.

To reach the objective of elaborating a **CWP standard for reference harmonization**, we propose to proceed by dissecting and defining the structural elements (e.g classification system, dimensions,..), and we aim at generically identifying the main structural patterns that are applied for a given data domain: what is fundamentally common, how can the variants be mapped to the agreed commons. Starting from a single apex, these structures should allow to describe in a systematic manner, and to decipher, any dataset.

The **CWP standard for reference harmonization** will therefore describe the structure achieved, the associated standard concepts and terms selected by the Task Group (TG), the use of classification system keeping in mind the need to stick to existing CWP standards as much as possible (e.g ISSCFG, Areal Grid System,..). It will materialize minimum global requirements, and allow extensions by adding modules (dimensions) so it can build up on the minimum requirements and accommodate local needs.

As a result, the ultimate objective of this TG is to lay basis for establishing data-sharing agreement as practical work arrangements between agencies involved in a data workflow. This is expected to reduce data reporting burden for data producers and to improve data quality by mainstreaming the cross-checking and reconciliation of information from national sources.

Specific objectives of the ad-hoc Task Group are:

- providing a CWP standard for reference harmonization and related reference metadata for the aquaculture production and fisheries catch data including effort and logbook data structures.
- supporting CWP Parties and their members in improving and harmonizing data schemes and related data exchange agreements.
- articulating best practices towards usage of the CWP endorsed data structures for statistics collection and dissemination.

4. Activities of the ad-hoc Task Group

CWP parties that expressed interest to contribute to this ad-hoc TG are namely CCSBT, EUROSTAT, FAO, GFCM, IATTC, ICCAT, ICES, IOTC, NACA, OECD, SEAFO, SPC and

WCPFC. The teleconference kick-off meeting took place on March 23rd 2017. One to one calls have been ensured with CWP parties that couldn't participate in the kick-off teleconference.

Following the terms of reference, an inventory was conducted to collect capture and aquaculture data structure and associated reference metadata (concepts, terminology,..) used by CWP parties. Exchanges were ensured through emails and individual-basis calls depending on the complexity of the collected information.

In the scope of aquaculture inventory, EUROSTAT, GFCM, FAO and OECD contributed with data structure and metadata. NACA has been solicited to provide feedback on the aquaculture related issues.

The inventory was required to identify the gaps, interconnect and find similarities across reference data used by the parties. Ultimately, the inventory served to elaborate draft proposals for global data structures for aquaculture production and capture production.

Proposals of the CWP standard were presented (document and presentation) at the CWP intersessional meeting that was held in Copenhagen, 19-22 June 2017. The meeting's feedback entailed revising terminology and expanding the scope of the data structures domains to data collection and dissemination and to cover nominal catch, catch and effort, logbook. Remarks and actions to be carried out are summarized in the meeting report.

On November 1st 2017, the second version of this document has been circulated to the TG's members. Comments were provided offline (see annex 2b) by January 19th 2018 and through e-meetings between FAO-CWP members.

From 19th to 22nd of March 2018, FAO organized in Rome a technical workshop on global harmonization of tuna fisheries statistics. Eight CWP parties attended the meeting namely CCSBT, FAO, GFCM, IATTC, ICCAT, IOTC, SPC and WCPFC and contributed to the proposals of the CWP standards with a focus on tuna fisheries statistics.

The workshop proposed additional changes on the data structures taking into account the essence of the work's rationale, the terminology used in the second version of the document, and precedent feedback from other CWP members.

CWP parties were informed of the main updates through the version 3.0 and version 4.0 of the document and were requested to provide feedback (annex 2 d, annex 2e).

The present document version 5.0 compiles feedback and comments from the TG's members. Suggestions were incorporated accordingly in the proposals of the CWP standard for reference harmonization (Annex1 excel file).

5. Conceptualization of harmonized reference data

In recent years many international organizations spent efforts to streamline reference data and metadata of statistical products [2]. This included setting principles and definitions of how they are generated and presented and move towards greater harmonization of its statistical data.

In the CWP context, the data structure and reference metadata required by national statistical organizations and reported to the international/regional organizations are diversified, this primarily because of the diverse data domains (e.g economic, biological, management, control and surveillance) for producing statistics.

Reference data harmonization is the process of capturing, analysing and reconciling the meaning and representation format of data concepts and codes used by different CWP parties. The harmonization process involves a set of activities undertaken at data structure level, the metadata

level and the semantic codes level. The process started with an inventory of the data requirements for each domain and utilized coding system, analysis of the codes definition and the classification system used as basis, reconciliation of the terminology and alignment with CWP standards by developing codes mappings.

5.1 Proposals of the CWP Standard for reference harmonization

The initial inventory's output enabled the identification of concepts of minimum data requirements used by CWP parties. Concepts and structural elements provided the basis to build proposals of the standard for reference data harmonization, as overarching and modular structure for use by national statistical agencies and international organizations. This present document summarize the reference data and metadata, the associated classifications and hierarchies, and ontology of the coding system.

The modular structures of the CWP Standard for reference harmonization was essential to allow its extension and address needs of local implementation including integration of diverse codelists for different purposes. For this, data module were inserted in the data structure to cluster concepts having the same subject of information (e.g catch module, effort module,..). The data structure is then composed of concepts and data modules that can be added up and extended depending on user's specific needs.

Based on the several rounds of the TG discussions, additional proposals of data structures were built and amended to extend the scope and cover both data collection and dissemination purposes. Besides the initial data structure for capture production, suggestions of TG's members were essentially to add structures for nominal catch, catch and effort and logbooks. Discussions led also to changes in the definitions of concepts.

At this stage, this document puts forward for **validation five** data structures (**Annex 1 Excel file**):

- **Global capture production**: is designed to cover the capture production in volume and value from an economic perspective. Volume and value of catch are compiled according to dimensions represented by concepts Flag Entity, Fishing area, Aquatic Species, and Time unit;
- **Catch**: covers the concepts (gross catch, discards, nominal catch, etc…) for management purpose to which was added the concept "Coverage" to indicate level of coverage of data collected. This is commonly referred as "Nominal catch" by the tuna RFMOs.
- **Catch and effort**: is designed for assessment and management purposes and was suggested by the tuna RFMOs workshop. It includes several modules: e.g catch module, effort module, fishing capacity module to associate fishing gear and its fishing mode.
- **Logbook**: the data structure serves for management purpose and in particular addresses a data collection scheme for monitoring fishing activity. It contains vessel information, catch and effort for each operation (i.e haul). Information on start and end of time and location of fishing information are also included.
- **Global aquaculture production**: it is built to cover the aquaculture production and its value for economic purpose. Core concepts compiled are Country, Production area, Environment, Aquatic Species and Time unit, and it could be extended for the same purpose with the other dimensions Farming Structure and Product type;

5.2 Components of the global data structure

Terminology used in this document stem from discussions that started since the CWP Inter-sessional meeting (2015) and 25th CWP session (2016) and continued until recent exchanges with CWP parties. This section represents the glossary of terms for use by this Task Group. Once adopted by CWP, it will be published by CWP, it will be published as part of the CWP standard for reference harmonization in the CWP website.

Data domain identifies domains of data for which minimum requirements can be formulated at regional and global levels; within these data domains, datasets are expected to share the same concepts, dimensions and coding system that determine the purpose of the covered information.

Concept refers to the fundamental terms defined for statistical purpose in the CWP handbook. These foundational concepts provide key references when building a global data structure. For instance, among concepts used in the global data structures: Time Unit, Fishing area, flag entity, Aquatic species

Dimension represented as a column in the data structure, contribute to identify each statistical observation. A dimension is implemented through a codelist listing the possible values they can take. For example, the dimension "Flag Entity" provides information about which country or area an observation refers to according to M49 codes (UN Standard country or area codes for statistical use).

Observation (also called "measure") is the /reported value of a particular measure.

Module is a building block composed of concepts that can be assembled to describe information. For instance Catch module is composed of five core concepts; Aquatic species, catch type, Unit, Observation measure and its Flag status.

Classification system defines hierarchies and coding system used in structuring the reference data. A classification system is generally accompanied of a coding system providing the rules to assign a unique code for each element of the classification system. The CWP international standard statistical classification systems are primarily used (e.g. ASFIS, ISSCFG, Areal grid system,..). A classification system is named, owned and maintained by an institution, and certain logics are factored in for the coding, set of aggregations, hierarchies. These logics respond to data collection scope and mandate of the owning institution.

The inventory of usage of statistical classification systems by CWP parties confirmed the necessity of adopting standards to the extent possible or to develop mappings with RFBs' specific owned classification systems.

Levels of granularity define the aggregation and disaggregation (breakdown) used by the CWP parties for their specific requirements. Aggregates generally mask what is happening at the individual observation level when reporting data. Disaggregated data provides detailed information about the specific needs to be available.

Depending on the level of details in the data structure when using a classification system, codes of related categories can be grouped or collated (aggregated) to provide a broader picture, or categories can be split (disaggregated) when finer details are required.

The decision of the granularity level depends on the data reporting requirements. In both cases of whether aggregation or disaggregation, mapping against codes of the standard classification is crucial to be integrated in the data structure.

For instance, based on the classification system “FAO Major Marine Fishing Areas”, the data structure can include breakdowns: Subarea, Division or Subdivision. ICES subareas are disaggregations of the FAO major fishing area 27.

Conversely, ISSCAAP groups are an example of aggregations of the 3-Alpha code species of the ASFIS classification

For instance Tuna RFMOs commonly use particular codes based on aggregations of ASFIS species codes to cater specific requirements.

CodeList comprises a set of identifiers/codes enumerating all possible instances of a dimension and responding to a certain coding logic (e.g numeric or alphanumeric) [3].

CodeList_Id: Codelist associate an identifier with a name and optional description. For instance, in the capture data structure the codelist named “Inter-agency 3-alpha code” has the Codelist_id “3alpha_code”.

Description provides descriptive information on the codelist and/or related contents.

Reference data is a term commonly used among IT community. It refers to terms used to categorize data within the data structure and disseminated to be used and “referenced” by systems, applications, data stores, processes, and reports. In our context, reference data of the global data structure are sets of concepts, codes and classification standards that are embedded..

Metadata is the data that define and describe other data and processes within a specific context. Metadata documents makes data in a formalized way and make it easier to retrieve, interpret, or use information [4].

Reference metadata is the metadata of the reference data. It represents full definitions and terminology used and linked to the codes of the reference data items. Reference metadata must be associated with the data to ensure that the reference data is understood and interpreted by any user [5]. For instance, in the context of a global data structure, the reference metadata comprises the description of the classification system ISSCFG, the associated gear codelist (named GEAR_A_CODE) and their other descriptive attributes.

6. Implementation issues and challenges

The proposed following points have been highlighted by CWP parties during the preceding and recent exchanges. Discussions with particular focus on these outlines are kept toward consensus and achievement of this TG objectives.

6.1 Mapping Code

Discussion should focus on best practices and practical steps for harmonizing reference data by mapping between coding systems i.e defining semantic relationships between codes of different coding systems/dictionaries. Semantic mapping, which can be based on automatic routine if necessary, could ensure direct (one-one) mapping of the majority of codes used by RFMOs to CWP classification standards. Alignment with standards and mapping of codes are a prerequisite in multilateral data interoperability among CWP parties.

However, some CWP Parties are using CWP standard coding systems to a certain extent. Some members (e.g, ICCAT, ICES, IOTC,..) adopted extra codes for their purposes or adopted different classification system (e.g DCF for EUROSTAT and ICES). In general, two main situations are encountered regarding the specific codes: these are either built on the codes of CWP standards by aggregating a group of codes (e.g. group of species built upon the ASFIS codelist), or by extending the CWP standards with more details resulting in higher level of granularity (e.g for gear codes that fall within one class/code of the ISSCFG codelist).

In these situations, the peculiarities of codes' mapping amongst CWP parties would be challenging as they require many-to-one mapping. Solving these particular cases would require expert knowledge which entails background on definition of codes and result in suggesting best matching. Once mappings are built, their maintenance is an essential task to ensure data interoperability.

6.2 CWP registry and catalogue

Upon its endorsement by CWP, the global CWP standard for reference harmonization and global data structures will be published through the CWP website, under a dedicated section on metadata. Two alternatives of CWP registry were presented at the intersessional meeting and FAO was given guidance to work towards a centralized dissemination repository [6]. During the technical workshop on harmonization of tuna fisheries statistics, FAO presented the proposal of a unified and collaborative CWP catalogue[1] that would disseminate various CWP global data structures, CWP classifications, and the specific reference data made available by CWP parties. The CWP catalogue would be the index of data structures and reference data and mappings hosted in the CWP registry. Catalogue contents will be harvested by CWP Parties and national authorities to facilitate data exchange and usage.

In the context of FAO's work on Master Data Management (MDM), the catalogue can ensure coordination and dissemination (e.g. CWP codelists and mappings among Parties' codelists) in compliance with the CWP standard for reference harmonization.

6.3 Governance

The role of governance is to define set of best-practices that ensure CWP parties own the process, their information asset, and disseminate and maintain the contents of the catalogue. CWP secretariat will maintain the CWP standard for reference harmonization and global data structures, the CWP international classifications, standards recommended for use by CWP, and disseminate codelists submitted by CWP parties and mappings of their codelists with CWP standards. At registry level, the maintenance mainly address registry subscriptions regarding new datasets or changes in the reference metadata of datasets (e.g updates to the CWP standards would have to be reflected in the registry) and the mappings among classification and sub-classification systems between any organization when is necessary. At repository level, the role of maintaining the individual classifications in the repository and well as the mapping among codelist should reside at the level of the CWP Party. In the case of any change in the mapping, copies should be made available to the CWP catalog for broader dissemination.

[1] The CWP Catalogue is under testing and not open to public. Access requires authorization request. https://bluebridge.d4science.org/web/cwp_secretariat/home?p_p_state=maximized&p_p_mode=view&saveLastPath=false&_58_struts_action=%2Flogin%2Flogin&p_p_id=58&p_p_lifecycle=0&_58_redirect=%2Fgroup%2Fcwp_secretariat%2Fcwp_secretariat

6.4 Data exchange formats and mechanisms

Data format provides the content and the structure of the document sent over the data network. There are several formats and standards of dissemination and exchange which can be used to implement the global CWP standard for reference harmonization and related data structures. Data exchange options were a topic of discussion during the intersessional meeting. The TG recognized the importance of defining and recommending formats and standards for data exchange. Options put forward should cover the varying capabilities and requirements of CWP Parties, as mechanisms need to be aligned to enable data sharing agreement.

Alternatives should be evaluated on the basis of ease of implementation and operation and the following criteria:

• It should be wide spread throughout the CWP parties to minimise compatibility issues.

• It needs to be readable for human and machine, complexity should therefore be kept at an acceptable level.

• Harmonization of structures needs to be possible – Structure format must be standardized and the file format must support an open standard.

As for best practices to be pointed out, the writing convention or format could be recommended when exchanging data with specific coding system (e.g. FAO areas breakdown,.). In this case, the easy digitalization of the codes should be considered to facilitate data interoperability and exchange.

6.4.1 Comma Separated Values CSV

CSV file format is widely used among CWP parties for dissemination of datasets and metadata. The readability of CSV files is acceptable and facilitate the interaction of human user. It could be a good candidate to exchange the global data structures, the reference data and metadata.

The main advantage of using CSV files lies in the fact that such format can be accessed through common spreadsheet software, making them easily managed manually and a useful option to accommodate data providers without information systems that can generate the data files for transmission automatically.

As example, FAO made available data structures for data domains namely global capture production, and global aquaculture production, in a packaged format comprising Data Structure Definitions and codelists in CSV files and related metadata in text file. There will be aligned with the adopted CWP standard for reference harmonization.

6.4.2 Statistical Data and Metadata eXchange SDMX/SDMX-ML

SDMX is an international initiative that aims at standardising and modernising the mechanisms and processes for the exchange of statistical data and metadata among international organizations and their member countries. The organizations involved in the SDMX initiative developed guidelines applicable to all statistical domains. Furthermore, the community made available software tools and a registry to host reusable SDMX artefacts [7].

SDMX is not just a technical standard but offers guidelines such as a Checklist for Design Projects and Modelling Guidelines which are relevant for establishing an SDMX project for a data domain. For a specific data domain (e.g capture data for dissemination purpose), an SDMX

project starts by creating a concept scheme that describes this domain and the data flows (e.g Country sends dataset to an organization). The design and creation of SDMX artefacts and the management of such a project are detailed in this standard project workflow. The structure of this checklist is based, to the largest extent possible, on the UNECE Generic Statistical Business Process Model.

SDMX principles have been applied to fisheries statistics and in particular to create the global catch DSD in the context of a joint-project SEIF that stands for SDMX for Eurostat, ICES and FAO. The initiative aimed at the alignment and the exchange of codelists between the three organizations.

SDMX is being adopted as the data collection format for fisheries in Eurostat, in-line with policy for all statistical domains covered by the European Statistical System. FAO is making progress in the implementation of SDMX principles and acquisition of necessary tools.

Technically, SDMX standard offers an information model which describes statistical data sets and the structural metadata needed to exchange them in a standard fashion. The content of SDMX files have visible structure with explanations what is stored where in the file. The usual format in SDMX information model is XML (SDMX-ML) which makes it a good option for exchange of fisheries statistical data sets and accompanied metadata.

In the CWP context, it remains essential to evaluate the ability of SDMX data model to incorporate the proposed multilingual reference data and the global data structures that can be expanded with other codelists and enriched with hierarchical codelists.

This evaluation is taking place with members of TG using SDMX. As a result background and technical documentation will be provided to the TG on the SDMX implementation of CWP data structures and related metadata.

6.4.3 Fisheries Language for Universal eXchange FLUX

FLUX standard, developed and maintained by the Centre for Trade Facilitation and e-Business (UN/CEFACT), provides an harmonized message standard allowing Fishery Management Organizations to automatically access the electronic data needed for stock management, such as vessel and trip identification, fishing operation (daily catch or haul-by-haul), fishing data (fishing area, species, date and time, and gear used), landing and sales information.

FLUX contains two distinct but related parts:

- The FLUX business layer
- The FLUX transportation layer

The core of the FLUX business layer is the detailed and standardised description of each and any data element needed. For the FLUX business layer, standardisation of the data elements and formats is based upon the UN/CEFACT approach of Business Requirements Specification (BRS).

UN/CEFCAT BRS have been defined and endorsed for the following FLUX domains:

- **Vessel Domain:** aims to standardize the exchange of fishing fleet data, and more specifically the information directly related to fishing vessels and vessels supporting fishing operations.
- **Fishing Activities Domain:** is related to data exchanges in the context of fishing activities performed by vessels during a fishing voyage. Fishing activities include all activities of vessels, related to a fishing trip. The domain contains reports related to the fishing trip: departure, arrival, entry and exit from zones, fishing operation, etc.

- **Vessel positions domain:** provides a standard for the communication of vessel position information (e.g. VMS or AIS) between monitoring centers.
- **Fishing licenses, authorizations and permits:** to standardize the exchange of data between stakeholders in the context of request for fishing license, authorization or permit.
- **Aggregated Catch Data (ACDR):** provides standard to exchange aggregated catch data between stakeholders.
- **Master Data Management (MDM):** encompasses exchanges from a Master Data Register to any requester of Fisheries information registered in it.

The focus of the TG should be directed to both Fishing Activities and MDM domains that are particularly relevant to the present proposals of global data structures covering global capture, nominal catch, catch and effort and logbook.

Technically speaking, FLUX is a language and not a system. It is a messenger that offers a protocol to create a secure and configurable network between different parties IT systems. UN/CEFACT provides a standardized schema for business process "XML schemas" and a standardized content called "Core Components". The components are harmonized and regularly published in UN/CEFACT Core Component Library.

FLUX offers several advantages, including free, open and global standard to automate the collection and dissemination of the fishery catch data. It provides a common approach towards electronic logbooks for fishing vessels, interoperability between IT systems, and relatively easy exchange of data between parties. FLUX is strongly tied to XML as a data format.

UNECE established a Team of Specialists on Sustainable Fisheries to promote, facilitate and support the implementation of sustainable fisheries standards on a global scale and particularly the UN/FLUX. The project started as a small group initiative of EU member states and later developed into a UN/CEFACT project which engaged experts from all regions of the world, and made it a global standard.

Notwithstanding these advantages, implementation of FLUX are to be further explored for the purpose of interoperability of the CWP global data structures. Considering the growing importance of UN/FLUX in handling fisheries data, it is strategically important that the CWP standard for reference harmonization and embedded CWP standards and metadata are communicated to the UN/FLUX Team of Specialists so that this output be up-taken in mainstream considerations by UN/FLUX for fisheries data exchange.

6.4.4 OGC standards

The ISO/OGC standards focuses on interoperability of geographic information and related metadata. These standards include (meta)data formats (OGC data formats: WKT, GML; ISO/OGC metadata formats : 19115/19139) and service protocols (OGC Catalogue Service For the Web – CSW- for data discovery, and Web Map and Feature – WMS/WFS - services for data access).
ISO/OGC standards were presented to the CWP group in the intersessional CWP meeting and during the t-RFMOs workshop. The latter acknowledged the importance and value of the work presented and didn't express any concern regarding proposed recommendations (Use of ISO/OGC 19115/19139 and CWP standard). Recommendations of OGC were supported by the majority of the CWP members.

A concrete example of implementation of OGC standards, is the revamped FAO global Tuna Atlas, built on datasets from five t-RFMOs. The perspectives of the Atlas's implementation include:

i) the need to strengthen implementation of OGC CSW Catalogue Service standard and related tools in use: upstream through a reference (meta)data catalogue for CWP, and downstream for community-specific catalogues (e.g. Tuna Atlas).

ii) boost the provision of standard metadata sheets through exchanges between t-RFMOs and CWP secretariat in both ad-hoc task group on reference data harmonization and GIS working group.

iii) enhancement of data exploitation and visualization tools, conditioned that there would be willingness from involved parties (FAO, t-RFMOs) to pursue developing and promoting these tools.

7. Actions requested by the ad-hoc Task Group

In order to forge ahead with discussions on the topics outlined, following actions are required:

- To provide feedback on the structural elements and terminology used in the last version of proposals of data structures.
- To review the modules of the global data structures that could accommodate other domains of data collection, or different aggregation levels to match organization's policies and purposes.

8. Requested for endorsement by the ad-hoc Task Group

8.1 Concepts

This is a proposal of general concepts to be incorporated in the handbook.

Flag entity defines the assignment of nationality to catch, landings and aquaculture production. The list of countries and areas available in the CWP handbook (http://www.fao.org/3/bt978e/bt978e.pdf) includes ISO Alpha 2 codes, ISO Alpha 3 codes and the M49 standard (Standard Country or Area Codes for Statistical Use" originally published as Series M, No. 49).
Flag entity matches the complexity of global political and administrative designation. This concept encompasses the definition of other terms such as flag state (which is limited to states only), Cooperating Party, Cooperating non-Contracting Party, chartering state.

Geographic area refers broadly to a marine or land area that produce aquaculture and capture fisheries. The concept accommodates a complexity of typology and hierarchies of areas definitions. The area could be for instance statistical area, jurisdictional area, management unit area (e.g competence area of a regional fishery body), or grid coding system (e.g for statistics of tuna fisheries).

The standard classification FAO Major Fishing Areas for statistical purposes and its breakdowns http://www.fao.org/3/bt979e/bt979e.pdf are commonly used among institutions working on fisheries statistics. It is also proposed for use in the data structure of global aquaculture production.

Fishing activity refers to any activity conducted with the intention of catching fish in the wild, or transferring, caging or fattening fish in aquaculture. This broad definition is presented in the Fishing activities in capture fisheries include *inter alia* fishing operations, transhipments, prior notifications, landings, departing and returning to port, and entering and exiting fishing areas (i.e. fishing zone or ground). A fishing activity may involve one or many fishing operations in which case a fishing activity is characterized by a fishing area, target species and/or fishing gear, and a new activity is recorded when any of these parameters change.

In the data structure Catch and Effort, the fishing activity refers also to métier because it is a combination of the description of a particular fishing practice (fishing gear (ISSCFG) + fishing mode) and characteristics of the vessel type used and length category (fishing vessel (ISSCFV) + Length classes (LOA)).

Fishing practice is defined by the gear code from the ISSCFG and the fishing mode which refers in particular to Tuna fisheries data.

Fleet segment is a combination of types of fishing vessel (ISSCFV by type) and length classes according to vessel length overall.

Coverage refers to the proportion that the amount of fish (in number or weight) or fishing effort that is monitored (sampled) makes out of the total (number or weight) of fish or fishing effort estimated in the stratum concerned[2]. For instance, coverage rate could be "Less than 5% of the boats covered" or "Between 10%-29% of the trips covered" "Statistics raised; coverage unknown".

8.2 Data structures (See Annex 1: Excel file)

The following three data structures are the results of scrutiny and constructive feedback by members of the ad-hoc Task Group. The concluding review is kindly required to compile final comments before the endorsement during the CWP 26th Session meeting:

1- **Global Capture production**

2- **Catch**

3- **Catch and effort**

4- The data structure **Logbooks** was proposed at the intersessional meeting. It was developed based on Logbook guidelines prepared by CWP Secretariat as section of the CWP handbook.

5- The proposal of the data structure **Global Aquaculture Production** requires further development and review by the Aquaculture Subject Group, particularly on best available or planned classifications to be used (e.g typology of farming structure/production unit or environment of production).

[2] http://www.iotc.org/sites/default/files/Guidelines_Data_Reporting_IOTC1.pdf

8.3 Workplan for next intersessional period

Following the endorsement of the proposed data structures, the workplan for the next session shall consist of the following activities:

- To elaborate the structure of Aquaculture Production with the minimum data requirements and taking in consideration outputs of the CWP 26th session (e.g List of farmings).

- To provide guidelines for implementation of three data structures (1- Capture production, 2- Catch and 3- Catch and effort) for data exchange at regional level (i.e. tuna RFMOs).

- To further develop CWP registry and catalogue through case studies that would disseminate various CWP global data structures, CWP classifications and codelists, and the specific reference data made available by CWP parties (with codelists mappings).

- To develop guidance and recommendations regarding data exchange formats and standards.

References

[1] Colpaert, P., Van Compernolle, M., De Vocht, L., Dimou, A., Sande, M. V., Verborgh, R., Mannens, E. (2014). Quantifying the Interoperability of Open Government Datasets. *Computer*, *47*(10), 50–56. http://doi.org/10.1109/MC.2014.296

[2] McGilvray D, 2008 - Executing Data Quality Projects: Ten Steps to Quality Data and Trusted Information- Morgan Kaufmann Publishers. Elsevier
http://booksite.elsevier.com/9780123743695/10steps_DataCategories.pdf

[3] European Central Bank (ECB), Bank for International Settlement (BIS), Eurostat, International Monetary Fund (IMF), Organisation for Economic Co-operation and Development (OECD), "GESMES/TS User Guide", Release 3.00, February, 2003; unpublished on paper.

[4] ISO / ISE (International Organisation for Standardisation / International Electrotechnical Commission), n.d., ISO/IEC 11179- (2004) - Information Technology – Metadata Registries (MDR) Part1: Framework, published on the Joint Technical Committee 1 (JTC1) Information Technology Standards website, Available from https://www.iso.org/obp/ui/#iso:std:iso-iec:11179:-1:ed-2:v1:en.

[5] United Nations Statistics Division - Compiler guide for the Manual on Statistics of International Trade in Services 2010. Access on June 2017 (Part IV Cross-cutting topics). https://unstats.un.org/wiki/display/M2CG

[6] UNECE (2009) Common Metadata Framework Part A - Statistical Metadata in a Corporate Context: A guide for managers
http://www.unece.org/fileadmin/DAM/stats/publications/CMF_PartA.pdf

[7] Statistical Data and Metadata Exchange (SDMX) - BIS, ECB, Eurostat, IBRD, IMF, OECD and UNSD - Metadata Common Vocabulary. https://stats.oecd.org/glossary/detail.asp?ID=7078

Annex 1 Proposals of CWP standard for reference harmonization: five data structures (See Excel file)

- **Global aquaculture production**
- **Global capture**
- **Catch**
- **Catch and Effort**
- **Logbook**

Annex 2 Detailed feedback on proposals of CWP Standard for reference harmonization

Annex 2a. Record of detailed feedback and discussion on the first proposal V1.0

(Outputs of the CWP intersessional meeting, June 2017)

This is a record of detailed feedback and actions of the ad-hoc Task Group on the meeting document and presentation during the CWP intersessional meeting – Copenhagen, 19-22 June 2017.

This keeps a track of the harmonization process, evolution and further elaboration of the CWP standard for global Data Structure Definition and the CWP repository.

Concepts and terminology

There was a general support by the participants for the on-going work on reference harmonization. It was indicated that the proposed high level 'Data domain' structure of the global SDSD was not appropriate, and that instead the commonly encountered reporting requirements (e.g logbook catch, discards) in fisheries and aquaculture should be used as structuring components of the global SDSD.

Catch as a 'generic' Reference data will refer to the catch concept defined in the CWP handbook, including the list of sub-concepts such as landings, nominal catch, discard, retained catch,… these details will be dealt with at end-user level

A good amount of terminology used to describe the elements of the proposed SDSD is compliant with SDMX nomenclature (codelists, observation,..). However, it has been noted that some definitions (e.g reference data) presented in the document are not fully aligned with the SDMX glossary. As much as possible and where applicable the definitions of SDMX (an ISO standard) should be used. In fact the SDMX was presented as an alternative for structuring the global SDSD and the associated metadata.

The concepts such as Fleet or Metier, that are not defined by CWP, are a combination of two or three base concepts.

Data Structure Definition

Flexibility of the global SDSD should accommodate for all possible forms of reporting schemes, such as Global fishery statistics, logbook, Port Inspection, VMS, on-board Scientific Observers. It should accommodate both Reporting and Dissemination data structures. It would cater for flexibility and will be accompanied with guidelines for extension. End users should be able to derive their specific DSDs from the minimum data requirements of core structure.

Observed or measured variables such as Catch or Effort should be considered building blocks among other Reference data. At higher level, the global SDSD will be structured with a minimalist requirement for a temporal, georeference, Observation/measure, and other dimensions. Each can then be declined into sub-concepts hosting more specific classifications, e.g. georeference can be declined into Country, Flag State, Fishing area, Production area.

The concept of reporting frequency (e.g monthly, annual,..) should be added to the structure as typically existing in the DSD in SDMX format. If a time series has time intervals between its observations, this interval determines the frequency of the time series. Frequency could be assigned as a dimension (Frequency Dimension) in every key family which uses the concept of Time (Time Dimension).

The confidentiality flag could also be added, and there might be a need for two flag values. It exists a SDMX code list of the Flags.

The proposal of the global SDSD will be modified according to this discussion and a second draft proposal will be communicated to gather a round of feedback.

CWP registry and repository

FAO was mandated to progress on the CWP registry and repository. The registry would be rather a 'conceptual' situated as a layer above implementation formats for data exchange.

The unified and collaborative CWP registry will be accessible from CWP handbook website. It would host the global SDSD and its implementation by CWP parties. The registry would also host the specific internal reference data used by the CWP parties when mapping between their codelists and those of CWP classifications are or will formalized.

The registry would be the index of data and metadata hosted in the CWP repository and two alternatives of CWP repository were presented. Formats of information exchange were also presented and the criteria of choice were explained.

Participants expressed openness for the two options of centralized or decentralized repository. It was generally understood that a centralized repository would serve more easily the objectives of serving codelist and codelist mappings services, and would obviously grant institutions with no capacity with such services; should decentralized option co-exist this could work under the condition that interoperable web-services can be easily implemented with the central one.

Exchange formats

Choosing one among the presented exchange formats (CSV, SDMX-ML, FLUX) remains open to discussion and will be further considered. This conceptual registry will primarily refer to the concepts described in the CWP handbook, and will materialize them as Reference Data or 'Building blocks'. The CWP registry will focus on enumerating these building blocks (modules or structural elements) and to identify for each reporting scheme which ones among these structural elements are essentially required.

Two aspects of the SDMX should be kept distinct, one is hosting the global SDSD and the related metadata and the second is the exchange format and the capability of dissemination from the SDMX registry where the physical implementation of specific DSDs is registered.

Governance and maintenance

The CWP registry should be maintained and controlled by the CWP secretariat and there would be the need for a forum where contributors could bring new code lists and mappings with reference data classification systems. In all cases, data owners will maintain update capacity through the web.

At implementation level, the regional variations in codelists will be dealt with through mappings.

Group agreements and needed actions:

- broaden the scope/data domain of the global SDSD by compiling essential dimensions/concepts for data collection in use broadly by the CWP parties.
- Use the catch defined in the CWP annex B1, and also landings, catch and effort as data domains.
- Further elaborate the global SDSD that could accommodate other domains of data collection (e.g. logbooks) to address the requirements of CWP Members.
- CWP Members that belong to the Task Group will provide feedback in one month after the end of the meeting on the document and presentation. This shouldn't prevent other CWP Members to provide feedback and join the task Group if so wished.
- FAO will revise the document accordingly with two months after the receiving the feedback.
- The group recommended that FAO proceed with CWP registry development to be accessed through the CWP website.

Annex 2b. Record of off-line feedback on the version 2.0 (dispatched in November 2017)

Major comments on the CWP reference harmonization working document and second version of data structures: Aquaculture, Global capture, Catch, Catch and Effort.

As a general comment about all the four data structures, ICES suggested to eliminate the terminology used to define the purpose of each data structure for instance Global Capture Production (for economic purpose), Catch (for management purpose).

Eurostat recommended to keep the main purpose of global data structures as 'data sharing', whereas 'data collection' and 'data dissemination' should rather be thought of at a late stage. Eurostat will continue to collect its statistical data according to its now well-established set of DSDs. These might of course serve as basis for developing global DSDs for data sharing. As regards data dissemination, Eurostat is not ready for disseminating data using DSDs.

Eurostat also gave emphasis to the harmonization as the main objective of the standardisation procedure. The CWP member considered the extension of the data structure and data modules with concepts and data hinder the standardisation process by allowing caveats, catering for each

group's specificities. Besides, it goes against the idea of a core set of data for data sharing. Variations from the core could be used for regional data collection but not data sharing. For the data sharing it should be the responsibility of each organization to map their structural metadata to fit the global data structure.

As for the structure contents, it has been suggested to adopt STATISTICAL_AREA instead of PRODUCTION_AREA. However, there seem to be a need for a reference AREA_TYPE to specify the type of area as there are several reference types like FAO areas, specific Grid, or other.

Aquaculture and Catch-related data structures are referring to either OBS_QUANTITY or OBS_MEASURE, which essentially seems to be the same. It is suggested to use a single concept in all of them accordingly. The same is suggested for TIME versus TIME_UNIT.

ICES proposed to add one more concept which is the DATA-ACCESS and that indicate whether the data have restricted data access, partially restricted, or can be publically available as is.

The other specific comments for each data structure are summarized:

Global Capture Production

In the data structure "Global Capture Production" the unit of catch should remain as a weight measurement for this purpose since there is a second unit measurement in this table that can be expressed as a monetary value. It would be useful for the last two columns (OBS_VALUE and UNIT) to have a header, such as 'Revenue' or 'Monetary' and that those units should also be strictly monetary. Currency should also be specified.

Catch data structure

In the data structure "Catch", the concepts UNIT and OBS_ OBS_VALUE indicate economic extension. However there won't be a need for a separate economic in the Catch module which could include instead the following concepts: "Aquatic species, Catch type, {Parameter (or Measurement) Type, Value, Unit}", where Parameter Type would be based a list for weight, numbers, or monetary value, Value would then have the reported value in given Units.

IOTC suggested to add area / grid information in this data structure. IOTC expects catch data (for the catch-and-effort dataset) to be reported on either a regular grid (using CWP standard) or on an irregular one, depending on the gear type.

IOTC also noted for the concept UNIT that Catches from a given country in a given strata can be reported - by the country - both as KG/MT and Number of fish at the same time. This means that multiple records for the same strata (beside the catch unit) should be expected

Cath and Effort (Logbook)

In the data structure Cath and Effort (Logbook), the vessel identifier suggest the use of IMO number. However in NAFO, some vessels of small size are not required to have an IMO number. So perhaps an alternative could be suggested if an IMO ID is not used, for instance: vessel call sign as.

In the module position details in the same structure "logbook", it would be beneficial to have a clear start and end definition for a haul activity. For example, start of haul could mean as soon as

a trawl hits the water, as soon as a trawl hits the seabed, as soon as the first set in a longline string is deployed, etc. This can be interpreted differently, and having a clear definition will ensure more comparable data collection.

As for the module catch, several types of catches are presented but it would be essential to have everything expressed in equivalent live weight.

NAFO noted that this data structure (Logbook) is assumed to be for each row of data entered and it would be specific to one tow / haul / set. Generally, this would be no more than one day, so the effort measures category B and category C are not suitable to be used on a tow basis.

Annex 2c. Record of detailed feedback and discussion on the version 2.0 from the Tuna RFMOs workshop

This is a record of detailed feedback and discussions on the second version of proposals during the technical workshop of Tuna RFMOs on global harmonization of fisheries statistics held from 19-22 March 2018.

Comments are made on concepts of the data structure of CWP standard for reference harmonization (Nominal catch, and catch and effort).

FLAG STATE

This concept defines the assignment of nationality to catch and landings. The list of countries and areas available in the CWP handbook (http://www.fao.org/3/bt978e/bt978e.pdf) includes ISO Alpha 2 codes, ISO Alpha 3 codes and the M49 standard (Standard Country or Area Codes for Statistical Use" originally published as Series M, No. 49). The latter is currently in use by FAO-FIAS with some modifications to include additional territories and states. It was discussed extensively with illustrations on specific uses and participants highlighted that the country list ISOAlpha 2 and 3 do not include the code “NEI” which is essentially useful to comprise peculiar cases of flags, states and political entities.

ICCAT highlighted that “flagstate” is too “state” oriented (e.g EU is not a state). ICCAT is using the term “fishing entity” (CPC) / Cooperating party to match the complexity of global political situation. Mr. Carlos Palma presented concept of ICCAT chartered flag: a vessel from a CPC when is chartered by another country is marked as CPC - Chartered country. (e.g chartered: used as suffix of the flag CPC + Chartered Flag, Japanese boat chartered by Brazil = Japan-Brazil. Mr. Peter Williams indicated that WCPFC allows for chartering arrangements whereby the catch is allocated to the chartering state, not the flag state. The WCPFC data structures do not currently cater for reporting of catch breakdown by chartered state and flag state. Other tRFMOs concurred that the term “flag state” cannot grasp definitions used by all tRFMOs.

Mr. Marc Taconet recorded that FAO firstly started with concept of list of countries and provinces to report economic/food security importance. He pointed out that the title of the column (module and concept names) should capture the meaning of the cascading elements, including structure and content. It should also be useful to improve exchange and reporting across all levels in the data-chain. He suggested the “political entity” as major category then a more detailed level is required. He outlined that Concept_type could accommodate the complexity of multiple

dimensions in political designation. MU49 is a potential classification system to facilitate the harmonization across data structures and concept-types.

The group agreed to set a broad definition for this concept as "Administrative or political entity". This will comprise the concept "Flag Entity" which corresponds specifically to the context of fisheries operations using flags to assign nationalities to catch or landings.

FISHING AREA

The meeting highlighted the variety of fishing areas definitions (statistical area, grid system etc.) with different hierarchies and the complexities in aligning these definitions. It was underlined that overlapping exists between area definitions leading to different catches statistics and this makes reallocation of catches challenging.

Mr. Nick Vogel underscored the need of some tRFMOs to report on one species at one fishing area level. He also pointed out that if it is required to use FAO fishing area instead of grid system then CPC need to first endorse this change. Mr. Miguel Herrera mentioned that it is often challenging to match the RFMO competence area, management area with FAO fishing areas. Mr. Peter Williams mentioned the overlapping of catch statistics between IATTC and WCPFC in the pacific areas.

Mr Marc Taconet and Mr Aureliano Gentile (FAO) presented the interlinked concepts of fishing areas, grid and management unit utilized under the Global Record of Stocks and Fisheries (GRSF) developed by BlueBRIDGE project. The GRSF has been developed with the aim to offer two key services: i) Stakeholders involved in global/regional/national state of stocks indicators, and ii) Public and private actors involved in eco-labelling, traceability and sustainable fisheries. The Fisheries and Resources Monitoring System (FIRMS) partnership is one of the three data sources contributing to the GRSF together with the RAM Legacy Stock Assessment Database (Univ. of Washington) and FishSource (Program of the Sustainable Fisheries Partnership).

The concept of management Unit has been reused from ICCAT and IATTC definitions. ICCAT mentioned the use of the term sampling area as defined by scientists to estimate productivity.

The discussion converged to building a module "geographic area" made up of the concept "fishing area" and the concept "area type". The latter complement the definition of the typology of area which could be for instance statistical area, jurisdictional area, management unit area, or grid coding system (Annex 1).

CATCH TYPE

The group went through definitions of catch and nominal catches used in data structures while referring to the CWP diagram on catch concepts http://www.fao.org/3/bt981t/bt981t.pdf.

There was a general agreement that the concepts of the CWP diagram characterizes (parameter discrimination and interaction levels) reasonably well the different biomass parcels that are involved in fishing operations allowing a simple formulation (positive/negative contributions) of nominal catches as being the live weight equivalent of the landings.

ICCAT triggered the discussion that revealed tRFMOs use differently CWP concepts to define the nominal catch.

Nominal catches are often used as the best estimation of the biomass removals due to fishing activity. Some tRFMOs (ICCAT, CCSBT) are starting to include the dead releases (live weight) parcel into the nominal catches. ICCAT is also foreseen to estimate mortality – biomass equivalent - of fish release alive as the best scientific estimates of harvested biomass.

An agreement was reached that most tRFMOs are moving from nominal catches to gross catches collection (including dead and live discards).

Tuna RFMOs representatives provided their definitions of catches concepts as follows:

- CCSBT receives retained catch and discarded catch separately. Some countries submit retained + Discards Dead.
- IATTC: Gross catch= retained catch + discards.
- ICCAT: nominal catch= (Landings + discards dead + percentage of Discards live)x conversion factor
- IOTC: nominal catch = Landings + discards dead
- WCPFC do not use the term nominal catch and instead Annual catch estimate = retained catch + discarded dead.

CWP parties' participants showed interest to update the definitions used in the diagram to accommodate these situations. Participants provided a proposal of an additional definition to the catch type discards deads relevant to the context of tRFMOs statistics. "Discarded dead" is the proportion of the discards from catch released live, for instance post-mortality of small tuna individuals caught for Tuna fattening/aquaculture. Transfers are reflected through retained catch and considered as unrecorded, rejected or dumped landings.

The group highlighted the opportunity for tRFMOs and other CWP parties to review relevance and actuality of the existing CWP concept catch diagram (Annex M1) for discussion in the next CWP session.

EFFORT and FISHING GEAR

The module effort in the previous version (V2.0) of data matrices was based on the CWP handbook section on fishing effort which identifies three levels of precision (A, B, and C categories) of fishing effort in association with each gear. Annex N1 (http://www.fao.org/3/BS245E/bs245e.pdf) presents the list of combinations of gear and effort in category A. While reviewing this module and effort categories, the group acknowledged the need to review CWP definitions to include effort measures utilized by the tRFMOs.

In concurrence with comments from other CWP parties, tRFMOs suggested to combine the three categories into one list of fishing effort measure as there won't be need to separate two measures of effort (number of days fishes and number of days on the ground) in two categories B and C.

The group proposed a contribution to the data structure as "fishing practice" module that combines two concepts namely fishing gear (ISSCFG) and fishing mode. The latter concept was added to define in particular the three fishing modes for purse seine (free-school/unassociated, associated, both).

A breakout group was dedicated to the five tRFMOs representatives to:
- inventory commonly used effort measures across tRFMOs towards a potential harmonized classification of effort measure descriptors by fishing practice.
- provide mappings of tRFMOs codes with CWP ISSCFG and effort definitions. This would be presented in the granularity level in the data matrix.
- establish a common gear list to harmonize all tRFMOs gear and map it to the CWP ISSCFG.

It was recalled that mapping between gears should not stay at the level of comparing names as some names can be misleading (Cf. in ITOC) compared to the international classification. The question of multi-purpose gear was raised. ICCAT recalled that this work was already done and available in the ICCAT website. [https://www.iccat.int/en/ICCATManual.asp?mId=3 chapter 3].

The results of the breakout group were presented in the last day, session 6 of the workshop. The comprehensive list of combinations of gears and associated effort is presented in Annex 3.

tRFMOs representatives will finalize remotely the definition used in the fishing practice and inventory of fishing mode.

OBS-VALUE

The meeting recalled that tRFMOs don't collect monetary value of catches for both data matrices nominal catch and catch and effort. It was agreed that an additional attribute (column) is required to define its status: Mandatory / Optional. For the data structure global capture production (for economic purpose) value is mandatory whereas for other data structures (e.g nominal catch) information of the value is optional.

A discussion followed on the sensitive issue of defining the reference to compute values. The approach to have a price per species per tRFMOs without geographical definition (no reference to country) was proposed by IOTC.

COVERAGE

The group suggested to add the concept coverage to indicate the degree of coverage of catch data for the fishing operations. It has been noted that this concept is not mandatory.

OTHER CONCEPTS

The discussion was not triggered for several concepts namely Unit, Species and Observation status. These concepts were unchanged in the updated versions of data matrices (Annex 1. Excel file)

Annex 2d. Record of detailed feedback and discussion on the version 3.0 and version 4.0 of this document and proposals of data structures

This is a record of feedback (from IATTC, ICCAT, ICES, IOTC, GFCM, NAFO, SEAFO and WCPFC) and discussions on the Version 3.0 and Version 4.0 of proposals. The documents were dispatched on 15th August 2018 and then on 7th March 2019. The last review received from a CWP party was on 17th April 2019.

Comments were made on concepts of the data structures of the CWP standard for reference harmonization.

Several CWP parties agreed with the contents of the last version of the proposal and did not provide further comments, namely: IATTC, GFCM, SEAFO and GFCM. Other parties provided the following comments:

It has been suggested to rename the data structure "Nominal Catch" into "Catch". Nominal catch contradicts to the meaning of the structure that accommodates other concepts like landings or discards.

Considering the forthcoming SDG14 demands for fisheries data, proposals should cater data from artisanal and recreational fisheries besides the commercial fisheries. ICES, ICCAT and NAFO suggested adding one concept (column) "**fishing activity type/segment**" with categories: Small Scale Fisheries, recreational and industrial.

ICCAT is currently working on definitions (commercial, industrial artisanal, recreational, local, subsistence, etc.) because of the overlapping notions. The term "Commercial" is derived from an economic and social jargon and it is equivalent to industrial in ICES definitions.

By this occasion, the CWP parties outlined the need to review the Catch Concepts Diagram and could propose a dedicated working group for this purpose. Current used terms and definitions in the diagram could be elaborated whereas additional terms should be included to accommodate terminology used by CWP parties.

For instance, catch types “bycatch” and “discards” can have overlapping meanings. They don’t have standard connotations. Discards commonly means thrown overboard, or if retained becomes a “non-discard”. NAFO also has its own definition of “bycatch”. Catches are indicated as either “retained” or “rejected” and these can either be a directed species or a bycatch species.

Regarding the data structure Catch and Effort, it has been suggested to add a module on **fishing activity (métier)** that consists of fishing gear (ISSCFG) + fishing mode + fishing vessel (ISSCFV) + Length classes (LOA).

NAFO and ICCAT noted that fishing effort is indicative of the fishing operation whereas the information on length classes (fleet segment) is irrelevant for their current context. This needs a particular review from all CWP parties members of the ad-hoc TG to check for overlapping, inconsistencies and whether the **module fishing activity** (métier) meets their requirements.

IOTC noted that the ‘Coverage status’ that appears both in the (Nominal) Catch and Catch-and-Effort modules needs to be standardized. Once done, IOTC and other t-RFMOs could check whether the proposal can be easily mapped with codelists in use.

Annex 3: Combinations of gear and effort measure in use by tuna RFMOs

Fishing gear	Fishing Mode	Effort measure Descriptors	Definitions
Longline		Hooks	Number of hooks set
Purse seine	All	Days/Hours fishing	Number of days/hours spent fishing
		Days fishing and searching	Number of days spent fishing and searching
		Searching hours	Number of hours searching
		Sets	Number of sets made
	Free School	Sets	Number of sets made on free schools
		Fishing hours	Number of hours calculated from the start of the set to the end of the set.
		Searching hours	Number of hours searching
	Associated	Sets	Number of sets made on associated schools
Pole-and-line		Days fishing	Number of days fishing
		Sets	Number of distinct fishing events (sets)
		Trips	Number of trips conducted
		No. of poles used	Number of poles used in fishing multiplied by the number of days fishing
		Fishing hours	Number of hours from the start of fishing event to the end of fishing event
Troll		Days fishing	Number of days fishing
		Trips	Number of trips conducted
		Vessels	Number of vessels active for the annual period
		No. of lines used	Number of lines in the water multiplied by the number of days fishing
Handline		Days fishing	Number of days fishing
		Trips	Number of trips conducted
		Hooks set	Total number of hooks used in fishing multiplied by the number of days fishing.
Drift Gillnet		Days fishing	Number of days fishing
		Trips	Number of trips conducted
		Days at sea	Number of days at sea
		Net length	Length of nets expressed in 100-metre units multiplied by the numbers of sets made.
Ring-net		Days fishing	Number of days fishing
		Trips	Number of trips conducted
		Sets	Number of sets made
		Fishing hours	Number of hours calculated from the start of the set to the end

			of the set.
Harpoon		Days fishing	Number of days fishing
Recreational (sport)		Days fishing	Number of days fishing
		Trips	Number of trips conducted
		Fishing hours	Number of hours spent fishing.
		Days at sea	Number of days at sea
Trawl		Days fishing	Number of days fishing
		Trips	Number of trips conducted
		Days at sea	Number of days at sea
		Fishing hours	Number of hours calculated from the start of the trawl event to the end of the trawl event.
Traps		Days fishing	Number of days fishing

On the above basis, the CWP tuna sub-group developed the following proposal of standard list of **required** effort units for each gear.

Gear	**Fishing mode**	Potential CWP standard		
		Recommended	Alternate1	Alternate 2
Longline		Hooks		
Purse seine	All	Days fishing	Sets	Fishing/Searching Hours
	Free schools	Sets	Days fishing	Fishing/Searching Hours
	Associated	Sets	Days fishing	
Pole-and-line		Days fishing	No. of poles used	Sets
Troll		Days fishing	No. lines set	
Handline		Days fishing	Hooks set	
Drift Gillnet		Days fishing	Net length set	
Ring-net		Days fishing	Sets	Trips
Harpoon		Days fishing		
Recreational (sport)		Days fishing		
Trawl		Days fishing	Fishing hours	
Traps		Days fishing		