



COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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PROGRESS REPORT ON THE DEVELOPMENT OF A GLOBAL INFORMATION SYSTEM FOR FARMED TYPES OF AQUATIC GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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I. INTRODUCTION

1. The Commission on Genetic Resources for Food and Agriculture (Commission), at its Seventeenth Regular Session, endorsed the report of the Second Session of the Intergovernmental Technical Working Group on Aquatic Genetic Resources (Working Group),¹ which recommended “to assess, explore and develop mechanisms to monitor the status and trends of AqGR including, as appropriate, through the establishment of a global information system and a registry of farmed types as well as stocks of wild relatives, subject to the availability of the necessary funds”.² It is worth noting that the Working Group had made its recommendation on the understanding that the submission of information by countries to the global information system should be voluntary.
2. The Commission and the Working Group were joined by the Committee on Fisheries (COFI) and its subsidiary bodies, the COFI Subcommittee on Aquaculture and the COFI Advisory Working Group on Aquatic Genetic Resources and Technologies that also recommended the development of the global information system, incorporating a registry for farmed types of AqGR.³
3. With the support of the government of Germany, FAO initiated work to develop a registry of farmed types of AqGR (Registry) that represents the first step towards the development of a fully-functional global information system that will be used by Members, on a voluntary basis, for regular reporting of information on conservation, sustainable use and development of AqGR and monitoring of the status and trends of these resources.
4. This document identifies knowledge gaps the Registry and a global information system⁴ for farmed types and wild relatives of aquaculture species should fill, summarizes progress made in the development of the Registry and the global information system, and proposes next steps, for consideration by the Working Group.

II. RATIONALE FOR THE GLOBAL INFORMATION SYSTEM

5. The FAO report on *The State of the World's Aquatic Genetic Resources for Food and Agriculture* (Report),⁵ published in 2019, notes that while information systems exist for fisheries and aquaculture, they usually do not provide information on AqGR used in aquaculture, especially below the level of species (i.e. farmed types⁶ and wild stocks), with only a few countries having established national information systems to inventory AqGR at the farmed type level. The Report further notes that more than 250 species and species items (i.e. species groups) are being farmed that do not appear in the Aquatic Sciences and Fisheries Information System (ASFIS).⁷ The Report also identifies a lack of standardization in the terminology and nomenclature used by countries to describe AqGR.
6. In terms of characterization, inventorying and monitoring of AqGR below the level of the species, aquaculture lags behind terrestrial agriculture. The crop and livestock sectors have already established global information systems, such as the FAO-hosted World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture (WIEWS) and the Domestic Animal Diversity Information System (DAD-IS), where countries report information on *ex situ* crop diversity and livestock breeds (including descriptions of breeds and their *in situ* and *ex-situ* diversity), respectively. These two global information systems are also used by FAO Members to monitor, via

¹ CGRFA-17/19/Report, paragraph 50.

² CGRFA/WG-AqGR-2/18/Report, paragraph 28.

³ C 2021/23, paragraph 10; FIAA/R1287, paragraph 22; FIAA/R1297, paragraph 27.

⁴ The information system is the broader system that collates data and makes it available to users as information in a range of reporting formats. The Registry is the data collection, management and processing module managed by FAO which represents the core of the information system.

⁵ <http://www.fao.org/3/CA5256EN/CA5256EN.pdf>

⁶ “Farmed type” is a relatively new term, introduced by *The State of the World for Aquatic Genetic Resources for Food and Agriculture* that refers to a farmed aquatic organism that could be a strain, variety, hybrid, triploid, monosex group, or other genetically altered form or wild type.

⁷ The FAO list containing species and species items for which countries regularly report aquaculture and fisheries production statistics to the Organization (<http://www.fao.org/fishery/collection/asfis/en>).

key indicators, the status of implementation of their Global Plans of Actions and to measure progress towards the relevant Sustainable Development Goals (SDGs) indicators.

7. Based on these findings, the Report identifies a number of specific needs. It proposes, in particular, to:

- i. promote a global standardized use of terminology, nomenclature and descriptions for AqGR;
- ii. improve and harmonize reporting procedures and expand existing species-based information systems in order to include also unreported species; and
- iii. develop, promote and institutionalize national, regional and global standardized information systems for reporting on farmed types of AqGR.

8. Therefore, the development of a global information system for AqGR is fundamental to fill this knowledge gap and serve as a tool for monitoring the implementation of the Global Plan of Action for AqGR in future.

III. PROGRESS IN THE DEVELOPMENT OF AN INFORMATION SYSTEM FOR FARMED TYPES OF AQUATIC GENETIC RESOURCES FOR FOOD AND AGRICULTURE

9. With the support of the government of Germany, FAO initiated, at the end of 2018, a two-year project⁸ focussing primarily on the development of a Registry of farmed types of AqGR that will provide FAO and designated national representatives, including National Focal Points, with the data collection, processing and storage structure as the core of an information system for AqGR. The intended output of this project is a prototype information system.

10. An initial Expert Workshop on the Development of a Global Information System for Farmed Types of Aquatic Genetic Resources was held in July 2019 with the objective to: (i) identify stakeholders with interest in contributing data to the Registry and in accessing information from a global information system for AqGR; (ii) review the classification of farmed types that was used in the Report; (iii) identify possible candidate species to be used as test cases for the information system for collecting farmed type data to populate the Registry and contribute to output reports from the system; and (iv) provide recommendations on the scope, structure and development of the Registry. The Expert Workshop revised the classification of farmed types⁹, resulting in 11 categories of farmed types, that were subsequently used for the development of the Registry.

11. Following the Expert Workshop, FAO developed a comprehensive questionnaire to collect data on species and farmed types which has been refined during the project and utilized by FAO, National Focal Points and species experts. A total of eight species experts have entered national, regional and global data for key species identified during the Expert Workshop. The species experts have provided feedback on the feasibility of collecting the information requested in the questionnaire and on possible future improvements to the questionnaire.

12. In a further step, FAO held a series of regional workshops to raise awareness and increase capacity of key stakeholders, consult them on their information needs and receive their feedback on the proposed contents of the Registry. The first workshop for the Africa region was held from 2 to 4 December 2019 in Addis Ababa, Ethiopia.¹⁰ Due to the COVID-19 pandemic, the remaining four workshops had to be held in a virtual modality: Asia and the Pacific (8–12 June 2020);¹¹ Europe and

⁸ GCP/GLO/970/GER.

⁹ Mair, G. and Lucente D. 2020. What are “Farmed Types” in Aquaculture and why do they Matter? *Thematic articles* (also available at <http://www.fao.org/3/ca8302en/CA8302EN.pdf#page=40>).

¹⁰ CGRFA/WG-AqGR-3/21/Inf.7.

¹¹ CGRFA/WG-AqGR-3/21/Inf.8.

Central Asia (5–8 October 2020);¹² Latin America and the Caribbean and North America (21–24 September 2020);¹³ and Near East (7–8 December 2020).¹⁴

13. The regional workshops helped to identify key regional stakeholders who would benefit from an information system, as well as key information needs to be met by the system.

14. The current version of the information system developed by FAO consists of five components (see Appendix I for more detail):

- **Interface for species and farmed type data entry (the questionnaire):**

Data are currently entered into the Registry through an online questionnaire developed on the Survey Solutions platform.¹⁵

- **Data validation interface:**

This interface allows FAO to access the data obtained through the interface for data entry and validate these data prior to being made publicly accessible.

- **Database**

Once validated, the data is uploaded from the Survey Solutions platform to the Registry database. The Registry database, hosted on an FAO server, is currently populated with information on key aquaculture species and their farmed types for which data collection was conducted with the help of a group of species experts. The database also contains data collected for the Report and production statistics from FishStatJ,¹⁶ the FAO information system to which countries regularly report data on the production of species used in capture fisheries and aquaculture.

- **User Interface (UI) for data query and analysis:**

The data query UI enables users to access some of the data in the database with the information outputs organized in four main sections: characterization, inventory and monitoring; development of AqGR; conservation and sustainable use; and policies, institutions and capacity. Users can query and filter information by geographic level, taxonomic groups, species and farmed types. The UI also includes tools to generate country and species fact sheets.

All the components are connected via a back-end system architecture that enables data flow into the database which can then be accessed by the data query UI as summarised in Appendix I. An Excel-based questionnaire for off-line data collection, as an alternative to the current online questionnaire was also developed for future data-collectors that may need to have an offline version of the questionnaire that can be easily shared with the stakeholders, and can later be submitted to FAO.

15. The current prototype information system permits data collection and storage and enables users to query and analyse some of the data via the data query UI. The current prototype is made available to specific users entering and reviewing data on select species and is scheduled to be launched for broader access later in 2021. However, further development is necessary given that the Survey Solutions platform is an interim solution for data gathering and the data query interface does not yet allow access to all data in the database. Thus, for it to be used as an authoritative tool for official reporting and monitoring by countries and AqGR stakeholders, it requires further refinement and inclusion of additional data and expanded outputs from the data query UI as explained in the following section.

¹² CGRFA/WG-AqGR-3/21/Inf.9.

¹³ CGRFA/WG-AqGR-3/21/Inf.10.

¹⁴ CGRFA/WG-AqGR-3/21/Inf.11.

¹⁵ A free software developed in the Data Group of The World Bank.

¹⁶ <http://www.fao.org/fishery/statistics/software/fishstatj/en>

IV. PROPOSED STEPS TOWARDS THE DEVELOPMENT OF A GLOBAL INFORMATION SYSTEM FOR FARMED TYPES AND WILD RELATIVES OF AQUACULTURE SPECIES

16. FAO is making efforts to mobilize funds to further develop the current prototype into a full global information system on AqGR.
17. The next phase of development will transform the prototype by: i) adding questions on wild relatives to the (online and Excel-based) questionnaires for data collection and revising questions based on feedback from species experts who worked with the prototype; ii) creating a more user-friendly bespoke web based UI for the questionnaire; and iii) improving the interface for data validation and the UI for data query and analysis by adding access to more data and generating specific indicators for monitoring the status of conservation, sustainable use and development of farmed types and wild relatives of farmed species (e.g. for monitoring progress against a Global Plan of Action).
18. The global information system will allow countries to report, on a voluntary basis, on the status of conservation, sustainable use and development of farmed types and wild relatives of aquaculture species. This will allow countries and individual stakeholders to monitor the status of AqGR at national, regional and international levels. It will also allow countries to monitor at regular intervals progress in these areas for example to monitor progress on the contribution of AqGR to the achievement of SDG target 2.5, for which currently AqGR indicators are not available. The data for the global information system, and the processes whereby it is collected, may also act to strengthen countries' regular reporting of production data to FAO.
19. For the development of the global information system, FAO will also consider the outputs of the Expert Workshop held in 2016 on *Incorporating genetic diversity and indicators into statistics and monitoring of farmed aquatic species and their wild relatives*¹⁷ where experts identified possible information applicable also to wild relatives of farmed species. The Expert Workshop also proposed "AQUAGRIS" (Aquatic Genetic Resources Information) as a possible title for the global information system. FAO proposes the following slightly revised version of this title for the full information system: Aquatic Genetic Resources Information System (AquaGRIS).
20. The National Focal Points on AqGR will be the main country representatives responsible for submitting and validating the AqGR information that will be reported in the global information system. Training courses will be developed by FAO for this purpose.
21. FAO will take into account lessons learnt from previous efforts to maintain and upgrade WIEWS and DAD-IS, as well as the ongoing development of a new global information system on forest genetic resources.
22. The future global information system can also be used by FAO Members as useful information sources for implementing aquaculture practices in line with the principles of the Code of Conduct for Responsible Fisheries, particularly concerning the recommendations related to aquatic genetic resources (Article 9 – Aquaculture development).¹⁸

V. GUIDANCE SOUGHT

23. The Working Group may wish to:
- i. take note of the progress made with regard to the development of the Registry; and
 - ii. provide guidance on the development of the future global information system (AquaGRIS), including on the information it should contain and the information outputs it can generate.

¹⁷ FIAA/R1173.

¹⁸ <http://www.fao.org/3/v9878e/V9878E.pdf>

24. Furthermore, the Working Group may wish to recommend that the Commission:
- i. request FAO to proceed, subject to the availability of funds, with the transformation of the prototype into a full global information system that will be used by countries, on a voluntary basis, for regular submission to FAO of information on the status of conservation, sustainable use and development of farmed types and wild relatives of aquaculture species;
 - ii. invite countries and their National Focal Points on AqGR to contribute to the development of AquaGRIS, and to prioritize the collection and provision of data on AqGR for this purpose; and
 - iii. encourage donors to support the development and promotion of the information system and the initial data gathering to optimize the utility of the system for the continuing monitoring and assessment of the global status of AqGR.

APPENDIX I

ARCHITECTURE OF FAO'S GLOBAL INFORMATION SYSTEM FOR AQUATIC GENETIC RESOURCES

INTRODUCTION

This document outlines the structure of the global information system being developed by FAO to collect, manage and disseminate information on aquatic genetic resources (AqGR) for Food and Agriculture. The objective of the global information system is to provide baseline information which can support efforts to enhance the conservation, sustainable use and development of AqGR.

STRUCTURE OF THE INFORMATION SYSTEM

The Aquatic Genetic Resources Information System (working title 'AquaGRIS') is structured to collect data from Members on their AqGR and make these available in a range of different report formats. The core of AquaGRIS is the Registry of farmed types (Registry) which is coordinated by FAO. National focal points will be given access to collect and store national data on AqGR by species and by farmed types and wild relative stocks, within species.

COMPONENTS OF THE REGISTRY

Questionnaire: This is the principal tool for collecting data on farmed types present in reporting countries and consists of a series of hierarchical questionnaires at the level of the species, primary farmed type and secondary farmed type. The questionnaire is currently hosted on the Survey Solutions platform. The same questions will also be available for off line data entry via an Excel spreadsheet version.

Dataset of the Report: The Registry contains selected data submitted by countries in the process of developing the report on *The State of the World's Aquatic Genetic Resources for Food and Agriculture*.

FAO production statistics: The Registry can access data on the production of many species from the data held in the FishstatJ information system for aquaculture and fishery production data reported by Member Countries.

Data validation interface: This interface allows National focal points and FAO to access the data obtained from the questionnaire and validate these data prior to being uploaded into the database.

Database: The database is the repository for validated data on AqGR provided by members and can be accessed by the broader information system to generate information outputs.

OUTPUTS GENERATED BY THE GLOBAL INFORMATION SYSTEM

Reports: Information in the Database can be accessed through the data query UI accessible to all AqGR stakeholders. Users can generate summary reports on the AqGR data which can be filtered by country or geographic region, taxonomic group, species and farmed type. This component of the system is still under development but the current data query UI can output summary reports focused on: i) conservation and sustainable use; ii) development; and iii) policies, capacities and institutions. The system can also generate species and country fact sheets. Future versions of the interface will ultimately enable wider access to all data through a greater range of report formats.

Indicators: Future versions of the information system will also be capable of generating specific indicators of the status of AqGR that could, for example, be used to monitor progress against SDG targets or against Global Plan of Action goals, including specific conservation targets.

Figure 1. Diagram illustrating the structure of AquaGRIS with the Registry of Farmed Types at its core

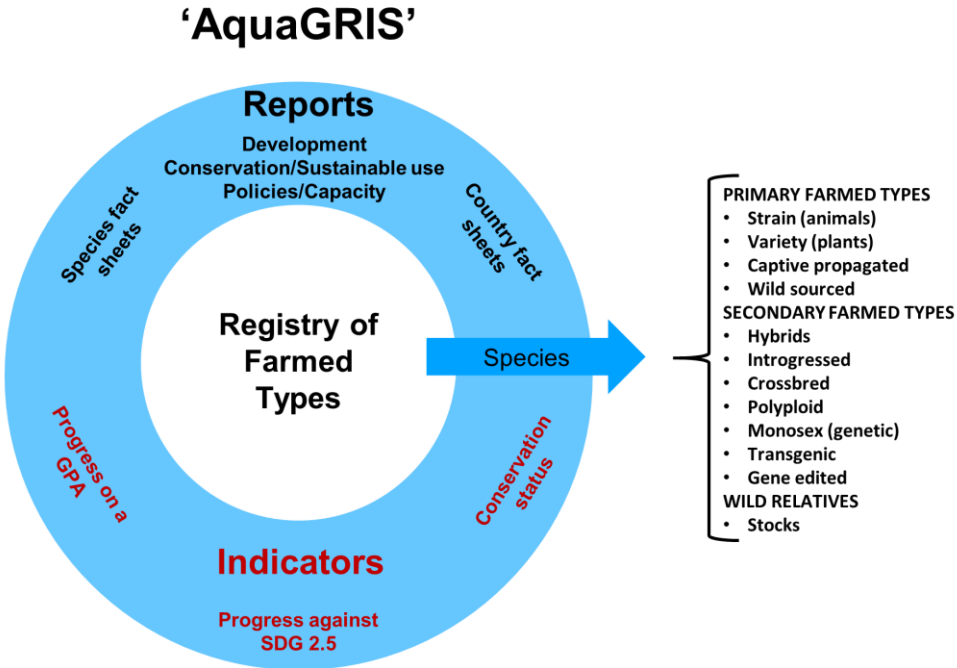


Figure 2. Flow chart outlining the components of the information system and the flow of data.

