CGRFA-13/11/11

May 2011

E

Item 4 of the Provisional Agenda
COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE
Thirteenth Regular Session
Rome, 18 – 22 July 2011

PREPARATION OF *THE STATE OF THE WORLD'S AQUATIC GENETIC RESOURCES*

Summary

In response to the Commission's request, this document outlines the rationale and scope for the preparation of *The State of the World`s Aquatic Genetic Resources* (*SoW AqGR*), proposes a process for preparing the report, and provides an indicative outline of its chapters. The Commission may wish to request FAO to prepare the SoW AqGR based on the outline and following the preparatory process presented in this document.

TABLE OF CONTENTS

I. INTRODUCTION

1. Fisheries and aquaculture are crucial for food security, poverty alleviation and general well-being especially for many poor people around the world. Capture fisheries for food, industrial (fishmeal and fish oil), ornamental, sport and baitfish species target about 5,000 species. Aquaculture involves the farming of over 500 species of finfish, molluscs, crustaceans and other invertebrates, about 20 species of seaweeds, over 30 species of freshwater macrophytes, a few species of amphibians and aquatic reptiles as well as about 50 species of microalgae and invertebrates as fish food organisms in hatcheries.

2. Aquaculture, and capture fisheries and associated secondary activities employ about 180 million people. Farmed and wild-harvested fish (finfish and aquatic invertebrates) and aquatic plants (seaweeds and freshwater macrophytes) are vital contributors to world food security, especially for the provision of animal protein, micronutrients and essential lipids, as well as supporting the livelihoods for the producers, processors and sellers of food fish, fish for non-food uses, ornamental, sport and bait fish, as well as those in the supporting services sector. In 2009, aquaculture and capture fisheries supplied the world with about 144.6 million tonnes of fish (117.8 million tonnes for human consumption) with aquaculture contributing about 47% to the world supply of fish and fish products for human consumption.[1] Aquatic genetic resources (AqGR)[2] underpin the productivity and sustainability of all of these activities. Marine Genetic Resources in Areas Beyond National Jurisdiction (MGRs in ABNJ), including some of the biota associated with hydrothermal vents, are thought to have high potential value.

3. The Commission on Genetic Resources for Food and Agriculture (the Commission), at its Eleventh Regular Session, recognized the importance and vulnerability of AqGR, their roles in an ecosystem approach for food and agriculture and their contributions to meeting the challenges presented by climate change. It agreed that its Multi-year Programme of Work (MYPOW) would cover AqGR for the development of sustainable and responsible fisheries and aquaculture.[3] The Commission requested that coverage of AqGR under the MYPOW should be undertaken in collaboration with, *inter alia*, the FAO Committee on Fisheries (COFI), the Convention on Biological Diversity (CBD), the United Nations Convention on the Law of the Sea (UNCLOS), the United Nations Informal Consultative Process on Oceans and the Law of the Sea, regional and international fisheries organizations and networks, and industry. It noted that FAO is well placed to coordinate sustainable use and conservation of AqGR,[4] and agreed that improving the collection and sharing of information on AqGR was of high priority.[5]

4. The Commission supported for inclusion in the MYPOW a scoping policy analysis to identify gaps and opportunities related to AqGR. It confirmed the need to review and to strengthen information systems, as well as to develop technical guidelines for the conservation and sustainable use of AqGR, in relation to the FAO Code of Conduct for Responsible Fisheries.[6] At its Twelfth Regular Session, the Commission considered the document, *Follow-up to Recommendations Regarding Aquatic Genetic Resources for Food and Agriculture*,[7] which considered steps that would enable the Commission to consider AqGR more fully at its Thirteenth

[1] FAO, 2010. The State of World Fisheries and Aquaculture 2010, p.3. (updated figures for 2009)

[2] Aquatic genetic resources comprise the genetic material (as species, sub-species, populations, individuals, gametes, genes, alleles and DNA) of all aquatic organisms of actual or potential value. In the context of the Commission's mandate, genetic resources comprise primarily the genetic material of fish and aquatic plants that are farmed or harvested from the wild, as well as the genetic material of the aquatic biota in the ecosystems that provide goods and services for fish production.

[3] CGRFA-11/07/Report paragraph 58.

[4] CGRFA-11/07/Report paragraph 59.

[5] CGRFA-11/07/Report paragraph 60.

[6] .CGRFA-11/07/Report, paragraph 61.

[7] CGRFA-12/09/16.

Regular Session.[8] The Commission welcomed the publication of *Technical Guidelines for Aquaculture Development - Genetic Resource Management* [9] and confirmed that it would review, at its Thirteenth Regular Session, the information base for AqGR and key issues for *The State of the World's Aquatic Genetic Resources*. The Commission highlighted the need to harmonize this work with the FAO Committee on Fisheries and its Sub-Committee on Aquaculture.[10]

5. In adopting its MYPOW, the Commission approved as a major milestone for its Fourteenth Regular Session, the preseentation of *The State of the World's Aquatic Genetic Resources*. The MYPOW includes the following major outputs and milestones concerning AqGR: review of the information base for AqGR, and key issues for *The State of the World's Aquatic Genetic Resources* (for CGRFA-13); presentation of *The State of the World's Aquatic Genetic Resources* (for CGRFA-14); development of elements related to the *Code of Conduct for Responsible Fisheries* aimed to maintain a broad genetic basis to ensure sustainable use and conservation of AqGR (for CGRFA-15); and consideration of follow-up to the Commission's Fifteenth Session regarding future work on AqGR for CGRFA-16).[11]

6. In considering the proposed MYPOW with regard to AqGR, the Committee on Fisheries, at its Twenty-seventh Session in February 2007, welcomed "the proposed work for genetic resource management in fisheries and aquaculture"[12] and expressed "its pleasure that the *Code of Conduct for Responsible Fisheries* would serve as a guide for this work."[13] The Sub-Committee on Aquaculture, at its fifth session, requested that FAO continue and be proactive in the work with the Commission towards the preparation of *The State of the World's Aquatic Genetic Resources*, subject to the availability of financial resources.[14]

7. The Conference of the Parties to the CBD, at its tenth meeting, noted the importance of robust data on inland water species in determining the status and trends of these ecosystems, including as key underlying data for other assessments and initiatives, and expressed appreciation for new initiatives, such as the *State of the World's Aquatic Genetic Resources*, being undertaken by the FAO.[15]

8. This document outlines the rationale and scope for the preparation of *The State of the World`s Aquatic Genetic Resources* (*SoW AqGR*), proposes a process for preparing the first report, and provides an indicative outline of chapters of the *SoW AqGR* (see *Appendix 1)*. It is suggested that the main input for the *SoW AqGR* be Country Reports on the Status and Trends of AqGR, complemented by reports prepared by international and regional organizations, as well as thematic background studies as shown in *Appendix 2*. An indicative timeline for the preparation of the *SoW AqGR* is shown in *Appendix 3,* and estimated costs are given in *Appendix 4*.

Preparatory Activities for the SoW AqGR

9. A number of regular programme activities undertaken by FAO will facilitate efforts to prepare the *SoW AqGR*, including: preparation of the *State of the World's Fisheries and Aquaculture Report;*[16] preparation of the *Review of the State of the World Marine Fishery Resources* (FAO, in prep.) collection and analysis of country level data and information on fisheries and aquaculture production and value; establishment and updating of information systems

[8] CGRFA-12/09/Report, paragraph 66.

[9] FAO. 2008. Aquaculture Development: 3. Genetic Resource Management. *FAO Technical Guidelines for Responsible Fisheries* 5 Suppl.3. Rome: FAO. 125p.

[10] CGRFA-12/09/Report, paragraph 67.

[11] CGRFA-12/09/Report/Appendix G page 18, para 17 and pages 19-20.

[12] FIEL/R380, paragraph 51.

[13] FIEL/R380, paragraph 19.

[14] FIRA/R950, paragraph 28.

[15] UNEP/CBD/COP/DEC/X/28, paragraph 3.

[16] *State of the World's Fisheries and Aquaculture Report,* FAO, 2010.

and databases on the fisheries and aquaculture sectors (Aquatic Species Fact Sheets, Cultured Aquatic Species Fact Sheets; The National Fisheries Sector Overview; The National Aquaculture Sector Overview; The National Aquaculture Legislation Overview; The Fisheries Resources Monitoring System; and the Database on Introduced Aquatic Species).

10. The *State of the World's Fisheries and Aquaculture Report* 2010, will be of particular value, as this report provides data and information on *inter alia;* fisheries resources, trends in production, utilization and trade; issues in Fisheries and Aquaculture; it contain a number of Special Studies of relevance to the *SoW AqGR*; and provides an Future Outlook - looking toward the future for inland fisheries. The report reaffirms the importance of aquatic resources as a food source for billions of humans and as income for subsistence and small-scale fishers.

11. FAO has undertaken other initiatives since the last Regular Session of Commission that directly or indirectly will assist efforts to prepare the *SoW AqGR*, including:

- Expert consultations on key issues of and possible processes for the preparation of the *SoW AqGR,* as well as on the information base for AqGR in response to requests by the Commission at its Twelfth Regular Session. These consultations which included many experts from various regions helped considerably to prepare the documentation for this meeting of the Commission.
- Concrete steps towards the preparation of a *Scoping Policy Analysis*, including consultations within FAO and with external experts.
- A background study paper on *Aquatic Genetic Resources and Climate Change: Adaptation and Mitigation,* which serves the purpose of facilitation the Commission's consideration of the cross-sectorial matter of climate change and genetic resources for food and agriculture.
- A special session on the *Role of Aquatic Genetic Resources for Responsible Fisheries and Aquaculture,* held during the *9th Asian Fisheries and Aquaculture Forum* in Shanghai in April 2011.
- The adoption of Guidelines for the Eco-labelling of Fish and Fishery Products from Inland Capture Fisheries that specifically address AqGR in regard to standards for eco-labelling.[17]

II. THE RATIONALE FOR AND THE SCOPE OF *THE STATE OF THE WORLD'S AQUATIC GENETIC RESOURCES*

Rationale and key issues

12. Despite the crucial role of AqGR in contributing to global food security and sustainable livelihoods, information available on AqGR tends to be scattered, is generally incomplete, and the lack of standardization results in poorly accessible data and information. There are major gaps in reporting aquaculture and fisheries data to FAO and in the characterization of aquatic genetic variation at levels below that of the species.[18]

13. Lack of data and information and inadequate standardization results in poor understanding of the status and trends of AqGR to support sound management of the resources, which has resulted in unsustainable practices in some instances. There is, however, growing recognition that genetic information will be increasingly important to support sustainable production from aquaculture and fisheries as well as for enhanced food security and to ensure increased national control of AqGR and improved traceability. There is also an increasing body of information on genetic resources for aquaculture and on genetically distinct fish stocks and cryptic species, and an increasing need for more information to underpin sound management. At the same time, the technical difficulty and costs associated with collecting information on genetic diversity need to be

[18] CGRFA-13/11/Inf.14.

recognized. The additional burden on the often over-loaded capacity in developing countries must also be taken into account; and clear procedures for sustainable development set and implemented.

14. Addressing these gaps cost-effectively requires strengthening capacity for information collection within countries and by improving standardization and quality of information forwarded to FAO. Subspecies level and genetic information should be included where available into established AqGR databases which are linked to FAO, and integrated with publicly available information held in the academic and private sector-based literature, through targeted studies and reviews.

15. Information that needs to be compiled and shared for AqGR is related to, *inter alia*: the status of and threats to free-living wild and feral fish populations (*in situ/in vivo*, in exploited open waters and wetlands, as well as in protected areas); the diversity of genetically distinct farm populations and genetic material in breeding programmes and related research (distinct breeds, pedigree brood stock, hybrids and other genetically altered types); the genetic material that is held in gene banks (*ex situ/in vivo* in public and private aquaria and *ex situ/in vitro* through cryopreservation); and the results and applications of fish genomics research. Information on genetic resources is often limited for many capture fisheries. The management of some fisheries would greatly benefit from accurate genetic information on the stocks they exploit. However, improving the information base on AqGR will be challenging and costly particularly in developing countries.

16. Some of the most important AqGR for aquaculture and capture fisheries are under threat and many populations are declining, resulting in loss of genetic diversity because they exist primarily or exclusively in aquatic habitats that are being progressively reduced and irreversibly damaged. Some of the most important genetic resources for future breeding programmes in aquaculture are not yet documented, valued and protected, and it will be important to further analyze threats to AqGR and to identify counter measures.

17. There is increasing recognition that more efficient methods of farming AqGR need to be developed and this means selecting appropriate stocks, developing improved strains, especially through breeding programmes and disseminating them efficiently while at the same time minimizing impacts on wild resources. Access to and exchange, including transboundary exchange, of AqGR, will be increasingly relevant for the sector. Policies and regulations addressing access to genetic resources, including AqGR, and the fair and equitable sharing of benefits derived from their utilization will therefore need to be analyzed with regard to their impact on and possible role for the conservation and use of AqGR.

18. Policy makers and managers are often unaware of the importance of AqGR, and lack of awareness results in generally inadequate AqGR policy instruments, at international, regional and national levels. Existing legal and policy instruments will need to be analysed with regard to the role they play for the conservation and sustainable use of AqGR.

19. Advances in biotechnology are rapidly enabling improved use of AqGR and can contribute to the characterization and conservation of AqGR, for example, cryopreserved sperm in *ex situ* genebanks. Aquaculture uses captive bred and domesticated populations that are genetically different from wild types, which can pose potential threats to native populations. Effective biosecurity measures are important to keep pace with developments in biotechnology to safeguard humans, biodiversity and the environment.

20. In summary, improvements in knowledge of the status and trends of the use and conservation of AqGR would enable stronger and more comprehensive policy and planning and overall management of these essential resources. In light of the loss and degradation of aquatic habitats and populations resulting in genetic impoverishment, changing environmental and economic conditions and advancement of biotechnology, the country-driven *SoW AqGR* will provide the opportunity to assess the status and trends of AqGR at country, regional and global levels. Opportunities to enhance the contribution of AqGR to food security and rural development are likely to emerge with greater understanding of their current and potential uses. Moreover, the

preparation of the *SoW AqGR* will assist in determining conservation and sustainable use needs and priorities and contribute to raising awareness among policy-makers.

Scope of The State of the World's Aquatic Genetic Resources

21. AqGR comprise the genetic material (as species, sub-species, populations, individuals, gametes, genes, alleles and DNA) of all aquatic organisms of actual or potential value. In the context of the Commission's mandate, genetic resources comprise primarily the genetic material of fish and aquatic plants that are farmed or harvested from the wild, as well as the genetic material of the aquatic biota in the ecosystems that provide goods and services for fish production. Accordingly, the *SoW AqGR* would aim to have a broad scope to provide understanding of the overall nature of AqGR, while ensuring a focus on issues and resources that are deemed most important by countries and stakeholders. For aquaculture and capture fisheries, this approach would imply that genetic resources of all fish (in the broad sense; i.e., finfish, crustaceans, molluscs and other invertebrates), together with the important aquatic plant, micro-organism and animal genetic resources are covered by the *SoW AqGR*. Identification of AqGR that are threatened and endangered, and that are most important for current and future providers of benefits to humans, especially to the rural and urban poor, would be highlighted. However, it is recognized that resource limitations, both human and financial, may require a stepwise approach initially focusing on aquatic species with significant production and value in international trade or importance for food security, the main cultured species and their wild relatives, species that are threatened or endangered and other priorities that countries may wish to apply. This will build on and complement the present assessment of world capture fishery resources by FAO which leads to focus on species generating significant production. In this context, it will be necessary to receive the Commission's advice and guidance on whether certain taxa, particularly aquatic microorganisms, algae, and aquatic macrophytes are better dealt with by their respective sectors and processes or if they should be included under AqGR.

III. THE PROPOSED PROCESS, TIMELINE AND COST ESTIMATES FOR PREPARING *THE STATE OF THE WORLD'S AQUATIC GENETIC RESOURCES*

Establishment of the Global Focal Point for AqGR

22. It is suggested that FAO, subject to the availability of sufficient funding, through its Fisheries and Aquaculture Department, will establish and host a Global Focal Point for AqGR (GFP-AqGR) to provide overall coordination and communication throughout the preparation of the *SoW AqGR*. FAO will assist and support countries, as appropriate, the preparation of the *SoW AqGR* and engage relevant international organizations to assist and facilitate the preparation of the *SoW AqGR*. The FAO Committee on Fisheries, its Sub-Committee on Aquaculture, the FAO and non-FAO Regional Fishery Bodies and other relevant bodies would be informed and invited to contribute to the process.

23. To facilitate preparation of the *SoW AqGR*, the GFP-AqGR could establish partnerships with intergovernmental and non-governmental organizations and seek cooperation and synergy with global programmes and organizations such as, *inter alia*: the CBD; the Ramsar Convention on Wetlands: the UN Environment Programme; the Convention on International Trade in Endangered Species; the UN Convention on the Law of the Sea; the UN Fish Stocks Agreement; the UN Framework Convention on Climate Change; the Consultative Group on International Agricultural Research; the International Union for the Conservation of Nature and Natural Resources; the World Wildlife Fund; the Marine Stewardship Council; and the Marine Aquarium Council.

National Focal Points for AqGR

24. Past experience in the preparation of global assessments indicates the need for National Focal Points (NFP) with clearly defined terms of reference and the need for the NFPs to interact

closely with the FAO GFP in preparing Country Reports that form the basis for the *SoW AqGR*. A national coordinator for AqGR would ideally be appointed to lead the NFP. Members Countries would be requested to officially nominate a NFP to lead the preparation of Country Reports and to ensure that Country Reports are made available in time for the preparation of the *SoW AqGR*.

Country Reports for AqGR

25. The primary source of data and information for the *SoW AqGR* would be Country Reports on AqGR. Accordingly, Country Reports would need to provide assessments of the status and trends of AqGR, as well as the state of management capacities and needs in aquaculture, based on countries' progress reporting in implementing the Code of Conduct for Responsible Fisheries, culture-based fisheries, capture fisheries, research and education, to serve as strategic tools for national and global efforts to enhance the sustainable use and conservation of AqGR, as well as provide the basis for preparing the *SoW AqGR*. Participating countries would need to plan the process for preparation of their Country Report. Upon request, FAO and its partners would provide technical assistance in the prepartion of Country Reports, subject to the availability of the necessary funds. FAO would convene regional and sub-regional meetings to review Country Reports and to identify knowledge and information gaps and consider needs and priorities.

Guidelines for Country Reports

26. The GFP-AqGR would prepare detailed guidelines to facilitate the preparation of Country Reports. Guidelines are essential to ensure consistent reporting which is essential for synthesizing the results for the *SoW AqGR*. The guidelines, including a detailed questionnaire that would be a key element of the guidelines, would facilitate the gathering of key data and information and ensure that Country Reports provide a strategic analysis of the current situation as well as future needs. The guidelines and the detailed questionnaire would be developed by FAO and could be reviewed by an expert consultation. International organizations will be invited to assist the GFP-AqGR support countries, if required and subject to availability of financial resources, to prepare Country Reports; and to convene regional and sub-regional meetings as appropriate, to review Country Reports and to discuss common issues.

Reports from International Organizations and Thematic Studies

27. The GFP-AqGR would encourage reports from international and regional organizations on the state of AqGR, and reports from the private sector, as well as request their support in the preparation of thematic background studies; a similar process to that followed in the preparation of reports on the state of the world plant and animal genetic resources. A number of thematic studies on AqGR will be prepared under the direction of FAO, depending on the availability of financial resources. Fourteen thematic studies are proposed as shown in *Appendix 2*.

Data and Information Collection

28. As much as possible, data and information already collected by FAO will be used to assist both the preparation of Country Reports and the *SoW AqGR*. This will include *inter alia;* Summary tables of fishery statistics; Yearbooks that provide a full range of tables with detailed statistics; and FishStat Plus - a universal software for fishery statistical time series that offers experts and scientists a stand-alone application for complex and sophisticated data exploration and extraction. Indeed, the preparation of the *SoW AqGR* will benefit from ongoing efforts to improve data and information on fisheries resources. The Strategy for Improving Information on Status and Trends of Capture Fisheries (Strategy-STF), adopted by FAO Members and endorsed by the UNGA in 2003, and the Strategy and Outline Plan for Improving Information on Status and Trends of Aquaculture (Strategy – STA) adopted by FAO Members in 2007 provide an overall framework and plan for the improvement of fishery statistics and information. The FishCode-STF Project supports implementation of the Strategy-STF, with a particular emphasis on capacity building in developing countries. FAO is promoting the use of standard international classifications and definitions, as the use of international concepts, classifications and methods will promote

international data comparability. FAO is also providing technical assistance to countries to enhance capacity to collect, process and analyse fishery statistical data. The UN Global Strategy to Improve Agricultural and Rural Statistics of 2010 also addresses fishery and aquaculture statistics.

Development of elements related to the Code of Conduct of Responsible Fisheries

29. In adopting its MYPOW, the Commission agreed to include in it, as a milestone for the Commission's Fifteenth Regular Session, the development of elements related to the Code of Conduct of Responsible Fisheries aimed to maintain a broad genetic basis and to ensure sustainable use and conservation of AqGR. While the work on such elements may be initiated before the SoW AqGR is finalized, it would seem to be wise to wait with the finalization of any policy conclusions until the work on the *SoW AqGR* has been concluded.

The timeline

30. An overview of the proposed timeline for preparing the first report on the *SOW AqGR* is given in *Appendix 3* to this document. The presentation of the *SoW AqGR* is foreseen within the Commission's *Multi Year Programme of Work* at its Fourteenth Regular Session. However, given the need to mobilize significant human and financial resources to enable establishment and full operation of the GFP-AqGR, to support countries in their preparation of Country Reports, to synthesize received Country Reports and reports from international organizations as well as complete required thematic studies, the Commission may wish to agree to have the first report on the *SoW AqGR* be made available at its Fifteenth Regular Session. This adjustment is reflected in the proposed timeline. The timeline indicates the establishment of NFPs and preparation of guidelines for Country Reports in 2011; and preparation of Country Reports, reports from organization and thematic studies from 2012-2013. The Commission would receive a progress report at its next Regular Session. Preparation of the draft first report on the *SoW AqGR* would occur in 2013-2014, with review of the draft through an expert consultation or by an Intergovernmental Technical Working Group on Aquatic Genetic Resources, if established, in 2014, with presentation of the first report to the Commission at its Fifteenth Regular Session in 2015. Elements related to the Code of Conduct of Responsible Fisheries aimed to maintain a broad genetic basis and to ensure sustainable use and conservation of AqGR would be considered at the Commission's Sixteenth Regular Session.

31. Preparation of the draft *SoW AqGR* would involve experts to synthesize chapters from all the inputs received. A review mechanism would be put in place for each draft chapter, including reviews through NFPs for AqGR. Regional consultations would be conducted as appropriate, and subject to availability of financial resources. Thematic Background Studies would be peer reviewed. The GFP AqGR would provide opportunities for stakeholders, including for relevant international organizations and non-governmental organizations, to review the draft *SoW AqGR*.

Estimated costs

32. Indicative costs for the overall process to prepare the *SoW AqGR,* are given in *Appendix 4*. The estimated total is USD 6,000,300 to establish and maintain the GFP AqGR within FAO; to support participation of developing countries in the process, including assistance for the preparation of Country Reports; to convene consultations and workshops and regional meetings; to hire consultants; to conduct expert meetings; to prepare Thematic Background Studies*;* to undertake reviews of the first draft of *SoW AqGR*; and to complete final editing and layout of the document. The FAO Fisheries and Aquaculture Department supports the process through targeted activities as outlined in the introductory part of this document as well as by currently providing part time of a senior staff member and an alternate for coordination.

IV. GUIDANCE SOUGHT

33. The Commission may wish to:

(i) Request FAO to prepare a first report on *SoW AqGR*, subject to the availability of the required funds, based on the outline provided in *Appendix 1* to this document and following the preparatory process presented in *Appendix 3*, for its Fifteenth Regular Session, as the first authoritative assessment of AqGR;

(ii) Encourage Members Countries to participate in the process by preparing Country Reports for *SoW AqGR* and strengthening their information systems for AqGR;

(iii) Invite donors to provide the required financial resources, taking note of the financial resource requirements indicated in *Appendix 4*; and

(iv) Invite relevant international and regional organizations to participate in the process for preparing the *SoW AqGR*, including providing reports to FAO.

APPENDIX 1

PRELIMINARY PROPOSED OUTLINE BY CHAPTER

	Chapter Title	*Scope of Chapter*	*Issues and elements*
1	**An Overview of AqGR**	Definitions of AqGR and overviews of their value and importance for food security – between and within species diversity in aquaculture and capture fisheries; threats; opportunities; challenges	Characteristics of AqGR; their differences and similarities with other genetic resources for food and agriculture (plant, animal, forestry, microorganisms); the state of knowledge and the knowledge gaps about AqGR for aquaculture and capture fisheries, including aquatic plants, animals and microorganisms not covered in other reports; threats and risk status – causes of genetic erosion.
2	**AqGR Conservation and Use**	AqGR conservation and use: management – strategies - programmes and their implementation	Aquaculture and capture fisheries production systems; including those for ornamental and sport and bait fish - low public awareness; lack of effective policies; limited information; need for twinning use and conservation; need for capacity building; role of the Code of Conduct for Responsible Fisheries; the Ecosystem Approach to Fisheries (EAF) and to Aquaculture (EAA), to help to fill these gaps; split into 2 sub-chapters: for aquaculture/culture- based fisheries and for capture fisheries.
3	**Trends Affecting Aquaculture and Capture Fisheries: Implications for AqGR**	Assessment of impacts of global trends in aquaculture and capture fisheries, and their management	Status, indicators, drivers and trends for a standardized classification of aquaculture and capture fisheries production systems; Environmental, economic, social, political trends and outlook - Positive and negative implications - Threats and opportunities; split into 2 sub-chapters: for aquaculture/culture- based fisheries and for capture fisheries.
4	**Capacities for the Management of AqGR**	Capacities of stakeholders and institutions involved in AqGR management (defined as sustainable use; integrated with conservation) at international, regional, subregional, national and local levels	Infrastructures, institutional and human capacities – public and private sectors, including operations at local level – capacities for the development and implementation of AqGR management strategies, genetic improvement in aquaculture, information sharing and networking, mainstreaming AqGR management into making and implementing national policies for aquaculture, culture-based fisheries and capture fisheries management and for contributing to broader international, regional and subregional national policies and programmes; building awareness and capacities

	Chapter Title	*Scope of Chapter*	*Issues and elements*
			through education and training; split into 2 sub-chapters: for aquaculture/ culture-based fisheries and for capture fisheries. The chapter will draw its information from the ongoing countries' reporting to FAO on implementing the Code of Conduct for Responsible Fisheries.
5	**Institutional, Policy and Legal Frameworks for AqGR**	Institutional, policy and legal frameworks for AqGR management at national, regional, subregional and global levels	Institutions and organizations responsible for AqGR management, including coordination mechanisms – legal framework and traditional use rights in AqGR management - AqGR in national aquaculture, culture-based fisheries and capture fisheries programmes and other national strategies and policies on: alien species; biodiversity, climate change, environment quality, land and water use, poverty reduction, protected areas etc. – International, regional and sub-regional agreements – frameworks for the exchange and use of aquatic genetic material; split into 2 sub-chapters: for aquaculture/culture- based fisheries and for capture fisheries.
6	**State of Knowledge about AqGR**	Current knowledge and knowledge gaps for the characterization, conservation and biotechnological use of AqGR	Technologies for characterization, conservation and biotechnological use; split into 2 sub-chapters: for aquaculture/culture- based fisheries for capture fisheries.
7	**Current and Emerging Information Systems for AqGR**	Information systems and databases that cover AqGR and that link to other information systems and databases of relevance to biodiversity for food and agriculture	History, present status and future plans of all relevant public domain information systems and databases – linking AqGR information to fish production and value statistics and to improving the management of production systems - information sources in the private sector; split into 2 sub-chapters: for aquaculture and culture-based fisheries and for capture fisheries.
8	**Stakeholders in the Conservation and Sustainable Use of AqGR: Valuation, Access and Benefit Sharing, and Rights**	Main stakeholders in aquaculture and capture fisheries and along the chains that provide fish, fish products and related goods and services to the public, including indigenous peoples and local communities	Keepers of aquatic genetic diversity - conservation as a sector - farmers, fishers, processors and marketers – trade – ecolabelling; split into 2 sub-chapters: for aquaculture/culture- based fisheries and for capture fisheries.
9	**AqGR for Food Security**	The contributions of aquatic produce to	Aquatic plants and fish as human foods of high quality and importance, especially for

	Chapter Title	*Scope of Chapter*	*Issues and elements*
	and Nutrition: Cross-Sectoral and Ecosystem-based Perspectives	food security and nutrition, as sources of protein, essential lipids and micronutrients; taking cross-sectoral and ecosystem-based perspectives so that those contributions are optimized and sustained; aquaculture and fisheries in synergy with other sectors	supply of protein, lipids that ensure the good development and functioning of the brain, and micronutrients; a holistic view of aquaculture and fisheries in synergy with other food and agriculture sectors, sharing the same ecosystems and benefitting the same people.
10	**Needs, Challenges and Required Responses for the Future Sustainable Use and Conservation of AqGR**	Synthesis - gaps and needs	Syntheses of gaps and needs and challenges identified in previous chapters – for future action.

APPENDIX 2

PRELIMINARY INDICATIVE LIST OF PROPOSED THEMATIC BACKGROUND STUDIES

	Subject	*Rationale*
1	**Incorporating Genetic Diversity into Aquaculture and Capture Fisheries Statistics**	Production and value statistics for aquaculture and capture fisheries are highly aggregated to species or commodity group levels, with many not even identifying the species used. Management of fish stocks and oversight and development of responsible aquaculture requires management of genetic diversity, linked to production.
2	**Domestication and Gene Flow in Aquaculture and Culture-based Fisheries: Implications for Fish Production and Conservation of AqGR**	Aquaculture and culture-based fisheries are in a dynamic state of development, with inadequate documentation of the domestication process for aquaculture, gene flow in breeding programmes and exchanges of aquatic germplasm, and interactions of farmed and stocked fish with wild fish populations.
3	**Biotechnology in Aquaculture, Capture Fisheries and Conservation of AqGR**	Aquaculture, capture fisheries and conservation of AqGR are making increasing use of biotechnology, with advances often outpacing the development of policy and regulatory frameworks; the key is to harness biotechnology for beneficial ends, with biosecurity ensured through precaution and sound management of risks.
4	**Genomic Research on Aquatic Organisms and its Implications for Aquaculture, Capture Fisheries and Conservation**	Genomic research on aquatic organisms is advancing rapidly and its results will have many applications. The state of knowledge of the genomics of aquatic organisms, as well as likely future developments, requires coverage in a State of the World Report.
5	**Threats to AqGR for Aquaculture and Capture Fisheries: Options for Countermeasures**	AqGR face a wide range of threats including: overfishing, and especially illegal, unreported and unregulated fishing; degradation of ecosystems; water pollution; water abstraction; diseases and parasites; climate change; interactions between wild and famed populations; alien and invasive species; irresponsible aquaculture and destructive fishing practices etc. Countermeasures exist but need wider application and improvement.
6	**Genetic Resources for Farmed and Wild-harvested Seaweeds**	The farming of seaweeds to produce chemicals for the food and other industries, as well as products for direct consumption as human food, is the world's largest aquaculture

	Subject	*Rationale*
		operation. There is also extensive wild harvesting of edible seaweeds. The genetic resources of these important aquatic plants require coverage in a State of the World Report.
7	**Genetic Resources for Farmed and Wild-harvested Freshwater Macrophytes for Food and Agriculture**	The farming and wild harvesting of freshwater macrophyes, for human, animal and fish feeds, is extensive and has potential for expansion. The genetic resources of these important aquatic plants require coverage in a State of the World Report.
8	**Genetic Resources for Micro-organisms of Current and Potential Use in Aquaculture**	Bacteria, cyanobacteria, microalgae and fungi are cultured extensively as feed sources in aquaculture. Some bacteria are used as probiotics to enhance fish growth and health. Many species and strains of microalgae are kept as *ex situ* culture collections. The genetic resources of these important micro-organisms for food and agriculture require coverage in a State of the World Report.
9	**Genetic Resources for Sport Fishing and Supply of Wild and Farmed Baitfish**	Sport fishing, in inland and coastal waters is the world's largest recreational activity in natural ecosystems. Its profitability and sustainability depend on sound conservation measures, for which information on genetic diversity and the impacts of fishing and other human interventions are essential. This perspective is not yet widely used in sport fisheries management. The same applies to the supply, from farming and wild harvesting, of baitfish.
10	**Genetic Resources for Ornamental Fish and Aquatic Plants**	Freshwater and marine ornamental fish and freshwater ornamental plants are farmed and wild-harvested to supply an immensely valuable worldwide industry. The domestication and production of ornamental fish and aquatic plant varieties is advanced for some species. Capture fisheries and wild harvesting of ornamental fish and aquatic plants face the same threats as other capture fisheries. A genetic resources perspective is essential to put these activities on to a more responsible and sustainable basis. The release of ornamental fish and aquatic plants as alien invasive species is a global problem.
11	**Economic Valuation of AqGR for Aquaculture, Capture Fisheries and Related Research**	Few attempts have yet been made to estimate the value of AqGR for aquaculture, capture fisheries and related research. This gap is serious. *In situ* AqGR, including those in aquatic protected areas, and *ex situ* collections, are undervalued. Their conservation is therefore under-resourced.

	Subject	*Rationale*
12	**Stakeholders Whose Food Security and Livelihoods Depend on AqGR**	The importance of AqGR for farmers, fishers, food processors, marketers and consumers has not been adequately assessed. As genetic diversity in fish production statistics, eco-labelling of fish products, conservation, and other ethical concerns become increasingly important, the concerns of stakeholders must be adequately canvassed and addressed.
13	**Aquatic Protected Areas for Long-term Conservation and Sustainable Use of AqGR**	The world's aquatic protected areas, including Ramsar sites, nature reserves, national parks, sacred groves and ecotourism sites, have immense importance for the conservation and sustainable use of AqGR, but most have yet to be inventoried and managed from this perspective.
14	**Marine Genetic Resources in Areas Beyond National Jurisdiction**	There is a wide diversity of MGRs in ABNJ, including some of high potential value. The UN General Assembly has requested FAO to contribute to coverage of MGRs in ABNJ.

APPENDIX 3

TIMELINE FOR PREPARING *THE STATE OF THE WORLD'S AQUATIC GENETIC RESOURCES*

2011	• The Commission requests FAO to prepare *SoW AqGR* for presentation at its Fifteenth Regular Session • The Commission requests countries to prepare Country Reports for *AqGR* and strengthening their information systems for AqGR, and by establishing a NFP for AqGR • The Commission appeals to donors to provide the required financial resources for preparation of the Country Reports and the *SoW AqGR* • The Commission invites international and regional organizations to participate in the process for preparing the *SoW AqGR* • The Commission requests FAO as the GFP -AqGR to prepare Guidelines for Country Reports in consultation with experts and NFPs for AqGR
2012	• FAO undertakes consultation of the draft Guidelines for Country Reports and finalizes and distributes the Guidelines to NFPs-AqGR • Countries begin preparation of Country Reports, through National Focal Points, with FAO assistance and through regional networks and workshops as required • FAO requests international and regional organizations and others to submit reports as contributions to the *SoW AqGR* • FAO over sees preparation of Thematic Background Studies, including ensuring peer reviews
2013	• Deadline for submission of Country Reports and Reports by International and Regional organizations and others • Presentation of a Progress report to CGRFA-14 • Deadline for submission of thematic background studies
2014	• FAO prepares a first draft report on the *SoW AqGR* • FAO organizes review of first draft report on *SoW AqGR* by NFPs AqGR, the ITWG AqGR, if established, and international organizations and non-governmental organizations
2015	• First draft report of the *SoW AqGR* available to the Commission at its Fifteenth Regular Session • Commission initiates the development of elements related to the *Code of Conduct of Responsible Fisheries* aimed to maintain a broad genetic basis and to ensure sustainable use and conservation of AqGR

APPENDIX 4

COST ESTIMATES

Item	*Cost (US$)*	*Calculation*	*Purpose and notes*
Staff costs	**600,000**	One P3/P4 staff appointment for 30 months (600,000); assisted by two APOs	As a hub for coordination of the preparatory process
Regional and sub-regional consultants	**700,000**	20 consultants @ 35, 000/consultant; each 2 – 3 months honorarium, plus travel	To provide advice and assistance to countries in the preparation of Country reports, including involvement of stakeholders
Support to preparation of Country Reports, including stakeholder consultations	**2,000,000**	c. 100 countries @ 20, 000/country	To provide support to the preparation of Country Reports, including national workshops and consultations
Expert meetings and workshops	**700,000**	14 meetings / consultancies @ 50, 000/meeting	To support development of Thematic Background Studies and other background material for the Report
Regional meetings	**1,250,000**	10 meetings @125,000/meeting	To review Country Reports, discuss regional issues related to the SoW-AqGR and identify common needs and priorities for action.
Editorial and layout	**60,000**	An Editor and a Layout Expert for 6 months each	To edit and layout the draft consolidated report and the final volume
Sub total	**5,310,000**		
Project Servicing Costs	**690,300**	@ 13%	
Grand Total	***6,000,300***		