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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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Fourteenth Regular Session

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DRAFT GUIDELINES FOR PREPARATION OF COUNTRY REPORTS FOR *THE STATE OF THE WORLD'S AQUATIC GENETIC RESOURCES FOR FOOD AND AGRICULTURE*

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I. INTRODUCTION

1. At its Thirteenth Regular Session, the Commission noted that the preparation of a country-driven *State of the World's Aquatic Genetic Resources for Food and Agriculture* would provide countries with opportunities for assessing the status of their aquatic genetic resources for food and agriculture and enhancing the contributions of aquatic genetic resources to food security and rural development, while assisting countries in determining their needs and priorities for the conservation and sustainable use of aquatic genetic resources for food and agriculture, and raising awareness among policy-makers.¹

II. COUNTRY REPORTS

2. As with the other sectors, *The State of the World's Aquatic Genetic Resources for Food and Agriculture* will be compiled from Country Reports and Guidelines are necessary in order to assist countries in completing those reports. The draft guidelines presented here (Appendix A) were developed in consultation² with international experts in the fields of aquaculture, capture fisheries, aquatic ecology and international development and conservation. Those experts noted the challenges that many countries will face in completing the country reports and recognized that support from and partnerships with other groups and institutions will be essential.

¹ CGRFA -13/11/11. paragraph 20.

² FAO workshop on FINALIZATION OF GUIDELINES FOR PREPARATION OF COUNTRY REPORTS FOR THE FIRST REPORT ON THE STATE OF THE WORLD'S AQUATIC GENETIC RESOURCES FOR FOOD AND AGRICULTURE, Regional Office for Asia and the Pacific, Bangkok Thailand, 28 – 30 January, 2013.

APPENDIX A

**GUIDELINES FOR PREPARATION OF COUNTRY REPORTS FOR
THE STATE OF THE WORLD'S AQUATIC GENETIC RESOURCES FOR
FOOD AND AGRICULTURE**

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THE ESSENTIAL ROLES AND BENEFITS OF COUNTRY REPORTS

The *State of the World's Aquatic Genetic Resources for Food and Agriculture* will be compiled from Country Reports. These guidelines are provided to assist countries in reporting under a common framework on aquatic genetic resources for the capture fisheries, aquaculture and culture-based fisheries that contribute to their food security and nutrition, livelihoods, poverty alleviation and the economy.

This is the first global exercise in country reporting on aquatic genetic resources for food and agriculture. The preparatory process for Country Reports will be a strategic planning and capacity strengthening exercise.

Country Reports will become powerful tools for improving the conservation, sustainable use and development of aquatic genetic resources for food and agriculture, at national and regional levels.

Country Reports will identify threats to aquatic genetic resources, gaps in information about aquatic genetic resources and needs for the strengthening of national capacity to manage aquatic genetic resources effectively.

Country Reports will inform the development of national policies, legislation, research and development, education, training and extension concerning the conservation, sustainable use and development of aquatic genetic resources for food and agriculture.

Country Reports will contribute to raising public awareness about the importance of aquatic genetic resources for food and agriculture.

Country Reports on aquatic genetic resources for food and agriculture will complement other country reporting on the conservation, sustainable use and development of biodiversity for food and agriculture.

I. INTRODUCTION

Aquatic Genetic Resources

1. Aquatic genetic resources sustain the current productivity of capture fisheries, aquaculture and culture-based fisheries and provide for their future productivity and sustainability when facing the challenges of global change, including climate change and changing demands for aquatic products.

2. In 2010, the contributions of fisheries and aquaculture to world fish supply were 88.6 and 59.9 million tonnes respectively. In 2009, fish accounted for 16.6 per cent of the world population's total intake of animal protein and 24.0 per cent of the animal protein intake in low- income food deficit countries (LIFDCs).³

3. Aquatic genetic resources for food and agriculture comprise all genetic material of actual or potential value for the productivity and sustainability of capture fisheries, aquaculture and culture-based fisheries, including finfish, crustaceans, molluscs and other aquatic invertebrates, aquatic microorganisms, plants, amphibians, reptiles and mammals.

4. Aquatic genetic resources for food and agriculture have high diversity. Capture fisheries target several thousand species. Over 300 species are farmed in aquaculture and more are under consideration for domestication or as contributors of genetic material in breeding programmes. Microalgae and aquatic invertebrates are used as live feeds in fish hatcheries with microalgae also being consumed by humans.

The Call for Country Reports

5. At its Thirteenth Regular Session, the Commission noted that the preparation of a country-driven *State of the World's Aquatic Genetic Resources for Food and Agriculture* would provide countries with opportunities for assessing the status of their aquatic genetic resources for food and agriculture and enhancing the contributions of aquatic genetic resources to food security and rural development, while assisting countries in determining their needs and priorities for the conservation and sustainable use of aquatic genetic resources for food and agriculture, and raising awareness among policy-makers.⁴

6. According to the revised timeline for the Commission's Multi-year Programme of Work, the preparation of Country Reports on aquatic genetic resources for food and agriculture will begin in 2013, assisted by FAO with regional networking and workshops, and will continue in 2014. Country Reports should be completed by 2015.

How to use this document

7. This document provides guidance to help countries complete their Country Reports. Chapters I – IV cover general concepts, while Annex 1 provides more detailed information, Annex 2 contains standard templates to assist reporting and Annex 3 contains definitions for key terms and concepts. Chapter I provides general background on the importance of AqGR and the work of the Commission. Chapter II describes the overall objectives of the document, i.e. the Guidelines, and how they will be used to complete the Country Reports. Chapter III provides suggested scope and contents of the Country Reports as well as a recommended structure. Chapter IV details the time line for completion of the Country Reports and suggests how Countries may wish to organize their work at the national level.

³ FAO. 2012. *The State of World Fisheries and Aquaculture 2012*. Rome: FAO. 230p.

⁴ CGRFA -13/11/11. paragraph 20.

8. Annex 1 provides more specific guidance on each chapter of the Country Report with questions that will help guide completion of the reports. The questions should be read with a mind to stimulate discussion and to assist countries in reporting on their aquatic genetic resources and related needs.

9. Templates for key sections of the Country Report are provided in Annex 2. Countries are encouraged to use these templates in the country reports.

10. Key terms and concepts are defined in Annex 3.

II. OBJECTIVES OF THESE GUIDELINES

11. These guidelines constitute the main reference documentation for the preparation of Country Reports on aquatic genetic resources for food and agriculture.

12. These guidelines have been designed by FAO to assist countries in the following tasks:

- To undertake a strategic assessment of their aquatic genetic resources for food and agriculture, including current and potential use in capture fisheries, aquaculture and culture-based fisheries and all purposeful stocking of waters for conservation and production.
- To document the perspectives and needs of stakeholders with interests in aquatic genetic resources and any arrangements for access and benefit sharing within and outside the country.
- To identify the capacity strengthening needed for the conservation, sustainable use and development of aquatic genetic resources for food and agriculture.
- To identify gaps in institutional and policy-making frameworks for the conservation, sustainable use and development of aquatic genetic resources for food and agriculture.
- To improve information gathering and reporting on the conservation, sustainable use and development of aquatic genetic resources for food and agriculture, at national, regional and global levels.
- To provide a common framework for information gathering and reporting for *The State of the World's Aquatic Genetic Resources for Food and Agriculture*.
- To encourage and facilitate the acquisition and use of information on aquatic genetic resources for food and agriculture in order to support policy-making, strategy development and related activities including, *inter alia*:
 - Documenting the contributions of distinct intraspecific types (subspecies, stocks, strains, triploids etc.) and hybrids to national capture fisheries, aquaculture and culture-based fisheries production.
 - Improving information on the status and trends of aquatic genetic resources that sustain capture fisheries, aquaculture and culture-based fisheries.
 - Providing relevant information on the status and trends of aquatic genetic resources for use in National Fisheries Sector Overviews, National Aquaculture Sector Overviews and National Aquaculture Legislative Overviews.

- Participating in international efforts for the *in situ* and *ex situ* conservation of aquatic genetic resources for food and agriculture and their exchange for research and development and production purposes.
- Reporting on aquatic genetic resources for food and agriculture as contributions towards the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets⁵ that concern the conservation, sustainable use and development of aquatic biodiversity.

13. FAO recognizes that there are major differences among countries concerning the diversity and importance of aquatic genetic resources for food and agriculture and that these differences will be reflected in Country Reports. However, a common framework for preparing Country Reports is essential to enable compilation of *The State of the World's Aquatic Genetic Resources for Food and Agriculture*, including regional and global syntheses. Countries should therefore strive to follow as closely as possible the scope, structure and contents for Country Reports recommended in these guidelines.

14. Countries should decide which of the questions are most relevant for their current and future uses of aquatic genetic resources for food and agriculture and should report accordingly. Countries need answer all questions.

III. RECOMMENDED SCOPE, STRUCTURE AND CONTENTS

Recommended Scope

15. Countries are invited to report on the aquatic genetic resources within their national jurisdictions that have current or potential importance in capture fisheries, aquaculture and culture-based fisheries and related research. Countries are also invited to comment on any of their aquatic genetic resources for food and agriculture that have current or potential importance at sub-regional, regional and global levels.

16. Countries will decide on the extents to which they report on their aquatic genetic resources for capture fisheries, aquaculture, culture-based fisheries and related research, according to the relative importance of those sub-sectors and the information available. Information gaps should also be reported.

17. Countries should report on their aquatic genetic resources using the best available levels of taxonomic identification and nomenclature, including the following: commodity groups, species, subspecies, hybrids, stocks and other management units, wild types, crossbreeds, strains, triploids, other distinct farmed types and DNA sequences.

18. Countries should report on their genetic resources for all wild-harvested and farmed aquatic organisms, including: aquatic plants (microalgae, seaweeds, and freshwater macrophytes); aquatic invertebrates (sponges, worms, molluscs, crustaceans, insects, echinoderms, tunicates and minor phyla); finfish; amphibians (frogs and salamanders); aquatic reptiles (crocodiles and turtles); and aquatic mammals (whales, dolphins and seals).

19. Countries should not report on the genetic resources of any aquatic plants, animals and forest trees that are covered in their reporting as genetic resources for other food and agriculture sectors, for example: the genetic resources for rice and other aquatic crops, reported as plant genetic resources; the

⁵ CBD. 2011. Memorandum of Cooperation Between International Agencies, Organizations and Conventions and the Secretariat of the Convention on Biological Diversity On the Implementation of the Strategic Plan for Biodiversity 2011-2020 and the Achievement of the 2020 Aichi Biodiversity Targets. Signed by the CBD, FAO and others on November 4, 2011. The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets are available at: www.cbd.int/sp

genetic resources of waterfowl and water-associated mammals, reported as animal genetic resources; and the genetic resources of tree species in mangroves and flooded forests, reported as forest genetic resources .

20. Countries should report on the genetic resources of all aquatic organisms that are targeted by or have future potential for their capture fisheries, including subsistence, small- or large-scale commercial fisheries, in all waters and wetlands under national jurisdiction.
21. Countries should report on aquatic genetic resources that sustain their capture fisheries in waters and wetlands under national jurisdiction, including subsistence, small- and large-scale commercial fisheries that target the following: species consumed by humans for food or for medicinal purposes; species used in industrial processing to produce fishmeal and fish oil or as low value/trash fish for feeding farmed fish and livestock; ornamental species; species for recreational fisheries; wild brood stock or seed to be used in aquaculture or culture-based fisheries; and bait species.
22. Countries with a large number and wide diversity of capture fisheries will decide the extents to which they report on the aquatic genetic resources for particular capture fisheries, depending upon their relative importance, but reporting should be as comprehensive as possible.
23. Countries should report on the aquatic genetic resources that are in use or have potential for all types and scales of aquaculture and culture-based fisheries that produce the following: species consumed by humans, live feeds used in hatcheries and fish farms, ornamental species, species used in recreational fisheries; and bait species.
24. Countries with a large number and wide diversity of aquaculture and/or culture-based fisheries will decide on the extents to which they report on the aquatic genetic resources for particular aquaculture and culture-based fisheries operations depending upon their relative importance, but reporting should be as comprehensive as possible.
25. Countries should document traditional knowledge held by fishers, farmers, conservationists, local communities and other stakeholders that can be applied to the conservation, sustainable use and development of aquatic genetic resources.
26. Countries should report on the main drivers that have impacts on their aquatic genetic resources, including climate change, changing demands for aquatic produce, and the emergence and application of new biotechnologies.
27. Countries should describe existing and planned *in situ* conservation measures for their aquatic genetic resources, including conservation through sustainable use in responsible and well managed capture fisheries, aquaculture and culture-based fisheries and through the establishment and management of aquatic protected areas.
28. Countries should describe existing and planned *ex situ* conservation measures for their aquatic genetic resources, including the establishment and management of public and private collections of live breeding individuals and of genetic material held *in vitro*, including cryopreserved gametes and embryos.
29. Countries should document the roles, perspectives and needs of stakeholders with interests in aquatic genetic resources.
30. Countries should summarize the sub-regional, regional and global agreements, conventions, treaties and programmes to which they are parties or contributors concerning the conservation, sustainable use and development of aquatic genetic resources for food and agriculture.

Recommended Structure

31. The Country Report should begin with an Executive Summary (Section I) to summarize its main contents and findings, followed by an Introduction (Section II) to provide general background information about the country, its peoples, its capture fisheries, aquaculture and culture-based fisheries, and the stakeholders who depend upon aquatic genetic resources for food and agriculture.

32. The following structure is recommended for the Main Body of the Country Report (Section III). Countries are invited to add further chapters to cover any specific issues and requirements that cannot be covered adequately under these chapter headings:

Chapter 1: The Use of Aquatic Genetic Resources in Capture Fisheries, Aquaculture and Culture-Based Fisheries

Chapter 2: Drivers and Trends in Capture Fisheries, Aquaculture and Culture-Based Fisheries: Consequences for Aquatic Genetic Resources

Chapter 3: *In Situ* Conservation of Aquatic Genetic Resources

Chapter 4: *Ex Situ* Conservation of Aquatic Genetic Resources

Chapter 5: Stakeholders with Interests in Aquatic Genetic Resources

Chapter 6: Policies and Legislation for Aquatic Genetic Resources, Including Access and Benefit Sharing

Chapter 7: Research, Education, Training and Extension on Aquatic Genetic Resources: Coordination, Networking and Information

Chapter 8: International Collaboration on Aquatic Genetic Resources

Recommended Contents

33. Each country will decide on the specific content and main issues to be addressed in its Country Report. It is recommended that Country Reports will as far as is possible:

- Address the main current and future issues concerning the conservation, sustainable use and development of aquatic genetic resources for food and agriculture.
- Describe the aquatic genetic resources that are important for sustaining current and future capture fisheries, aquaculture, culture-based fisheries and related research.
- Describe the drivers that affect the status of aquatic genetic resources for capture fisheries, aquaculture, culture-based fisheries and related research and summarize the trends in their use and availability over the past 10 years, with projections for the next 10 years where possible.
- Identify new and emerging issues and opportunities.
- Identify the main challenges, opportunities and priorities for achieving the conservation, sustainable use and development of aquatic genetic resources.
- Identify immediate and long-term needs for capacity strengthening to achieve the conservation, sustainable use and development of aquatic genetic resources at the national level and to contribute at regional and global levels.

34. Annex 1 of these guidelines provides a chapter-by chapter structure for Country Reports, together with sets of questions to be answered. The questions are suggested to stimulate discussion and to assist countries in reporting on their aquatic genetic resources and related needs.
35. It is not necessary to answer every question. However, all countries are encouraged to complete annotated inventories of their aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries as called for in Chapter 1.
36. Annex 2 provides templates for making annotated inventories of aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries and for summarizing information on stakeholders with interests in aquatic genetic resources for food and agriculture.
37. Annex 3 provides definitions of key terms.
38. Country reports should finish with an Annex summarizing the reporting process, including the major sources of information used, the names of contributors, meetings held etc.

IV. TIMELINE AND RECOMMENDED INSTITUTIONAL STEPS

Timeline

39. In April 2012, FAO invited countries to nominate a National Focal Point for the preparation of a Country Report on aquatic genetic resources.
40. These guidelines are provided for countries to begin preparation of their Country Reports in 2013 through their National Focal Points, with regional networking and workshops where possible.
41. FAO will prepare and present to the Commission at its Fourteenth Regular Session a report on progress towards preparation of *The State of the World's Aquatic Genetic Resources for Food and Agriculture*.
42. Country Reports should be finalised and submitted to FAO in 2015, in order for them to be used in preparing *The State of the World's Aquatic Genetic Resources for Food and Agriculture*.
43. If countries are unable to submit final Country Reports by 2015, preliminary reports of findings should be provided to FAO to contribute to the identification of global priorities for inclusion in *The State of the World's Aquatic Genetic Resources*.
44. FAO will then prepare a first draft of *The State of the World's Aquatic Genetic Resources for Food and Agriculture* and will organize reviews by the National Focal Points, international organizations and non-governmental organizations, and other bodies as appropriate.
45. In 2017, *The State of the World's Aquatic Genetic Resources for Food and Agriculture* will be presented to the Commission at its Sixteenth Regular Session.

Recommended Institutional Steps

46. The following steps are recommended in undertaking the preparation of the Country Report, using a participatory approach:
- Each country should appoint one office for preparation of the Country Report as the point for contact between the country and FAO. Countries should provide to FAO the name and address of the National Focal Point for the country reporting process, as soon as possible.

- Each country should establish a National Committee to oversee the preparation of the Country Report and to harmonize this national reporting on aquatic genetic resources with the work of national offices that report to FAO and to other international and regional organizations on capture fisheries, aquaculture, culture-based fisheries and aquatic biodiversity.
 - It is recommended that the National Committee include as many representative stakeholders as practical. The National Committee should consult with key stakeholders and should meet as frequently as possible to review progress.
 - The National Committee can establish *ad hoc* groups and convene consultations, as and when appropriate, in order to address specific issues as they arise, as well as to provide expert advice.
 - The National Committee should establish a Working Group to compile data, to report progress and to draft the Country Report. All Working Group members should be conversant with these guidelines.
 - The National Committee should request the Working Group to determine rapidly the scope, structure and content of the Country Report. The Working Group should then prepare a draft outline.
 - Once the National Committee has approved the outline, the Working Group should designate competent persons to assemble information and prepare a first draft of each chapter. This work should start early in the process, leaving adequate time for gathering and analyzing information, reporting on progress and completing the Country Report.
 - The Working Group should assemble the first draft of the Country Report. The National Committee should review it and provide it for broader review by stakeholders.
 - The National Committee should finalize the Country Report and submit it to the national government for official endorsement and submission to FAO.
 - The Country Report will be an official government report. In order to be used as an input to *The State of the World's Aquatic Genetic Resources for Food and Agriculture*. The Country Report must have been endorsed by each country's national government and officially transmitted to FAO in one of FAO's official languages.
47. Subject to available resources and if invited by governments as a priority activity, FAO can assist in the preparation of Country Reports.

48. The FAO contact for preparation of Country Reports is:

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ANNEX 1

PREPARATION OF THE COUNTRY REPORT

A. INTRODUCTION

1. Annex 1 explains the general methodology that should be applied and gives specific guidance for the completion of the chapters proposed for the Country Report. Part B presents general guidance. Part C provides methodology and guidance on a section-by-section and chapter-by-chapter.

B. GENERAL GUIDANCE

2. The Country Report should as far as possible:
- Describe the diversity and importance of aquatic genetic resources in the country for capture fisheries, aquaculture and culture-based fisheries, giving trends in their status and use.
 - Identify the main issues, challenges and opportunities for conservation, sustainable use and development of the country's aquatic genetic resources for food and agriculture and propose, where possible, solutions to threats and constraints.
 - Describe strategic directions, at national, regional and global levels, that will address the country's priorities and needs to achieve the conservation, sustainable use and development of aquatic genetic resources and identify capacity strengthening and other needs.
 - Become a national policy and reference document for the conservation, sustainable use and development of aquatic genetic resources for food and agriculture.
 - Describe in an Annex the process used for reporting, including main sources of information, contributors and activities.

C. METHODOLOGY AND GUIDANCE BY SECTION AND CHAPTER

SECTION I: EXECUTIVE SUMMARY

3. The Country Report should contain an Executive Summary of about 2-3 pages to highlight the main findings and provide an overview of key issues and challenges, existing capacities and needs. The Executive Summary should be prepared after completion of the main body of the Country Report.

4. The Executive Summary should cover, in summary form and in the same order as the chapters, the following: the diversity and status of the country's aquatic genetic resources and their importance for capture fisheries, aquaculture, culture-based fisheries; the main drivers and trends for conservation, sustainable use and development of aquatic genetic resources; the related needs and priorities for capacity strengthening; the current status of and future plans for the *in situ* and *ex situ* conservation of aquatic genetic resources; the stakeholders with interests in aquatic genetic resources;

the current status of and future plans for policies and legislation for aquatic genetic resources, including access and benefit sharing; the current status of and future plans and needs for research, education, training and extension on aquatic genetic resources and related coordination, networking and information systems; the current status of and future plans for international collaboration on aquatic genetic resources, at sub-regional, regional and global levels; general conclusions concerning strategies and prospects for the conservation, sustainable use and development of aquatic genetic resources.

SECTION II: INTRODUCTION

Background Information on Your Country and its Fisheries, Aquaculture and Culture-Based Fisheries

5. The main objective of the Introduction is to present an overview that will allow a person who is unfamiliar with the country to appreciate the context for the Country Report. The Introduction should present a broad overview. Detailed information should be provided in the main body of the Country Report. Countries may wish to consider developing their Introductions after completing the main body of their Country Reports.

6. Other forms of country reporting to FAO on fisheries and aquaculture, including National Fisheries Sector Overviews, National Aquaculture Sector Overviews, National Aquaculture Legislative Overviews and Country Strategies for Improving Information on Status and Trends in Capture Fisheries and Aquaculture can be sources for some the summary information required in the Introduction⁶.

7. It is recommended that the Introduction provide basic information and summary data for the following:

- The size and location of the country, its main physiographic and climatic features, demographic trends over the past 10 years and projected trends for the next 10 years.
- The main aquatic ecosystems in which capture fisheries, aquaculture and culture-based fisheries are located, indicating the current and likely future areas and states of health of those ecosystems. Maps can be included to indicate past, present and likely future status.
- The main types of capture fisheries in all waters and wetlands under national jurisdiction, including subsistence fisheries and small- and large-scale commercial fisheries that target the following: species consumed by humans as food or for medicinal purposes; species used in industrial processing to produce fishmeal and fish oil or as low value/trash fish for feeding farmed fish and livestock; species used for ornamental purposes; species targeted in recreational fisheries; wild brood stock or seed for use in aquaculture or culture-based fisheries; and species used for bait.
- The main types of aquaculture in waters and wetlands under national jurisdiction, including the farming of species consumed by humans for food, of live feeds used in hatcheries and on fish farms, of ornamental species, and of bait used in recreational or commercial capture fisheries.
- The main types of culture-based fisheries and other forms stocking in waters and wetlands under national jurisdiction, for production or conservation purposes.

⁶ See <http://www.fao.org/fishery/countryprofiles/search/en> for example.

- The main types of stakeholders with interests in aquatic genetic resources, including fishers, seed suppliers, farmers, processors, sellers, consumers, managers, researchers and others.
- Summary statements on the extents to which capture fisheries, aquaculture and culture-based fisheries are competitive or complementary to each other and to other food and agriculture sectors.
- Summary statements on the main drivers that have impacts on aquatic genetic resources for capture fisheries, aquaculture, culture-based fisheries and related research, with examples of any aquatic genetic resources that are threatened or endangered.
- Summary statements on the current and likely future status of *in situ* conservation of aquatic genetic resources, through their use in well-managed capture fisheries, aquaculture and culture-based fisheries and through the establishment and management of aquatic protected areas.
- Summary statements on the current and likely future status of *ex situ* conservation of aquatic genetic resources, as collections of live breeding individuals and *in vitro* as collections of cryopreserved gametes and embryos and DNA samples, at universities, government research establishments, public aquaria and in the private sector.
- Summary statements and references on the recent history, current status and future plans for research on aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries.

8. In order to ensure comparability among Country Reports and to use them for compiling *The State of the World's Aquatic Genetic Resources for Food and Agriculture*, the Introduction should contain the kind of basic information and summary data that are obtained by answering the following questions:

- What are the main types of capture fisheries, aquaculture and culture-based fisheries in your country?
- How important are capture fisheries, aquaculture and culture-based fisheries in your country for food security and nutrition, livelihoods and poverty alleviation, and the economy?
- Which stakeholders in your country have interests in aquatic genetic resources?
- What are the main drivers in your country that threaten the diversity and availability of aquatic genetic resources for capture fisheries, aquaculture, culture-based fisheries and related research?
- To what extents are the capture fisheries, aquaculture and culture-based fisheries subsectors in your country coexisting in conflicts or in partnerships?
- To what extents are capture fisheries, aquaculture, culture-based fisheries in conflicts or in partnerships with other sectors in your country (e.g., agriculture, forestry, mining, tourism, transport water resources and waste disposal)?
- What is needed most in your country to ensure the conservation, sustainable use and development of aquatic genetic resources for food and agriculture?

SECTION III: MAIN BODY OF THE COUNTRY REPORT

9. Capture fisheries, aquaculture and culture-based fisheries have differing importance among countries. The structure of chapters in each Country Report will reflect those differences. These guidelines provide for comprehensive coverage of aquatic genetic resources for capture fisheries,

aquaculture and culture-based fisheries. Countries should decide how to prioritize the coverage of their Country Reports among those subsectors.

Chapter 1: The Use of Aquatic Genetic Resources in Capture Fisheries, Aquaculture and Culture-Based Fisheries

10. The main objective of Chapter 1 is to provide annotated inventories for the use of aquatic genetic resources in capture fisheries, aquaculture and culture-based fisheries.

11. The specific objectives of Chapter 1 are as follows:

- For capture fisheries, to list all target species, stocks and other management units, together with the following information: availability of genetic data; use of genetic data; trends in production or catches; the ecosystems in which the capture fisheries are located; and changes in ranges and habitats of the targeted organisms.
- For aquaculture, to list all farmed species and types and others used in aquaculture research and development, together with the following information: availability and use of genetic data; trends in production; and genetic improvement efforts.
- For culture-based fisheries, to list all species in use or under development, together with the following information: availability and use of genetic data; trends in production; types of stocked waters; and the extents to which different species and types are moved among open waters.
- To identify gaps in information about aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries, as specific statements in the text and/or as gaps in the annotated inventories.

12. Chapter 1 should commence with an overview of the extents to which accurate and reliable information is available, at local and national levels, about: the status of and trends in the productivity of capture fisheries; aquaculture, culture-based fisheries; and the extents to which information about aquatic genetic resources is available and used across the entire sector.

13. Chapter 1 should continue with a review of the country's aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries, by completing detailed annotated inventories (Tables 1.1, 1.2 and 1.3 – see Annex 2). The annotated inventories should be supplemented with text summarizing the information presented for each subsector and drawing attention to items and issues of special importance and to gaps in available information.

14. The following questions are suggested as guidance:

Capture fisheries:

- Over the last 10 years, have catches been: Increasing; Stable; Decreasing; Depleted; Still in Research and Development; Don't know?
- What is the expected trend over the next 10 years?
- Is the range over which the species, stock or other management unit can be fished increasing, decreasing, stable, or unknown?

- What are the likely reasons for changes in range, loss of habitat, climate change, invasive species, others, unknown?
- Is the identification and naming of the targeted species, stocks and other management units accurate and up-to-date? Is it possible to improve the identification of all capture fishery landings to at least species level?
- What proportions of capture fisheries statistics are collected at species or higher aggregated levels, rather than at stock or other management unit levels?
- To what extents are genetic data for capture fisheries available and used in management?
- Are there any unexploited species or virgin stocks of currently exploited species in your country that have potential for new marine or inland fisheries? If so, give details.
- Have any of your country's fisheries developed from introductions of alien species, including escapes from aquaculture or the aquarium trade?

Aquaculture:

- Over the last 10 years, has production been: Increasing; Stable; Decreasing; Stopped; Still in Research and Development; Don't know?
- What is the expected trend over the next 10 years?
- Is the identification and naming of farmed species, subspecies, hybrids, crossbreeds, strains, triploids, other distinct types accurate and up-to-date? Is it possible to improve the identification of farmed aquatic organisms to at least species level?
- What proportions of aquaculture statistics are collected at species or higher aggregated levels, rather than as hybrids, crossbreeds, strains, triploids and other distinct farmed types?
- To what extent are genetic data for farmed aquatic organisms available and used in management?
- To what extent are the aquatic organisms farmed in your country sourced as wild seed or from wild brood stock?
- What proportions (%) of breeding programmes and efforts for the genetic improvement of cultured fish in your country are being managed by the public sector (government research, universities etc.), the private sector, and public-private partnerships?
- To what extent do genetically improved aquatic organisms, including hybrids, crossbreeds, strains, triploids and other distinct types contribute to aquaculture production? For any significant examples, indicate whether they were developed by the public sector (government research, universities etc.), or by the private sector (individual farmers and corporations) or by public-private partnerships.
- Which aquatic species in your country are thought to have potential for domestication and future use in aquaculture?

Culture-based fisheries:

- Over the last 10 years, have catches been: Increasing; Stable; Decreasing; Depleted; Still in Research and Development; Don't know?

- What is the expected trend over the next 10 years?
- Over the last 10 years, has production of seed for release been: Increasing; Stable; Decreasing; Depleted; Still in Research and Development; Don't know?
- What is the expected trend over the next 10 years?
- Is the identification and naming of species and any hybrids used in culture-based fisheries accurate and up-to-date? Is it possible to improve the identification of all aquatic organisms used in culture-based fisheries to at least the species level?
- What proportions (%) of culture-based fisheries statistics are reported without identification even to species level?
- To what extents are culture-based fisheries statistics disaggregated between production from wild-collected seed and hatchery-produced seed?
- To what extents are genetic data from culture-based fisheries available and used in management?
- Which aquatic species in your country, if any, are not yet used in culture-based fisheries but are thought to have potential for future use, in inland or coastal waters?

15. As far as is possible from the information available, make entries in the annotated inventories at species or intraspecific levels. For each entry, include one or more common names by which the organism is most widely known in your country.

16. For the purpose of taxonomic consistency and practical utility, entries should be made in the following order:

- **Aquatic Microorganisms and Plants**
 - Cyanobacteria (also called blue-green algae, such as *Spirulina*)
 - Algae⁷ (red, brown and green seaweeds and any microalgae used as live feeds in aquaculture)
 - Freshwater macrophytes (such as Azolla, water cress, water spinach, duckweed, lotus, water chestnut, others)
- **Aquatic Invertebrates**⁸
 - Porifera (sponges)
 - Cnidaria (corals; jellyfish)
 - Rotifera (Brachionus)
 - Annelida (polychaetes - ragworms and lugworms; oligochaetes – tubifex and leeches; and worms formerly considered as separate phyla, such as echiurans - spoon worms)
 - Crustacea (branchiopods - Artemia; cladocerans - water fleas; copepods; cirripedes - barnacles; isopods; amphipods; mysid shrimps; euphausiids; decapods - shrimps, prawns,

⁷ See www.algaebase.org for guidance on correct scientific nomenclature and order of mention for algae, including wild-harvested and farmed seaweeds.

⁸ See www.sealifebase.org for guidance on correct scientific nomenclature and order of mention for fished and farmed aquatic invertebrates.

mantis shrimps, galatheids – squat lobsters, crabs, lobsters; others, including any other species used as live feeds in aquaculture)

- Insecta (chironomid larvae – bloodworms, giant water beetles etc.)
- Mollusca (gastropods; bivalves; cephalopods; others, including any larval forms used as live feeds in aquaculture)
- Echinodermata (starfish; sea urchins; sea cucumbers)
- Tunicata (sea squirts)
- **Aquatic Vertebrates⁹**
 - Agnatha (hagfishes; lampreys)
 - Chondrichthyes (sharks; rays; chimaeras)
 - Osteichthyes (all other fishes)
 - Amphibians (frogs; salamanders)
 - Reptiles (turtles; crocodiles)
 - Mammals (whales, dolphins, seals)

17. Use Tables 1.1, 1.2 and 1.3 (see Annex 2) to compile annotated inventories of your country's aquatic genetic resources. Make separate annotated inventories of aquatic genetic resources for your capture fisheries, aquaculture and culture-based fisheries.

Chapter 2: Drivers and Trends in Capture Fisheries, Aquaculture and Culture-Based Fisheries: Consequences for Aquatic Genetic Resources

18. The main objective of Chapter 2 is to review the main drivers and trends that are shaping capture fisheries, aquaculture and culture-based fisheries and their consequences for aquatic genetic resources.

19. The specific objectives are as follows:

- To identify the main drivers and trends in capture fisheries, aquaculture and culture-based fisheries.
- To describe the consequences (both positive and negative) for aquatic genetic resources that sustain current capture fisheries, aquaculture and culture-based fisheries and that will provide for their future productivity and sustainability and consider countermeasures to address adverse impacts.

20. Chapter 2 should commence with an overview of drivers and trends for capture fisheries, aquaculture and culture-based fisheries and their proven or likely consequences for aquatic genetic resources. The overview can include an appraisal of prospects for combining policies and strategies for conservation with those sustainable use and development.

⁹ See the Catalog of Fishes: <http://research.calacademy.org/ichthyology/catalog/SpeciesByFamily> for guidance on correct scientific nomenclature and order of mention, by subfamily, family and higher taxa, for finfish (Pisces). See also www.fishbase.org which follows the same nomenclature. The latest update is by Eschmeyer, W. N. and I.D. Fong, J. D. 2012. Species by Family and Subfamily in the Catalog of Fishes: (<http://research.calacademy.org/research/ichthyology/catalog/SpeciesByFamily.asp>)

21. Chapter 2 should continue with detailed appraisals of the main drivers and trends in capture fisheries, aquaculture and culture-based fisheries that have consequences for aquatic genetic resources.
22. Reference can be made to the six main sets of drivers as identified in various publications cited by the FAO Committee on Fisheries in 2012¹⁰: 1) global human population increase; 2) changes in income and per capita demand – increased demand for fish and fish products; 3) governance of food production – the potential ability of public, private and civil society to act collectively and holistically in managing resources and production processes; 4) climate change and other environmental impacts; 5) competition for resources and increased demand for energy and freshwater; and 6) changes in values and ethics of consumers.
23. The new biotechnologies that are emerging and being applied in capture fisheries, aquaculture and culture-based fisheries should also be reviewed, as an additional and important driver; for example, monitoring the genetics of capture fisheries stocks, genetic identification of produce in post-harvest chains; and accelerating genetic improvement of farmed aquatic organisms.
24. The drivers that are changing the aquatic ecosystems in which capture fisheries, aquaculture and culture-based fisheries are located should also be reviewed, including the following: 1) quantitative and qualitative changes in land and water use that alter the habitats of aquatic species and the size and quality of fishing grounds and farming areas; 2) pollution of fished and farmed waters; 3) increased frequency of extreme climatic events and long-term climate change; and 4) establishment of invasive species; 5) introductions or invasive alien species and their parasites and pathogens; and 6) impacts of purposeful stocking and escapes from aquaculture.
25. The aquatic ecosystems covered can include the following, *inter alia*: inland water bodies, watercourses and wetlands; estuaries, intertidal mud flats, lagoons and mangroves; and coastal waters, with diverse substrates and biological communities, such as coral and other reefs, sea mounts, soft substrates and associated water columns.
26. The following questions are suggested as guidance:

Capture fisheries

- In what ways have the aquatic genetic resources that sustain capture fisheries been impacted by prevailing drivers and trends?
- To what extent have capture fisheries changed the genetic structure of any stocks or other management units?
- What countermeasures might be taken to reduce adverse consequences for the aquatic genetic resources that sustain capture fisheries?

Aquaculture

- In what ways have the aquatic genetic resources that sustain aquaculture been impacted by prevailing drivers and trends? If possible, give examples of positive and negative impacts for specific drivers.
- In what ways have aquaculture practices contributed to inbreeding and the loss of aquatic genetic resources?
- What countermeasures might be taken to reduce adverse impacts on the aquatic genetic resources that sustain current aquaculture and/or provide for its future development?

¹⁰ COFI/2012/11. Paragraph 13.

- Which biotechnologies have been used in your country for accelerating the genetic improvement of farmed aquatic organisms and what are the expectations for the development and application of new biotechnologies?

Culture-based fisheries

- In what ways have the aquatic genetic resources that sustain culture-based fisheries been impacted by prevailing drivers and trends? If possible, give examples of positive and negative impacts for specific drivers.
- In what ways have culture-based fisheries practices contributed to the loss of aquatic genetic resources?
- What countermeasures might be taken to reduce adverse impacts on the aquatic genetic resources that sustain culture-based fisheries?

Chapter 3: *In Situ* Conservation of Aquatic Genetic Resources

27. The main objective of Chapter 3 is to review the current status and future prospects for the *in situ* conservation of aquatic genetic resources for food and agriculture.

28. The specific objectives are as follows:

- To review the current and likely future contributions to *in situ* conservation of aquatic genetic resources by those who use them in responsible and well managed capture fisheries, aquaculture, and culture-based fisheries.
- To identify and describe any existing and planned aquatic protected areas that are contributing, or will contribute, to *in situ* conservation of aquatic genetic resources for capture fisheries, aquaculture, and culture-based fisheries.
- To identify and describe any major existing and planned efforts for the *in situ* conservation of threatened or endangered aquatic genetic resources.
- To review needs and priorities for the future development of *in situ* conservation of aquatic genetic resources.

29. Chapter 3 should commence with an overview of the current status and future prospects for the *in situ* conservation of aquatic genetic resources, including the following:

- The extent to which responsible and well managed capture fisheries are contributing to *in situ* conservation of the aquatic genetic resources that sustain their current productivity and provide for their future productivity and sustainability, in changing environments and demand scenarios.
- The extent to which responsible and well managed aquaculture and culture-based fisheries are contributing to *in situ* conservation of the aquatic genetic resources that sustain their current productivity and provide for their future productivity and sustainability, in changing environments and demand scenarios.
- The extent to which existing and planned aquatic protected areas are contributing, or will contribute to *in situ* conservation of aquatic genetic resources for food and agriculture and related research.

- Examples of current or planned activities for the *in situ* conservation of endangered or threatened species with proven or potential importance for capture fisheries, aquaculture and culture-based fisheries.
- Needs and priorities for the future development of *in situ* conservation of aquatic genetic resources.

30. Chapter 3 should continue with reviews of the *in situ* conservation of aquatic genetic resources, through their use in responsible and well managed capture fisheries, aquaculture and culture-based fisheries and through the establishment and management of aquatic protected areas.

31. The following questions are suggested for guidance:

Capture fisheries

- Is the conservation of aquatic genetic resources included as a named objective in the management of any capture fisheries in your country? If so, please give examples.
- Which particular capture fisheries in your country (marine, riverine, lacustrine etc.) are contributing to the conservation of aquatic genetic resources (species, stocks and other management units) through their sustainable use. Are the results monitored and/or certified?

Aquaculture and culture-based fisheries

- Is the conservation of aquatic genetic resources, included as a named objective in the management of aquaculture and/or culture-based fisheries in your country? If so, please give examples for seed production and/or grow-out farms.
- Which particular aquaculture and/or culture-based fisheries activities, including the management of public and private brood stocks, hatcheries and production stocks, are contributing to the conservation of aquatic genetic resources (species, sub-species, hybrids and strains) through their sustainable use? Are the results monitored and/or certified?
- To what extent are collectors of wild seed and brood stock for aquaculture and culture-based fisheries contributing to the conservation of aquatic genetic resources by maintaining habitats and/or limiting the quantities collected?

Aquatic protected areas

- Are there any existing or planned aquatic protected areas in your country that are contributing, or will contribute, to the *in situ* conservation of aquatic genetic resources for food and agriculture, including the species, stocks and other management units, subspecies, geographical races (riverine, lacustrine, island etc.) and strains that are sustaining current production and that have potential for contributing to future production? If so, give examples, including any that are contributing to the conservation of threatened and endangered aquatic genetic resources of proven or potential commercial importance.
- Have any analyses been conducted or planned in your country to evaluate the effectiveness of aquatic protected areas for the *in situ* conservation of aquatic genetic resources for food and agriculture? For example, include any past and planned analyses for the following: the effectiveness of management of aquatic protected areas; issues concerning the use of aquatic protected areas by local communities, fishers, farmers and others; stock assessments; and ecological surveys.

- Have there been any moratoria on fishing for particular species, stocks and other management units in your country, as conservation measures. If so, give examples, including the main results.

Chapter 4: *Ex Situ* Conservation of Aquatic Genetic Resources

32. The main objective of Chapter 4 is to review the current status and future prospects for the *ex situ* conservation of aquatic genetic resources for food and agriculture.

33. The specific objectives are as follows:

- To review existing and planned *ex situ* conservation of aquatic genetic resources in aquaculture facilities, culture collections and gene banks, research facilities, zoos and aquaria.
- To review the contributions that various stakeholders are making to the *ex situ* conservation of aquatic genetic resources.
- To review needs and priorities for the future development of *ex situ* conservation of aquatic genetic resources, including any that are threatened or endangered.

34. Chapter 4 should commence with an overview of existing and/or planned activities for the *ex situ* conservation of aquatic genetic resources, categorized as collections of live breeding individuals and as *in vitro* collections of cryopreserved gametes, embryos and tissues. The overview can include examples in which *ex situ* conservation is regarded as complementary to *in situ* conservation and/or examples in which *ex situ* conservation is the main or sole approach.

35. Chapter 4 can continue with summaries of specific examples of existing and planned *ex situ* conservation of aquatic genetic resources, including collections of live breeding individuals and of genetic material held *in vitro*. Include descriptions of *ex situ* conservation of aquatic genetic resources in any or all of the following: aquaculture facilities, culture collections and gene banks, research facilities, zoos and aquaria. Indicate any examples of *ex situ* conservation of threatened or endangered aquatic genetic resources; for example, aquatic species of past or potential commercial importance in the IUCN Red List,¹¹ CITES Appendices¹² and national lists.

36. The following questions are suggested as guidance:

Collections of live breeding individuals

- Does your country have any existing or planned collections of live breeding aquatic organisms that can be considered as contributing to the *ex situ* conservation of aquatic genetic resources? This includes not only collections of fished and farmed species but also collections of live feed organisms used in aquaculture and culture-based fisheries (e.g., bacterial flocs, yeasts, microalgae, rotifers and *Artemia*). If so, describe the major efforts (e.g., in government research establishments, universities and commercial breeding programmes) and identify the key stakeholders.
- Are any public or private zoos or aquaria in your country keeping collections of live breeding individual aquatic organisms under conditions that can be construed as contributing to the *ex situ* conservation of aquatic genetic resources? If so, give examples and identify key stakeholders.

¹¹ www.iucnredlist.org

¹² www.cites.org

Collections of genetic material held in vitro

- Does your country have any existing or planned *in vitro* collections and gene banks of the gametes, embryos, tissues, spores and other quiescent forms of aquatic organisms, using cryopreservation or other methods of long-term storage? If so, describe the major examples, identifying the facilities in which the collections are held and indicate the managers and users. Include examples of any aquatic genetic material from your country that is being kept in *in vitro* collections outside your country on behalf of beneficiaries in your country.
- Do any museums and herbaria or other collections of aquatic specimens in your country contain accessions from which DNA could be sourced for research in support of capture fisheries, aquaculture and culture-based fisheries? If so, give details of any major collections and identify the managers and existing or potential users.

All forms of ex situ conservation

- What are the future prospects, needs and priorities in your country for the *ex situ* conservation of aquatic genetic resources?

Chapter 5: Stakeholders with Interests in Aquatic Genetic Resources

37. The main objective of Chapter 5 is to provide an overview of the perspectives and needs of the principal stakeholders who have interests in aquatic genetic resources for food and agriculture.

38. The specific objectives are to:

- To describe the different principal stakeholder groups with interests in aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries
- To identify the type(s) of aquatic genetic resources in which each stakeholder group has interests and why.
- To describe the roles of stakeholder groups and the actions they are taking for the conservation, sustainable use and development of the aquatic genetic resources in which they have interests.
- To describe the further actions that stakeholder groups would like to see taken for the conservation, sustainable use and development of aquatic genetic resources in which they have interests, and the constraints that are hindering those actions, including lack of capacity and perceived threats.

39. Chapter 5 should commence with an overview of the principal stakeholder groups who have interests in aquatic genetic resources for food and agriculture including, *inter alia*: fishers in capture fisheries; fish farmers; persons involved in stocking and harvesting in culture-based fisheries; persons employed in postharvest chains; fisheries managers and other officials in government; staff and members of fisheries, aquaculture, ornamental and recreational fisheries associations; managers of aquatic protected areas and others working for the conservation of aquatic ecosystems; researchers; and civil society.

40. Stakeholder groups can be identified from existing institutional knowledge, from sectoral and sub-sectoral consultations conducted during the country reporting process and where necessary from expert opinions.

41. Gender issues pertaining to the conservation, sustainable use and development of aquatic genetic resources should be covered in this overview. The perspectives and needs of indigenous peoples and local communities whose food and nutrition, livelihoods and culture derive significantly from fisheries, aquaculture and use of aquatic ecosystems should also be covered.
42. Chapter 5 should then review separately the principal stakeholder groups with interests in capture fisheries, aquaculture and culture-based fisheries, together with their perspectives and needs.
43. The main questions to be answered are the same for capture fisheries, aquaculture and culture-based fisheries, as follows: Table 5.1 (Annex 2) is suggested as a framework for answering those questions. Countries may wish to use or modify that table or alternatively to report as text, or as a table with accompanying text.
44. The following questions are suggested as guidance:
- Who are the principal stakeholder groups with interests in aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries?
 - What are the type(s) of aquatic genetic resources in which each stakeholder group (identified at any level - commodity, higher taxa, species, hybrids, intraspecific levels and DNA) has interests and why?
 - What are the roles of and the actions being taken by the stakeholder groups for the conservation, sustainable use and development of the aquatic genetic resources in which they have interests?
 - What future roles and actions are sought by stakeholder groups for the conservation, sustainable use and development of aquatic genetic resources in which they have interests, and what are the constraints that are hindering those actions, including lack of capacity and perceived threats.

Chapter 6: Policies and Legislation for Aquatic Genetic Resources, Including Access and Benefit Sharing

45. The main objective of Chapter 6 is to review the status and adequacy of national policies and legislation concerning aquatic genetic resources for food and agriculture, including access and benefit sharing.
46. The specific objectives are as follows:
- To describe the existing policy and legal framework for the conservation, sustainable use and development of aquatic genetic resources.
 - To review current policies and instruments for access to aquatic genetic resources and the fair and equitable sharing of benefits arising from their utilization.
 - To identify any significant gaps in policies and legislation concerning aquatic genetic resources.
47. Chapter 6 should commence with an overview of the status and adequacy of national policies and legislation concerning aquatic genetic resources for food and agriculture. The overview should include an explanation of how capture fisheries, aquaculture and culture-based fisheries are

governed in your country: as one sector or as separate sub-sectors and/or in combination with one or more other sectors such as agriculture, forestry and environment?

48. The overview should contain a summary of the past history of current status of policies and instruments for access and benefit sharing concerning aquatic genetic resources. This should include the acquisition of genetic material for research purposes and the sharing of genetic material and related information for production purposes and/or further research.

49. Chapter 6 can continue with reviews of the current status and gaps in policies and legislation for the conservation, sustainable use and development of aquatic genetic resources having proven or potential importance in capture fisheries, aquaculture and culture-based fisheries and a more detailed appraisal of policies and instruments for access and benefit sharing.

50. For capture fisheries, aquaculture and culture-based fisheries, considered together or as separate sub-sectors, list existing policies, legislation and related action plans for the conservation, sustainable use and development of aquatic genetic resources, specifying their main elements and indicating any gaps and constraints. Continue with a detailed appraisal of policies and instruments for access and benefit sharing.

51. The following questions are suggested for guidance:

- Over the past 10 years, has your country developed or modified national policies and/or legislation for access and benefit sharing with respect to national aquatic genetic resources?
- Does your country restrict access to any of its national aquatic genetic resources? (Yes, No, Don't Know). If yes, give details of the restrictions and the reasons for them.
- Has your country established any multi-lateral, regional or international mechanisms for access to, and the sharing of the benefits from, the use of any aquatic genetic resources? (Yes, No, Don't Know). If yes, give details.
- Has your country subscribed, or does it plan to subscribe, to any international agreements, such as the Nagoya Protocol?¹³ If yes, give details, including, if applicable, the law implementing the Nagoya Protocol.
- To what extent are access to and benefit sharing from aquatic genetic resources in your country determined by laws other than specific access and benefit sharing laws? For example, does intellectual property legislation extend to aquatic genetic resources? (Yes, No, Don't Know). If such other legislation exists, give details, including examples of patents and intellectual property rights granted.
- Over the past 10 years, has your country undertaken any management actions to maintain or enhance access to aquatic genetic resources located outside your country; for example, by establishing germplasm acquisition agreements or material transfer agreements? (Yes, No, Don't Know). If yes, give details.
- Has your country identified any obstacles to accessing aquatic genetic resources outside of your country (including access for research purposes)? If so, describe the obstacles and ways in which they might be overcome.
- Over the past 10 years, has your country transferred or exchanged aquatic genetic resources with other countries? If yes, give details of those transfers or exchanges.

¹³ <http://www.cbd.int/abs/nagoya-protocol/signatories/>

<p style="text-align: center;">Chapter 7: Research, Education, Training and Extension on Aquatic Genetic Resources: Coordination, Networking and Information</p>

52. The main objective of Chapter 7 is to review the status and adequacy of national research, education, training and extension, coordination and networking arrangements and information systems that support the conservation, sustainable use and development of aquatic genetic resources for food and agriculture.

53. The specific objectives are as follows:

- To describe the current status, future plans, gaps, needs and priorities for research on the conservation, sustainable use and development of aquatic genetic resources.
- To describe the current status, future plans, needs and priorities for education, training and extension on the conservation, sustainable use and development of aquatic genetic resources.
- To describe existing or planned national networks for the conservation, sustainable use and development of aquatic genetic resources.
- To describe existing or planned information systems for the conservation, sustainable use and development of aquatic genetic resources.
- To review the state of national public awareness concerning aquatic genetic resources for food and agriculture.

54. The following questions are suggested as guidance:

Research

- Does your national research programme support the conservation, sustainable use and development of aquatic genetic resources? If yes, give details of current and/or planned research. If no, explain the gaps, needs and priorities.
- Which institutions, organizations, corporations and other entities in your country are actively engaged in field and/or laboratory research related to the conservation, sustainable use and development of aquatic genetic resources?
- What capacity strengthening is needed to improve national research in support of the conservation, sustainable use and development of aquatic genetic resources?

Education, Training and Extension

- To what extents are education, training and extension in your country covering the conservation, sustainable use and development of aquatic genetic resources? List the main institutions involved and the types of courses offered, indicating the scales of these activities.
- What capacity strengthening is needed to improve national education, training and extension for the conservation, sustainable use and development of aquatic genetic resources?

Coordination and Networking

- Are there any mechanisms in your country for coordination among the capture fisheries, aquaculture and culture-based fisheries subsectors and/or with the other sectors that use watershed and coastal ecosystems and have impacts on aquatic genetic resources (e.g., agriculture, forestry, mining, tourism, waste management and water resources)? If so, summarize the mechanisms. If not, identify needs and priorities.
- What capacity strengthening is needed to improve intersectoral coordination in support of the conservation, sustainable use and development of aquatic genetic resources?
- Are there any national networks in your country to support the conservation, sustainable use and development of aquatic genetic resources? If so, summarize their memberships and roles. If not, identify needs and priorities.
- What capacity strengthening is needed to improve national networking in support of the conservation, sustainable use and development of aquatic genetic resources?

Information Systems

- Are any information systems existing or planned in your country for receiving, managing and communicating information about the conservation, sustainable use and development of aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries? If so, give details of the managers and users of the information systems. If not, identify needs and priorities.
- What capacity strengthening is needed to improve national information systems to support the conservation, sustainable use and development of aquatic genetic resources?
- What capacity strengthening is needed to improve national information systems to support of the conservation, sustainable use and development of aquatic genetic resources?

Chapter 8: INTERNATIONAL COLLABORATION ON AQUATIC GENETIC RESOURCES

55. The main objective of Chapter 8 is to review the mechanisms and instruments through which your country participates in international collaborations on aquatic genetic resources.

56. The specific objectives are as follows:

- To identify your country's current participation in bilateral, sub-regional, regional, other international and global forms of collaboration on aquatic genetic resources. List national memberships, status as a Party and other forms of affiliation in agreements, conventions, treaties, international organizations, international networks and international programmes.
- To identify any other forms of international collaboration on aquatic genetic resources.
- To review the benefits from existing forms of international collaboration on aquatic genetic resources.
- To identify needs and priorities for future international collaboration on aquatic genetic resources

57. Chapter 8 should commence with an overview of formal collaboration such as agreements, conventions, treaties and arrangements such as networks, programmes and memberships in organizations. International collaboration includes bilateral arrangements and the sharing of particular waters and stocks.

Global Agreements, Conventions and Treaties Concerning Aquatic Genetic Resources

58. List the main global agreements, conventions and treaties concerning aquatic genetic resources to which your country is a Party, summarizing for each the main points of relevance.

59. Of the main global agreements conventions and treaties that you collaborate with please describe how they have impacted your AqGR.

Sub-Regional and Regional Agreements, Conventions and Treaties Concerning Aquatic Genetic Resources

60. List significant sub-regional, regional, bilateral and other international agreements in which your country participates that have implications for the conservation, sustainable use and development of aquatic genetic resources. Examples could include agreements on:

- Fishing rights, seasons and quotas
- Establishment and management of shared or networked aquatic protected areas
- Aquaculture and culture-based fisheries in transboundary or shared water bodies
- Sharing aquatic genetic material and related information
- Conservation and sustainable use of shared water bodies and watercourses
- Quarantine procedures for aquatic organisms and for control and notification of aquatic diseases

Sub-regional, regional and other international organizations, networks and programmes for the conservation, sustainable use and development of aquatic genetic resources

61. List any significant sub-regional, regional and other international organizations, networks or programmes concerning aquatic genetic resources in which your country participates. Summarize for each organization, network or programme your main activities. Regional Fishery Bodies would be considered such an organization, network or programme.

62. The following questions are suggested as guidance:

- What are the priority needs regarding collaboration? Are they being addressed, i.e. are there any critical gaps?
- Which types of collaboration have been beneficial for your country, and why?
- Is there a need for your country to expand its collaboration concerning the conservation, sustainable use and development of aquatic genetic resources? If so, give details, including any requirements for capacity strengthening
- Describe important roles that your country performs within its region (and/or sub-region) and globally in terms of being a keeper, user and sharer of aquatic genetic resources and aquatic ecosystems.

ANNEX 2: TEMPLATES FOR REPORTING ON AQUATIC GENETIC RESEOURCES

Annex 2 provides templates for making annotated inventories of aquatic genetic resources for capture fisheries, aquaculture and culture-based fisheries and for summarizing information on stakeholders with interests in aquatic genetic resources for food and agriculture. Countries are encouraged to use these templates in the country reports.

A. ANNOTATED INVENTORIES OF AQUATIC GENETIC RESOURCES FOR CAPTURE FISHERIES, AQUACULTURE AND CULTURE-BASED FISHERIES

1. Make annotated inventories of your aquatic genetic resources for **capture fisheries**, based on Table 1.1 as follows:
 - Table 1.1.1. Species fished for consumption by humans as food¹⁴ (the main table for most countries)
 - Table 1.1.2. Species fished to produce fishmeal and fish oil, or as low value/trash fish for feeding farmed fish and livestock (*template not shown – use Table 1.1. as model*)
 - Table 1.1.3. Species fished for ornamental purposes (*template not shown – use Table 1.1. as model*)
 - Table 1.1.4. Species used in recreational fisheries (*template not shown – use Table 1.1. as model*)
 - Table 1.1.5. Species fished as wild brood stock or seed to be used in aquaculture or culture-based fisheries¹⁵ (*template not shown – use Table 1.1. as model*)
 - Table 1.1.6. Species fished for use as bait (*template not shown – use Table 1.1. as model*)
2. Make annotated inventories of your aquatic genetic resources for **aquaculture**, based on Table 1.2.
3. Make annotated inventories of your aquatic genetic resources for **culture based fisheries**, based on Table 1.3

¹⁴ Include any species fished for medicinal purposes, with a comment to indicate this form of use.

¹⁵ The on-site (i.e., on-farm) collection of seed or brood stock for aquaculture - for example, the natural settlement of bivalve molluscs in farming areas - is regarded as part of aquaculture.

Table 1.1: Aquatic genetic resources for capture fisheries in (Country) (including aquatic genetic resources for all fisheries in (Country) that provide wild aquatic feed organisms for aquaculture or agriculture, including fishmeal and fish oil, unprocessed low value/trash fish and aquatic plants)

Target species, stocks and other management units	Availability of genetic data	Use of genetic data in management	Trends in catches	Ecosystem(s) where the fishery is located	Changes in ranges and habitats
<p>List species as scientific names (put in brackets the most widely used national common names)</p> <p>For each species, list the named stocks and other management units.</p> <p>Indicate any that are:</p> <ul style="list-style-type: none"> - Straddling - Transboundary 	<p>Are genetic data available for the fishery?</p> <ul style="list-style-type: none"> - Yes - No/ - Don't know <p>If yes, give summary details (refs.)</p>	<p>Are genetic data used in management?</p> <ul style="list-style-type: none"> - Yes - No/ - Don't know <p>If yes, give summary details (refs.)</p>	<p>Over the last 10 years, have catches been:</p> <ul style="list-style-type: none"> - Increasing? - Stable? - Decreasing? - Depleted? - Don't know? <p>Expected trend over the next 10 years?</p>	<p>List one or more of the following:</p> <ul style="list-style-type: none"> - Intertidal - Coastal in EEZ - High Seas - Lake - Reservoir - River, - Swamp - Other (specify) <p>Other issues:</p> <ul style="list-style-type: none"> - Overfishing? - IUU fishing? - Others? 	<p>Please specify if range or habitat is:</p> <ul style="list-style-type: none"> - increasing - decreasing - stable or - don't know <p>Comment on the likely reasons for changes:</p> <ul style="list-style-type: none"> - loss of habitat? - climate? - invasive species? - others?
<p>List species here, for example <i>Crassostrea iredalei</i> (Slipper cupped oyster)</p>					
<p>Continue with additional species as needed</p>					

Table 1.2: Aquatic genetic resources for aquaculture in (Country)

Farmed species and types	Availability of genetic data	Trends in production	Genetic improvement
<p>List species as scientific names (put in brackets the most widely used national common name or names).</p> <p>For each species, list</p> <ul style="list-style-type: none"> - wild type - hybrids - cross breeds - strains - varieties - polyploids - and other farmed types by trade and/or scientific names 	<p>Are genetic data available for farmed populations?</p> <ul style="list-style-type: none"> - Yes - No/ - Don't know <p>If yes, give summary details (refs.)</p>	<p>Over the last 10 years, has production been:</p> <ul style="list-style-type: none"> - Increasing? - Stable? - Decreasing? - Stopped? - Don't know? <p>Expected trend over the next 10 years?</p>	<p>Has any genetic improvement been achieved over the last 10 years?</p> <ul style="list-style-type: none"> - Yes - No/ - Don't know <p>If yes, summarize method(s) and results by trait.</p> <p>Which methods are most likely to be used for genetic improvement over the next 10 years?</p> <p>Give examples of other current or planned R&D, for example:</p> <ul style="list-style-type: none"> - Development of reliable hatchery technology - Development and application of new biotechnologies? - Other (specify)
<p>List species here, for example <i>Penaeus vannamei</i> (Whiteleg shrimp)</p>			
<p>Continue with additional species as needed</p>			

Table 1.3: Aquatic genetic resources for culture-based fisheries and other stocking¹⁶ of waters and wetlands in (Country)

Species, stock or other named type.	Availability of genetic data	Genetic data used?	Trends in seed production	Trends in catch	Type(s) of waters into which cultured fish are stocked?
List as scientific names (put in brackets the most widely used national common name or names).	Are any genetic data available? - Yes - No/ - Don't know If yes, give summary details	By seed producers? - Yes - No - Don't know By managers of the stocked waters? - Yes - No - Don't know	Over the last 10 years, has seed production been: - Increasing? - Stable? - Decreasing? - Stopped? - Don't know? Expected trend over the next 10 years?	Over the last 10 years, have catches of stocked been: - Increasing? - Stable? - Decreasing? - Stopped? - Still in R&D? - Don't know Expected trend over the next 10 years?	List one or more of the following: - Estuary - Semi-Enclosed Bay/ Inlet - Open Coast - Lake - Reservoir - River - Swamp - Other (specify)
List species here, for example, <i>Pagrus major</i> (Red sea bream)					
Continue with additional species as needed					

¹⁶ For entries that refer to stocking for purposes other than culture-based fisheries - for example, re-establishment and conservation of particular species, subspecies and local races - add a comment to specify these forms of use.

B. STAKEHOLDERS WITH INTERESTS IN AQUATIC GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Table 5.1: Stakeholders in Aquatic Genetic Resources for Food and Agriculture. Separate Tables could also be made for capture fisheries, aquaculture and culture-based fisheries.

Principal stakeholders	Type of aquatic genetic resources of interest	Roles of and actions of principal stakeholders	Future roles and actions of stakeholders
List the principal stakeholders with interests in aquatic genetic resources	List the type(s) of aquatic genetic resources (e.g. species, hybrids, stocks and DNA) in which the stakeholder group has interests and why.	List the roles of and actions being taken by the stakeholder group for the conservation, sustainable use and development of aquatic genetic resources	Explain future roles and actions sought by stakeholders for the conservation, sustainable use and development of aquatic genetic resources, major constraints and perceived threats.
Stakeholders in Capture fisheries			
1. List types of stakeholder here, for example <i>fishery manager</i>			
2. List additional stakeholders as needed			
Stakeholders in Aquaculture and culture-based fisheries			
1. List types of stakeholder here, for example <i>fish breeder</i>			
2. List additional stakeholders as needed			

ANNEX 3

DEFINITIONS OF KEY TERMS¹⁷

Aquaculture – the farming of aquatic organisms including fish, molluscs, crustaceans, aquatic plants, crocodiles, alligators, turtles and amphibians. Farming implies some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators etc. Farming also implies individual or corporate ownership of the stock being cultivated; i.e., the population chosen for culture and not a stock in the same sense as that term is used for capture fisheries. (Modified from the FAO Glossary and the FAO Coordinated Working Party Handbook of Fishery Statistical Standards.¹⁸)

Aquatic genetic resources for food and agriculture – all genetic material of actual or potential value in aquatic organisms that contribute, or could contribute, to the productivity and sustainability of fisheries, aquaculture and culture-based fisheries, including fish, defined in the broad sense as finfish, crustaceans, molluscs and other aquatic invertebrates, and aquatic microorganisms, plants, amphibians, reptiles and mammals. (Compiled from FAO sources, principally FAO Fisheries Proceedings 5 and CGRFA-13/11/Inf.14.)

Brood stock – individuals or populations, either as eggs, juveniles, or adults, chosen to produce a first or subsequent generation of progeny in captivity, whether for growing as aquaculture or for release to the wild for stock enhancement; i.e., culture-based fisheries. (Modified from the FAO Glossary.)

Conservation (for sustainability) – the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations. Conservation is positive, embracing preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environment. (FAO Glossary.)

Culture-based fisheries – fisheries on resources, the recruitment of which originates or is supplemented from cultured stocks (i.e., populations chosen for culture and not stocks in the same sense as that term is used for capture fisheries) raising total production beyond the level sustainable through natural processes. (Modified from the FAO Coordinated Working Party Handbook of Fishery Statistical Standards.)

Cross breeding – the mating of two different strains or varieties within a species. (As in FAO Technical Guidelines for Responsible Fisheries. 5 Suppl. 3. Aquaculture Development. 3. Genetic resource management.)

Depleted stock – a stock driven by fishing to a very low level of abundance compared to historical levels, with dramatically reduced spawning biomass and reproductive capacity. (Modified from the FAO Glossary.)

Diadromous – a species, stock or other management unit which undertakes a spawning migration from marine to inland waters or vice versa. (Modified from the FAO Glossary.)

¹⁷ Definitions primarily taken from FAO glossary <http://www.fao.org/fishery/glossary/en> and the Convention on Biological Diversity (CBD) <http://www.cbd.int/>

¹⁸ www.fao.org/fishery/cwp/handbook/J/en

Domesticated or cultivated species – a species in which the evolutionary process has been influenced by humans to meet their needs. (CBD.)

Ecosystem – a dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit. (CBD.)

Ex situ conservation –the conservation of components of biological diversity outside their natural habitats. (CBD.)

Capture fisheries – the sum of all fishing activities on a given resource, for example a hake fishery or shrimp fishery, or the activities of a single type or style of fishing on a particular resource, for example a beach seine or trawl fishery. (Modified from the FAO Technical Guidelines for Responsible Fisheries 4. Fisheries Management.)

Fish Stock – the living resources in the community or population from which catches are taken in a fishery. Use of the term stock implies that the particular population is more or less isolated from other stocks of the same species and hence self-sustaining. In a particular fishery, the fish stock may be one of several species of fish but here is also intended to include commercial invertebrates and plants. (FAO Glossary.)

Genetic material – any material of plant, animal, microbial or other origin containing functional units of heredity. (CBD.)

Genetic resources – genetic material of actual or potential value. (CBD.)

Germplasm – genetic material. (FAO Glossary.)

Grow-out – growing fish seed from hatcheries or nurseries to market size, in aquaculture. (Modified from the FAO Glossary.)

Migratory – any species whose life cycle includes migrations. For the purposes of inventories of aquatic genetic resources for fisheries requested here, the definition includes diadromous species and species that make lengthy migrations through inland waters.

Hybridization – breeding individuals from two separate species. (As in FAO Technical Guidelines for Responsible Fisheries. 5 Suppl. 3. Aquaculture Development. 3. Genetic resource management.)

In situ conditions –conditions where genetic resources exist within ecosystems and natural habitats, and, in the case of domesticated and cultivated species, in the surroundings where they have developed their distinctive properties. (CBD.)

In situ conservation –conservation in *in situ* conditions. (CBD)

Management unit – a specific fishery resource defined for management purposes by any or all of the following: fish type(s), location(s) or type(s) of ecosystem(s), gear(s), and participant(s). A management unit and may or may not be genetically distinct from other populations of the same species.

Protected area – a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives. (CBD.)

Recreational fisheries – fisheries conducted by individuals primarily for sport but with a possible secondary objective of capturing fish for domestic consumption but not for onward sale. (FAO Technical Guidelines for Responsible Fisheries 6. Inland Fisheries.)

Selective breeding – choosing as parents the particular individuals that possess a high additive genitive value for a desired phenotype (trait) such that they pass on their superior genes to progeny in the following generations. (Modified from the FAO Technical Guidelines for Responsible Fisheries. 5 Suppl. 3. Aquaculture Development. 3. Genetic resource management.)]

Strain – a group of organisms from the same species displaying certain differential traits based on parental lineage; that come either from the same area, e.g. the same catchment area of a river, or are the result of a particular breeding programme (exists as an interbreeding unit with no introductions from external sources). (FAO Glossary.)

Triploid – having three sets of chromosomes, as induced in some farmed stocks for superior growth and appearance, for promoting sterility and in the production of some monosex populations.

Virgin stock – a stock in its natural condition before anyone has fished it. (FAO Glossary.)