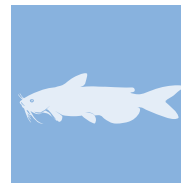
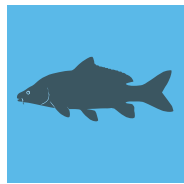
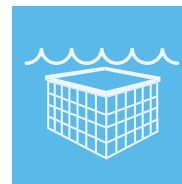
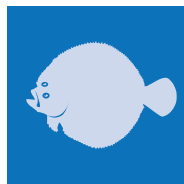




Food and Agriculture
Organization of the
United Nations

COUNTRY REPORTS

Uganda



Country Report Supporting the Preparation of the
First Report on *The State of the World's Aquatic
Genetic Resources for Food and Agriculture*

This Country Report has been submitted by the national authorities as a contribution to the Food and Agriculture Organization of the United Nations (FAO) publication, *The State of the World's Aquatic Genetic Resources for Food and Agriculture*. The information in this Country Report has not been verified by FAO, and its content is entirely the responsibility of the entity preparing the Country Report, and does not necessarily represent the views of FAO, or its Members. The designations employed and the presentation of material do not imply the expression of any opinion whatsoever on the part of FAO concerning legal or development status of any country, territory, city or area or of its authorities or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.



Food and Agriculture
Organization of the
United Nations

COMMISSION ON
GENETIC RESOURCES
FOR FOOD AND
AGRICULTURE

**Questionnaire for the Preparation of
Country Reports for *the First State of
the World's Aquatic Genetic Resources
for Food and Agriculture***

COMMISSION ON
GENETIC RESOURCES
FOR FOOD AND
AGRICULTURE



INSTRUCTIONS FOR COMPLETING THE DYNAMIC GUIDELINES

How do I complete the dynamic guidelines?

1. You will require Adobe Reader to open the dynamic guidelines. Adobe Reader can be downloaded free of charge from: <http://get.adobe.com/uk/reader/otherversions/>. Use Adobe Reader Version 10 or higher.
2. Open the dynamic guidelines and save it (save as a pdf) on your hard drive.
3. Please rename it <name of your country>.pdf.
4. You may forward the dynamic guidelines to stakeholders you would like to involve or inform by e-mail. You may also print and/or save the dynamic guidelines.
5. It is advisable to prepare textual responses (including any formatting such as bullet points) first in a separate document and then to copy and paste them into the form. Please use font Arial 10. Acronyms and abbreviations should be avoided if possible. If included, they must be introduced (i.e. written out in full) the first time they are used. Note that the text boxes are expandable. Once text has been entered, the box will automatically enlarge to make its content fully visible when you click outside its border. To delete a row you have added, click on the "X" on the far right of the table
6. When you have finished completing the dynamic guidelines, click the "Submit form" button at the end of the form and send the completed dynamic guidelines to Devin.Bartely@fao.org; Matthias.Halwart@fao.org; and ruth.garciagomez@fao.org.
7. This should automatically attach the document to an email that you can then send. Otherwise, please attach the completed dynamic guidelines manually to an e-mail and send it to Devin.Bartely@fao.org; Matthias.Halwart@fao.org; and ruth.garciagomez@fao.org.
8. A letter confirming official endorsement by relevant authorities should also be attached to the email.
9. You will receive a confirmation that the submission was successful.

Where can I get further assistance?

If you have any questions regarding the dynamic guidelines, please contact Devin.Bartely@fao.org; Matthias.Halwart@fao.org; ruth.garciagomez@fao.org

Several websites provide useful information on aquatic species that can be consulted for proper species names and for information on aquatic genetic resources: [AlgaeBase](http://www.algaebase.org), [Aquamaps](http://www.aquamaps.org), [Barcode of Life](http://www.barcodeoflife.org), [Census of Marine Life](http://www.censusofmarinelife.org), [FishBase](http://www.fishbase.org), [Frozen Ark](http://www.frozenark.org), [GenBank](http://www.genbank.org), [Global Biodiversity Information Facility](http://www.gbif.org), [International Union for Conservation of Nature](http://www.iucn.org), [National Institutes of Health Database on Genomes and Bioinformatics](http://www.nih.gov), [Ornamental Fish International](http://www.sealifebase.org), [SealifeBase](http://www.sealifebase.org), [Sea Around Us](http://www.searoundsus.org), and [World Register of Marine Species](http://www.marinespecies.org).

How, by whom and by when must the completed dynamic guidelines be submitted?

Once officially endorsed by the relevant authorities, the completed dynamic guidelines should be submitted (click the "Submit form" button on the header banner) by the National Focal Point. **Completed dynamic guidelines should be sent by December 31st 2015.**

www.algaebase.org
www.aquamaps.org
www.barcodeoflife.org
www.coml.org
www.fishbase.org
www.frozenark.org
www.genbank.org
www.gbif.org
www.iucn.org
<http://discover.nci.nih.gov/>
www.ornamental-fish-int.org
www.sealifebase.org
www.searoundsus.org
www.marinespecies.org

I. INTRODUCTION

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. Additionally the process of producing Country Reports will assist countries in determining their needs and priorities for the conservation and sustainable use of aquatic genetic resources for food and agriculture, and will help raise awareness among policy-makers.

II. COUNTRY REPORTS

As with the other sectors, *The State of the World's Aquatic Genetic Resources for Food and Agriculture (SoWAqGR)* will be compiled from Country Reports. It is recognized that guidance is necessary in order to assist countries in completing those reports under a common framework. The Country Reports will become official government documents submitted to FAO.

The following questionnaire is the suggested format for the preparation and submission of Country Reports. The questionnaire has been prepared by FAO to assist in the preparation of Country Reports contributing to the SoWAqGR Report. It has been designed to assist countries to undertake a strategic assessment of their aquatic genetic resources for food and agriculture.

The scope of the first State of the World's Aquatic Genetic Resources for Food and Agriculture, and therefore the emphasis in the Country Reports, is farmed aquatic species and their wild relatives within national jurisdiction.

Country Reports should:

- become powerful tools for improving the conservation, sustainable use and development of aquatic genetic resources for food and agriculture, at national and regional levels;
- 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;
- 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;
- contribute to raising public awareness about the importance of aquatic genetic resources for food and agriculture;
- complement other national reporting activities on the conservation, sustainable use and development of aquatic genetic resources.

Timeline and process

In line with the overall process, as established by the Commission, the Director-General of FAO sent a Circular State Letter on 19 April 2012 to countries requesting them to identify National Focal Points for the preparation of Country Reports by 31 December, 2015.

The following steps are recommended in preparing the Country Report, using a participatory approach:

- Each participating country should appoint a National Focal Point for the coordination of the preparation of the Country Report who will also act as focal point to FAO. National Focal Points should be communicated to the Secretary, Commission on Genetic Resources for Food and Agriculture (cgrfa@fao.org) immediately.
- Countries are encouraged to establish a national committee to oversee the preparation of the Country Report. The national committee should consist of as many representative stakeholders as practical (representing government, industry, research and civil society).
- The national committee should meet frequently to review progress and consult widely with key stakeholders.

- The National Focal Point should coordinate the preparation of the first draft of the Country Report, which should be reviewed by the national committee. The National Focal Point should facilitate a consultative process for broader stakeholder review.
- Following the stakeholder review, the National Focal Point should coordinate the finalization of the Country Report, submit it to the government for official endorsement and transmit it to FAO in one of the Organization's official languages (Arabic, Chinese, English, French, Russian and Spanish) by 31 December 2015.
- The Country Report will be an official government report.
- If countries are unable to submit final Country Reports by the set deadline, preliminary reports of findings should be provided to FAO to contribute to the identification of global priorities for inclusion in the SoWAqGR Report.

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

Country report supporting the preparation of
The State of the World's Aquatic Genetic Resources for Food and Agriculture

| | |
|-------------|-----------------------------|
| Country | Uganda |
| Prepared By | Uganda National Focal Point |
| Date | Dec 23, 2015 |

TABLE OF CONTENTS

| | Page |
|--|------|
| I.EXECUTIVE SUMMARY | 6 |
| II.INTRODUCTION | 7 |
| III.MAIN BODY OF THE COUNTRY REPORT | 9 |
| Chapter 1. The Use and Exchange of Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction | 9 |
| Chapter 2. Drivers and Trends in Aquaculture: Consequences for Aquatic Genetic Resources within National Jurisdiction | 23 |
| Chapter 3. <i>In Situ</i> Conservation of Aquatic Genetic Resources of Farmed Aquatic Species and their wild Relatives within National Jurisdiction | 31 |
| Chapter 4. <i>Ex Situ</i> Conservation of Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction | 36 |
| Chapter 5. Stakeholders with Interests in Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction | 43 |
| Chapter 6. National Policies and Legislation for Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction | 50 |
| Chapter 7. Research, Education, Training and Extension on Aquatic Genetic Resources within National Jurisdiction: Coordination, Networking and Information | 58 |
| Chapter 8. International Collaboration on Aquatic Genetic Resources of Farmed Aquatic Species and Their Wild Relatives | 72 |

I. EXECUTIVE SUMMARY

The Country Report should contain an executive summary of 2-3 pages highlighting the main findings of the analysis and providing an overview of key issues, constraints and existing capacity to address the issues and challenges. The executive summary should indicate trends and driving forces and present an overview of the proposed strategic directions for future actions aimed at the national, regional and global levels.

Please include the Executive Summary here.

Uganda is gifted by nature; it has a very large number of aquatic species. The waters of Uganda contain an impressive array of fish species—over 90 in all. This count does not include the Haplochromis complex, which itself is made up of more than 200 species. Only a few species are exploited for human utilisation and even fewer are currently farmed in the country. Currently there are four farmed species - Oreochromis niloticus, Oreochromis esculentus, Clarias gariepinus, all native species and Cyprinus carpio an introduced species. However there are on-going efforts of diversification to increase number of farmed fish species especially the high value species. Production from aquaculture has been increasing due to stagnating production from the wild, increasing demand of fish protein due to increasing population and better farming methods and investment into aquaculture.

Breeding of AqGR is done by the Government aquaculture research station - the Aquaculture Research and Development Centre (ARDC), Kajjansi and private hatchery operators. ARDC, Kajjansi does seed multiplication, genetic improvement of the farmed fish species and mass production of live fish foods whereas the private hatcheries mostly only do seed multiplication. Movement of AqGR within the country is unrestricted which may be detrimental to conservation, sustainable use and development of the AqGR. For importing or exporting AqGR, the restriction is mostly on the live species where one is required to get explicit permission from the Chief Fisheries Officer or Fisheries Commissioner.

AqGR conservation has been affected by a number of issues albeit at different scales. Hitherto, there have been some counter measures against these especially negative effects on the AqGR including genetic improvement of farmed fish to reduce pressure on the wild AqGR relatives, training and increase in human capacity to deal with vices, improved legal framework and policies to stop the vices, improved management of farmed species brood stock, diversification of farmed species, improved AqGR habitat management, public sensitisation about the need for conservation, sustainable use and development of AqGR and research and adoption of alternative livelihoods.

Biotechnology use in Uganda on AqGR is still on very small scale and limited mostly to selective breeding. No efforts have been put in generation of transgenic organisms.

A number of drivers have had impacts on the AqGR including habitat loss and degradation; pollution of waters; climate change; purposeful stocking and escapees from fish farms; invasive species due to species translocations and introduction of parasites and pathogens of AqGR .

There have been a number in situ and ex situ conservation efforts for AqGR in the fisheries sector. This has involved a number of stakeholders making different efforts toward the conservation, sustainable use and development of farmed AqGR and their wild relatives. These include the National Fisheries Resources Research Institute (NaFIRRI); Universities and Fisheries Training Institute involved in research and training; Government resource managers - the Directorate of Fisheries Resources Uganda (DFRU); Fish farmers associations; Beach Management Units (BMUs); and donors. Even with all the above listed efforts the country infrastructure and human capacities require enhancement in areas such as improved in situ and ex situ efforts for conservation of AqGR . Gender issues in conservation of farmed AqGR and their wild relatives are limited to a few areas.

Uganda has in place a legal framework designed for conservation, sustainable utilisation and development of AqGR albeit with a number of gaps. About status, future plans and needs for research, training, extension and education on conservation, sustainable use and development of AqGR, the institutions within the country that are involved include; the government research institute - NaFIRRI, a number of Universities and the Fisheries Training Institute (FTI). These institutions are greatly limited in capacity both human and infrastructure. The country has mechanisms for coordinating the conservation efforts in the fisheries sector.

The Country has also signed or adopted a number of networks for supporting conservation, sustainable use and development of AqGR. Information systems geared toward the same efforts include Websites and libraries in NaFIRRI, Makerere University Kampala, and DFRU. Uganda has also entered into International collaborations for the conservation, sustainable use and development of AqGR. The country has desires and has in place efforts to conserve, sustainable utilisation and developing of farmed AqGR and their wild relatives, but these efforts require urgent enhancement to achieve the intended goal.

II. INTRODUCTION

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 and present background information from your country on farmed aquatic species, their wild relatives and culture based fisheries. 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.

Please write the overview here

Uganda is gifted by nature; it has a very large number of aquatic species. The waters of Uganda contain an impressive array of fish species—over 90 in all. This count does not include the Haplochromis complex, which itself is made up of more than 200 species. Only a few species are exploited for human utilisation and even fewer are currently farmed in the country. Total fish production rose by 11% from 517,313 MT (2013/14) to 572,759 MT (2014/15). Of this capture fisheries contributed 80% and aquaculture 20%. The main commercial species caught are Nile perch, Tilapia and Mukene. Capture fisheries grew by 10% mainly due to the upsurge of mukene (*Rastrineobola agatea*) and other small fish species

The production from aquaculture has been increasing from a paltry 400 mt in 1986 to current 100,000 mt by 2014 mostly due stagnating production from the wild, increasing demand of fish protein due to increasing population and better farming methods and investment into aquaculture.. Cages on Lake Victoria rose from 1,386 (2013) to 2000 (2014) producing 1,739 and 3,155 MT respectively

Currently four fish species - *Oreochromis niloticus*, *Oreochromis esculentus*, *Clarias gariepinus* all native species and *Cyprinus carpio* which is an introduced species are farmed. However there are on-going efforts of diversification to increase number of farmed fish species especially the high value species including *Labeo victorianus*, *Lates niloticus*, *Barbus altianalis*, *Bagrus docmak* and *Protopterus aethiopicus*.

Characterisation of AqGR is mostly based on phenotypic features with few species having been genetically characterised such as *Oreochromis niloticus*, *Lates niloticus*, *Labeo victorianus*, *Clarias gariepinus*, and *Barbus altianalis* and this is mostly due to limited human and infrastructure capacities.

Breeding of AqGR is done by the Government aquaculture research station - the Aquaculture Research and Development Centre, Kajjansi and private hatchery operators. ARDC, Kajjansi does seed multiplication, genetic improvement of the farmed fish species and mass production of live fish food organisms (rotifers, chlorella, moina and artemia) for feeding juvenile fish;; the private hatchery mostly only do seed multiplication for stocking their production systems or selling to other farmers. Movement of AqGR within the country is unrestricted which may be detrimental to conservation, sustainable use and development of the AqGR. For importing or exporting AqGR, the restriction is mostly on the live species where one is required to get explicit permission from the Chief Fisheries Officer or Fisheries Commissioner.

AqGR conservation as been affected by a number of issues albeit at different scales. The issues include increase in human population that creates demand for increased animal protein, increase in wealth that has increased the populations purchasing power and demand for fish that is been fronted as the best and most affordable animal protein, better governance by creation of improved legal framework for conservation, sustainable use and development of AqGR and better enforcement, climate change which has had detrimental effects on the AqGR, increase in competition for freshwaters by different uses such as power generation, transport, domestic and industrial uses and animal consumption which have negatively impacted on the natural users - the AqGR.

Hitherto, there have been some counter measures against these especially negative effects on the AqGR including genetic improvement of farmed fish to reduce pressure on the wild AQGR relatives, training and increase in human capacity to deal with vices, improved legal framework and policies to stop the vices, improved management of farmed species broodstock, diversification of farmed species, improved AqGR habitat management, public sensitisation about the need for conservation, sustainable use and development of AqGR and research and adoption of alternative livelihoods for fisher folk that do not involve use of AqGR.

Biotechnology use in Uganda on AqGR is still on very small scale, limited to mostly to selective breeding in *Oreochromis niloticus* and *Claris gariepinus* and monosex production of farmed *Oreochromis niloticus*. Nothing has been done on the production of transgenic organisms because of limited infrastructure capacity and the justification for their production. A number of drivers have had impacts on the AqGR including habitat loss and degradation; pollution of waters; climate change; purposeful stocking and escapees from fish farms; invasive species due to species translocations and introduction of parasites and pathogens of AqGR leading to mortalities of AqGR, decreased genetic diversity and complete extinction of certain species, e.g the introduction of *Lates niloticus* from Lake Albert into Lake Victoria caused loss of over 200 fish species. There have been a number in situ conservation efforts for AqGR in the fisheries sector including identification, characterisation and gazetting for protection of breeding and nursing grounds for key fish species; restocking of depleted lakes, imposing stringent management regimes on restocked lakes; stopping or quarantining fishing activities form certain areas of water bodies such as the northern part of Lake Albert that falls in the National Game park, identified and gazetted

breeding and nursing grounds for key fish species; Conservation of threatened or endangered AqGR through public awareness and sensitization, breeding and restocking of threatened AqGR such as *Oreochromis esculentus*, research and adoption of alternative livelihoods for fisher folk to reduce pressure on wild relatives of farmed AqGR and establishing, translocation of threatened AqGR such as *Oreochromis esculentus* moved from Lake Victoria to identified refugia the Koki and Kyoga satellite lakes, and enforcing more stringent legislature against use of illegal harvesting gear for AqGR and harvesting of immature AqGR.

The country has also made some efforts toward ex situ conservation of the AqGR, which include - phenotypic and molecular identification and characterisation of AqGR, DNA microsatellite genotyping and sequencing and sending results to the world genebank, and on-station breeding for restocking depleted water bodies.

A number of stakeholders have made different efforts toward the conservation, sustainable use and development of farmed AqGR and their wild relatives. These include the National Fisheries Resources Research Institute (NaFIRRI) at forefront of identification, characterising and monitoring stocks of AqGR; Universities and Fisheries Training Institute for research and training of human capacity for conservation, sustainable use and development AqGR; and the Government resource managers - the Directorate of Fisheries Resources Uganda (DFRU) that conserves, manages and controls harvesting of AqGR; Fish farmers associations responsible for breeding and production of farmed AqGR thereby reducing pressure on the wild relatives of the AqGR; Beach Management Units (BMUs) that responsible for monitoring and policing illegal harvesting methods, immature fish harvesting and fishing from protected areas; Donors who sponsor different conservation and programmes for AqGR.

Notwithstanding the above efforts, the country infrastructure and human capacities require enhanced for better results in conservation of AqGR. The needs and priorities for future development of ex situ efforts for conservation of AqGR include increased and easily accessible infrastructure and human capacities in genetic analyses and usage, better and modern AqGR breeding facilities, establishing capacity for cryopreservation of gametes, embryos, DNA and tissues of AqGR for future use. Gender considerations in conservation of farmed AqGR and their wild relatives have been minimal with women relegated to processing and marketing of harvested AqGR whereas the indigenous and local communities have been limited to harvesting of AqGR, but in some cases help in identification of breeding and nursing grounds for different fish species, reporting and policing of illegal fishing methods and harvesting of immature fish.

Uganda has an existing legal framework that is currently being used for conservation, sustainable utilisation and development of AqGR, which includes - Fish Act (Cap 197), Fish (aquaculture) Rules (No. 81 of 2003), Land Act (Cap 227), Water Resources Regulations of 1997, Water Statute (No. 9 of 1995), National Environment Regulations (No. 3 of 2000), Environment Impact Assessment Regulations (No. 13 of 1998), the SOPs for aquaculture by DFRU of 2006, Animal Disease Act (Cap 38) and the Fisheries Policy of 2004.

Though there are a number of laws and regulations as enumerated above, there are gaps in the Country's legal framework that needed to be addressed for better results. For the conservation of AqGR, the legal framework is mostly focused on only the Fish species leaving out the other AqGR and about the importation and export restriction of AqGR the legal framework is only concerned with the living species and not other forms of AqGR such as DNA, embryos, gametes and tissues. The legal framework is also silent on management, use and conservation of trans-boundary AqGR.

About status, future plans and needs for research, training, extension and education on conservation, sustainable use and development of AqGR, the institutions within the country that are involved include the government research institute - NaFIRRI, a number of Universities and the Fisheries Training Institute (FTI). The teaching institutions offer right from diplomas to doctorates by research in conservation, sustainable use and development of the AqGR. NaFIRRI carries out research in identification, characterisation and monitoring of AqGR. In addition NaFIRRI does genetic improvement of farmed AqGR, economic evaluation and initiates policy through policy beliefs to the resource managers. There are gaps in these areas such as low staffing levels in all institutions, lack of well equipped laboratories and other infrastructure, low capacities in characterisation and monitoring of AqGR, breeding and genetic improvement and extension services provision, which should be urgently addressed for better results in conservation, sustainable use and development of AqGR. The country has put in some mechanisms for coordinating the conservation efforts in the fisheries sector. This includes - a well established legal and policy framework; fish farmers associations, BMUs; registration of fish farmers by District Fisheries Officers by location, number and type of production systems, fish species farmed and size of farm annually and relaying the information to DFRU; Public awareness and sensitisation of need to conserve AqGR; and capacity strengthening. The Country has also signed or adopted a number of networks for supporting conservation, sustainable use and development of AqGR, which include LVFO; CBD; CITES; Conservation, Nature Uganda; IUCN; Lake Edward and Lake Albert Fish Project and the East Africa Aquaculture working group. Information systems geared toward the same efforts include Websites and libraries in NaFIRRI, Makerere University Kampala, and DFRU. Lastly Uganda has entered into International collaborations for the conservation, sustainable use and development of AqGR. These include memberships' to treaties, agreements, conventions such as CBD; CITES; IUCN; LVFO; Convention on persistent organic pollutants, Stockholm; Framework convention on climate change; Lake Edward and Albert Fisheries Project; Convention concerning the protection of the world cultural and natural heritage, Paris; Agreement on the Conservation of African-Eurasian Migratory water birds; Convention on the conservation of nature and natural resources, Maputo; Millennium Development Goals (MDGs); and Convention on Wetlands of International Importance (Ramsar convention).

III. MAIN BODY OF THE COUNTRY REPORT

Aquaculture, culture-based fisheries and capture fisheries, have differing importance among countries. The structure of chapters in each Country Report will reflect those differences. Countries which do not have a well-developed aquaculture sector but where wild relatives of farmed aquatic species are located, should report on these resources. Countries should decide how to prioritize the coverage of their Country Reports depending on their aquatic genetic resources.

Chapter 1: The Use and Exchange of Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction

The main objective of Chapter 1 is to provide annotated inventories of aquatic genetic resources (AqGR) of farmed aquatic species and their wild relatives.

Farmed aquatic species

1. Over the last 10 years, has production been: *Please mark appropriate box.*

- Increasing
- Stable
- Decreasing
- Stopped
- Still in Research and Development
- Fluctuating
- Not known

2. What is the expected trend over the next 10 years? *Please mark appropriate box.*

- Increasing
- Stable
- Decreasing
- Stopped
- Still in Research and Development
- Fluctuating
- Not known

3. Is the identification and naming of farmed species, subspecies, hybrids, crossbreeds, strains, triploids, other distinct types accurate and up- to-date? *Please mark appropriate box.*

- Yes
- No
- Mostly Yes
- Mostly No

Please include any explanation or additional information here.

4. To what extent are genetic data for farmed aquatic organisms

a) Available? *Please mark appropriate box.*

- Not at all
- To a minor extent
- To some extent
- To a great extent

b) Used in management? *Please mark appropriate box.*

- Not at all
- To a minor extent
- To some extent
- To a great extent

Please add any explanation here.

5. To what extent are the aquatic organisms farmed in your country sourced as wild seed or from wild brood stock?

Please mark appropriate box.

- Not at all
- To a minor extent
- To some extent
- To a great extent

Please add any explanation here.

6. What proportions (%) of breeding programmes and efforts for the genetic improvement of farmed aquatic species in your country are being managed by the public sector (government research, universities etc.), the private sector, and public-private partnerships?

• Percent managed by public sector. **Please Enter Percentage Here**

• Percent managed by private sector. **Please Enter Percentage Here**

• Percent managed by private /public partnership. **Please Enter Percentage Here**

Total

Please add any explanation here.

7. To what extent do genetically improved aquatic organisms, including hybrids, crossbreeds, strains, triploids and other distinct types contribute to national aquaculture production in terms of volume ?

Please mark appropriate box.

- Not at all
- To a minor extent
- To some extent
- To a great extent

8. Please list most significant examples where genetic improvement contributed to increased production and indicate whether they were developed by public, private or public/private partnerships.

Add Row

| Species | Type of genetic improvement <i>mark all that apply</i> | Developed By <i>mark all that apply</i> | |
|-----------------------|--|---|---|
| Oreochromis niloticus | <input checked="" type="checkbox"/> Traditional selective breeding | <input checked="" type="checkbox"/> Private Sector <input checked="" type="checkbox"/> Public Sector <input checked="" type="checkbox"/> Private/Public partnership | |
| | <input type="checkbox"/> Hybrids | <input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership | |
| | <input type="checkbox"/> Triploids and other polyploids | <input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership | X |
| | <input checked="" type="checkbox"/> Mono-sex production | <input checked="" type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input checked="" type="checkbox"/> Private/Public partnership | |
| | <input checked="" type="checkbox"/> Other | <input type="checkbox"/> Private Sector <input checked="" type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership | |
| | | | |
| | <input checked="" type="checkbox"/> Traditional selective breeding | <input checked="" type="checkbox"/> Private Sector <input checked="" type="checkbox"/> Public Sector <input checked="" type="checkbox"/> Private/Public partnership | |
| | <input type="checkbox"/> Hybrids | <input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership | |
| Clarias gariepinus | <input type="checkbox"/> Triploids and other polyploids | <input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership | X |
| | <input type="checkbox"/> Mono-sex production | <input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership | |
| | <input checked="" type="checkbox"/> Other | <input type="checkbox"/> Private Sector <input checked="" type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership | |
| | | | |

9. Please fill in table 1.1

Table 1.1 Aquatic genetic resources (AqGR) of farmed aquatic species in your country

| Add Row | | | | | | | |
|---|--|---|--|--|--|--|--|
| Farmed species | Genetic type | Availability of genetic data | Trends in production | Future trends in production | Genetic improvement | Future genetic improvement | Comments |
| List species (scientific names), strains and varieties as scientific names (put in brackets the most widely used national common name or names) and indicate whether native or introduced | <i>Indicate all genetic types that apply to the species</i> | Are genetic data available for farmed populations? If yes, give summary details in comments | Over the last 10 years, production has been (mark one) | Expected trend over the next 10 years is that production will (mark one) | Which genetic technologies are currently being used on the species (mark all that apply) | mark all that apply | For example important traits improved, how data are used in management or name of breed, source of information, etc. |
| <input checked="" type="radio"/> Native <input type="radio"/> Introduced | <input checked="" type="checkbox"/> Wild Type <input checked="" type="checkbox"/> Selective bred type <input type="checkbox"/> Hybrids <input checked="" type="checkbox"/> Cross breeds <input checked="" type="checkbox"/> Strains <input type="checkbox"/> Varieties <input type="checkbox"/> Polyploids | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known | <input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known | <input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input checked="" type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input checked="" type="checkbox"/> Other (specify in comment) | <input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input checked="" type="checkbox"/> Monosex <input checked="" type="checkbox"/> Marker assisted selection <input type="checkbox"/> Other (specify in comment) | strains include Albert, Edward/George, Kyoga & Victoria Genetic data are available but limited within research institutions and in some hatcheries. Traits for genetic improvement include high growth rate, increased fillet, low food conversion ratio and disease resistance. |
| Oreochromis niloticus | | | | | | | X |

| | | | | | | | | |
|---|--|---|--|--|---|--|---|--|
| <input checked="" type="radio"/> Native <input type="radio"/> Introduced | | | | | | | | |
| Clarias gariepinus | <input checked="" type="checkbox"/> Wild Type <input checked="" type="checkbox"/> Selective bred type <input type="checkbox"/> Hybrids <input checked="" type="checkbox"/> Cross breeds <input checked="" type="checkbox"/> Strains <input type="checkbox"/> Varieties <input type="checkbox"/> Polyploids | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known | <input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known | <input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input checked="" type="checkbox"/> Other (specify in comment) | <input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input type="checkbox"/> Other (specify in comment) | <p>Strains include Lake Albert, Lake Edward, Kyoga, Wamala and Victoria</p> <p>Genetic data available but limited within research institutions.</p> <p>Traits for genetic improvement include high growth rate, increased fillet, low food conversion ratio and disease resistance.</p> | |

X

10. Which aquatic species in your country are thought to have potential for domestication and future use in aquaculture?

Add Row

| Species <i>Type and select a species</i> | Is the species native to your country? | Comments <i>For example main sources of information</i> | |
|---|---|--|---|
| Labeo victorinus | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | Aquaculture Research and Development Center - Kajjansi library; Internet | X |
| Bagrus spp | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | Aquaculture Research and Development Center - Kajjansi library; Internet | X |
| Lates niloticus | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | Aquaculture Research and Development Center - Kajjansi library; Internet | X |

| | | | |
|-------------------------|---|---|---|
| Barbus altianalis | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <p>Aquaculture Research and Development Center - Kajjansi library; Internet</p> | X |
| Oreochromis esculentus | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <p>Aquaculture Research and Development Center - Kajjansi library; Internet</p> | X |
| Protopterus aethiopicus | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <p>Aquaculture Research and Development Center - Kajjansi library; Internet</p> | X |

Oncorhynchus mykiss

Yes

No

Not Known

X

11. Please list the aquatic genetic resources of farmed aquatic species your country has transferred or exchanged with other countries over the past 10 years.

Add Row

| Species | Genetic alteration of exchanged material Mark all that apply | Details of transfer or exchange | Type of genetic material exchanged Mark all that apply | Country or countries involved with exchange Hold CTRL button to select more than one country | Comments <i>Please add main purpose or objective of the exchange and main sources of information</i> |
|-----------------------|---|---|--|--|---|
| Oreochromis niloticus | No deliberate genetic alteration <input checked="" type="checkbox"/> Traditional selective breeding <input type="checkbox"/> Hybrids <input type="checkbox"/> Triploids and other polyploids <input checked="" type="checkbox"/> Mono-sex production <input checked="" type="checkbox"/> Other | <input type="checkbox"/> Import <input checked="" type="checkbox"/> Export | <input type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Gametes <input type="checkbox"/> Tissues <input type="checkbox"/> Embryos <input checked="" type="checkbox"/> Living specimens <input type="checkbox"/> Other | Canada Central African Republic Chad Chile China Colombia Comoros Cook Islands Costa Rica Côte d'Ivoire Croatia Cuba Cyprus Czech Republic Republic of Korea Democratic Republic Denmark | The main purpose of exchange of genetic material is supply fish fingerlings/seed to neighboring countries from Uganda's hatcheries. |
| Clarias gariepinus | No deliberate genetic alteration <input checked="" type="checkbox"/> Traditional selective breeding <input type="checkbox"/> Hybrids <input type="checkbox"/> Triploids and other polyploids <input type="checkbox"/> Mono-sex production <input type="checkbox"/> Other | <input type="checkbox"/> Import <input checked="" type="checkbox"/> Export | <input type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Gametes <input type="checkbox"/> Tissues <input type="checkbox"/> Embryos <input checked="" type="checkbox"/> Living specimens <input type="checkbox"/> Other | Canada Central African Republic Chad Chile China Colombia Comoros Cook Islands Costa Rica Côte d'Ivoire Croatia Cuba Cyprus Czech Republic Republic of Korea Democratic Republic Denmark | The main purpose of exchange of genetic material is supply fish fingerlings/seed to neighboring countries from Uganda's hatcheries. |

Wild relatives of farmed aquatic species

12. Please list any wild relatives of aquatic species present in your country that are farmed in another country (but not in your country) and indicate their uses.

This question refers to aquatic genetic resources that are present in the wild in your country and that are being farmed elsewhere (but not farmed in your country), indicating any uses these resources may have in your country.

Add Row

| Species | Use <i>(mark all that apply)</i> | Comments | |
|---------------------|---|---|---|
| Oncorhynchus mykiss | <input checked="" type="checkbox"/> Capture fisheries <input type="checkbox"/> Recreational fishery <input type="checkbox"/> Aquaria <input type="checkbox"/> Biological control <input checked="" type="checkbox"/> Research and development <input type="checkbox"/> Other (specify in comments) | Rainbow trout is found in streams in colder areas of the country - Mt. Elgon region where it is a delicacy. It farmed in Europe, USA, Canada and neighboring Kenya. | X |

13. Please list the aquatic genetic resources of wild relatives of farmed aquatic species your country has transferred or exchanged with other countries over the past 10 years.

Add Row

This question refers to wild aquatic genetic resources collected from the wild, not from farming facilities as in question 11.

| Species | Details of transfer or exchange <i>mark all that apply</i> | Type of genetic material exchanged | Country Hold CTRL button to select more than one country | Comments <i>main sources of information, if the transfer was legal or not</i> | |
|-----------------------|--|--|---|---|---|
| Oreochromis niloticus | <input type="checkbox"/> Import <input checked="" type="checkbox"/> Export | <input checked="" type="checkbox"/> Tissues <input type="checkbox"/> Gametes <input checked="" type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Embryos <input checked="" type="checkbox"/> Living specimens <input type="checkbox"/> Other | Netherlands New Zealand Nicaragua Niger Nigeria Niue Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland | Transfers were legal in most cases for purposes of genetic analyses, genetic improvement programs and provision of seed for culturing of the species. | X |
| Clarias gariepinus | <input checked="" type="checkbox"/> Import <input checked="" type="checkbox"/> Export | <input checked="" type="checkbox"/> Tissues <input type="checkbox"/> Gametes <input checked="" type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Embryos <input checked="" type="checkbox"/> Living specimens <input type="checkbox"/> Other | Canada Central African Republic Chad Chile China Colombia Comoros Cook Islands Costa Rica Côte d'Ivoire Croatia Cuba Cyprus Czech Republic Republic of Korea Democratic Republic of th | Transfers were legal in most cases for purposes of genetic analyses, genetic improvement programs and provision of seed for culturing of the species. | X |

14. Please fill in table 1.2

Table 1.2 Aquatic genetic resources of wild relatives of farmed aquatic species in your country.

| Add Row | | | | | | | | | | |
|--|---|---|---|---|---|---|---|--|--|--|
| Target species, stocks or other management units | Characteristics of species | Capture fisheries | Management measures | Availability of genetic data | Use of genetic data in management | Trends in catches | Future trends in catches | Ecosystem(s) where the fishery is located | Changes in ranges and habitats | Reasons for change in abundance of species |
| For each row, list the species as scientific names (put in brackets the most widely used national common For each species, include the named stocks and name of other management units if known) | Is the species (mark as appropriate) : | Is this species targeted by capture fisheries? | Are there any management measures in place? | Are genetic data available for the fishery? | Are genetic data used in management? | Over the last 10 years, catches have been: | Expected trend over the next 10 years. | Indicate the ecosystem where the fishery is located (mark all that apply) | The habitat or range is | What are likely reasons for changes? (mark all that apply) |
| | <input type="checkbox"/> Straddling <input checked="" type="checkbox"/> Transboundary <input type="checkbox"/> Introduced <input checked="" type="checkbox"/> Native | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known | <input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input checked="" type="radio"/> Decreasing <input type="radio"/> Depleted <input type="radio"/> Not known | <input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input checked="" type="radio"/> Decreasing <input type="radio"/> Depleted <input type="radio"/> Not known | <input type="checkbox"/> Intertidal <input type="checkbox"/> Coastal in EEZ <input type="checkbox"/> High seas <input checked="" type="checkbox"/> Lake <input checked="" type="checkbox"/> Reservoir <input checked="" type="checkbox"/> River <input checked="" type="checkbox"/> Swamp <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="radio"/> Increasing <input type="radio"/> Stable <input checked="" type="radio"/> Decreasing <input type="radio"/> Not known | <input checked="" type="checkbox"/> Habitat <input checked="" type="checkbox"/> Climate <input checked="" type="checkbox"/> Invasive species <input checked="" type="checkbox"/> Pollution <input type="checkbox"/> Rehabilitation of habitat <input type="checkbox"/> Others <input type="checkbox"/> Not known |
| Oreochromis niloticus | | | | | | | | | | X |

| Target species, stocks or other management units | Characteristics of species | Capture fisheries | Management measures | Availability of genetic data | Use of genetic data in management | Trends in catches | Future trends in catches | Ecosystem(s) where the fishery is located | Changes in ranges and habitats | Reasons for change in abundance of species | |
|--|---|---|---|---|---|---|---|---|--|--|---|
| Clarias gariepinus | <input type="checkbox"/> Straddling <input checked="" type="checkbox"/> Transboundary <input type="checkbox"/> Introduced <input checked="" type="checkbox"/> Native | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known | <input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input checked="" type="radio"/> Decreasing <input type="radio"/> Depleted <input type="radio"/> Not known | <input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input checked="" type="radio"/> Decreasing <input type="radio"/> Depleted <input type="radio"/> Not known | <input type="checkbox"/> Intertidal <input type="checkbox"/> Coastal in EEZ <input type="checkbox"/> High seas <input checked="" type="checkbox"/> Lake <input checked="" type="checkbox"/> Reservoir <input checked="" type="checkbox"/> River <input checked="" type="checkbox"/> Swamp <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="radio"/> Increasing <input type="radio"/> Stable <input checked="" type="radio"/> Decreasing <input type="radio"/> Not known | <input checked="" type="checkbox"/> Habitat <input checked="" type="checkbox"/> Climate <input type="checkbox"/> Invasive species <input checked="" type="checkbox"/> Pollution <input type="checkbox"/> Rehabilitation of habitat <input type="checkbox"/> Others <input type="checkbox"/> Not known | X |
| Cyprinus carpio | <input type="checkbox"/> Straddling <input type="checkbox"/> Transboundary <input checked="" type="checkbox"/> Introduced <input type="checkbox"/> Native | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known | <input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Depleted <input type="radio"/> Not known | <input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input checked="" type="radio"/> Decreasing <input type="radio"/> Depleted <input type="radio"/> Not known | <input type="checkbox"/> Intertidal <input type="checkbox"/> Coastal in EEZ <input type="checkbox"/> High seas <input checked="" type="checkbox"/> Lake <input checked="" type="checkbox"/> Reservoir <input type="checkbox"/> River <input type="checkbox"/> Swamp <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="radio"/> Increasing <input type="radio"/> Stable <input checked="" type="radio"/> Decreasing <input type="radio"/> Not known | <input checked="" type="checkbox"/> Habitat <input checked="" type="checkbox"/> Climate <input type="checkbox"/> Invasive species <input checked="" type="checkbox"/> Pollution <input checked="" type="checkbox"/> Rehabilitation of habitat <input type="checkbox"/> Others <input type="checkbox"/> Not known | X |

Chapter 2: Drivers and Trends in Aquaculture: Consequences for Aquatic Genetic Resources within National Jurisdiction

The main objective of Chapter 2 is to review the main drivers and trends that are shaping aquaculture and their consequences for aquatic genetic resources.

15. Please indicate the ways the aquatic genetic resources (AqGR) of **farmed aquatic species** have been impacted by the following drivers. Please give examples of positive and negative impacts for specific drivers.

This question refers to drivers impacting farmed aquatic genetic resources, not about impacts on the entire aquaculture sector. Drivers should be seen from a national perspective.

| Driver impacting aquaculture | Effect on AqGR <i>Mark appropriate box</i> | Comments <i>List examples or other relevant information</i> |
|--|---|---|
| Human population increase | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Increased aquaculture due to increased demand for fish protein |
| Increased wealth and demand for fish | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Farm more -> better care for AqGR |
| Governance (ability of government, industry and the public to work together in managing resources) | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Farmer association established -> better coordination in AqGR management Easier to enforce regulations in AqGR management |
| Climate change | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Floods cause loss of farmed AqGR Increased temperature leads to shallow water and hence diseases occur Drought impacts water availability and hence deterring development of AgGRs. |
| Competition for resources, especially freshwater | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Reduced development of AgGRs. |

| Driver impacting aquaculture | Effect on AqGR <i>Mark appropriate box</i> | Comments <i>List examples or other relevant information</i> |
|--|---|---|
| Changes in values and ethics of consumers | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Changes in attitude towards eating fish lead to more demand for fish. |
| Other Add other drivers as necessary | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | |
| Add Row | Remove Row | |

16. Please indicate the ways the aquatic genetic resources of **wild relatives of farmed aquatic species** in nature have been impacted by the following drivers. Please give examples of positive and negative impacts for specific drivers.

This question refers to drivers impacting wild aquatic genetic resources of farmed species, not about impacts on the entire aquaculture sector. Drivers should be seen from a national perspective.

| Driver impacting aquaculture | Effect on AqGR <i>Mark appropriate box</i> | Comments <i>List examples or other relevant information</i> |
|--|---|---|
| Human population increase | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Increased fishing effort/pressure Declined wild stock Increased use of illegal fishing methods/gear Degradation of habitats |
| Increased wealth and demand for fish | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | More exploitation of wild stock Increased fishing effort/pressure Declined wild stock Increased use of illegal fishing methods/gear Degradation of habitats |
| Governance (ability of government, industry and the public to work together in managing resources) | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Better management and conservation |
| Climate change | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Declined water levels affect breeding and nursing grounds |
| Competition for resources, especially freshwater | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Conflicts among resource users (fishers, farmers, hydro-power projects, industrialists) leading decline in stocks |

| Driver impacting aquaculture | Effect on AqGR <i>Mark appropriate box</i> | Comments <i>List examples or other relevant information</i> |
|--|---|--|
| Changes in values and ethics of consumers | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Demand for fish increases -> exploitation -> declining stock |
| Other Add other drivers as necessary | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | |
| | | |
| Add Row | Remove Row | |

17. 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?

Describe countermeasures

Genetic improvement - through this program the government and research hope to develop fast growing strains with low food conversion ratios, which can allow increased crops and yield in year; Capacity building - through this program we shall achieve increased and better quality human capacity and infrastructure to manage, utilise and conserve better the AqGRs; with better policies and legislation, planning and strategies the AqGRs will be exploited in a better way while conserving them for the future; the conservation efforts both 'in situ' and 'ex situ' will be explored to maintain the genetic diversity of the AqGRs; application of best practices in broodstock and genetic resources management will also aid in maintaining the genetic diversity and avoid inbreeding in the AqGRs; and the diversification farmed species especially the high value species will lead to increased aquaculture resources production and productivity while reducing pressure on the few currently farmed AqGRs.

Biotechnologies

18. To what extent have the following biotechnologies been used in your country for the genetic improvement of farmed aquatic organisms.

| Biotechnology | Extent of use | Comments <i>main sources of information, important species for which the biotechnology is applied</i> |
|--|---|--|
| Selective breeding | <input type="radio"/> Not at all <input type="radio"/> To a minor extent <input checked="" type="radio"/> To some extent <input type="radio"/> To a great extent | Research Institutes & Internet; Oreochromis niloticus Clarias gariepinus |
| Hybridization | <input checked="" type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent | |
| Polyploidy (chromosome set manipulation) | <input checked="" type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent | |
| Monosex production | <input type="radio"/> Not at all <input type="radio"/> To a minor extent <input checked="" type="radio"/> To some extent <input type="radio"/> To a great extent | Research Institutes & Internet; Oreochromis niloticus |
| Marker assisted selection | <input checked="" type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent | |
| Gynogenesis/androgenesis | <input checked="" type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent | |
| Other | <input type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent | |
| Continue adding row as necessary | | |
| | | |
| Add Row | Remove Row | |

19. Please indicate the ways aquatic genetic resources of the wild relatives of farmed aquatic species have been impacted by drivers that are changing aquatic ecosystems. Please give countermeasures that might be taken to reduce adverse consequences for the aquatic genetic resources that sustain capture fisheries on wild relatives of farmed species.

| Drivers that are changing aquatic ecosystems | Effect on AqGR <i>mark appropriate box</i> | Countermeasures and effects |
|---|---|---|
| Habitat loss and degradation | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Habitat restoration Protect breeding and nursing grounds |
| Pollution of waters | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Better strong legislation and policies, Strengthen law enforcement |
| Increased frequency of extreme climatic events and long-term climate change | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Conserve genetic diversity; Increase public awareness of effects of climate change, mitigation and adaptability measures; Biosecurity measures for farmed fish to avoid escapees |
| Establishment of invasive species | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Biological and mechanical removal of water hyacinth; Prohibit AqGR translocations within the Country without following proper well laid out procedures and stem importation of invasive species without authorisation and biosecurity and biosafety measures |
| Introductions of parasites and pathogens | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Prohibition of intentional movement and importation of parasites and pathogens |

| Drivers that are changing aquatic ecosystems | Effect on AqGR <i>mark appropriate box</i> | Countermeasures and effects |
|---|---|---|
| Impacts of purposeful stocking and escapes from aquaculture | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Encouraging best farm management practices - screening both ponds' inlets and outlets; Improving extension services to farmers; Better planning and site selection |
| Capture fisheries | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | Improved genetic resources management; Avoidance of escapees getting into the wild; Protection of breeding and nursery grounds; Seed for farmed AqGR should be gotten from registered hatcheries and not from the wild |
| Other | <input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | |
| <i>Continue listing other drivers</i> | <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | |
| | <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown | |
| Add Row | Remove Row | |

Chapter 3: *In Situ* Conservation of Aquatic Genetic Resources of Farmed Aquatic Species and their wild Relatives within National Jurisdiction

The main objective of Chapter 3 is to review the current status and future prospects for the *in situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives within national jurisdiction for food and agriculture.

The specific objectives are as follows:

- To review the current and likely future contributions to *in situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives 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 of wild relatives of farmed aquatic species.
- To identify and describe any major existing and planned efforts for the *in situ* conservation of threatened or endangered aquatic genetic resources (farmed and wild).
- To review needs and priorities for the future development of *in situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives.

Overview of the current status and future prospects for the *in situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives

20. To what extent are responsible and well managed aquaculture and culture-based fisheries contributing to *in situ* conservation of the aquatic genetic resources of farmed aquatic species and their wild relatives.

Please mark appropriate box.

- To a great extent
 To a limited extent
 Not at all
 Not applicable

Please include any additional information

This achieved through provision of livelihood alternative to fisher folk and thereby reduction of pressure on the wild relatives of the farmed AqGR; Responsible aquaculture and culture-based fisheries are important in aiding restocking of overexploited waters in the wild by providing fingerlings/seed

21. To what extent are existing facilities contributing to *in situ* conservation of aquatic genetic resources of wild relatives of farmed aquatic species?

Please mark appropriate box.

- To a great extent
 To a limited extent
 Not at all
 Not applicable

Please include any additional information

Research has and is continuously identifying breeding and nursery grounds for the AqGR of wild relatives of farmed species for gazetting and consequent protection by the resource management; Extension and Research are encouraging best farm practices to avoid farmed escapees into the wild; Legislation and its enforcement against illegal and under size harvest of the AqGR of wild relatives of farmed species are in place; Government of restocking over exploited water bodies and putting in place management regimes for these water bodies

22. Please provide *examples* of current or planned activities for the *in situ* conservation of endangered or threatened farmed species and their wild relatives with demonstrated or potential importance for aquaculture, culture-based fisheries, and capture fisheries.

Please describe examples

Research has and is continuously identifying breeding and nursery grounds for the AqGR of wild relatives of farmed species for gazetting and consequent protection by the resource management; Extension and Research are encouraging best farm practices to avoid farmed escapees into the wild; Legislation and its enforcement against illegal and under size harvest of the AqGR of wild relatives of farmed species are in place; Government of restocking over exploited water bodies and putting in place management regimes for these water bodies.

23. Please rank (from 1 to 10) the importance of the following objectives for *in situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives in your country.

| Objectives of <i>in situ</i> conservation | Rank 1=Very Important 10=No importance |
|--|--|
| Preservation of aquatic genetic diversity | <input type="text" value="1"/> |
| Maintain good strains for aquaculture production | <input type="text" value="2"/> |
| Meet consumer and market demands | <input type="text" value="2"/> |
| To help adapt to impacts of climate change | <input type="text" value="1"/> |
| Future breed improvement in aquaculture | <input type="text" value="1"/> |
| <i>Please continue listing any other objectives as needed</i> | <input type="text"/> |
| | |
| <input type="button" value="Add Row"/> <input type="button" value="Remove Row"/> | |

Review of the *in situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives through their use in responsible and well managed aquaculture and culture-based fisheries

24. Is the *in situ* conservation of aquatic genetic resources included in the policy as an objective in the management of aquaculture and/or culture-based fisheries in your country?

Please mark appropriate box

- Yes
 Not yet, but planned to be included
 No
 Unknown

If yes, please give examples

25. 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?

Please mark appropriate box

- To a great extent
 To a limited extent
 Not at all
 Not applicable

Please include any additional details

Private collectors do not maintain the habitats or limit the number of wild seed or broodstock they collect.

Review of the *in situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives through their use in responsible and well managed capture fisheries

26. Is the conservation of aquatic genetic resources of wild relatives of farmed aquatic species included as an objective in the management of any capture fisheries in your country?

Please mark appropriate box

If yes, please give examples

- Yes
 Not yet, but under development
 No
 Unknown

Limiting sizes to be harvested, control of fishing effort; prohibition of certain type of gear that target AqGR of farmed aquatic species and their wild relatives.

Review of the *in situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives through the establishment and management of aquatic protected areas

27. Please list any aquatic protected areas in your country that are contributing to the *in situ* conservation of aquatic genetic resources of wild relatives of farmed aquatic species and an assessment of effectiveness

Add Row

| Aquatic protected area | Effectiveness of conserving Aquatic Genetic Resources | Comments <i>provide any additional information</i> | |
|--|---|--|---|
| 56 identified breeding and nursery grounds for key species on Northern Lake Victoria; 35 identified breeding and nursery grounds for key species on Lake Albert; 23 identified breeding and nursery grounds for key species on lakes Edward and George - gazetted for their protection | <input type="radio"/> Very effective <input checked="" type="radio"/> Somewhat effective <input type="radio"/> Not effective <input type="radio"/> Unknown | These places have been identified and gazetted but the resource managers are thin on the ground for effective enforcement. | X |

Chapter 4: *Ex Situ* Conservation of Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction

The main objective of Chapter 4 is to review the current status and future prospects for the *ex situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives.

The specific objectives are:

- To review existing *ex situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives 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 of farmed aquatic species and their wild relatives;
- To review needs and priorities for the future development of *ex situ* conservation of aquatic genetic resources of farmed aquatic species and their wild relatives, including any that are threatened or endangered.

Review of existing and planned collections of live breeding individuals of aquatic genetic resources of farmed aquatic species and their wild relatives

28. Please list your country's existing 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 species farmed directly for human use, but also collections of live feed organisms (e.g., bacterial flocs, yeasts, microalgae, rotifers and brine shrimp (*Artemia*)).

| Add Row | | | | |
|--|--|---|--|---|
| Species (include information on subspecies or strain in comments if available) | Type of use <i>Please mark all that apply</i> | Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? <i>Please mark appropriate box</i> | Comments <i>Please list any additional information</i> | |
| Oreochromis niloticus | <input checked="" type="checkbox"/> Direct human consumption <input type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | Strains - Albert, Edward/George, Kyoga and Victoria | X |
| Clarias gariepinus | <input checked="" type="checkbox"/> Direct human consumption <input type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | Country wide distribution - lakes, rivers, streams, swamps and flood plains | X |
| Cyprinus carpio | <input checked="" type="checkbox"/> Direct human consumption <input checked="" type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | Introduced from Israel, escaped from farms into the wild in cater lakes in Western Uganda (Kisoro lakes) | X |

| Species (include information on subspecies or strain in comments if available) | Type of use <i>Please mark all that apply</i> | Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? <i>Please mark appropriate box</i> | Comments <i>Please list any additional information</i> | |
|--|---|---|---|---|
| Labeo victorianus | <input checked="" type="checkbox"/> Direct human consumption <input type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown | Local name - Ningu, English name – African carp) Species Lake Victoria waters - mouths of Rivers Kagera and Sio | X |
| Moina belli | <input type="checkbox"/> Direct human consumption <input checked="" type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | English name – Species of Crustaceans Species native to Uganda | X |
| Chlorella vulgaris | <input type="checkbox"/> Direct human consumption <input checked="" type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | English name – Chlorella Species native to Uganda | X |
| Daphnia magna | <input type="checkbox"/> Direct human consumption <input checked="" type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | English name – Water flea Species native to Uganda | X |
| Copepoda sp. | <input type="checkbox"/> Direct human consumption <input checked="" type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | These part of the crustaceans, English name – Copepods Species native to Uganda with the biggest group being the cyclopoid copepods and most abundant species being the Thermochclops hyalinus | X |
| Cladocera sp. | <input type="checkbox"/> Direct human consumption <input checked="" type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | Species of Crustaceans, English name – Diatoms Species native to Uganda | X |

| Species (include information on subspecies or strain in comments if available) | Type of use <i>Please mark all that apply</i> | Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? <i>Please mark appropriate box</i> | Comments <i>Please list any additional information</i> | |
|--|---|---|---|---|
| Artemia sp. | <input type="checkbox"/> Direct human consumption <input checked="" type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | English name – Artemia Strains: A. Franscicana strain (GSL strain), Tuz strain, Chinese strain and the Vin chao strain Species non-native to Uganda, all these strains are imported | X |
| Brachionus plicatilis | <input type="checkbox"/> Direct human consumption <input checked="" type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | English name –Rotifers Species native to Uganda | X |
| Lates niloticus | <input checked="" type="checkbox"/> Direct human consumption <input type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | | X |
| Bagrus docmak | <input checked="" type="checkbox"/> Direct human consumption <input type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | Strains - Albertine rift strain and Victoria waters strain | X |
| Barbus altianalis | <input checked="" type="checkbox"/> Direct human consumption <input type="checkbox"/> Live feed organism <input type="checkbox"/> Other | <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown | | X |

Review of existing *ex situ* conservation activities of aquatic genetic resources of farmed aquatic species and their wild relatives *in vitro*.

29. Please list your country's *in vitro* collections and gene banks of the gametes, embryos, tissues, spores and other quiescent forms of farmed aquatic species and their wild relatives, using cryopreservation or other methods of long-term storage. Describe the major examples, identifying the facilities in which the collections are held. Include examples of any such genetic material from your country that is being kept in *in vitro* collections outside your country on behalf of beneficiaries in your country.

| Add Row | | | | | |
|--|--|--|--|--|---|
| Species (include information on subspecies or strain if available in comments) | Users and managers <i>List all that apply</i> | Type of <i>ex-situ</i> conservation collection <i>in vitro</i> <i>mark all that apply</i> | Facilities where collection is located <i>mark all that apply</i> | Comments <i>list all breeds, subspecies of the species and any additional information</i> | |
| Oreochromis niloticus | Research Institutions, farmers & Universities | <input type="checkbox"/> In vitro collection of gametes <input type="checkbox"/> In vitro collection of embryos <input checked="" type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input checked="" type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | Strains - Albert, Edward/George, Kyoga & Victoria | X |
| Clarias gariepinus | Research Institutions, farmers & Universities | <input type="checkbox"/> In vitro collection of gametes <input type="checkbox"/> In vitro collection of embryos <input checked="" type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input checked="" type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | | X |
| Cyprinus carpio | Research Institutions, farmers & Universities | <input type="checkbox"/> In vitro collection of gametes <input type="checkbox"/> In vitro collection of embryos <input checked="" type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input checked="" type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | | X |
| Labeo victorinus | Research Institutions, farmers & Universities | <input type="checkbox"/> In vitro collection of gametes <input type="checkbox"/> In vitro collection of embryos <input checked="" type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input checked="" type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | 2 morphotypes - Kagera & Sio | X |

| Species (include information on subspecies or strain if available in comments) | Users and managers <i>List all that apply</i> | Type of <i>ex-situ</i> conservation collection <i>in vitro</i> <i>mark all that apply</i> | Facilities where collection is located <i>mark all that apply</i> | Comments <i>list all breeds, subspecies of the species and any additional information</i> | |
|--|--|---|--|--|---|
| Moina belli | Research Institutions, farmers & Universities | <input type="checkbox"/> In vitro collection of gametes <input checked="" type="checkbox"/> In vitro collection of embryos <input type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input checked="" type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | | X |
| Brachionus plicatilis | Research Institutions, farmers & Universities | <input type="checkbox"/> In vitro collection of gametes <input checked="" type="checkbox"/> In vitro collection of embryos <input type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input checked="" type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | | X |
| Artemia sp. | Research Institutions, farmers & Universities | <input checked="" type="checkbox"/> In vitro collection of gametes <input type="checkbox"/> In vitro collection of embryos <input type="checkbox"/> In vitro collection of tissues <input checked="" type="checkbox"/> Spores <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | | X |
| Chlorella vulgaris | Research Institutions, farmers & Universities | <input type="checkbox"/> In vitro collection of gametes <input checked="" type="checkbox"/> In vitro collection of embryos <input type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input checked="" type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | | X |
| Lates niloticus | Research Institutions, farmers & Universities | <input checked="" type="checkbox"/> In vitro collection of gametes <input checked="" type="checkbox"/> In vitro collection of embryos <input type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input checked="" type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | Efforts on-going to Domesticate & breed species in captivity | X |

| Species (include information on subspecies or strain if available in comments) | Users and managers <i>List all that apply</i> | Type of <i>ex-situ</i> conservation collection <i>in vitro</i> <i>mark all that apply</i> | Facilities where collection is located <i>mark all that apply</i> | Comments <i>list all breeds, subspecies of the species and any additional information</i> | |
|--|--|--|---|--|---|
| Bagrus docmak | Research Institutions, farmers & Universities | <input checked="" type="checkbox"/> In vitro collection of gametes <input checked="" type="checkbox"/> In vitro collection of embryos <input checked="" type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | Efforts on-going to Domesticate & breed species in captivity | X |
| Barbus altianalis | Research Institutions, farmers & Universities | <input checked="" type="checkbox"/> In vitro collection of gametes <input checked="" type="checkbox"/> In vitro collection of embryos <input checked="" type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input checked="" type="checkbox"/> Other | <input checked="" type="checkbox"/> Aquaculture facilities <input checked="" type="checkbox"/> Research facilities <input type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> Other | Efforts on-going to Domesticate & breed species in captivity | X |

30. Please rank (from 1 – 10) the importance of the following objectives for ex situ conservation of aquatic genetic resources of farmed aquatic species and their wild relatives in your country

| Objectives of <i>ex situ</i> conservation | Rank 1=Very Important 10=No importance |
|--|--|
| Preservation of aquatic genetic diversity | <input type="text" value="1"/> |
| Maintain good strains for aquaculture production | <input type="text" value="2"/> |
| Meet consumer and market demands | <input type="text" value="8"/> |
| To help adapt to impacts of climate change | <input type="text" value="3"/> |
| Future breed improvement in aquaculture | <input type="text" value="1"/> |
| Other <i>Continue adding row as necessary</i> | <input type="text"/> |
| | |
| Add Row | Remove Row |

Chapter 5: Stakeholders with Interests in Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction

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 of farmed aquatic species and their wild relatives for food and agriculture. 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. Gender issues pertaining to the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives should be considered, as well as the perspectives and needs of indigenous peoples and local communities.

The specific objectives are:

- To describe the different principal stakeholder groups with interests in aquatic genetic resources of farmed aquatic species and their wild relatives To identify the type(s) of aquatic genetic resources of farmed aquatic species and their wild relatives 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.

Overview of the principal stakeholder groups who have interests in aquatic genetic resources of farmed aquatic species and their wild relatives

31. Please indicate the principal stakeholder groups who have interests in aquatic genetic resources of farmed aquatic species and their wild relatives including, *inter alia*: fish farmers; fishers in capture fisheries; persons involved in stocking and harvesting in culture-based fisheries; persons employed in postharvest chains; government officials; staff and members of aquaculture associations; managers of aquatic protected areas and others working for the conservation of aquatic ecosystems; researchers; and civil society.

| Stakeholders | Role of stakeholder in regards og AqGR <i>mark all that apply</i> | Genetic resource of main interest <i>mark all that apply</i> | Comments <i>Please provide any information or explanation of stakeholders' role</i> |
|--------------|--|--|--|
| Fish Farmers | <input type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input type="checkbox"/> Feed manufacturing <input checked="" type="checkbox"/> Breeding <input type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input type="checkbox"/> Processing <input type="checkbox"/> Advocacy <input type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| Fishers | <input type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input type="checkbox"/> Feed manufacturing <input type="checkbox"/> Breeding <input type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input checked="" type="checkbox"/> Processing <input type="checkbox"/> Advocacy <input type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |

| Stakeholders | Role of stakeholder in regards og AqGR <i>mark all that apply</i> | Genetic resource of main interest <i>mark all that apply</i> | Comments <i>Please provide any information or explanation of stakeholders' role</i> |
|------------------------------|--|--|--|
| Fish hatchery people | <input checked="" type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input type="checkbox"/> Feed manufacturing <input checked="" type="checkbox"/> Breeding <input type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input type="checkbox"/> Processing <input type="checkbox"/> Advocacy <input checked="" type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| People involved in marketing | <input type="checkbox"/> Conservation <input type="checkbox"/> Production <input type="checkbox"/> Feed manufacturing <input type="checkbox"/> Breeding <input type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input checked="" type="checkbox"/> Processing <input type="checkbox"/> Advocacy <input type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| Government resource managers | <input checked="" type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input type="checkbox"/> Feed manufacturing <input type="checkbox"/> Breeding <input type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input type="checkbox"/> Processing <input type="checkbox"/> Advocacy <input checked="" type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |

| Stakeholders | Role of stakeholder in regards og AqGR <i>mark all that apply</i> | Genetic resource of main interest <i>mark all that apply</i> | Comments <i>Please provide any information or explanation of stakeholders' role</i> |
|-------------------------------------|--|--|--|
| Fishing or aquaculture associations | <input checked="" type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input checked="" type="checkbox"/> Feed manufacturing <input type="checkbox"/> Breeding <input type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input checked="" type="checkbox"/> Processing <input checked="" type="checkbox"/> Advocacy <input checked="" type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| Aquatic protected area managers | <input checked="" type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input type="checkbox"/> Feed manufacturing <input type="checkbox"/> Breeding <input checked="" type="checkbox"/> Research <input type="checkbox"/> Marketing <input type="checkbox"/> Processing <input checked="" type="checkbox"/> Advocacy <input checked="" type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| Policy Makers | <input checked="" type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input checked="" type="checkbox"/> Feed manufacturing <input type="checkbox"/> Breeding <input type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input checked="" type="checkbox"/> Processing <input checked="" type="checkbox"/> Advocacy <input type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |

| Stakeholders | Role of stakeholder in regards og AqGR <i>mark all that apply</i> | Genetic resource of main interest <i>mark all that apply</i> | Comments <i>Please provide any information or explanation of stakeholders' role</i> |
|---------------------------------|--|---|--|
| Non-Governmental Organizations | <input checked="" type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input checked="" type="checkbox"/> Feed manufacturing <input type="checkbox"/> Breeding <input checked="" type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input checked="" type="checkbox"/> Processing <input checked="" type="checkbox"/> Advocacy <input checked="" type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| Intergovernmental Organizations | <input checked="" type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input checked="" type="checkbox"/> Feed manufacturing <input checked="" type="checkbox"/> Breeding <input checked="" type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input checked="" type="checkbox"/> Processing <input checked="" type="checkbox"/> Advocacy <input checked="" type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| Donors | <input checked="" type="checkbox"/> Conservation <input checked="" type="checkbox"/> Production <input checked="" type="checkbox"/> Feed manufacturing <input checked="" type="checkbox"/> Breeding <input checked="" type="checkbox"/> Research <input checked="" type="checkbox"/> Marketing <input checked="" type="checkbox"/> Processing <input checked="" type="checkbox"/> Advocacy <input checked="" type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div> | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |

| Stakeholders | Role of stakeholder in regards og AqGR <i>mark all that apply</i> | Genetic resource of main interest <i>mark all that apply</i> | Comments <i>Please provide any information or explanation of stakeholders' role</i> | | | | | | | | | | |
|--|---|---|--|--|--|---|-----------------------------------|-----------------------------------|---|-----------------------------------|---|--|--|
| Consumers | <table><tr><td><input type="checkbox"/> Conservation</td><td><input checked="" type="checkbox"/> Marketing</td></tr><tr><td><input checked="" type="checkbox"/> Production</td><td><input checked="" type="checkbox"/> Processing</td></tr><tr><td><input type="checkbox"/> Feed manufacturing</td><td><input type="checkbox"/> Advocacy</td></tr><tr><td><input type="checkbox"/> Breeding</td><td><input type="checkbox"/> Outreach/Extension</td></tr><tr><td><input type="checkbox"/> Research</td><td><input type="checkbox"/> Other (specify)</td></tr></table> <div data-bbox="867 602 1224 703" style="border: 1px solid black; height: 60px; width: 100%;"></div> | <input type="checkbox"/> Conservation | <input checked="" type="checkbox"/> Marketing | <input checked="" type="checkbox"/> Production | <input checked="" type="checkbox"/> Processing | <input type="checkbox"/> Feed manufacturing | <input type="checkbox"/> Advocacy | <input type="checkbox"/> Breeding | <input type="checkbox"/> Outreach/Extension | <input type="checkbox"/> Research | <input type="checkbox"/> Other (specify) | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| <input type="checkbox"/> Conservation | <input checked="" type="checkbox"/> Marketing | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Production | <input checked="" type="checkbox"/> Processing | | | | | | | | | | | | |
| <input type="checkbox"/> Feed manufacturing | <input type="checkbox"/> Advocacy | | | | | | | | | | | | |
| <input type="checkbox"/> Breeding | <input type="checkbox"/> Outreach/Extension | | | | | | | | | | | | |
| <input type="checkbox"/> Research | <input type="checkbox"/> Other (specify) | | | | | | | | | | | | |

a) Please indicate the most important role of women in regards to AqGR

Processing and marketing

b) Please indicate the most important role of indigenous and local communities in regards to AqGR

Production through harvesting from the wild and culturing of the AqGR; identification, policing & monitoring of breeding and nursing grounds for different AqGR species; Notifying resource managers and local authorities about new introductions, invasions, infestations by weeds and parasites and pathogens into native AqGR habitats, reporting of use of illegal harvesting gears and harvesting of immature and restricted AqGR

Chapter 6: National Policies and Legislation for Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction

The main objective of Chapter 6 is to review the status and adequacy of national policies and legislation concerning aquatic genetic resources of farmed aquatic species and their wild relatives including access and benefit sharing.

The specific objectives are as follows:

- To describe the existing national policy and legal framework for the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives.
- To review current national policies and instruments for access to aquatic genetic resources of farmed aquatic species and their wild relatives 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 of farmed aquatic species and their wild relatives..

Review of national policies and legislation for Aquatic Genetic Resources of farmed aquatic species and their wild relatives within national jurisdiction

32. Please list national legislation, policies and/or mechanisms that address aquatic genetic resources of farmed species and their wild relatives (see question 47 regarding international agreements).

Add Row

| National legislation, policy and/or mechanism | Date established | Scope <i>Select all that apply</i> | Comments <i>Please provide any additional information for example whether it has been effective or not; and main sources of information</i> | |
|---|------------------|--|--|---|
| The Fish Act (Cap.197) | 01 April 1951 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input checked="" type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | Its out dated, does not consider recent changes in Fisheries management and Aquaculture developments in National and International arenas | X |
| Fish (Aquaculture) Rules (No. 81 of 2003) | 19 May 2003 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input checked="" type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | The rules specify aquaculture inspectors powers, promote responsible aquaculture activities, prescribe conditions for fish seed production, fish transfers, live fish imports and exports. | X |

| National legislation, policy and/or mechanism | Date established | Scope <i>Select all that apply</i> | Comments <i>Please provide any additional information for example whether it has been effective or not; and main sources of information</i> | |
|--|------------------|--|--|---|
| Land Act (Cap. 227) | 02 July 1998 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | The Act as not been very effective because the accompanying policy to operationalise it has not been finalised and passed by the authorities. | X |
| Water (Resources) Regulations | 07 April 1997 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input checked="" type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | | X |
| Water statute (No. 9 of 1995) | 14 December 1995 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input checked="" type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | | X |
| National environment (wetlands, river banks, and lake shores management) Regulations (No. 3 of 2000) | 23 December 2000 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | Not effective because enforcement is thin on the ground and public sensitisation has been slow | X |

| National legislation, policy and/or mechanism | Date established | Scope <i>Select all that apply</i> | Comments <i>Please provide any additional information for example whether it has been effective or not; and main sources of information</i> | |
|---|------------------|---|---|---|
| National Environment Statute (No. 4 of 1995) | 17 May 1995 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | | X |
| Environmental Impact Assessment Regulations (No. 13 of 1998) | 01 May 1998 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | | X |
| Water (waste discharge) Regulations (No. 32 of 1998) | 21 August 1998 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | Enforcement is wanting, lot of raw discharge into wetlands and water bodies from urban centers, industries, car washing bays and large farms continues unabated | X |
| Manual of Standard Operating Procedures for Inspection of Aquaculture Establishments and Aquaculture Production Practices, Ministry of Agriculture, Animal Industry and Fisheries-Department of Fisheries Resources | June 2006 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | | X |

| National legislation, policy and/or mechanism | Date established | Scope <i>Select all that apply</i> | Comments <i>Please provide any additional information for example whether it has been effective or not; and main sources of information</i> | |
|---|------------------|--|--|---|
| Animal Diseases Act (Cap.38) | 01 Januaey 1918 | <input type="checkbox"/> Genes or molecules only <input type="checkbox"/> Aquaculture <input type="checkbox"/> Capture fisheries <input type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input checked="" type="checkbox"/> Other | This Act deals with animal diseases but its ineffective it does not include AqGR and its outdated | X |
| Fisheries Policy | 02 August 2004 | <input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input checked="" type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other | | X |

Review of the current status and gaps in national policies and legislation for the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives

33. Please list any gaps in the coverage or constraints in implementing national legislation, policies and/or mechanisms in regard to aquatic genetic resources.

There is unrestricted movement of AqGR from one place to another within the country without any bio-security measures yet some AqGR my adapted and endemic to only certain ecological zones within the country; the oter gaps are in management and usage of trans-boundary AqGR; and Export and importation of DNA of AqGR without restriction.

34. Please indicate any national aquatic genetic resources of farmed aquatic species and their wild relatives for which your country restricts access.

| Type of genetic resource (can be species name, DNA, gametes or other descriptor) | Comments <i>Please, provide verifiable main sources of information, effectiveness of the restriction, description of type of restriction and for whom does the restriction apply</i> |
|--|---|
| DNA | |
| Stock, breed or variety | Restricted under The Fish Act (Cap.197), Fisheries Policy & Fish (Aquaculture) Rules, for any importation or export of stocks, breeds or variety should only sanctioned by the Chief Fisheries Officer or Commissioner of Fisheries and the restriction applies to all persons natives and foreigners. |
| Species | Restricted under The Fish Act (Cap.197), Fisheries Policy & Fish (Aquaculture) Rules, for any importation or export of any AqGR species should only sanctioned by the Chief Fisheries Officer or Commissioner of Fisheries and the restriction applies to all persons natives and foreigners. Though punitive measures not stringent enough, with culprits going away with light sentences. |
| Other | |
| Continue adding row as necessary | |
| | |
| Add Row | Remove Row |
| | |

35. Over the past 10 years, indicate the actions your country has taken to maintain or enhance access to aquatic genetic resources of farmed aquatic species and their wild relatives located outside your country; for example, by establishing germplasm acquisition agreements or material transfer agreements.

Add Row

| Action taken to enhance access to aquatic genetic resources outside your country | Type of genetic resource <i>Mark all that apply</i> | Comment <i>for example other types of genetic resources</i> | |
|---|---|--|---|
| Imported Chinese carps (silver carps, big head carps and grass carps) under the China-Uganda friendship project | <input type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Gametes <input type="checkbox"/> Tissues <input checked="" type="checkbox"/> Embryos <input checked="" type="checkbox"/> Living specimens | | X |
| Artemia sp. | <input type="checkbox"/> DNA <input type="checkbox"/> Genes <input checked="" type="checkbox"/> Gametes <input type="checkbox"/> Tissues <input type="checkbox"/> Embryos <input type="checkbox"/> Living specimens | | X |

36. Please indicate any obstacles your country has encountered when trying to access aquatic genetic resources of farmed aquatic species and their wild relatives outside of your country (including access for research purposes).

| Obstacles to accessing aquatic genetic resources | Please describe type of genetic resource <i>mark all that apply</i> | Comments <i>please include additional information as needed</i> |
|--|---|---|
| Intellectual property protection | <input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | Most countries of very strict IPP laws against moving or using their AqGR outside these countries |
| National laws of your country | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | One needs permission and to have bio-security measures in place to import and use these AqGR |
| National laws of donor country | <input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | In most cases importation of these AqGR is not allowable |
| International laws or protocols | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | Laws and protocols may be in place but enforcement is not very strict |
| Too expensive | <input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | In most cases the cost of these AqGR is very prohibitive |
| Material transfer agreements required | <input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | Save for regional countries, in all cases material transfer agreements are a prerequisite |
| Knowledge gaps | <input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | |
| Public perception | <input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other | The importation and use of some AqGR, such as red tilapia which is badly perceived in this part of the world, are affected by public perception |

| Obstacles to accessing aquatic genetic resources | Please describe type of genetic resource <i>mark all that apply</i> | Comments <i>please include additional information as needed</i> |
|--|--|--|
| Other | <input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input type="checkbox"/> Species <input type="checkbox"/> Other | |
| Continue adding row as necessary | | |
| | | |
| Add Row | | |

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

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 of farmed aquatic species and their wild relatives for food and agriculture.

The specific objectives are:

- To describe the current status, future plans, gaps, needs and priorities for research, training, extension and education on the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives
- To describe existing or planned national networks for the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives.
- To describe existing or planned information systems for the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives.

Research

37. Does your national research programme support the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives? If yes, give details of current and/or planned research; if no, explain the main reasons why not in box below.

Please mark appropriate box

- Yes
 No
 Unknown

Please provide details

On-going research involves genetic improvement of farmed fish (*Oreochromis niloticus* and *Clarias gariepinus*); Isolation and mass production of live food organisms (*Chroococcoid*, *moina*, rotifers and *artemia*) for fish for use in fish farming/hatcheries; domesticating and breeding in captivity of high value fish species (*Labeo victorinus*, *Lates niloticus*, *Bagrus docmak* & *Barbus altianalis*); and breeding and growth performance evaluation of Chinese carps in the different ecological zones of the country

38. Please list main institutions, organizations, corporations and other entities in your country that are engaged in field and/or laboratory research related to the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives.

Add Row

| Main institutions, organizations, corporations and other entities | Area of research <i>Mark all that apply</i> | Comments <i>Please provide any additional information</i> | |
|---|--|--|---|
| Aquaculture Research and Development Center (ARDC) - Kajjansi which is under the National Fisheries Resources Research Institute (NaFIRRI); Makerere University Kampala; University of the Mountains of the Moon, Fortportal; Busoga University; The Fisheries Training Institute, Entebbe; and the Islamic University in Uganda, Mbale | <input checked="" type="checkbox"/> Genetic resource management <input checked="" type="checkbox"/> Basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Characterization and monitoring of aquatic genetic resources <input checked="" type="checkbox"/> Genetic improvement <input checked="" type="checkbox"/> Economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Conservation of aquatic genetic resources <input checked="" type="checkbox"/> Communication on aquatic genetic resources <input checked="" type="checkbox"/> Access and distribution of aquatic genetic resources <input type="checkbox"/> Other | | X |

39. What capacity strengthening is needed to improve national research in support of the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives?

Please rank the following in regard to capacity strengthening.

| Capacities | Rank 1=Very Important 10=No importance |
|---|--|
| Improve basic knowledge on aquatic genetic resources | 5 |
| Improve capacities for characterization and monitoring of aquatic genetic resources | 3 |
| Improve capacities for genetic improvement | 1 |
| Improve capacities for genetic resource management | 1 |
| Improve capacities for economic valuation of aquatic genetic resources | 1 |
| Improve capacities for conservation of aquatic genetic resources | 2 |
| Improve communication on aquatic genetic resources | 1 |
| Improve access to and distribution of aquatic genetic resources | 5 |
| Add other rows as appropriate and rank | |
| Add Row | Remove Row |

Please describe any other capacity building needs in regards to aquatic genetic resources

Education, training and extension

40. Please indicate the extent that education, training and extension in your country covers the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives? List the main institutions involved and the types of courses offered.

Add Row

| Institution | Thematic Area | Type of courses mark all that apply | Comments | |
|---|--|---|--|---|
| Aquaculture Research and Development Center (ARDC) - Kajjansi which is under the National Fisheries Resources Research Institute (NaFIRRI); Makerere University Kampala; University of the Mountains of the Moon, Fortportal; Busoga University; The Fisheries Training Institute, Entebbe; and the Islamic University in Uganda, Mbale | Genetic resource management | <input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input checked="" type="checkbox"/> Extension | Done by all institutions | |
| | Characterization and monitoring of aquatic genetic resources | <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input type="checkbox"/> Extension | Done by the overnment research Institute ARDC - Kajjansi and Universities | |
| | Genetic improvement | <input type="checkbox"/> Undergraduate <input type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input type="checkbox"/> Extension | Done only by the government research Institute ARDC - Kajjansi | X |
| | Economic valuation of aquatic genetic resources | <input type="checkbox"/> Undergraduate <input type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input type="checkbox"/> Extension | Done only by the government research National Fisheries Resources Research Institute (NaFIRRI) | |
| | Conservation of aquatic genetic resources | <input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input checked="" type="checkbox"/> Extension | Done by all institutions | |

Coordination and networking

41. Please list any mechanisms within your country responsible for coordinating the aquaculture, culture-based fisheries and capture fisheries subsectors with the other sectors that use watersheds and coastal ecosystems and have impacts on aquatic genetic resources of wild relatives of farmed aquatic species (e.g., agriculture, forestry, mining, tourism, waste management and water resources).

If no mechanism exists check here:

| Add Row | |
|---|---|
| Name of mechanism | Description of how mechanism operates |
| Legal and policy framework | All land based activities carried out next to watersheds that may endanger the AqGR and their habitat should not be located within 200 meters of the shoreline of the watersheds; all activities that produce effluents must have the effluent treated to remove any harmful contents before release into watersheds; all activities carried out on/in the watersheds must have an Environmental Impact Assessment (EIA) carried out and the report submitted to NEMA which must carry out a public hearing thereafter before licensing the activity. |
| Public sensitization | Through media, group discussions, public gatherings, political rallies, religious meetings, school and other gatherings the relevant authorities campaign and sensitise the public about conservation and sustainable utilisation and management of AqGR |
| Fish farmers associations | Through regular meetings and symposia, the associations bring out any emerging issues such as disease outbreaks, markets and lack of inputs; and similarly government or donors respond through the same networks. |
| Beach Management Units (BMUs) | These established on all fish landing sites country-wide through regular elections by the fisher folk to manage, monitor and police the capture fisheries subsector activities following guidelines and regulations set by the Directorate of Fisheries Resources Uganda (DFRU). |
| Registration of fish farmers and hatchery operators | The District Fisheries Officers are required to register all fish farmers and hatchery operators in their areas of jurisdiction, monitor their activities and record farmed species, production systems and crop yields annually and report to DFRU |

42. Please indicate how capacity strengthening can be improved in intersectoral coordination in support of the conservation, sustainable use and development of aquatic genetic resources.

Please rank the following in regards to capacity strengthening.

| Capacities | Rank 1=Very Important 10=No importance |
|--|--|
| Increase awareness in institutions | <input type="text" value="1"/> |
| Increase technical capacities of institutions | <input type="text" value="1"/> |
| Increase information sharing between institutions | <input type="text"/> |
| Add other rows as appropriate and rank <input type="text"/> <input type="text"/> <input type="text"/> | <input type="text"/> |
| Add Row | Remove Row |

Please specify in box below

43. Please list any national networks in your country or any international networks your country belongs to that support the conservation, sustainable use and development of aquatic genetic resources.

Add Row

| Network | Objectives of the network <i>Please mark all that apply</i> to your country | Comments | |
|---|---|----------|---|
| Ramsar convention | <input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input checked="" type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input checked="" type="checkbox"/> Improve access to and distribution of aquatic genetic resources | | X |
| Lake Victoria Fisheries organisation (LVFO) | <input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input checked="" type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input checked="" type="checkbox"/> Improve access to and distribution of aquatic genetic resources | | X |

| Network | Objectives of the network <i>Please mark all that apply</i> to your country | Comments | |
|--|---|----------|---|
| Convention of Biological Diversity (CBD) | <input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources | | X |
| Control of international Trade in Endangered Species (CITES) | <input type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input checked="" type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources | | X |

| Network | Objectives of the network <i>Please mark all that apply to your country</i> | Comments | |
|---|--|----------|---|
| Conservation Nature, Uganda | <input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input checked="" type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources | | X |
| International Union for Conservation of Nature (IUCN) | <input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input checked="" type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources | | X |

| Network | Objectives of the network <i>Please mark all that apply to your country</i> | Comments | |
|--|---|--|---|
| Lake Edward and Albert Fisheries Project | <input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input checked="" type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input checked="" type="checkbox"/> Improve access to and distribution of aquatic genetic resources | | X |
| East Africa Aquaculture working group | <input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input checked="" type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input checked="" type="checkbox"/> Improve access to and distribution of aquatic genetic resources | Established under the auspices of the LVFO, but is rather redundant. | X |

Information systems

44. Please list any information systems existing in your country for receiving, managing and communicating information about the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives.

Add Row

| Name of information system | Type of information stored <i>mark all that apply</i> | Main stakeholders <i>mark all that apply</i> | |
|--|---|--|---|
| National Fisheries Resources Research Institute (NaFIRRI) web site and libraries | <input type="checkbox"/> DNA sequence <input type="checkbox"/> Genes and genotype <input checked="" type="checkbox"/> Breeds, strains or stocks <input checked="" type="checkbox"/> Species names <input checked="" type="checkbox"/> Production figures <input checked="" type="checkbox"/> Distribution <input checked="" type="checkbox"/> Level of endangerment <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Fish farmers <input checked="" type="checkbox"/> Fishers in capture fisheries <input checked="" type="checkbox"/> Fish hatchery people <input checked="" type="checkbox"/> People involved in marketing <input checked="" type="checkbox"/> Government resource managers <input type="checkbox"/> Fishing or aquaculture associations <input type="checkbox"/> Aquatic protected area managers <input checked="" type="checkbox"/> University and academic people <input type="checkbox"/> Non-Governmental Organizations <input checked="" type="checkbox"/> Intergovernmental Organizations <input checked="" type="checkbox"/> Policy makers <input checked="" type="checkbox"/> Donors <input checked="" type="checkbox"/> Consumers <input checked="" type="checkbox"/> Politicians <p>Please list other stakeholders as necessary</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> | X |

| Name of information system | Type of information stored <i>mark all that apply</i> | Main stakeholders <i>mark all that apply</i> | |
|--|--|---|---|
| Makerere University web site and libraries | <input checked="" type="checkbox"/> DNA sequence <input checked="" type="checkbox"/> Genes and genotype <input checked="" type="checkbox"/> Breeds, strains or stocks <input checked="" type="checkbox"/> Species names <input type="checkbox"/> Production figures <input checked="" type="checkbox"/> Distribution <input checked="" type="checkbox"/> Level of endangerment <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Fish farmers <input type="checkbox"/> Fishers in capture fisheries <input checked="" type="checkbox"/> Fish hatchery people <input type="checkbox"/> People involved in marketing <input checked="" type="checkbox"/> Government resource managers <input type="checkbox"/> Fishing or aquaculture associations <input type="checkbox"/> Aquatic protected area managers <input checked="" type="checkbox"/> University and academic people <input checked="" type="checkbox"/> Non-Governmental Organizations <input checked="" type="checkbox"/> Intergovernmental Organizations <input type="checkbox"/> Policy makers <input checked="" type="checkbox"/> Donors <input type="checkbox"/> Consumers <input type="checkbox"/> Politicians <p>Please list other stakeholders as necessary</p> <div data-bbox="1057 1276 1446 1436" style="border: 1px solid black; height: 76px; width: 240px;"></div> | X |

| Name of information system | Type of information stored <i>mark all that apply</i> | Main stakeholders <i>mark all that apply</i> | |
|---|---|--|---|
| Directorate of Fisheries Resources Uganda Library | <input type="checkbox"/> DNA sequence <input type="checkbox"/> Genes and genotype <input checked="" type="checkbox"/> Breeds, strains or stocks <input checked="" type="checkbox"/> Species names <input checked="" type="checkbox"/> Production figures <input checked="" type="checkbox"/> Distribution <input checked="" type="checkbox"/> Level of endangerment <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Fish farmers <input checked="" type="checkbox"/> Fishers in capture fisheries <input type="checkbox"/> Fish hatchery people <input checked="" type="checkbox"/> People involved in marketing <input checked="" type="checkbox"/> Government resource managers <input checked="" type="checkbox"/> Fishing or aquaculture associations <input checked="" type="checkbox"/> Aquatic protected area managers <input checked="" type="checkbox"/> University and academic people <input checked="" type="checkbox"/> Non-Governmental Organizations <input checked="" type="checkbox"/> Intergovernmental Organizations <input checked="" type="checkbox"/> Policy makers <input checked="" type="checkbox"/> Donors <input checked="" type="checkbox"/> Consumers <input checked="" type="checkbox"/> Politicians Please list other stakeholders as necessary <div style="border: 1px solid black; height: 50px; width: 100%; margin-top: 10px;"></div> | X |

45. What capacity strengthening is needed to improve national information systems to support the conservation, sustainable use and development of aquatic genetic resources?

Please describe what capacities need to be strengthened

There is need to enhance the capacities of the information systems by greatly increasing the numbers and updating the hardware, software, infrastructure and training or retooling responsible personnel in information management.

Please describe any other capacity building needs in regards to information systems for aquatic genetic resources

The information systems should be regularly updated and made more accessible to all stake holders world-wide by use of modern technologies such as websites, blogs, cloud storages, electronic magazines, social media etc.

Chapter 8: International Collaboration on Aquatic Genetic Resources of Farmed Aquatic Species and Their Wild Relatives

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 of farmed aquatic species and their wild relatives.

The specific objectives are:

- 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

International collaboration includes bilateral arrangements and the sharing of particular waters and stocks of wild relatives of farmed aquatic species.

International, regional or sub-regional agreements, conventions and treaties concerning aquatic genetic resources of farmed aquatic species and their wild relatives

46. Please list the international, regional or sub-regional agreements your country subscribes to that cover aquatic genetic resources of farmed species and their wild relatives, such as the Nagoya Protocol² the Convention on Biological Diversity and the Cartagena Protocol and how they have impacted aquatic genetic resources and stakeholders in your country. Examples could include:

² <http://www.cbd.int/abs/nagoya-protocol/signatories/>

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

Add Row

| International, Regional, bilateral or Sub-Regional agreement | Year your country ratified or subscribed to the agreement | Impact on aquatic genetic resources | Impact on stakeholders | Comments | |
|--|---|--|--|--------------------------------|---|
| Convention on Biological Diversity | 1993 | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | Stronger enforcement is needed | X |

| International, Regional, bilateral or Sub-Regional agreement | Year your country ratified or subscribed to the agreement | Impact on aquatic genetic resources | Impact on stakeholders | Comments | |
|---|---|--|--|---|---|
| Convention on Wetlands of International Importance (Ramsar convention) | 1988 | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | Enforcement needs to be enhanced | X |
| Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) | 1987 | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | | X |
| Millennium Development Goals (MDGs) | 2000 | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | Progress on attainment of MDGs has been slow | X |
| Lake Victoria Fisheries Organisation (LVFO) | 1994 | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | LVFO has made some good efforts toward sustainable utilisation and conservation of lake Victoria AqGR | X |
| Convention on the conservation of nature and natural resources, Maputo | 2004 | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | Enforcement not good | X |

| International, Regional, bilateral or Sub-Regional agreement | Year your country ratified or subscribed to the agreement | Impact on aquatic genetic resources | Impact on stakeholders | Comments | |
|--|---|--|--|--|---|
| Agreement on the Conservation of African-Eurasian Migratory water birds | 1995 | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | | X |
| Convention concerning the protection of the world cultural and natural heritage, Paris | 1972 | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | | X |
| Framework convention on climate change | 1992 | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | | X |
| Convention on persistent organic pollutants, Stockholm | 2004 | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | | X |
| Lake Edward and Albert Fisheries Project | 2002 | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | <input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect | Instability in the DRC could not allow for total enforcement | X |

47. Please list the priority needs regarding collaboration on conservation and sustainable use of aquatic genetic resources of farmed aquatic species and their wild relatives. Are they being addressed, i.e. are there any critical gaps?

| Collaboration is needed in order to ... | Rank 1=Very Important 10=No importance | To what extent are the needs being met | Comments <i>For example any critical gaps</i> |
|---|--|---|--|
| Improve information technology and database management | 1 | <input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Improve basic knowledge on aquatic genetic resources | 1 | <input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Improve capacities for characterization and monitoring of aquatic genetic resources | 1 | <input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Improve capacities for genetic improvement | 2 | <input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Improve capacities for economic valuation of aquatic genetic resources | 3 | <input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Improve capacities for conservation of aquatic genetic resources | 1 | <input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Improve communication on aquatic genetic resources | 4 | <input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |

| Collaboration is needed in order to ... | Rank 1=Very Important 10=No importance | To what extent are the needs being met | Comments <i>For example any critical gaps</i> |
|--|--|---|--|
| To improve access to and distribution of aquatic genetic resources | 1 | <input checked="" type="radio"/> To a great extent <input type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Other | | <input type="radio"/> To a great extent <input type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Continue adding row as necessary | | <input type="radio"/> To a great extent <input type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| | | <input type="radio"/> To a great extent <input type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown | |
| Add Row | Remove Row | | |

48. Please describe the types of collaboration that have been most beneficial for your country, and why?

LVFO, CBD, Ramsar convention, Agreement on the Conservation of African-Eurasian Migratory water birds - due to vigilance, good funding, human capacity, public awareness and sensitisation

49. Is there a need for your country to expand its collaboration concerning the conservation, sustainable use and development of aquatic genetic resources? If yes, give details, including any requirements for capacity strengthening in box below

Yes

No

If yes, please give details

Uganda has a good number of species of AqGR that need identification and characterisation, most have not fully been exploited for human utilisation and their conservation and most of the resources have been identified using morphological or other phenotypic traits, there is need to increase or enhance the country's capacity for genetic or molecular analyses to be able to genetically characterise and monitor most of the AqGR.

50. 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.

Uganda is signatory to a good number of international agreements and conventions that support sustainable utilisation and conservation of AqGR, the country has passed and is enforcing a number of legislature and policies toward sustainable utilisation and conservation of AqGR, the country continuously sensitizes its population about the need to conserve AqGR for future generations and the country trains and employs experts in management and conservation of AqGR.

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