Food and Agriculture Organization of the United Nations

COUNTRY REPORTS

Korea

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, Aquamaps, Barcode of Life, Census of Marine Life, FishBase, Frozen Ark, GenBank, Global Biodiversity Information Facility, International Union for Conservation of Nature, National Institutes of Health Database on Genomes and Bioinformatics, Ornamental Fish International, SealifeBase, Sea Around Us, and World Register of Marine Species.

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.seaaroundus.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) immediatly.
- 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	Republic of Korea
Prepared By	NIFS
Date	Dec 15, 2015

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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.

This country report has been prepared for the first time in Republic of Korea in accordance with the instructions and guidelines of Commission on Genetic resources for Food and Agriculture, FAO. This first country report consists of information on genetic resources of major fish and shellfish only since there is a much variety of species being farmed in Republic of Korea and little information is available for most minor species. Nevertheless, this report shall be upgraded in the following years. The report represents the overview of the major farmed species in terms of exchanges and management of the aquatic genetic resources and the drivers and trends of the management of the resources.

The production schemes of the major farming species carry a potential for increasing the volume of production but there are many challenges to capture the potential because there is little exchange of genetic resources for the management between neighboring countries and in addition, there are many political and economic hurdles. For examples, it seems to take more time to set up the optimal farming policy in the country and therefore overall expansion of capacity for the production has been much restricted.

The main driver of changing the current platform of aquatic genetic resources is the market demands and the willingness of the players (producers) and the government with an aim at fulfilling the demands but the trends of other leading countries are of an additional driving power. The consumption of seafood per capita in Republic of Korea is placed in the highest level along with Japan and Taiwan, which has been the strongest basis of the development of the aquaculture business until the market opens to the world. The seafood market in the country is now restructuring itself and many forces such as quality and origin of products give impact on the reorganization.

The genetic information of farmed aquatic species is being used for a limited range of species, only are a few major economically important species under study. Therefore, it is more suitable to indicate that the genetic data of the aquatic species for environmentally and ecologically important species are available but those data should be further used for the management of aquatic species. The limitation of using the genetic information attributes to the low passion on the use of the data. Some of the governmental research institutes and public universities generate the data and it is to great extent difficult for farmers to use those data directly.

The farming activity still mainly depends on the collection of genetic resources from wild relatives of the target species and thus there is no scientific breeding programs except a couple of species. The reason for this is that the small-scale farmers cannot afford running the expensive breeding programs and it is almost not feasible to hire expertise and to get supplied all necessary knowledge and materials.

It is not expected that there is sudden tangible drivers to change the management of the aquatic resources in the Republic of Korea but steady and gradual drivers changing the current platform of the management exist, ie., the climate changes and changes in market environments such as the demands from different market segments. The high-end market demands species that are more exotic in general, which drives the management forces to the edge because it affects the general policy in developing more species for various market segments. Furthermore, the high-end segment is leading the whole market and thus overall market trend follows them. Nevertheless, the choice of species for genetic studies comes, in general, from the market size and the production volume except for a few cases for the conservation status of the species.

The change of the human population size in the Republic of Korea has little impact on the management of the aquatic species but the consequences of the climate changes need to be investigated and need more detailed information for a longer period. The change of water temperature has a great impact on the ecosystem of aquatic species and it is obvious that there are other adverse events in Korea such as red tides and the sudden surge of cold water from the East Sea.
There have been no official exchanges of aquatic genetic resources between countries but definitely a few species were introduced in the country without records of the time and ways of import. In addition, there is no report for in situ conservation activity for the aquatic species but the efforts in the traditional ways of conservation have been made and the consequences of the activity are to be available in coming years. The release of genetic resources to the wild seems to certain extent contributing the restoration of the fauna but in the same time more conservation measures such as a strict quote system and seasonal fishing rules should be installed to keep the positive effects longer.

The stakeholders of the conservation forces are mainly from the government and farmers but the consequences of the activity is not yet in the stage of evaluations. It takes several years to be visible and the evaluation entity should have a familiar methodology and enough references. The biological techniques used for the conservation and efficient production of aquatic genetic resources are also limited but will be gradually developed, although selective breeding and monosex production are of the techniques being applied. For the best results, it is strongly needed to have dedicated educational

institutes (programs) in the country performing the conservation and management of the aquatic genetic resources.

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

This summary of the country report presents overview of the country report and the details of each item are described in the main body of the report. Please note that there are many parts of the report based on the statistics, and the sources of the information other than the statistics are basically published papers and publicly available data. For some items requiring to some extent subjective information, we discussed with relevant scientists and persons to get information that is more objective.

Chapter 1: The use and exchange of aquatic resources of farmed aquatic species and their wild relatives within national jurisdiction

The overall production of the country aquatic resources has been stable despite the fact that the business has been fluctuated to some extent because of unexpected disease outbreak and difficulties of producing juveniles of some species. The projection of production for the next 10 years is more positive side than the other way around since the general farming conditions of major species should be upgraded more quickly. For examples, the techniques and knowledge for the feed production and disease control would likely be at better position. The status of R&D on the aquatic genetic resources is yet not fully integrated with the business and the use of the genetic information in the production is still in the ground stage except a few major species. The exchange or transfer of aquatic genetic materials to other countries have not officially occurred although many species exist overlapping the country boundaries. In fact, the market attractive species are being simultaneously farmed in the neighboring countries and the track and trace of the origin of the fish species between countries sometimes make things tricky and would become an issue between countries.

Chapter 2: Drivers and trends in aquaculture: Consequences for aquatic genetic resources within national jurisdiction

The main drivers paving the ways of aquaculture in the republic of Korea is the economic values of the species and the profitability of the business. There has a strong effort been made from both government and private entity working on driving the management to the positive direction, targeting the most efficient and sustainable aquaculture. The climate change does not yet have a huge impact on the management of aquatic resources, but it becomes a more frequent issue. Due to the shortage of fresh water availability, the farming in any fresh water reservoirs is prohibited in the Republic of Korea. The consumers have pushed up the standard of ethnics and values of animal welfare and it is in the same line of policy for which several internationally known certificate entities work in this field.

Since the country is on the top rank of seafood consumptions, there is always pressure for over fishing especially for the marine species. The government installed a restoring program for the marine species hoping the effort to increase the population sizes. In addition, implementation of some countermeasures such as strict regulations and scientific restoration methods against the adverse effects on the management of wild species should be considered in the near future.

The selective breeding is most frequently appeared scientific approach to the efficient management but it applies to not many species yet. Monosex production is always a matter for the species with strong sexual dimorphisms and olive flounder would be the first species for all female production.

As usual, the artificial consequences from human activity have adverse impacts on the ecosystem of the wild relatives of the farmed species. Although none of those events has had strong negative impacts on the status of the wild life of the species, it is clear that the gradual changes of the fauna are inevitable.

Chapter 3: In Situ Conservation of aquatic genetic resources of farmed aquatic species and their wild relatives within national jurisdiction

In Situ conservation is the principal approach for the wild relatives of farmed species. The country has several institutes performing the activity for conservation of the aquatic species. It comes together with local governments and private participants. However, consequences of the overall performance have not yet been quantified. There are no listed endangerous or threatened farmed species in Korea, and therefore no activity for this category has been rolled on, neither has no protected area for certain species been announced. However, it is important to have some measures such as maintaining good diversity of genetic platforms of the farmed species and wild relatives in advance, before pushing the species to the edge. This will also help the performance of farmed species to increase the productivity. For this purposes, the government imposed a regulation to certify all juveniles before releasing to the nature and several national facilities keep collecting and managing the wild individuals to support production of juveniles for the restoration programs.

Chapter 4: Ex Situ Conservation of aquatic genetic resources of farmed aquatic species and their wild relatives within national jurisdiction

In Korea, there is no aquatic farmed species or their wild relatives under control of ex situ conservation methods. For the future, at least for keeping the genetic diversity of the aquatic species, some efforts should have been made for widening

the genetic spectrum of the wild relatives of the farmed aquatic species. The techniques could be kryo-preservation of sperms and establishment of germ-lines.

Chapter 5: Stakeholders with interests in aquatic genetic resources of farmed aquatic species and their wild relatives within national jurisdiction
The stakeholders for the conservation of AqGR can mainly be classified to the government and fish farmers. They both carry out R&Ds together and design projects for the future perspectives. NGOs have activities on endangerous species but not on the farmed species that are not listed threatened. There is no gender issue on this subject and the local communities heavily involve in AqGR management along with the governmental offices.

Chapter 6: National policies and legislation for aquatic genetic resources of farmed aquatic species and their wild relatives within national jurisdiction.
The country is at the starting line for the management of AqGR and a couple of new policies have been imposed recently. The main objects are to keep the wild populations variable enough to maintain the current population structures, which is basically from the concept that the healthy and abundant wild populations provide sustainable productivity for capture fishery business. Thus the country does not have any history of restrictions on accession of the materials either nationally or internationally within the country regulations.

Chapter 7: Research, education, training and extension on aquatic genetic resources within national jurisdiction: Coordination, networking and information.
The government and national institutes have recognized the importance of conservation and maintenance of genetic diversity of aquatic species and there are several projects on this field at the current stage. The government supports to establish the educational and training programs widening the knowledge on the genetic resource management and genetic improvement. In addition, the distribution of genetic resources to the needed parties is an essential role for the government. A central database for the genetic resources of aquatic species has been established in NFRDI and it plays a central role for the information distribution to people who participate in the programs for the conservation.
Many relevant persons do not have enough knowledge on the management of aquatic resources and therefore many training and educational programs along with a coordination and networking mechanism would be necessary. Not yet is there international exchange program between neighboring countries.

Chapter 8: International collaboration on aquatic genetic resources of farmed aquatic species and their wild relatives.
There is no agreement or treaties between countries in regard with the conservation and management of farmed aquatic resources yet, although those agreements should have played an essential roles to manage the wild populations that habitat in the both countries. Many conflicts exist on economic interests of each country and the unresolved arguments lead to the overfishing and drain of the resources. The improvements of genetic managements including mutual efforts on the conservation of the wild aquatic resources and exchange of information could be done by international collaborations.

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.

Republic of Korea has well organized classifications of farmed and wild species over several decades. However some species have been introduced unofficially and the exact scientific names are not identified due to many hybridizations and thus often common names are used for those species.

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.

Genetics of a few major farmed species and some important wild species have been studied and the data are available both for production and management. Nevertheless majority of aquatic species still have not been touched so the overall genetic data availability is in a minor level.

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.

Most farmed species depend on the wild seed sources, which means that the fertilized eggs, juveniles, or adults brood fish are captured from the parents from the wild populations although the captured brood stocks could often be kept for several years. Systematic breeding programs are under running for producing next generations of olive flounder, striped beakperch, turbot and abalones only.

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** 75
- Percent managed by private sector**.** **Please Enter Percentage Here** 0
- Percent managed by private /public partnership. **Please Enter Percentage Here** 25

Total 100

Please add any explanation here.

Breeding programs for olive flounder, abalones, and striped beakperch are managed by a public institute and that of turbot is controlled by private and public partnership (Golden Seed Project).

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 *mark all that apply*	Developed By *mark all that apply*	
	☒ Traditional selective breeding	☐ Private Sector ☒ Public Sector ☐ Private/Public partnership	
	☐ Hybrids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Paralichthys olivaceus	☒ Triploids and other polyploids	☐ Private Sector ☐ Public Sector ☒ Private/Public partnership	X
	☒ Mono-sex production	☐ Private Sector ☐ Public Sector ☒ Private/Public partnership	
	☐ Other	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☒ Traditional selective breeding	☐ Private Sector ☒ Public Sector ☐ Private/Public partnership	
	☐ Hybrids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Nordotis discus discus	☐ Triploids and other polyploids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	X
	☐ Mono-sex production	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	

	☒ Traditional selective breeding	☐ Private Sector ☐ Public Sector ☒ Private/Public partnership	
	☐ Hybrids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Psetta maxima	☐ Triploids and other polyploids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	X
	☐ Mono-sex production	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other	☐ Private Sector ☐ Public Sector ☐ 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	*Indicate all genetic types that apply to the species*	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.	
◉ Native ○ Introduced Paralichthys olivaceus	☒ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☒ Monosex ☒ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☒ Monosex ☒ Marker assisted selection ☐ Other (specify in comment)	Scientifically well designed breeding program is under running.	X

◉ Native ○ Introduced Sebastes schlegelii	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	No genetic improvement program is expected in near future.	X
◉ Native ○ Introduced Liza haematocheila	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	No genetic improvement program is expected in near future.	X

◉ Native ○ Introduced Pagrus major	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Production is unstable mainly due to viral diseases.	X
◉ Native ○ Introduced Platichthys stellatus	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	No genetic improvement program is expected in near future.	X

◉ Native ○ Introduced Lateolabrax japonicus	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X
◉ Native ○ Introduced Oplegnathus fasciatus	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	A breeding program is designed and ready to start.	X

◉ Native ○ Introduced Silurus asotus	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	No major efforts to increase the production of this species are expected. Overall the salt water species dominate in the markets.	X
○ Native ◉ Introduced Oncorhynchus mykiss	☐ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☒ Varieties ☒ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	This strains were introduced from North America and no other major efforts to increase the productivity are expected.	X

○ Native ◉ Introduced Psetta maxima	☐ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☒ Strains ☒ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	A normal scale of breeding program has been started by a public fund.	X
○ Native ◉ Introduced Cyprinus carpio nudus	☐ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☒ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

◉ Native ○ Introduced Crassostrea gigas	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☒ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	A public breeding and improvement program is to be launched.	X
○ Native ◉ Introduced Mytilus galloprovincialis	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☒ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☐ Monosex ☒ Marker assisted selection ☐ Other (specify in comment)		X

◉ Native ○ Introduced Haliotis discus hannai	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☒ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☒ Marker assisted selection ☐ Other (specify in comment)	A public breeding program started 4 years ago and a new hybridization program started 2 years ago.	X
○ Native ◉ Introduced Litopenaues vannamei	☐ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☒ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	No improvement scheme has been developed.	X

◉ Native ○ Introduced Porphyra tenera	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☒ Marker assisted selection ☐ Other (specify in comment)	A national program has been launched to genetic improvement.	X
◉ Native ○ Introduced Undaria pinnatifida	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☒ Varieties ☐ Polyploids	○ Yes ○ No ◉ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☒ Marker assisted selection ☐ Other (specify in comment)	A genetic improvement program will start from a local government in a few years.	X

◉ Native ○ Introduced Saccharina japonica	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ○ No ◉ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	No improvement program has been planned.	X
◉ Native ○ Introduced Brachionus spp	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Mostly being imported as feed for aquaculture	X

◉ Native ○ Introduced Artemia salina	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Mostly being imported as feed for aquaculture	X
○ Native ○ Introduced Nordotis discus discus	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ○ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ◉ Not known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

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

Add Row

Species ***Type and select a species***	Is the species native to your country?	Comments ***For example main sources of information***	
Scomber japonicus	(•) Yes ( ) No ( ) Not Known	The mackerel is a pelagic species and has a wide range of habitat in the pacific ocean. However they are caught in Korean water territory.	X
Anguilla japonica	(•) Yes ( ) No ( ) Not Known	The same as described for mackerel.	X
Larimichthys polyactis	(•) Yes ( ) No ( ) Not Known	The same as described for mackerel.	X

Thunnus orientalis	◉ Yes ○ No ○ Not Known	Blufin tuna is not an exclusive Korean native species but seen in the Korean EEZ. The farming techniques are being developed.	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 ***Please add main purpose or objective of the exchange and main sources of information***	
Anguilla japonica	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Republ Chad Chile China Colombia		X
Anguilla anguilla	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Belarus Belgium Belize Benin Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Republ		X

Anguilla rostrata	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Belarus Belgium Belize Benin Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub		X
Anguilla bicolor	☐ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Nepal Netherlands New Zealand Nicaragua Niger Nigeria Niue Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland		X
Anguilla australis	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Afghanistan Albania Algeria Andorra Angola Antigua and Barbuda Argentina Armenia Australia Austria Azerbaijan Bahamas Bahrain Bangladesh Barbados Belarus Belgium		X

Anguilla mossambica	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Japan Jordan Kazakhstan Kenya Kiribati Kuwait Kyrgyzstan Lao People's Democra Latvia Lebanon Lesotho Liberia Libya Lithuania Luxembourg Madagascar Malawi		X
Anguilla marmorata	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Nepal Netherlands New Zealand Nicaragua Niger Nigeria Niue Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland		X
Misgurnus mizolepis	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Oncorhynchus mykiss	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☒ Embryos ☐ Living specimens ☐ Other	Central African Repub Chad Chile China Colombia Comoros Cook Islands Costa Rica Côte d'Ivoire Croatia Cuba Cyprus Czech Republic Republic of Korea Democratic Republic Denmark Djibouti		X
Oncorhynchus kisutch	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☒ Embryos ☐ Living specimens ☐ Other	Belarus Belgium Belize Benin Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub		X
Acipenser baerii	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Acipenser gueldenstaedtii	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Greece Grenada Guatemala Guinea Guinea-Bissau Guyana Haiti Hungary Iceland India Indonesia Iran (Islamic Republic Iraq Ireland Israel Italy Jamaica		X
Huso huso	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Acipenser schrenckii	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Leuciscus idus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia Comoros Cook Islands Costa Rica Côte d'Ivoire Croatia Cuba Cyprus Czech Republic Republic of Korea		X
Pelteobagrus fulvidraco	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Trionyx sinensis	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Slovakia Slovenia Solomon Islands Somalia South Africa South Sudan Spain Sri Lanka Sudan Suriname Swaziland Sweden Switzerland Syrian Arab Republic Tajikistan Thailand Timor-Leste		X

Macrobrachium nipponense	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Pimephales promelas	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Thailand Timor-Leste Togo Tokelau (Associate Me Tonga Trinidad and Tobago Tunisia Turkey Turkmenistan Tuvalu Uganda Ukraine United Arab Emirates United Kingdom United Republic of Ta United States of Amer Uruguay		X
Oreochromis mossambicus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Saint Lucia Saint Vincent and the Samoa San Marino Sao Tome and Princip Saudi Arabia Senegal Serbia Seychelles Sierra Leone Singapore Slovakia Slovenia Solomon Islands Somalia South Africa South Sudan		X

Carassius auratus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Cyprinus carpio	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Guatemala Guinea Guinea-Bissau Guyana Haiti Hungary Iceland India Indonesia Iran (Islamic Republic Iraq Ireland Israel Italy Jamaica Japan Jordan		X
Takifugu rubripes	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Lateolabrax japonicus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Paralithodes camtschaticus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Guatemala Guinea Guinea-Bissau Guyana Haiti Hungary Iceland India Indonesia Iran (Islamic Republic Iraq Ireland Israel Italy Jamaica Japan Jordan		X
Epinephelus lanceolatus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Gabon Gambia Georgia Germany Ghana Greece Grenada Guatemala Guinea Guinea-Bissau Guyana Haiti Hungary Iceland India Indonesia Iran (Islamic Republic		X

Plectropomus leopardus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Epinephelus akaara	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Hyporthodus septemfasciatus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☐ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Kareius bicoloratus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Epinephelus coioides	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☐ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Epinephelus fuscoguttatus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Epinephelus bruneus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☐ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Chlamys farreri nipponensis	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Patinopecten yessoensis	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Argopecten irradians	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Anadara broughtonii	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Ruditapes philippinarum	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Cyclina sinensis	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Thunnus thynnus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☒ Embryos ☐ Living specimens ☐ Other	Guatemala Guinea Guinea-Bissau Guyana Haiti Hungary Iceland India Indonesia Iran (Islamic Republic Iraq Ireland Israel Italy Jamaica Japan Jordan		X
Meretrix lusoria	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Meretrix petechialis	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Penaeus vannamei	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Thailand Timor-Leste Togo Tokelau (Associate Me Tonga Trinidad and Tobago Tunisia Turkey Turkmenistan Tuvalu Uganda Ukraine United Arab Emirates United Kingdom United Republic of Ta United States of Amer Uruguay		X
Penaeus chinensis	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Crassostrea gigas	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☒ Embryos ☐ Living specimens ☐ Other	Guatemala Guinea Guinea-Bissau Guyana Haiti Hungary Iceland India Indonesia Iran (Islamic Republic Iraq Ireland Israel Italy Jamaica Japan Jordan		X
Haliotis discus discus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Larimichthys crocea	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Psetta maxima	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X
Anoplopoma fimbria	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Thailand Timor-Leste Togo Tokelau (Associate Me Tonga Trinidad and Tobago Tunisia Turkey Turkmenistan Tuvalu Uganda Ukraine United Arab Emirates United Kingdom United Republic of Ta United States of Amer Uruguay		X
Apostichopus japonicus	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

Saccharina japonica	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Bhutan Bolivia (Plurinational S Bosnia and Herzegovi Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Repub Chad Chile China Colombia		X

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.

Add Row

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.

Species	Use *(mark all that apply)*	Comments	
	☐ Capture fisheries ☐ Recreational fishery ☐ Aquaria ☐ Biological control ☐ Research and develpment ☐ Other (specify in comments)		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 ***mark all that apply***	Type of genetic material exchanged	Country **Hold CTRL button to select more than one country**	Comments ***main sources of information, if the transfer was legal or not***	
	☐ Import ☐ Export	☐ Tissues ☐ Gametes ☐ DNA ☐ Genes ☐ Embryos ☐ Living specimens ☐ Other	Afghanistan Albania Algeria Andorra Angola Antigua and Barbuda Argentina Armenia Australia Austria Azerbaijan Bahamas Bahrain Bangladesh Barbados Belarus		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)***	
Paralichthys olivaceus	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ◉ Stable ○ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	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	
Sebastes schlegelii	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ○ Stable ○ Decreasing ◉ Not known	☐ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☒ Not known	X
Liza haematocheila	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Depleted ◉ Not known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Depleted ◉ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ◉ Stable ○ Decreasing ○ Not known	☐ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	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	
Pagrus major	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ◉ Stable ○ Decreasing ○ Not known	☐ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	X
Platichthys stellatus	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ◉ Stable ○ Decreasing ○ Not known	☐ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	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	
Lateolabrax japonicus	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ○ Stable ◉ Decreasing ○ Not known	☐ Habitat ☒ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	X
Ostreidae	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☒ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ○ Stable ◉ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	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	
Haliotis spp	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☒ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ◉ Stable ○ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	X
Pectinidae	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ◉ Stable ○ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	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	
Pectinidae	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Depleted ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☒ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ○ Stable ◉ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	X
Atrina pectinata	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Depleted ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ◉ Stable ○ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	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	
Mytilidae	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Depleted ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Depleted ○ Not known	☒ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☐ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ◉ Stable ○ Decreasing ○ Not known	☒ Habitat ☒ Climate ☐ Invasive species ☐ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ 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 ***Mark appropriate box***	Comments ***List examples or other relevant information***
Human population increase	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	Human demands more fresh water and has had negative impacts on the fresh water (farmed) aquatic species but overall it positively drivers the farmed aquatic resources to more production, especially for the marine fish. Therefore several breeding programs have been launched.
Increased wealth and demand for fish	◉ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	The current trend is that people want to consume more seafoods than territorial meats and more species have been focused for the management.
Governance (ability of government, industry and the public to work together in managing resources)	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	There are several pubic projects to restore the fauna of major species that are under pressure of getting depleted and many cases farmed fish are released to the nature. The genetic resources of the releasing populations are well managed.
Climate change	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	The habitat of aquatic species is getting narrow and consequently the genetic variation of the species becomes small.
Competition for resources, especially freshwater	○ Strongly positive ○ Positive ○ Negative ◉ Strongly negative ○ No effect ○ Unknown	There is a ban to the farming in the fresh water reservoirs and the farming of fresh water species became extremely difficult due to the shortage of appropriate farming sites.

Driver impacting aquaculture	Effect on AqGR ***Mark appropriate box***	Comments ***List examples or other relevant information***
Changes in values and ethics of consumers	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	Many species are available to general people and the farming conditions become more favorable to the species in terms of welfare of the animals.
Other ***Add other drivers as necessary*** Add Row / Remove Row	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	

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 ***Mark appropriate box***	Comments ***List examples or other relevant information***
Human population increase	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Most of the species is under pressure of over fishing.
Increased wealth and demand for fish	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	More middle class people eat more fish and give a negative impacts on the natural relatives of farmed aquatic species. Especially the fishing population grows faster and the dwelling species are under fear of over fishing.
Governance (ability of government, industry and the public to work together in managing resources)	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	There are several means for controlling the natural aquatic resources. A quota system can be placed, and also the seasonal fishing bans can be installed. Additionally the restoring of natural populations can be facilitated.
Climate change	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	The native species lose their habitats and new invaders take over that of native species.
Competition for resources, especially freshwater	○ Strongly positive ○ Positive ○ Negative ◉ Strongly negative ○ No effect ○ Unknown	Occasional drought depletes the aquatic species. Many dams and reservoirs make the natural migration of the aquatic species difficult, reducing the possibility of natural spawning of the species.

Driver impacting aquaculture	Effect on AqGR ***Mark appropriate box***	Comments ***List examples or other relevant information***
Changes in values and ethics of consumers	◯ Strongly positive ◯ Positive ◉ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	Many seafood consumers, especially over middle class people still look for the natural products instead of farmed products and therefore the natural species are always under pressure of over fishing.
Other ***Add other drivers as necessary*** Add Row / Remove Row	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	

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

There are several countermeasures should be taken to reduce the adverse impacts.
1. More strict regulations to be implemented for saving and even increase the natural relatives of farming aquatic resources.
2. More scientific and systematic restoration of the natural relatives of farming aquatic species should be performed.
3. Updated sanitation systems must be equipped for cage sites of aquatic farming species and also an escape prevent system should be installed and controlled.
4. Better disease control systems should be introduced to the farming sites of aquatic resources since many diseases transfer the pathogens bidirectionally between natural and farming sites.

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 ***main sources of information, important species for which the biotechnology is applied***
Selective breeding	◯ Not at all ◯ To a minor extent ◉ To some extent ◯ To a great extent	Olive flounder, Abalone, and turbot are the species being improved by selective breeding.
Hybridization	◯ Not at all ◯ To a minor extent ◉ To some extent ◯ To a great extent	Grouper, abalones
Polyploidy (chromosome set manipulation)	◯ Not at all ◉ To a minor extent ◯ To some extent ◯ To a great extent	Oysters
Monosex production	◯ Not at all ◉ To a minor extent ◯ To some extent ◯ To a great extent	Olive flounder
Marker assisted selection	◉ Not at all ◯ To a minor extent ◯ To some extent ◯ To a great extent	
Gynogenesis/androgenesis	◯ Not at all ◉ To a minor extent ◯ To some extent ◯ To a great extent	Used for olive flounder monosex production
Other **Continue adding row as necessary** Add Row | Remove Row	◯ Not at all ◯ To a minor extent ◯ To some extent ◯ To a great extent	

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 ***mark appropriate box***	Countermeasures and effects
Habitat loss and degradation	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	The major cause for the habitat loss is the climate changes for marine species but there have been some efforts made to restore the habitats for the fresh water species after man-made constructions in rivers. More efforts such as making fish passages are needed to restore the habitats.
Pollution of waters	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Definitely there were negative effects from the pollutions on the fresh water species but it has little effects these days after more strict water management regulations have been implemented. However some constructions cause blooms of green algae leading aquatic species suffocate.
Increased frequency of extreme climatic events and long-term climate change	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Fish habitats change according to the climate events in the ocean. Not much choices are available for the current species.
Establishment of invasive species	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Several invasive species occupy the native habitats threatening the original species. More strict regulations and closer monitoring for foreign species are required mainly for fresh water species.
Introductions of parasites and pathogens	○ Strongly positive ○ Positive ○ Negative ◉ Strongly negative ○ No effect ○ Unknown	No data for wild populations are available but it is assumed that the major pathogens might have the same negative effects as for the aquaculture farms.

Drivers that are changing aquatic ecosystems	Effect on AqGR ***mark appropriate box***	Countermeasures and effects
Impacts of purposeful stocking and escapes from aquaculture	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Stocking of farmed juveniles and escapees from farms give strong negative impact on the maintenance of genetic health of wild populations. A well designed and controllable restocking system is required to keep the genetic divergence of the wild populations variable enough.
Capture fisheries	○ Strongly positive ○ Positive ○ Negative ◉ Strongly negative ○ No effect ○ Unknown	More environmentally friendly capture regulations and rules must be implemented, especially prohibit of fishing during the spawning seasons of each species under pressure of depletion.
Other ***Continue listing other driverst*** Add Row Remove Row	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	

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 sit*u 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 fisher*ies* 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

At the moments, there is a good contribution from hatchery techniques (for the production of juveniles) to the conservation of wild relatives of farmed aquatic resources and the authority plans to impose more systematic contributions to the wild populations.

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

There are a few places producing genetic resources to restore the genetic resources of wild populations but the efficiency of the activities has not been yet verified.

22. Please provide ex*amples* 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

There is no endangered or threatened farmed species and their wild relatives at the current statues.

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 *in situ* conservation	Rank 1=Very Important 10=No importance
Preservation of aquatic genetic diversity	3
Maintain good strains for aquaculture production	5
Meet consumer and market demands	8
To help adapt to impacts of climate change	5
Future breed improvement in aquaculture	5
Please continue listing any other objectives as needed	
Add Row / 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

There is a law passed, imposing the genetic diversity of released famed species to the wild populations, and the effects are now being evaluated each year.

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

There are several facilities in the national institutes (NFRDI and FIRA) collecting wild individuals to produce next generations that will be released to the nature to keep the maintenance of genetic variation of the wild populations. They scientifically monitor the collected populations for the analysis of the genetics parameters.

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

There is a systematic approach to manage the wild life populations of the target species important for the capture fisheries. For examples, some major species with reduced capture volume have been reared and will be released to the wild populations to make the populations restored and in addition, for some species a ban for capture has been imposed and also seasonal bans have been imposed.

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 ***provide any additional information***	
The High Moor, Yongneup of Mt. Daeam	( ) Very effective ( ) Somewhat effective ( ) Not effective (•) Unknown	There are 21 protected areas in Korea but those sites are not for aquaculture purposes, mainly for environmental conservation where many other species from birds to microorganisms are protected.	X
Odaesan National Park Wetlands	( ) Very effective ( ) Somewhat effective ( ) Not effective (•) Unknown		X
Hanbando Wetland Ramsar Site	( ) Very effective ( ) Somewhat effective ( ) Not effective (•) Unknown		X

Aquatic protected area	Effectiveness of conserving Aquatic Genetic Resources	Comments ***provide any additional information***	
Upo Wetland	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Moojechineup	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Suncheon Bay	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Dongbaekdongsan	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Mulyeongari-oreum	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Muljangori-oreum wetland	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X

Aquatic protected area	Effectiveness of conserving Aquatic Genetic Resources	Comments ***provide any additional information***	
1100 Altitude Wetland	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Sumeunmulbaengdui Ramsar Site	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Jangdo Island High Moor	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Jeungdo Tidal Flat	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Muan Tidal Flat	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Ungok Wetland	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X

Aquatic protected area	Effectiveness of conserving Aquatic Genetic Resources	Comments ***provide any additional information***	
Gochang and Buan Tidal Flats	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Seocheon Tidal Flat	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Du-ung Wetland	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Songdo Tidal Flat	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Han River-Bamseom Islets	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		X
Ganghwa Maehwamareum Habitat	◯ Very effective ◯ Somewhat effective ◯ Not effective ◉ Unknown		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 ***Please mark all that apply***	Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? ***Please mark appropriate box***	Comments ***Please list any additional information***	
Undaria pinnatifida	☒ Direct human consumption ☐ Live feed organism ☐ Other	○ Yes ◉ No ○ Unknown	This is one of the seaweeds.	X
Porphyra tenera	☒ Direct human consumption ☐ Live feed organism ☐ Other	○ Yes ◉ No ○ Unknown	This is one of the seaweeds.	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 ***List all that apply***	Type of *ex-situ* conservation collection *in vitro* ***mark all that apply***	Facilities where collection is located ***mark all that apply***	Comments ***list all breeds, subspecies of the species and any additional information***	
Undaria pinnatifida	NIFS	☐ In vitro collection of gametes ☐ In vitro collextion of embryos ☒ In vitro collection of tissues ☐ Spores ☐ Other	☐ Aquaculture facilities ☒ Research facilities ☐ Universities ☐ Zoos and aquaria ☐ Other		X
Porphyra tenera	NIFS	☐ In vitro collection of gametes ☐ In vitro collextion of embryos ☒ In vitro collection of tissues ☐ Spores ☐ Other	☐ Aquaculture facilities ☒ Research facilities ☐ Universities ☐ Zoos and aquaria ☐ Other		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 *ex situ* conservation	Rank 1=Very Important 10=No importance
Preservation of aquatic genetic diversity	3
Maintain good strains for aquaculture production	3
Meet consumer and market demands	7
To help adapt to impacts of climate change	5
Future breed improvement in aquaculture	5
Other ***Continue adding row as necessary***	
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 ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Fish Farmers	☐ Conservation ☒ Production ☐ Feed manufactoring ☒ Breeding ☒ Research ☒ Marketing ☒ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☐ Species ☐ Other	Major fish farmers involve in production followed by marketing and processing in their own interests but a few farmers are interested in breeding and researches.
Fishers	☒ Conservation ☒ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	Most fishers do their business on their own interest with an exception of few fishers concerning the conservation of the species under pressure of over fishing.

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Fish hatchery people	☐ Conservation ☐ Production ☐ Feed manufactoring ☒ Breeding ☒ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☒ DNA ☒ Stock, breed or variety ☐ Species ☐ Other	A few hatchery groups are involved in public breeding and research activities improving the genetic performance in aquaculture.
People involved in marketing	☐ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☒ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	N/A
Government resource managers	☒ Conservation ☒ Production ☒ Feed manufactoring ☒ Breeding ☒ Research ☒ Marketing ☒ Processing ☒ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☒ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	Public institutes do most of those activities for the conservation of aquatic genetic resources, which still needs more knowledge and experiences for better performance and results.

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Fishing or aquaculture associations	☒ Conservation ☒ Production ☒ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☐ Species ☐ Other	The associations work with the governmental institutes and the private hatcheries for some activities in the area of AqGR.
Aquatic protected area managers	☒ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	This is mainly for a few fresh water species in some restricted areas.
Policy Makers	☒ Conservation ☒ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	Policy makers are not involved in the direct collection of genetic resources but do play general roles of the management.

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Non-Governmental Organizations	☒ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	NGOs play role in conservation of some species in certain areas.
Intergovernmental Organizations	☐ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
Donors	☐ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	

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Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Consumers	☐ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	

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

There seem no visible differences in the roles of women in this area.

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

The local communities are best aware of the current situations of the species or stocks of AqGR in their areas and they should help the responsible entities with correct information in order to set up the most efficient policy for the management.

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 ***Select all that apply***	Comments ***Please provide any additional information for example whether it has been effective or not; and main sources of information***	
The restocking policy of the major fishing species.	Dec 1, 2014	☐ Genes or molecules only ☐ Aquaculture ☐ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other	It has been imposed now but it has been too short to evaluate the effectiveness.	X
The seed development policy for major aquaculture species.	Jan 1, 2015	☐ Genes or molecules only ☒ Aquaculture ☐ Capture fisheries ☐ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☒ Access and benefit sharing ☐ Other	The purpose of the policy is to maximize the productivity but on the same time to ensure the equal sharing of the results among the communities.	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.

It is now the time implementing the legislations listed in no. 32, so it would be possible to evaluate the differences or gaps between parties of different interests and those of the legislation in the coming years. It is too early to list the gaps now.

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 ***Please, provide verifiable main sources of information, effectiveness of the restriction, description of type of restriction and for whom does the restriction apply***
DNA	
Stock, breed or variety	
Species	
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 ***Mark all that apply***	Comment ***for example other types of genetic resources***	
	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☐ 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 ***mark all that apply***	Comments ***please include additional information as needed***
Intellectual property protection	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
National laws of your country	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
National laws of donor country	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
Internationl laws or protocols	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
Too expensive	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
Material transfer agreements required	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
Knowledge gaps	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
Public perception	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	

Obstacles to accessing aquatic genetic resources	Please describe type of genetic resource ***mark all that apply***	Comments ***please include additional information as needed***
Other **Continue adding row as necessary** Add Row | Remove Row	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	

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

The government supports many projects studying the principles of conservations and also performing the basic practical collections of live materials of the species of interest. The reproduced genetic materials will be released to the natural populations to increase the genetic diversity. In addition, there are several public programs supported by the government, doing breeding of commercially important species, which help preventing overfishing of the certain species in the wild.

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 ***Mark all that apply***	Comments ***Please provide any additional information***	
National Fisheries Research and Development Institute	☒ Genetic resource management ☒ Basic knowledge on aquatic genetic resources ☒ Characterization and monitoring of aquatic genetic resources ☒ Genetic improvement ☒ Economic valuation of aquatic genetic resources ☒ Conservation of aquatic genetic resources ☒ Communication on aquatic genetic resources ☒ Access and distribution of aquatic genetic resources ☐ Other		X
FIRA	☒ Genetic resource management ☐ Basic knowledge on aquatic genetic resources ☒ Characterization and monitoring of aquatic genetic resources ☐ Genetic improvement ☒ Economic valuation of aquatic genetic resources ☒ Conservation of aquatic genetic resources ☒ Communication on aquatic genetic resources ☒ Access and distribution of aquatic genetic resources ☐ 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	1
Improve capacities for characterization and monitoring of aquatic genetic resources	1
Improve capacities for genetic improvement	3
Improve capacities for genetic resource management	4
Improve capacities for economic valuation of aquatic genetic resources	4
Improve capacities for conservation of aquatic genetic resources	5
Improve communication on aquatic genetic resources	3
Improve access to and distribution of aquatic genetic resources	6
Add other rows as appropriate and rank Add Row Remove Row	

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

Understanding the needs and background knowledge is the utmost critical thing to establish the policy for the management. To achieve this goal, education and exchange programs are needed.

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	
NIFS	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☒ Training ☒ Extension	NFRDI is not an educational institute but a research institute, so basically it performs the work together with private partners and also public universities.	
	Characterization and monitoring of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☐ Training ☒ Extension		
	Genetic improvement	☐ Undergraduate ☐ Post-graduate ☐ Training ☒ Extension		X
	Economic valuation of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☐ Training ☒ Extension		
	Conservation of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☐ Training ☒ Extension		

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	
National Institute of Fisheries Science	It plays a role bridging the government policy to the general people who work in the fisheries business.	X

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	1
Increase technical capacities of institutions	2
Increase information sharing between institutions	5
Add other rows as appropriate and rank Add Row Remove Row	

Please specify in box below

The capacity of managing the aquatic resources can be improved and maximized by improving the knowledge and experiences on the interest sectors and the exchange of the capacity between institutes is very important, especially in the stage of the first learning curve.

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 ***Please mark all that apply*** to your country	Comments	
FAO	☒ Improve basic knowledge on aquatic genetic resources ☒ Improve capacities for characterization and monitoring of aquatic genetic resources ☒ Improve capacities for genetic improvement ☒ Improve capacities for economic valuation of aquatic genetic resources ☒ Improve capacities for conservation of aquatic genetic resources ☒ Improve communication on aquatic genetic resources ☒ Improve access to and distribution of aquatic genetic resources	It is in the beginning stage of the management in the country and it is strongly recommended to establish the network between countries sharing the water and also with countries having well established systems and experiences.	X
NACA	☒ Improve basic knowledge on aquatic genetic resources ☒ Improve capacities for characterization and monitoring of aquatic genetic resources ☒ Improve capacities for genetic improvement ☒ Improve capacities for economic valuation of aquatic genetic resources ☒ Improve capacities for conservation of aquatic genetic resources ☒ Improve communication on aquatic genetic resources ☒ Improve access to and distribution of aquatic genetic resources		X

Network	Objectives of the network ***Please mark all that apply*** to your country	Comments	
SEAFDEC	☒ Improve basic knowledge on aquatic genetic resources ☒ Improve capacities for characterization and monitoring of aquatic genetic resources ☒ Improve capacities for genetic improvement ☒ Improve capacities for economic valuation of aquatic genetic resources ☒ Improve capacities for conservation of aquatic genetic resources ☒ Improve communication on aquatic genetic resources ☒ Improve access to and distribution of aquatic genetic resources		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 ***mark all that apply***	Main stakeholders ***mark all that apply***	
Biological information system in National Fisheries and Research and Development Institute.	☒ DNA sequence ☒ Genes and genotype ☐ Breeds, strains or stocks ☒ Species names ☐ Production figures ☐ Distribution ☐ Level of endangerment ☐ Other	☐ Fish farmers ☐ Fishers in capture fisheries ☐ Fish hatchery people ☐ People involved in marketing ☒ Government resource managers ☒ Fishing or aquaculture associations ☐ Aquatic protected area managers ☒ University and academic people ☐ Non-Governmental Organizations ☒ Intergovernmental Organizations ☐ Policy makers ☐ Donors ☐ Consumers ☐ Politicians **Please list other stakeholders as necessary**	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

The education system for knowledge and the background information for the conservation, sustainable use and development of aquatic genetic resources is the first thing to be improved. For those purposes, public education programs and network should be well established.

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

The public awareness and willingness of use of the information are of the required basis and the exchange system of knowledge and experiences between public and private institutes is strongly important.

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 Protocol[2] 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	
Nagoya Protocol	2012	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect	Participation in Nagoya Protocol raised the general awareness of the importance of aquatic genetic resources and by which the country got the basis of benefit-sharing of the collaborations.	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 Biological Diversity (CBD)	1994	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect		X
CITES	1993	◉ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect		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 ***For example any critical gaps***
Improve information technology and database management	5	○ To a great extent ◉ To some extent ○ None ○ Unknown	It is important to share the information between countries to reach the common goals of the genetic resources.
Improve basic knowledge on aquatic genetic resources	3	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve capacities for characterization and monitoring of aquatic genetic resources	2	○ To a great extent ○ To some extent ○ None ◉ Unknown	
Improve capacities for genetic improvement	3	○ To a great extent ○ To some extent ◉ None ○ Unknown	
Improve capacities for economic valuation of aquatic genetic resources	6	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve capacities for conservation of aquatic genetic resources	3	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve communication on aquatic genetic resources	6	○ To a great extent ◉ To some extent ○ None ○ Unknown	

Collaboration is needed in order to ...	Rank 1=Very Important 10=No importance	To what extent are the needs being met	Comments ***For example any critical gaps***
To improve access to and distribution of aquatic genetic resources	5	◯ To a great extent ◉ To some extent ◯ None ◯ Unknown	
Other **Continue adding row as necessary** Add Row Remove Row		◯ To a great extent ◯ To some extent ◯ None ◯ Unknown	

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

The collaboration type such as Nagoya protocol is the only one for Korea and it works enough by now but more detailed collaboration types would be recognized as more people get involved later.

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

There are many conflicts between neighboring countries that come mostly from economic interests of each country, which now leads overfishing and drain of genetic resources. International agreements and collaborative efforts could save the resources and even could restore the healthiness of the wild relatives of farmed species.

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.

Republic of Korea agrees most of international treaties in terms of saving the aquatic resources not only in the region but in the world as well. Moreover, Korea is prepared to play an important role to support and to contribute to the global collaboration for the aquatic genetic resources.

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