Food and Agriculture Organization of the United Nations

COUNTRY REPORTS

Japan

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	Japan
Prepared By	Fisheries Agency
Date	Dec 11, 2015

TABLE OF CONTENTS

		Page
I.EXECUTIVE SUMMARY		6
II.INTRODUCTION		6
III.MAIN BODY OF THE COUNTRY REPORT		7
Chapter 1.	The Use and Exchange of Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction	7
Chapter 2.	Drivers and Trends in Aquaculture: Consequences for Aquatic Genetic Resources within National Jurisdiction	38
Chapter 3.	*In Situ* Conservation of Aquatic Genetic Resources of Farmed Aquatic Species and their wild Relatives within National Jurisdiction	46
Chapter 4.	*Ex Situ* Conservation of Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction	51
Chapter 5.	Stakeholders with Interests in Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction	58
Chapter 6.	National Policies and Legislation for Aquatic Genetic Resources of Farmed Aquatic Species and their Wild Relatives within National Jurisdiction	65
Chapter 7.	Research, Education, Training and Extension on Aquatic Genetic Resources within National Jurisdiction: Coordination, Networking and Information	70
Chapter 8.	International Collaboration on Aquatic Genetic Resources of Farmed Aquatic Species and Their Wild Relatives	85

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.

Out of fish and shellfish being currently cultured in Japan, this Country Report picks up the total of 22 typical farmed aquatic species mentioned by fish species or by fish group such as yellowtail and pufferfish in the country's official statistics, Annual Statistics on Fishery and Aquaculture Production, and feed organisms, to draw up Table 1.1. Then, based on Table 1.1, Table 1.2 is compiled with regard to 14 wild relatives of the farmed aquatic species. With these two tables, we consider that almost all of our farmed aquatic species in quantitative terms and the status of each of species is described.

In the Country Report, availability of genetic data concerning farmed aquatic species in Japan is described in the form of answers to each question. For genetic improvement, selective breeding is currently being applied to many farmed species. For the future direction of genetic improvement, however, selection assisted by genetic markers is chosen in many cases. The Country Report also mentions factors impacting aquaculture and the utilization of biotechnologies. Furthermore, it describes conservation measures for farmed aquatic species both in habitats and outside of the habitats as well as their current status. Then, stakeholders with interests in the farmed aquatic species and their wild relatives as well as the roles of the stakeholders are mentioned, followed by the government policies and legislation associated with farmed aquatic species. Finally, with regard to the farmed aquatic species, relevant research and study and education, our national networks and international collaboration we are participating in are mentioned.

Reflecting the fact that researches are being conducted in Japan on a variety of fish species as mentioned in the Country Report, for a considerable number of fish species genome information is to some extent available, or is being researched. However, practical use of varieties utilizing genome information has not made any notable progress thus far. It is expected to increase in the future. Practical use of varieties created utilizing biotechnologies such as triploid and gynogenesis has been somewhat achieved but only to a certain extent. A system for storing fish and shellfish as genetic resources using gene banks is not fully developed. From now on, establishing high-value-added farmed aquatic species and utilizing genetic information for breeding will be required in order to put the high-value-added farmed species into practical use. Needs for such movement are projected to become stronger.

The wild relatives populations of farmed aquatic species has been evaluated by the national government. Furthermore, on the legal front, a legal framework for sustainable aquaculture is in place. With the increasing global demand for fish and shellfish, we need to continue conducting research and development, attaching importance to methods for sustainable use of fishery resources including these farmed aquatic species through fisheries management and resource management in areas surrounding Japan. An administrative mechanism to support such research and development will be required.

Moreover, the Country Report involves farmed aquatic species and their wild relatives within national jurisdiction in accordance with the agreement reached in 2013 at the Fourteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture (CGRFA) of FAO.

The Country Report is made in cooperation of the following 26 people.
Fisheries Research Agency (National Research and Development Agency, Fisheries Research Agency)
Names of Researchers (in Roman letters)
Ryo Kimura, Kazumasa Ikuta, Chihaya Nakayasu, Fuminari Ito, Toru Nagasawa, Yuji Machiguchi, Takashi Kamiyama, Hiromu Zenitani, Masaya Katoh, Hiroyuki Shimada, Hiroyuki Sudo, Keisuke Yamano, Hideaki Aono, Masakazu Oka, Eiji Fujiyoshi, Kazuhisa Teruya, Harumi Yamada, Koichi Okuzawa, Hironori Usuki, Masanori Okauchi,Toshiya Suzuki, Junya Higano, Hideki Tanaka, Hiroshi Kuwada, Misao Arimoto, Mitsuru Ototake

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

Japan is an island nation consisting of a chain of islands extending more than 1,000 kilometers north to south, surrounded by the Pacific Ocean, the East China Sea, the Sea of Japan, and the Sea of Okhotsk. The climate ranges from subarctic to

subtropical, and its coastal areas are significantly affected by changes in oceanic conditions due to the Kuroshio Current and the Tsushima Warm Current. As Japan does not have many large rivers, most rivers reach their mouth in a short time. Topographical features of coastal areas are varied; some areas have a ria coast with mountains close to the shore while other areas have a sandy and shallow beach.

Our aquaculture technologies represented by marine and shrimp aquaculture have significantly contributed to the development of the world's aquaculture. In Japan, there is a record showing fisheries were already carried out several thousand years ago. The country's fisheries started developing several hundred years ago, and for more than a hundred years, research and development in the field of aquaculture have been conducted such as aquaculture of laver (Pyropia yezoensis), oysters (Crassostrea gigas), red sea bream (Pagrus major), tiger prawns (Marsupenaeus japonicus), leading to the current aquaculture technologies. In particular, after the end of the Second World War, Japan developed mass culture techniques of rotifers in seawater that have become the foundation for seed production techniques of fish species, making an enormous contribution to artificial seed production techniques. In order to reduce impact on wild aquatic resources, Japanese government plans to further develop aquaculture techniques using artificial seed.

Japan's aquaculture production volume including inland water aquaculture for 2013 stood at 1.03 million tons. This production volume is broken down into marine aquaculture with 240,000 tons, shellfish with 330,000 tons, seaweed with 420,000 tons, and inland waters with 30,000 tons. For the top six farmed species in terms of production volume including inland water aquaculture, laver (Pyropia yezoensis) and related species came in first, and scallop (Mizuhopecten yessoensis) second, followed by oyster (Crassostrea gigas) and related species, yellowtail (Seriola quinqueradiata) and related species, red sea bream (Pagrus major), and wakame seaweed (Undaria pinnatifida) and related species. The combined production volume of these six accounts for 88% of the total aquaculture production. The ratio of aquaculture production to the total production volume of fisheries and aquaculture is 21%. Furthermore, aquaculture production volume has been on a modest decline for the recent 10 years.

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.

Most of the farmed species in the country

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.

- Estimation of quality of parents for seed production of Pagrus major (Madai, by private company)

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.

On such as Seriola quinqueradiata (Buri), aquaculture technologies using artificial juveniles from reared broodstocks are being developed.

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** 80
- Percent managed by private sector**.** **Please Enter Percentage Here** 20
- Percent managed by private /public partnership. **Please Enter Percentage Here** 0

Total 100

Please add any explanation here.

Most of efforts are managed by the public sector.
Efforts by private sector or private /public partnership are limited.

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*	
Pagrus major	☒ Traditional selective breeding	☒ Private Sector ☒ Public Sector ☒ Private/Public partnership	X
	☐ Hybrids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Triploids and other polyploids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Mono-sex production	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Paralichthys olivaceus	☐ Traditional selective breeding	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	X
	☐ Hybrids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Triploids and other polyploids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ 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	
Seriola quinqueradiata	☐ 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	
Oncorhynchus mykiss	☒ 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	
Pyropia yezoensis	☐ 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	
Pinctada fucata martensii	☐ 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	Specify parental species in the box below Oncorhynchus mykiss x O. masou	☐ Private Sector ☒ Public Sector ☐ Private/Public partnership	
Oncorhynchus mykiss	☒ 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 Oncorhynchus kisutch	☐ 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)	Genetic data: species identification The main trait for selection is higher growth rate.	X

◉ Native ○ Introduced Seriola quinqueradiata	☒ 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)	Future genetic improvement: Genomic selection Researches on marker-assisted selection using simple sequence repeat (SSR) and single nucleotide polymorphism (SNP) markers and linkage map are on going. Main traits for selection are disease-resistance and higher growth rate.	X
◉ Native ○ Introduced Trachurus 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 Pseudocaranx dentex	☒ 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)	Future genetic improvement: Genomic selection The wild population is so little that reproductive generations have been repeated in captivity. The target traits for breeding are disease-resistance and higher growth rate.	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)	Future genetic improvement: Genomic selection Researches on marker-assisted selection using simple sequence repeat (SSR) and single nucleotide polymorphism (SNP) markers and linkage map are on going. Main traits for selection are disease-resistance and higher growth rate.	X

◉ 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)	Future genetic improvement: Genomic selection Disease-resistance strains established by marker-assisted selections using simple sequence repeat (SSR) and single nucleotide polymorphism (SNP) markers and linkage map are commercially available. Main traits for selection are disease-resistance	X
◉ Native ○ Introduced Takifugu rubripes	☒ 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)	Genetic data: microsatellites and mtDNA Future genetic improvement: Genomic selection Researches on marker-assisted selection using simple sequence repeat (SSR) and single nucleotide polymorphism (SNP) markers and linkage map are on going. Main traits for selection are higher growth rate. Genome sequence is available for research.	X

◉ Native ○ Introduced Mizuhopecten yessoensis	☒ 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)	Genetic data: microsatellites and mtDNA Main traits for selection are higher survival and growth rates.	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)	Genetic data: microsatellites and mtDNA Artificial produced seeds are partly used, but researches on genetic improvement do not progress. For future, possible main traits for selective breeding are high growth rate, tolerance for high temperature, and easily excretion of Norovirus or shellfish toxins Main traits for selection are higher survival and growth rates.	X

◉ Native ○ Introduced Penaeus 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)	Genetic data: microsatellites and mtDNA A substantial number of nucleotide and EST sequences are in public databank. Main traits for selection are disease-resistance, higher survival, coloration and higher growth rate. Researches on a sex-regulating hormone are on going.	X
◉ Native ○ Introduced Halocynthia roretzi	☒ 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)	Genetic data: microsatellites and mtDNA Genetic improvement: Collecting seeds from good locations Genome sequence is available for research	X

◉ Native ○ Introduced Laminaria 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)	Genetic data are used for species identification The main trait for selection is tolerance for warm temperature.	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)	Genetic data: mtDNA The main trait for selection is tolerance for warm temperature.	X

◉ Native ○ Introduced Pyropia yezoensis	☐ 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)	Genetic data is limited Future genetic improvement: Mutagenesis Researches on breeding by mutagenesis are on going. Researches on marker-assisted selection using simple sequence repeat (SSR) and single nucleotide polymorphism (SNP) markers and linkage map are on going. Main traits for selection are disease-resistance and tolerance for warm temperature. Genome sequence is available for research. The shortage of the information on the cultivars' characteristics prevents scientific breeding.	X
◉ Native ○ Introduced Cladosiphon okamuranus	☐ 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)	Main traits for selection are high growth and prolific variety.	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)	Main traits for selection are disease-resistance and higher growth rate. Genome sequence is available for research.	X
◉ Native ○ Introduced Plecoglossus altivelis	☒ 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)	Genetic data: some genetic markers are available microsatellites and mtDNA The main trait for selection is disease-resistance.	X

◉ Native ○ Introduced Cyprinus carpio	☒ 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)	Genetic data: genome information, mtDNA Main traits for selection are disease-resistance and coloration.	X
◉ Native ○ Introduced Brachionus plicatilis	☐ 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)	Future genetic improvement: genomic selection, genome editing Main traits for selection are size and higher nutrition. Genome sequence is available for research.	X

◉ Native ○ Introduced Chaetoceros neogracile	☐ 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)	Future genetic improvement: Colony formation on agar plates Researches culture as one of the useful live feed for shellfish larval rearing. Main traits for selection are high temperature tolerable live food which can be produced using an outdoor pond. Genome sequence is available for research.	X
◉ Native ○ Introduced Nannochloropsis oculata	☐ 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)	Future genetic improvement: Colony formation on agar plates Researches culture as a live food for rotifer. Main traits for selection are high temperature tolerable live food with much EPA.	X

◉ Native ○ Introduced Tetraselmis tetrathele	☐ 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)	Future genetic improvement: Colony formation on agar plates Researches culture as a live food for shellfish and prawn larval rearing. Main traits for selection are high temperature tolerable live food which can be cultured easily.	X
○ Native ○ Introduced Pinctada fucata martensii	☐ 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***	
Seriola quinqueradiata	(•) Yes ( ) No ( ) Not Known	A few artificial seeds are in use. Mass production technique of artificial seeds is under development.	X
Seriola dumerili	(•) Yes ( ) No ( ) Not Known	A few artificial seeds are in use. Mass production technique of artificial seeds is under development.	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***	
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	Slovakia Slovenia Solomon Islands Somalia South Africa South Sudan Spain Sri Lanka Sudan Suriname Swaziland Sweden Switzerland Syrian Arab Republic Tajikistan Thailand Timor-Leste	For land-based culture	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)***	
Seriola quinqueradiata	☐ 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	
Trachurus 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
Pseudocaranx dentex	☐ 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
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	
Takifugu rubripes	☐ 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
Mizuhopecten yessoensis	☒ 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	
Crassostrea gigas	☒ 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
Penaeus 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

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	
Halocynthia roretzi	☒ 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
Laminaria japonica	☐ 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	
Undaria pinnatifida	☒ 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
Plecoglossus altivelis	☐ 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	
Cyprinus carpio	☐ 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	Changes of natural environment necessary in life history (Especially in freshwater areas)
Increased wealth and demand for fish	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	Positive: Preventive effect on extinction by continuous monitoring and management.
Governance (ability of government, industry and the public to work together in managing resources)	◉ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	Prevention of overfishing by resource management systems involving government, researchers and fishermen.
Climate change	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◉ Unknown	
Competition for resources, especially freshwater	◯ Strongly positive ◯ Positive ◯ Negative ◉ Strongly negative ◯ No effect ◯ Unknown	

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	Increasing interest to food safety/security Increasing reliability to seafood certification such as MSC
Other ***Add other drivers as necessary*** Change in international circumstance such as adoption of IUCN regulation Add Row / Remove Row	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ◉ Unknown	
Other ***Add other drivers as necessary*** Special preference to certain fish based on cultural background Add Row / Remove Row	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	
Other ***Add other drivers as necessary*** Number of fishermen Add Row / Remove Row	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	
Other ***Add other drivers as necessary*** Changes in quantity of imported fish 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	Changes of natural environment necessary for reproduction. (Especially in freshwater areas.)
Increased wealth and demand for fish	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	Positive: Preventive effect on extinction by continuous monitoring and management. Negative: Overfishing of natural seeds or young used for culture
Governance (ability of government, industry and the public to work together in managing resources)	◉ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	Prevention of overfishing by resource management systems involving government, researchers and fishermen.
Climate change	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ◉ Unknown	
Competition for resources, especially freshwater	○ Strongly positive ○ Positive ○ Negative ◉ Strongly negative ○ No effect ○ Unknown	

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	Increasing interest to food safety/security Increasing reliability to seafood certification such as MSC
Other ***Add other drivers as necessary*** Change in international circumstance such as adoption of IUCN regulation Add Row / Remove Row	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ◉ Unknown	
Other ***Add other drivers as necessary*** Special preference to certain fish based on cultural background Add Row / Remove Row	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	
Other ***Add other drivers as necessary*** Number of fishermen 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

Development of cost-effective culture technique.
Genetic improvement of cultured species.
Promotion of natural resource management.
Development of preservation and restoration technique of genetic resources.

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	Pagrus major
Hybridization	○ Not at all ◉ To a minor extent ○ To some extent ○ To a great extent	Allotriploid of Oncorhynchus mykiss wifh other salmonid fish.
Polyploidy (chromosome set manipulation)	○ Not at all ◉ To a minor extent ○ To some extent ○ To a great extent	Oncorhynchus mykiss
Monosex production	○ Not at all ◉ To a minor extent ○ To some extent ○ To a great extent	Oncorhynchus mykiss
Marker assisted selection	○ Not at all ○ To a minor extent ◉ To some extent ○ To a great extent	Paralichthys olivaceus
Gynogenesis/androgenesis	○ Not at all ◉ To a minor extent ○ To some extent ○ To a great extent	Oncorhynchus mykiss
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	
Pollution of waters	○ Strongly positive ○ Positive ○ Negative ◉ Strongly negative ○ No effect ○ Unknown	"Act on Special Measures concerning Conservation of the Environment of the Seto Inland Sea" and other laws.
Increased frequency of extreme climatic events and long-term climate change	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ◉ Unknown	
Establishment of invasive species	○ Strongly positive ○ Positive ○ Negative ◉ Strongly negative ○ No effect ○ Unknown	Provision of laws and acts (ex. Invasive Alien Species Act). Development of techniques for extermination of invasive species.
Introductions of parasites and pathogens	○ Strongly positive ○ Positive ○ Negative ◉ Strongly negative ○ No effect ○ Unknown	Governmental system for prevention of epidemics through importation.

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	Guidelines for rearing of genetically modified fish
Capture fisheries	◯ Strongly positive ◯ Positive ◉ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	
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

○Ayu (Plecoglossus altivelis)
- filial generation numbers are kept less than 10 generations, concerning genetic diversity.
- the origins of hatchery-reared ayu are caught in the same river basin as stocking release-sites.

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

○Masu salmon (Oncorhynchus masou) and white-spotted charr (Salvelinus leucomaenis)
・esatablishment and management of aquatic protected area where native populations are distributed

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

・Depending on a target species, reducing the collection of wild juvenile for aquaculture, or protecting to collect spawning adult fishes are conducted

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	1
Maintain good strains for aquaculture production	1
Meet consumer and market demands	2
To help adapt to impacts of climate change	2
Future breed improvement in aquaculture	1
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

○Inland fisheries
- compulsory enhancement for stock based on Fisheries Act

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

○ maintaining spawning habitat
- Ayu (Plecoglossus altivelis)
- Masu salmon (Oncorhynchus masou) and white-spotted charr (Salvelinus leucomaenis)

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

Transplantation from the other areas has been regulated against genetic introgression.
Although the genetic evidence has not shown yet, the production looks better than the other area.

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***	
• Protecting spawning area for Ayu (Plecoglossus altivelis)	( ) Very effective (•) Somewhat effective ( ) Not effective ( ) Unknown		X
• Protecting native population for Masu salmon (Oncorhynchus masou)	( ) Very effective (•) Somewhat effective ( ) Not effective ( ) Unknown		X
Mikawa Bay, Lake Hamana and northeastern Hokkaido for Asari (Ruditapes philippinarum)	( ) Very effective (•) Somewhat effective ( ) Not effective ( ) Unknown	Transplantation from the other areas has been regulated against genetic introgression. Although the genetic evidence has not shown yet, the production looks better than the other area.	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***	
Chaetoceros neogracile	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Chaetoceros sp. (MO strain)	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Chaetoceros calcitrans	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X

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***	
Chaetoceros ceratosporum	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Skeletonema costatum	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Phaeodactylum tricornutum	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Navicula ramossima	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Isochrysis galbana	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Pavlova lutheri	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X

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***	
Dunaliella tertiolecta	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Ulvella lens	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Chlorella sp.	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Tetraselmis tetrathele	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Tetraselmis sp.	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X
Nannochloropsis oculata	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Microalgae, for research and education	X

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***	
Branchionus plicatilis sp. Complex	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Rotifers, for research and education S-type, SS-type, L-type	X
Laminaria japonica	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Macroalgae, for research and education	X
Undaria pinnatifida	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Macroalgae, for research and education	X
Undaria undarioides	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Macroalgae, for research and education	X
Pyropia yezoensis	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Macroalgae, for research and education	X
Pyropia tenera	☐ Direct human consumption ☐ Live feed organism ☒ Other	◉ Yes ○ No ○ Unknown	Macroalgae, for research and education	X

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***	
Pyropia tenuipedalis	☐ Direct human consumption ☐ Live feed organism ☒ Other	◉ Yes ○ No ○ Unknown	Macroalgae, for research and education	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***	
		☐ 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	1
Maintain good strains for aquaculture production	1
Meet consumer and market demands	2
To help adapt to impacts of climate change	2
Future breed improvement in aquaculture	1
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	
Fishers	☒ Conservation ☒ Production ☐ Feed manufactoring ☒ Breeding ☒ Research ☒ Marketing ☒ Processing ☒ Advocacy ☒ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	

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	
People involved in marketing	☐ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☒ Marketing ☒ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	
Government resource managers	☒ Conservation ☒ Production ☐ Feed manufactoring ☒ Breeding ☒ Research ☐ Marketing ☐ Processing ☒ Advocacy ☒ Outreach/Extension ☐ Other (**specify**)	☒ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	

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	
Aquatic protected area managers	☒ Conservation ☒ Production ☐ Feed manufactoring ☒ Breeding ☒ Research ☐ Marketing ☐ Processing ☒ Advocacy ☒ Outreach/Extension ☐ Other (**specify**)	☒ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	
Policy Makers	☒ Conservation ☒ Production ☒ Feed manufactoring ☒ Breeding ☒ Research ☒ Marketing ☒ Processing ☒ Advocacy ☒ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	

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	
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	

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

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

Inheritance of food culture, inheritance of marine products use culture

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***	
Living Aquatic Resources Protection Act	1951 Dec	☐ Genes or molecules only ☒ Aquaculture ☒ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☒ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other		X
The Act on Promotion of Inland Water Fisheries	2014 June	☐ Genes or molecules only ☒ Aquaculture ☐ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other		X

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

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

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

Stock assessment on 52 species/84 local stocks within Japanese EEZ

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***	
Fisheries Research Agency	☒ 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
Prefecture's Fisheries Experimental Station	☒ 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

Main institutions, organizations, corporations and other entities	Area of research ***Mark all that apply***	Comments ***Please provide any additional information***	
Prefecture's Center for Stock Enhancement	☒ 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	2
Improve capacities for genetic resource management	2
Improve capacities for economic valuation of aquatic genetic resources	2
Improve capacities for conservation of aquatic genetic resources	2
Improve communication on aquatic genetic resources	2
Improve access to and distribution of aquatic genetic resources	2
Add other rows as appropriate and rank Add Row Remove Row	

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

Education, training and extension

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

Add Row

Institution	Thematic Area	Type of courses **mark all that apply**	Comments	
Tokyo University of Marine Science and Technology	Genetic resource management	☒ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	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		

National Fisheries University	Genetic resource management	☒ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	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		
Hokkaido University	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	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		

Tohoku University	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	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		
Tokyo University	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	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		

Kitasato University	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	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 Government	Coordination associated with authorized licences for Aquaculture and Fisheries	X
Local Government	Coordination associated with authorized licences for Aquaculture and Fisheries	X
Fisheries Cooperative Association	Coordination associated with authorized licences for Aquaculture and Fisheries	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	2
Increase technical capacities of institutions	1
Increase information sharing between institutions	2
Add other rows as appropriate and rank Add Row Remove Row	

Please specify in box below

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

Add Row

Network	Objectives of the network ***Please mark all that apply*** to your country	Comments	
National Council for the Promotion of Research and Development in Institutes of Fisheries Science	☒ 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
SEAFDEC (SouthEast Asian Fisheries Development Center)	☒ 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***	
White Paper on Fisheries	☐ 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

Name of information system	Type of information stored ***mark all that apply***	Main stakeholders ***mark all that apply***	
Annual Statistics on Fishery and Aquaculture Production, Statistics Department, Ministry of Agriculture, Forestry and Fisheries.	☐ 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

Name of information system	Type of information stored ***mark all that apply***	Main stakeholders ***mark all that apply***	
Bulletin of Fisheries Research Agency	☐ 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

Improve information technology and database management
Improve basic knowledge on aquatic genetic resources
Improve capacities for characterization and monitoring of aquatic genetic resources

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

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	
Convention on Biological Diversity	1993 May ratified	(•) Strongly positive ( ) Positive ( ) Negative ( ) Strongly negative ( ) No effect	(•) Strongly positive ( ) Positive ( ) Negative ( ) Strongly negative ( ) No effect		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	
Cartagena Protocol on Biosafety	2003 Nov ratified	◉ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect	◉ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect		X
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1980 Nov ratified	◉ 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	2	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve basic knowledge on aquatic genetic resources	1	◉ To a great extent ○ To some extent ○ None ○ Unknown	
Improve capacities for characterization and monitoring of aquatic genetic resources	1	◉ To a great extent ○ To some extent ○ None ○ Unknown	Limitation of budget for research and development
Improve capacities for genetic improvement	2	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve capacities for economic valuation of aquatic genetic resources	2	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve capacities for conservation of aquatic genetic resources	2	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve communication on aquatic genetic resources		○ 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	2	(•) 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?

• Collaboration to the research of fish disease and shellfish poisoning etc. for food safety
• Collaboration to the research of stock assessment and fishery management
The reason is that these collaboration will help the stable supply/secure the safety of seafood in Japan.

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

Japan will expand the collaboration with SEAFDEC (South East Asia Fisheries Development Center) activities concerning to conservation, sustainable use of wild stock, and sustainable aquaculture in South East Asia region.

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.

As a developed country in fisheries technology, Japan has developed, and will develop the research and technology needed for implementation of sustainable fisheries/aquaculture, such as artificial seed production, fish disease, stock assessment, and fishery management taking into consideration of ecosystem management etc. in the Southeast Asia region through the collaboration to SEAFDEC, as well as worldwide.

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