

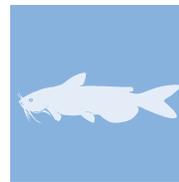
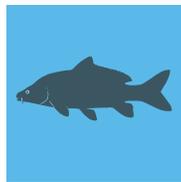
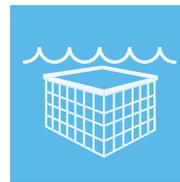
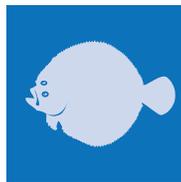


Food and Agriculture  
Organization of the  
United Nations

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COUNTRY REPORTS

## Sweden



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

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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](mailto:Devin.Bartely@fao.org); [Matthias.Halwart@fao.org](mailto:Matthias.Halwart@fao.org); and [ruth.garciagomez@fao.org](mailto: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](mailto:Devin.Bartely@fao.org); [Matthias.Halwart@fao.org](mailto:Matthias.Halwart@fao.org); and [ruth.garciagomez@fao.org](mailto: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](mailto:Devin.Bartely@fao.org); [Matthias.Halwart@fao.org](mailto:Matthias.Halwart@fao.org); [ruth.garciagomez@fao.org](mailto:ruth.garciagomez@fao.org)

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

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

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

[www.algaebase.org](http://www.algaebase.org)  
[www.aquamaps.org](http://www.aquamaps.org)  
[www.barcodeoflife.org](http://www.barcodeoflife.org)  
[www.coml.org](http://www.coml.org)  
[www.fishbase.org](http://www.fishbase.org)  
[www.frozenark.org](http://www.frozenark.org)  
[www.genbank.org](http://www.genbank.org)  
[www.gbif.org](http://www.gbif.org)  
[www.iucn.org](http://www.iucn.org)  
<http://discover.nci.nih.gov/>  
[www.ornamental-fish-int.org](http://www.ornamental-fish-int.org)  
[www.sealifebase.org](http://www.sealifebase.org)  
[www.searoundsus.org](http://www.searoundsus.org)  
[www.marinespecies.org](http://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](mailto:cgrfa@fao.org)) immediately.
- Countries are encouraged to establish a national committee to oversee the preparation of the Country Report. The national committee should consist of as many representative stakeholders as practical (representing government, industry, research and civil society).
- The national committee should meet frequently to review progress and consult widely with key stakeholders.

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

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

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

Country	Sweden
Prepared By	Daniel Melin
Date	Feb 26, 2016

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## I. EXECUTIVE SUMMARY

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

*Please include the Executive Summary here.*

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

The production of farmed aquatic species have increased over the last ten years and the trend is likely to continue in the future. The species farmed today are *Salvelinus alpinus*, *Salmo salar*, *Oncorhynchus mykiss*, *Sander lucioperca*, *Anguilla anguilla*, *Pacifastacus leniusculus*, *Salvelinus fontinalis*, *Salmo trutta*, *Astacus astacus*, *Perca fluviatilis*, *Mytilus edulis*, *Ostrea edulis* and *Crassostrea gigas*. Species thought to have potential for domestication and future use in aquaculture are *Sander lucioperca*, *Perca fluviatilis*, *Scophthalmus maximus*, *Nephrops norvegicus*, *Anarhichas lupus*, *Anarhichas minor*, *Homarus gammarus*, *Solea solea* and *Hippoglossus hippoglossus*.

The identification, naming and genetic data of farmed aquatic organisms is up to date and available. The genetic data for rainbow trout and arctic char are well documented. This is also true for all species included in the national compensation programs, for *Sander lucioperca* used in aquaculture, for *Astacus astacus* and in part for *Homarus gammarus*.

The major volume of farmed fish (*Salvelinus alpinus* and *Oncorhynchus mykiss*) is not based on wild sources, but wild stock recruitment dominates in the number of farmed species. Around 4 million fish is released annually from the hatcheries, while the number of farmed food fish for slaughter is between 4-6 million individuals.

About 40 % of the breeding programs and efforts for the genetic improvement of farmed aquatic species in Sweden is being managed by the private sector. The remaining 60 % is being managed by private/public partnership. The Swedish government has initiated and partly supported formation of two family based selection programs for *Salvelinus alpinus* and *Oncorhynchus mykiss*, starting in the mid-1980s.

Genetically improved aquatic organisms contribute to a minor extent of the production in terms of volume. The most significant examples where genetic improvement (mainly by traditional selective breeding) contributed to increased production are *Salvelinus alpinus*, *Oncorhynchus mykiss*, *Astacus astacus* and *Pacifastacus leniusculus*.

Over the past 10 years Sweden has exported *Salmo salar* to Norway to be used in farming and enhanced recruitment. *Salmo trutta* has both been exported and imported to and from Finland for enhanced recruitment and put and take. Finally we have been importing *Oncorhynchus mykiss* from Finland and Denmark.

Wild relatives of aquatic species present in Sweden that are farmed in another country are *Salvelinus fontinalis* and *Cyprinus carpio* (for recreational fishery), *Ctenopharyngodon idellus* (for biological control) and *Homarus americanus* (for capture fisheries, recreational fishery and research and development).

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

All of the drivers listed in the questionnaire (Q 1.15) effect aquatic genetic resources of farmed aquatic species positively. Especially the need to produce food for the increasing human population. The positive effect of the drivers listed is however not the case when it comes aquatic genetic resources of wild relatives of farmed aquatic species. Here climate change is the only driver thought to be positive, and only for wild carp and grass carp in the southern part of Sweden.

Among the drivers that are changing aquatic ecosystems increased frequency of extreme climatic events and long term climate change is the only one thought to have a positive effect on Aquatic genetic resources in the sense that both carps and *Salvelinus fontinalis* are favored in an increased temperature compared to native species of the same ecological niche.

All aquatic species in genetic selection in Sweden is based on selective breeding.

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

In Sweden sea-ranching programs have been launched in order to compensate for the losses of salmon and trout due to the construction of hydro-electrical power plants. Each river uses their native strains for that purpose. In situ conservation of some species are thereby included in the Swedish policy as an objective in the management of aquaculture and/or culture-based fisheries.

Examples of activities for the in situ conservation of endangered or threatened farmed species and their wild relatives:

1. Nobel cray fish (*Astacus astacus*) has programs for conservation farming.
2. Cryo preservation program of wild strains of Atlantic salmon (*Salmo salar*) and brown trout (*Salmo trutta*).
3. Cryo preservation of former breeding program *Oncorhynchus mykiss* (Gloria). Unknown if still in effect.
4. The European lobster (*Homarus gammarus*) has programs for conservation farming in several European countries (not Sweden).

The most important objectives for in situ conservation of aquatic genetic resources of farmed aquatic species and their wild relatives are to help adapt to impacts of climate change and to meet consumer and market demands.

Collectors of wild seed and brood stock for aquaculture and culture-based fisheries are contributing to the conservation of aquatic genetic resources by maintaining habitats and/or limiting the quantities collected to a limited extent. Oysters (*Ostreidae*) and mussels are exclusively using wild seeds.

There is one aquatic protected area that are contributing to the in situ conservation of European lobster (*Homarus gammarus*) in Sweden.

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

#### National Jurisdiction

Sweden collects more than 20 strains of brown trout (*Salmo trutta*). Trout is reared at several large and small hatcheries, mainly for stocking for sport fishing purposes.

The most important objectives of *ex situ* conservation in Sweden is preservation of genetic diversity followed by the need to meet consumer and market demands.

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

The principal stakeholder groups who have interests in aquatic genetic resources of farmed aquatic species and their wild relatives in Sweden are fish farmers, fishers, fish hatchery people, people involved in marketing, government resource managers, fishing or aquaculture associations, aquatic protected area managers, policy makers, non-governmental organizations, intergovernmental organizations, donors and consumers. Their role and main interest in regard to aquatic genetic resources differ to a great extent (for details, see answer to question 31).

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

Several agencies are involved in national policies and legislation. The Swedish Board of Agriculture is responsible for regulations regarding sites, animal health and welfare, import/export, disease control, genetic modified organisms, moving aquatic organisms between aquaculture facilities and quarantine. The Swedish Agency for Marine and Water Management (SwAM) is responsible for management of wild aquatic resources. Also for regulations regarding invasive aquatic alien species, releasing aquatic fauna into the wild including moving wild stocks, holding genetic modified aquatic organisms. SwAM is also responsible for guidance regarding obligatory enrolment regarding hazardous activity under the Swedish Environmental Code. More over the Environmental Code are of great overall importance regarding policies and regulations regarding environmental impact by aquaculture and aquatic genetic resources. The County Administrative Boards are responsible for control and implementation of the national policies and legislation on a regional level. The National Veterinary Institute are responsible for fish health.

Regulation of aquaculture are also of great importance to achieve at least four of the national environmental objectives (i.e. 16 in total). The Swedish Environmental Protection Agency have an overall responsibility for a rich biological diversity of plant and animal life, SwaM are responsible for three of them on sustainable aquatic environment in seas and freshwater. Basically all species has restricted access. Strain should not be transplanted between watersheds.

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

Swedish national research program support the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives in several ways (for details, see the answer to question 37).

The institutions 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 are the Swedish University of Agricultural Sciences, Gothenburg University (and Chalmers University of technology), Aquaculture Center North AB and EM-Lax (for details, see the answer to question 38).

The most important capacity strengthening needed to improve Swedish research in support of the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives is to improve capacities for conservation of aquatic genetic resources and to improve capacities for economic valuation of aquatic genetic resources. It is also important with research and development of more resource efficient selective breeding methods and improved research capacity in domestication.

The Swedish University of Agricultural Sciences (SLU) is the main Swedish university educating in animal breeding, including fish. They are developing courses in aquatic genetic resources at the department of Aquatic resources. Some courses in wild salmon genetic resources at the Department of Wild Life, Fish and Environmental Studies. SLU is presently giving training and is developing courses in conservation aquatic genetic resources at the department of Aquatic resources.

Gothenburg University gives courses in aquaculture and aquaculture techniques, sustainable aquaculture, coastal management, management of marine resources, invertebrate biology, physiology, immunology and ecology. They also hold courses PH D training in sustainable aquaculture, coastal management, management of marine resources and ecology as well as projects in aquaculture and aquaculture techniques, sustainable aquaculture for conservational and re-stocking. There are several mechanisms within Sweden that are 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 (for details, see answer to question 41).

Increased awareness in institutions, technical capacities of institutions and information sharing between institutions are all very important to improve capacity strengthening in intersectoral coordination in support of the conservation, sustainable use and development of aquatic genetic resources.

There are several national networks and international networks that support the conservation, sustainable use and development of aquatic genetic resources. Among these are ALF - a reference group on the adaptive management of Baltic salmon populations, ICES Aquaculture group, Swedish Centre for Aquaculture, Swedish Aquaculture Centre West and ELCE (European Lobster Centre of Excellence). They have different objectives (for details, see answer to question 43).

Information systems in Sweden 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 are scientific and popular science publications, teaching, and information meetings for relevant organizations and the public. However, no databases or other information systems on genetic resources, accessible for the public, have been developed, but may be. Long term national, governmental as well as regional support to the regional and national centers for aquaculture is needed in order to improve national information systems to support the conservation, sustainable use and development of aquatic genetic resources.

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

There are several International, regional or sub-regional agreements, conventions and treaties concerning aquatic genetic resources of farmed aquatic species and their wild relatives (for details, see answer to question 46). The most important priority needs regarding collaboration on conservation and sustainable use of aquatic genetic resources of farmed aquatic species and their wild relatives are to improve basic knowledge on aquatic genetic resources, improve capacities for conservation of aquatic genetic resources, improve communication on aquatic genetic resources and to access impact on wild populations of escaped fishes from farms other countries. They are all being met to some extent today. Different EU financed projects have been very fruitful to Sweden. The work in the ICES working group are also good forums for international collaboration. There is however a need for Sweden to expand its collaboration concerning the conservation, sustainable use and development of aquatic genetic resources.

## II. INTRODUCTION

The main objective of the Introduction is to present an overview that will allow a person who is unfamiliar with the country to appreciate the context for the Country Report. The Introduction should present a broad overview and present background information from your country on farmed aquatic species, their wild relatives and culture based fisheries. Detailed information should be provided in the main body of the Country Report. Countries may wish to consider developing their Introductions after completing the main body of their Country Reports.

### *Please write the overview here*

The production of farmed aquatic species have increased over the last ten years and the trend is likely to continue in the future. The identification, naming and genetic data of farmed aquatic organisms is up to date and available. The major volume of farmed fish (*Salvelinus alpinus* and *Oncorhynchus mykiss*) is not based on wild sources, but wild stock recruitment dominates in the number of farmed species.

About 40 % of the breeding programs and efforts for the genetic improvement of farmed aquatic species in Sweden is being managed by the private sector. The remaining 60 % is being managed by private/public partnership.

Genetically improved aquatic organisms contribute to a minor extent of the production in terms of volume.

Over the past 10 years Sweden has exported *Salmo salar* to Norway to be used in farming and enhanced recruitment. *Salmo trutta* has both been exported and imported to and from Finland for enhanced recruitment and put and take. Finally we have been importing *Oncorhynchus mykiss* from Finland and Denmark.

The need to produce food for the increasing human population is one of the major drivers that effect aquatic genetic resources of farmed aquatic species positively.

All aquatic species in genetic selection in Sweden is based on selective breeding.

In Sweden sea-ranching programs have been launched in order to compensate for the losses of salmon and trout due to the construction of hydro-electrical power plants.

The most important objectives for in situ conservation of aquatic genetic resources of farmed aquatic species and their wild relatives are to help adapt to impacts of climate change and to meet consumer and market demands.

Sweden collects more than 20 strains of brown trout (*Salmo trutta*). Trout is reared at several large and small hatcheries, mainly for stocking for sport fishing purposes. The most important objectives of ex situ conservation in Sweden is preservation of genetic diversity followed by the need to meet consumer and market demands.

The principal stakeholder groups who have interests in aquatic genetic resources of farmed aquatic species and their wild relatives in Sweden are fish farmers, fishers, fish hatchery people, people involved in marketing, government resource managers, fishing or aquaculture associations, aquatic protected area managers, policy makers, non-governmental organizations, intergovernmental organizations, donors and consumers.

Several agencies are involved in national policies and legislation. The Swedish Board of Agriculture, The Swedish Agency for Marine and Water Management, The County Administrative Boards and The National Veterinary Institute to name a few.

The most important capacity strengthening needed to improve Swedish research in support of the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives is to improve capacities for conservation of aquatic genetic resources and to improve capacities for economic valuation of aquatic genetic resources.

The Swedish University of Agricultural Sciences (SLU) is the main Swedish university educating in animal breeding, including fish.

Increased awareness in institutions, technical capacities of institutions and information sharing between institutions are all very important to improve capacity strengthening in intersectoral coordination in support of the conservation, sustainable

use and development of aquatic genetic resources.

Long term national, governmental as well as regional support to the regional and national centers for aquaculture is needed in order to improve national information systems to support the conservation, sustainable use and development of aquatic genetic resources.

The most important priority needs regarding collaboration on conservation and sustainable use of aquatic genetic resources of farmed aquatic species and their wild relatives are to improve basic knowledge on aquatic genetic resources, improve capacities for conservation of aquatic genetic resources, improve communication on aquatic genetic resources and to access impact on wild populations of escaped fishes from farms other countries. They are all being met to some extent today.

Sweden needs to expand its collaboration concerning the conservation, sustainable use and development of aquatic genetic resources.

### III. MAIN BODY OF THE COUNTRY REPORT

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

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

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

##### **Farmed aquatic species**

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

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

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

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

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

- Yes
- No
- Mostly Yes
- Mostly No

*Please include any explanation or additional information here.*

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

a) Available? *Please mark appropriate box.*

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

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

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

*Please add any explanation here.*

The genetic data for rainbow trout and arctic char, which make up the majority of the Swedish production, are well documented. This is also true of all species included in the national compensation programs (sea-ranching programs) as Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), white fish (*Coregonus lavaretus*) and European eel (*Anguilla anguilla*). There is also good knowledge for pikeperch (*Sander lucioperca*) used in aquaculture, for freshwater crayfish (*Astacus astacus*) and in part for European lobster (*Homarus gammarus*). Minor knowledge exist for potential aquaculture species as perch (*Perca fluviatilis*), Baltic turbot (*Psetta maxima*) and oyster (flat and japonica). Knowledge in regard to wolf fish, common carp (includingkoj carp), grass carp and giant shrimp is low.

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.*

The major volume of farmed fish is not based on wild sources (Arctic charr and rainbow trout), but counted as number of species wild stock recruitment dominates. Around 4 million fish is released annually from the hatcheries (about salmon, 2.5 million., brown trout 0.75 million, white fish 0.3 million, eel 0.1 million), while the number of farmed food fish for slaughter is between 4-6 million individuals.

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

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

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

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

**Total**

*Please add any explanation here.*

Swedish government has initiated and partly supported formation of two family based selection programs for Arctic charr and rainbow trout, starting in mid 1980s. Both programs are now privately owned but still receive public support and is developed in close collaboration with the academia. In addition is the majority of rainbow trout smolt delivered by a private company acting only on commercial conditions and with a low interaction with academia.

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

*Please mark appropriate box.*

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

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

Add Row

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

	<input checked="" type="checkbox"/> Traditional selective breeding	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input checked="" type="checkbox"/> Private/Public partnership	
	<input type="checkbox"/> Hybrids	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership	
Astacus astacus	<input type="checkbox"/> Triploids and other polyploids	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership	X
	<input type="checkbox"/> Mono-sex production	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership	
	<input type="checkbox"/> Other	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership	
	<input checked="" type="checkbox"/> Traditional selective breeding	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input checked="" type="checkbox"/> Private/Public partnership	
	<input type="checkbox"/> Hybrids	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership	
Pacifastacus leniusculus	<input type="checkbox"/> Triploids and other polyploids	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership	X
	<input type="checkbox"/> Mono-sex production	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership	
	<input type="checkbox"/> Other	<input type="checkbox"/> Private Sector <input type="checkbox"/> Public Sector <input type="checkbox"/> Private/Public partnership	

9. Please fill in table 1.1

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

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

<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type	<input checked="" type="radio"/> Yes	<input type="radio"/> Increasing	<input type="radio"/> Increasing	<input type="checkbox"/> Selective breeding	<input type="checkbox"/> Selective breeding		
Salmo salar	<input type="checkbox"/> Selective bred type	<input type="radio"/> No	<input checked="" type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	Wild seed is used in rearing for re-stocking. No genetic modification.	
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input checked="" type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		X
	<input checked="" type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input checked="" type="checkbox"/> Other (specify in comment)	<input checked="" type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							
<input type="radio"/> Native <input checked="" type="radio"/> Introduced	<input type="checkbox"/> Wild Type	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> Increasing	<input checked="" type="radio"/> Increasing	<input checked="" type="checkbox"/> Selective breeding	<input checked="" type="checkbox"/> Selective breeding		
Oncorhynchus mykiss	<input type="checkbox"/> Selective bred type	<input type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		
	<input checked="" type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		X
	<input type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							

<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> Increasing	<input checked="" type="radio"/> Increasing	<input checked="" type="checkbox"/> Selective breeding	<input checked="" type="checkbox"/> Selective breeding		
Sander lucioperca	<input type="checkbox"/> Selective bred type	<input type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		X
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input checked="" type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							
<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type	<input checked="" type="radio"/> Yes	<input type="radio"/> Increasing	<input type="radio"/> Increasing	<input type="checkbox"/> Selective breeding	<input type="checkbox"/> Selective breeding		
Anguilla anguilla	<input type="checkbox"/> Selective bred type	<input type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		
	<input type="checkbox"/> Cross breeds		<input checked="" type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input type="checkbox"/> Strains		<input type="radio"/> Stopped	<input checked="" type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input checked="" type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids						Wild seed is used in rearing for re-stocking. No genetic modification.	X

<input type="radio"/> Native <input checked="" type="radio"/> Introduced	<input type="checkbox"/> Wild Type	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> Increasing	<input type="radio"/> Increasing	<input checked="" type="checkbox"/> Selective breeding	<input checked="" type="checkbox"/> Selective breeding		
<i>Pacifastacus leniusculus</i>	<input type="checkbox"/> Selective bred type	<input type="radio"/> No	<input type="radio"/> Stable	<input checked="" type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		X
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input checked="" type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							
<input type="radio"/> Native <input checked="" type="radio"/> Introduced	<input type="checkbox"/> Wild Type	<input type="radio"/> Yes	<input type="radio"/> Increasing	<input type="radio"/> Increasing	<input type="checkbox"/> Selective breeding	<input type="checkbox"/> Selective breeding		
<i>Salvelinus fontinalis</i>	<input type="checkbox"/> Selective bred type	<input checked="" type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		
	<input type="checkbox"/> Cross breeds		<input checked="" type="radio"/> Decreasing	<input checked="" type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex	No active selection	X
	<input checked="" type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input checked="" type="checkbox"/> Other (specify in comment)	<input checked="" type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							

<input checked="" type="radio"/> Native <input type="radio"/> Introduced								
Salmo trutta	<input checked="" type="checkbox"/> Wild Type <input type="checkbox"/> Selective bred type <input type="checkbox"/> Hybrids <input checked="" type="checkbox"/> Cross breeds <input checked="" type="checkbox"/> Strains <input type="checkbox"/> Varieties <input type="checkbox"/> Polyploids	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<input type="radio"/> Increasing <input checked="" type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input checked="" type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input checked="" type="checkbox"/> Other (specify in comment)	<p>Wild seed is used in rearing for re-stocking. No genetic modification. Possible a very small activity in private sector for put and take selection.</p>	X
<input checked="" type="radio"/> Native <input type="radio"/> Introduced								
Astacus astacus	<input checked="" type="checkbox"/> Wild Type <input type="checkbox"/> Selective bred type <input type="checkbox"/> Hybrids <input type="checkbox"/> Cross breeds <input checked="" type="checkbox"/> Strains <input type="checkbox"/> Varieties <input type="checkbox"/> Polyploids	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<input type="radio"/> Increasing <input type="radio"/> Stable <input checked="" type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input type="checkbox"/> Other (specify in comment)	<input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input type="checkbox"/> Other (specify in comment)		X

<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type	<input type="radio"/> Yes	<input checked="" type="radio"/> Increasing	<input checked="" type="radio"/> Increasing	<input checked="" type="checkbox"/> Selective breeding	<input checked="" type="checkbox"/> Selective breeding		
Perca fluviatilis	<input type="checkbox"/> Selective bred type	<input checked="" type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		X
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input checked="" type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							
<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type	<input type="radio"/> Yes	<input type="radio"/> Increasing	<input checked="" type="radio"/> Increasing	<input type="checkbox"/> Selective breeding	<input type="checkbox"/> Selective breeding		
Mytilus edulis	<input type="checkbox"/> Selective bred type	<input checked="" type="radio"/> No	<input checked="" type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		X
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							

<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type	<input type="radio"/> Yes	<input type="radio"/> Increasing	<input type="radio"/> Increasing	<input type="checkbox"/> Selective breeding	<input type="checkbox"/> Selective breeding		
<i>Ostrea edulis</i>	<input type="checkbox"/> Selective bred type	<input type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		X
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							
<input type="radio"/> Native <input checked="" type="radio"/> Introduced	<input type="checkbox"/> Wild Type	<input type="radio"/> Yes	<input type="radio"/> Increasing	<input type="radio"/> Increasing	<input type="checkbox"/> Selective breeding	<input type="checkbox"/> Selective breeding		
<i>Crassostrea gigas</i>	<input type="checkbox"/> Selective bred type	<input type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input checked="" type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input checked="" type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input checked="" type="radio"/> Not known	<input checked="" type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							

<input checked="" type="radio"/> Native <input type="radio"/> Introduced								
Coregonus lavaretus	<input checked="" type="checkbox"/> Wild Type <input type="checkbox"/> Selective bred type <input type="checkbox"/> Hybrids <input type="checkbox"/> Cross breeds <input checked="" type="checkbox"/> Strains <input type="checkbox"/> Varieties <input type="checkbox"/> Polyploids	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<input type="radio"/> Increasing <input checked="" type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input type="checkbox"/> Other (specify in comment)	At this time no active breeding in Sweden but may develop.	X
<input type="radio"/> Native <input type="radio"/> Introduced								
Oreochromis (=Tilapia) spp	<input type="checkbox"/> Wild Type <input checked="" type="checkbox"/> Selective bred type <input type="checkbox"/> Hybrids <input type="checkbox"/> Cross breeds <input type="checkbox"/> Strains <input type="checkbox"/> Varieties <input type="checkbox"/> Polyploids	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Known	<input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input checked="" type="radio"/> Not known	<input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input checked="" type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input checked="" type="checkbox"/> Other (specify in comment)	Small farms using their own broad stock	X



<input type="radio"/> Native <input checked="" type="radio"/> Introduced	<input type="checkbox"/> Wild Type	<input type="radio"/> Yes	<input checked="" type="radio"/> Increasing	<input checked="" type="radio"/> Increasing	<input checked="" type="checkbox"/> Selective breeding	<input checked="" type="checkbox"/> Selective breeding		
Ctenopharyngodon idellus	<input checked="" type="checkbox"/> Selective bred type	<input checked="" type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		X
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input type="radio"/> Not known	<input type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							
<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type	<input type="radio"/> Yes	<input type="radio"/> Increasing	<input checked="" type="radio"/> Increasing	<input checked="" type="checkbox"/> Selective breeding	<input checked="" type="checkbox"/> Selective breeding		
Anarhichas lupus	<input type="checkbox"/> Selective bred type	<input checked="" type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex	Gothenburg University: Research culturing just started - for future commercial applications	X
	<input type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input checked="" type="radio"/> Not known	<input type="radio"/> Not known	<input type="checkbox"/> Other (specify in comment)	<input type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids							

<input type="radio"/> Native <input checked="" type="radio"/> Introduced	<input type="checkbox"/> Wild Type <input checked="" type="checkbox"/> Selective bred type <input type="checkbox"/> Hybrids <input type="checkbox"/> Cross breeds <input type="checkbox"/> Strains <input type="checkbox"/> Varieties <input type="checkbox"/> Polyploids	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Known	<input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input checked="" type="radio"/> Not known	<input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input checked="" type="radio"/> Not known	<input type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input checked="" type="checkbox"/> Other (specify in comment)	<input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input checked="" type="checkbox"/> Other (specify in comment)		
Anarhichas minor							Gothenburg University: Fertilized eggs imported from Norway. Research culturing planned	X
<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type <input type="checkbox"/> Selective bred type <input type="checkbox"/> Hybrids <input type="checkbox"/> Cross breeds <input type="checkbox"/> Strains <input type="checkbox"/> Varieties <input type="checkbox"/> Polyploids	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known	<input type="radio"/> Increasing <input type="radio"/> Stable <input checked="" type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input checked="" type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Stopped <input type="radio"/> Not known	<input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input type="checkbox"/> Other (specify in comment)	<input checked="" type="checkbox"/> Selective breeding <input type="checkbox"/> Hybridization <input type="checkbox"/> Polyploidy (chromosome set manipulation) <input type="checkbox"/> Monosex <input type="checkbox"/> Marker assisted selection <input type="checkbox"/> Other (specify in comment)		
Homarus gammarus							European lobster (common lobster) Gothenburg University: Ongoing research culturing for futur commecial applications	X

<input checked="" type="radio"/> Native <input type="radio"/> Introduced	<input checked="" type="checkbox"/> Wild Type	<input type="radio"/> Yes	<input type="radio"/> Increasing	<input type="radio"/> Increasing	<input type="checkbox"/> Selective breeding	<input type="checkbox"/> Selective breeding		
Gadus morhua	<input type="checkbox"/> Selective bred type	<input type="radio"/> No	<input type="radio"/> Stable	<input type="radio"/> Stable	<input type="checkbox"/> Hybridization	<input type="checkbox"/> Hybridization		
	<input type="checkbox"/> Hybrids	<input checked="" type="radio"/> Not Known	<input type="radio"/> Fluctuating	<input type="radio"/> Fluctuating	<input type="checkbox"/> Polyploidy (chromosome set manipulation)	<input type="checkbox"/> Polyploidy (chromosome set manipulation)		
	<input type="checkbox"/> Cross breeds		<input type="radio"/> Decreasing	<input type="radio"/> Decreasing	<input type="checkbox"/> Monosex	<input type="checkbox"/> Monosex		
	<input type="checkbox"/> Strains		<input type="radio"/> Stopped	<input type="radio"/> Stopped	<input type="checkbox"/> Marker assisted selection	<input type="checkbox"/> Marker assisted selection		
	<input type="checkbox"/> Varieties		<input checked="" type="radio"/> Not known	<input checked="" type="radio"/> Not known	<input checked="" type="checkbox"/> Other (specify in comment)	<input checked="" type="checkbox"/> Other (specify in comment)		
	<input type="checkbox"/> Polyploids						Gothenburg University: Research rearing for re-stocking. There are future possible aquaculture applications	X

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

Add Row

Species <i>Type and select a species</i>	Is the species native to your country?	Comments <i>For example main sources of information</i>	
Sander lucioperca	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<p>Small farms earlier using wild seed from wild type is now changing to using recruitment from broad stock in their own farm, i.e. a domestication process is initiated.</p>	X
Perca fluviatilis	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<p>Small farms earlier using wild seed from wild type is now changing to using recruitment from broad stock in their own farm, i.e. a domestication process is initiated.</p>	X
Psetta maxima	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<p>Baltic Turbot, identified as an species with interest for aquaculture</p>	X

Nephrops norvegicus	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	Norwegian lobster. Domestication projects in effect	X
Anarhichas lupus	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	Domestication projects in effect	X
Anarhichas minor	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known	Domestication projects ongoing	X

Homarus gammarus	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	European lobster - Domestication projects ongoing	X
Solea solea	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	Domestication projects ongoing	X
Hippoglossus hippoglossus	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	Domestication projects ongoing	X

Gadus morhua

Yes

No

Not Known

Domestication projects ongoing

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 <b>Mark all that apply</b>	Details of transfer or exchange	Type of genetic material exchanged <b>Mark all that apply</b>	Country or countries involved with exchange <b>Hold CTRL button to select more than one country</b>	Comments <i>Please add main purpose or objective of the exchange and main sources of information</i>
Salmo salar	<input checked="" type="checkbox"/> No deliberate genetic alteration <input type="checkbox"/> Traditional selective breeding <input type="checkbox"/> Hybrids <input type="checkbox"/> Triploids and other polyploids <input type="checkbox"/> Mono-sex production <input type="checkbox"/> Other	<input type="checkbox"/> Import <input checked="" type="checkbox"/> Export	<input type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Gametes <input type="checkbox"/> Tissues <input type="checkbox"/> Embryos <input checked="" type="checkbox"/> Living specimens <input type="checkbox"/> Other	Monaco Mongolia Montenegro Morocco Mozambique Myanmar Namibia Nauru Nepal Netherlands New Zealand Nicaragua Niger Nigeria Niue Norway Oman	To be used in farming and in enhancement during the 1980s
Salmo trutta	<input checked="" type="checkbox"/> No deliberate genetic alteration <input type="checkbox"/> Traditional selective breeding <input type="checkbox"/> Hybrids <input type="checkbox"/> Triploids and other polyploids <input type="checkbox"/> Mono-sex production <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Import <input checked="" type="checkbox"/> Export	<input type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Gametes <input type="checkbox"/> Tissues <input checked="" type="checkbox"/> Embryos <input checked="" type="checkbox"/> Living specimens <input type="checkbox"/> Other	Democratic Republic Denmark Djibouti Dominica Dominican Republic Ecuador Egypt El Salvador Equatorial Guinea Eritrea Estonia Ethiopia European Union (Men Faroe Islands (Associa Fiji Finland France	Exchange for enhancement and put and take both on mainland Finland and Åland

<p>Oncorhynchus mykiss</p>	<p>No deliberate genetic alteration</p> <p><input type="checkbox"/> Traditional selective breeding</p> <p><input type="checkbox"/> Hybrids</p> <p><input type="checkbox"/> Triploids and other polyploids</p> <p><input checked="" type="checkbox"/> Mono-sex production</p> <p><input type="checkbox"/> Other</p>	<p><input checked="" type="checkbox"/> Import</p> <p><input type="checkbox"/> Export</p>	<p><input type="checkbox"/> DNA</p> <p><input type="checkbox"/> Genes</p> <p><input type="checkbox"/> Gametes</p> <p><input type="checkbox"/> Tissues</p> <p><input type="checkbox"/> Embryos</p> <p><input checked="" type="checkbox"/> Living specimens</p> <p><input type="checkbox"/> Other</p>	<p>Central African Republic</p> <p>Chad</p> <p>Chile</p> <p>China</p> <p>Colombia</p> <p>Comoros</p> <p>Cook Islands</p> <p>Costa Rica</p> <p>Côte d'Ivoire</p> <p>Croatia</p> <p>Cuba</p> <p>Cyprus</p> <p>Czech Republic</p> <p>Republic of Korea</p> <p>Democratic Republic of Korea</p> <p><b>Denmark</b></p> <p>Djibouti</p>	<p>Private import from both Finland and Denmark</p>	<p><input checked="" type="checkbox"/></p>
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### Wild relatives of farmed aquatic species

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

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

Add Row

Species	Use (mark all that apply)	Comments	
Salvelinus fontinalis	<input type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Recreational fishery <input type="checkbox"/> Aquaria <input type="checkbox"/> Biological control <input type="checkbox"/> Research and development <input type="checkbox"/> Other (specify in comments)	Imported during 1980s for sport fishing.	X
Cyprinus carpio	<input type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Recreational fishery <input type="checkbox"/> Aquaria <input type="checkbox"/> Biological control <input type="checkbox"/> Research and development <input type="checkbox"/> Other (specify in comments)		X
Ctenopharyngodon idellus	<input type="checkbox"/> Capture fisheries <input type="checkbox"/> Recreational fishery <input type="checkbox"/> Aquaria <input checked="" type="checkbox"/> Biological control <input type="checkbox"/> Research and development <input type="checkbox"/> Other (specify in comments)	Mainly for water hazard plant control at golf courses, but is also used at other locations more and more.	X

Homarus americanus	<input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Recreational fishery <input type="checkbox"/> Aquaria <input type="checkbox"/> Biological control <input checked="" type="checkbox"/> Research and development <input type="checkbox"/> Other (specify in comments)	<p>The American lobster. A non-native species that has been illegally released in Swedish waters and is now caught during commercial and recreational fishing. The species is imported live from North America as food. The species is cultured in its native area, however as the wild catch is high it is currently not as economically sustainable to farm them at the moment.</p> <p>The species has a risk of becoming invasive in Sweden, and major concerns are about hybridization, disease transfer and outcompeting the native species in the wild.</p>	<div style="text-align: center; border: 1px solid black; width: 20px; margin: 0 auto;">X</div>
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13. Please list the aquatic genetic resources of wild relatives of farmed aquatic species your country has transferred or exchanged with other countries over the past 10 years.

Add Row

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

Species	Details of transfer or exchange <i>mark all that apply</i>	Type of genetic material exchanged	Country <b>Hold CTRL button to select more than one country</b>	Comments <i>main sources of information, if the transfer was legal or not</i>	
	<input type="checkbox"/> Import <input type="checkbox"/> Export	<input type="checkbox"/> Tissues <input type="checkbox"/> Gametes <input type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Embryos <input type="checkbox"/> Living specimens <input type="checkbox"/> Other	Afghanistan Albania Algeria Andorra Angola Antigua and Barbuda Argentina Armenia Australia Austria Azerbaijan Bahamas Bahrain Bangladesh Barbados Belarus		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	
Salvelinus alpinus	<input type="checkbox"/> Straddling <input type="checkbox"/> Transboundary <input type="checkbox"/> Introduced <input checked="" type="checkbox"/> Native	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<input type="radio"/> Increasing <input checked="" type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Depleted <input type="radio"/> Not known	<input type="radio"/> Increasing <input checked="" type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Depleted <input type="radio"/> Not known	<input type="checkbox"/> Intertidal <input type="checkbox"/> Coastal in EEZ <input type="checkbox"/> High seas <input checked="" type="checkbox"/> Lake <input checked="" type="checkbox"/> Reservoir <input type="checkbox"/> River <input type="checkbox"/> Swamp <input type="checkbox"/> Other (specify) <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div>	<input type="radio"/> Increasing <input checked="" type="radio"/> Stable <input type="radio"/> Decreasing <input type="radio"/> Not known	<input type="checkbox"/> Habitat <input type="checkbox"/> Climate <input type="checkbox"/> Invasive species <input type="checkbox"/> Pollution <input type="checkbox"/> Rehabilitation of habitat <input type="checkbox"/> Others <input type="checkbox"/> Not known	X
Oncorhynchus mykiss	<input type="checkbox"/> Straddling <input type="checkbox"/> Transboundary <input checked="" type="checkbox"/> Introduced <input type="checkbox"/> Native	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Known	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Known	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Known	<input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Depleted <input checked="" type="radio"/> Not known	<input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Fluctuating <input type="radio"/> Decreasing <input type="radio"/> Depleted <input checked="" type="radio"/> Not known	<input type="checkbox"/> Intertidal <input type="checkbox"/> Coastal in EEZ <input type="checkbox"/> High seas <input checked="" type="checkbox"/> Lake <input checked="" type="checkbox"/> Reservoir <input type="checkbox"/> River <input type="checkbox"/> Swamp <input checked="" type="checkbox"/> Other (specify) <div style="border: 1px solid black; padding: 2px;">Unintention released or intentional releases for put-and-take-fishery</div>	<input type="radio"/> Increasing <input type="radio"/> Stable <input type="radio"/> Decreasing <input checked="" type="radio"/> Not known	<input type="checkbox"/> Habitat <input type="checkbox"/> Climate <input type="checkbox"/> Invasive species <input type="checkbox"/> Pollution <input type="checkbox"/> Rehabilitation of habitat <input type="checkbox"/> Others <input type="checkbox"/> Not known	X

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

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

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

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

Driver impacting aquaculture	Effect on AqGR <i>Mark appropriate box</i>	Comments <i>List examples or other relevant information</i>
Human population increase	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	With increasing human population the need for AqGR also increase in order to produce food for the increasing population.
Increased wealth and demand for fish	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	
Governance (ability of government, industry and the public to work together in managing resources)	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	
Climate change	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	Establishment of wild carp and grass carp in Southern Sweden is a direct effect of climate changes.
Competition for resources, especially freshwater	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	

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

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

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

Driver impacting aquaculture	Effect on AqGR <i>Mark appropriate box</i>	Comments <i>List examples or other relevant information</i>
Human population increase	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input checked="" type="radio"/> No effect <input type="radio"/> Unknown	
Increased wealth and demand for fish	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	
Governance (ability of government, industry and the public to work together in managing resources)	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input checked="" type="radio"/> No effect <input type="radio"/> Unknown	
Climate change	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	Establishment of wild carp and grass carp in Southern Sweden is a direct effect of climate changes.
Competition for resources, especially freshwater	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	

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

17. What countermeasures might be taken to reduce adverse impacts on the aquatic genetic resources that sustain current aquaculture and/or provide for its future development?

*Describe countermeasures*

Reduction of escapes by technical (farming equipment) and biological (sterile animals). A more strict legislation in regards to stocking and transport of aquatic organisms.

**Biotechnologies**

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

Biotechnology	Extent of use	Comments <i>main sources of information, important species for which the biotechnology is applied</i>
Selective breeding	<input type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input checked="" type="radio"/> To a great extent	All aquatic species in genetic selection in Sweden is based on selective breeding
Hybridization	<input checked="" type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent	
Polyploidy (chromosome set manipulation)	<input type="radio"/> Not at all <input checked="" type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent	Under evaluation in limited experiment
Monosex production	<input type="radio"/> Not at all <input checked="" type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent	Used in commercial setting through import and under evaluation in limited experiment for national production
Marker assisted selection	<input checked="" type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent	
Gynogenesis/androgenesis	<input checked="" type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent	
Other	<input type="radio"/> Not at all <input type="radio"/> To a minor extent <input type="radio"/> To some extent <input type="radio"/> To a great extent	
<b>Continue adding row as necessary</b>		
Add Row		

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

Drivers that are changing aquatic ecosystems	Effect on AqGR <i>mark appropriate box</i>	Countermeasures and effects
Habitat loss and degradation	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input checked="" type="radio"/> No effect <input type="radio"/> Unknown	
Pollution of waters	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input checked="" type="radio"/> No effect <input type="radio"/> Unknown	
Increased frequency of extreme climatic events and long-term climate change	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	Both carps and <i>Salvelinus fontinalis</i> are favored in a increased temperature compared to native species of the same ecological niche.
Establishment of invasive species	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input checked="" type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	<p>The European lobster (<i>Homarus gammarus</i>) most likely is negatively affected by competition from the accidentally (and/or illegally) introduced American lobster.</p> <p>The Noble crayfish (<i>Astacus astacus</i>) is negatively affected by the crayfish plague (<i>Aphanomyces astaci</i>) which is spread via illegally onrtoduction of the signal crayfish (<i>Pacifastacus leniusculus</i>). The later was, however, introduced by purpose in Sweden.</p>
Introductions of parasites and pathogens	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input checked="" type="radio"/> Unknown	<p>The introduction of carp virus is discussed. If so the impact would be negative.</p> <p>Possible disease transfer from the accidentally (and/or illegally) introduced American lobster to the European lobster.</p>

Drivers that are changing aquatic ecosystems	Effect on AqGR <i>mark appropriate box</i>	Countermeasures and effects
Impacts of purposeful stocking and escapes from aquaculture	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input checked="" type="radio"/> Unknown	
Capture fisheries	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input checked="" type="radio"/> No effect <input type="radio"/> Unknown	
Other	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	
<b><i>Continue listing other driverst</i></b>	<input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	
	<input type="radio"/> Strongly negative <input type="radio"/> No effect <input type="radio"/> Unknown	
Add Row	Remove Row	

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

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

The specific objectives are as follows:

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

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

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

***Please mark appropriate box.***

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

***Please include any additional information***

In Sweden sea-ranching programs have been launched in order to compensate for the losses due to the construction of hydro-electrical power plants. Each river uses their native strains for that purpose.

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***

See above.

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

***Please describe examples***

1. Nobel cray fish (*Astacus astacus*) has programs for conservation farming.
2. Cryo preservation program of wild strains of Atlantic salmon (*salmo salar*) and brown trout (*Salmo trutta*).
3. Cryo preservation of former breeding program *Oncorhynchus mykiss* (Gloria). Unknown if still in effect.
4. The European lobster (*Homarus gammarus*) has programs for conservation farming in several European countries (not Sweden).

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

Objectives of <i>in situ</i> conservation	Rank 1=Very Important 10=No importance
Preservation of aquatic genetic diversity	<input type="text" value="1"/>
Maintain good strains for aquaculture production	<input type="text" value="3"/>
Meet consumer and market demands	<input type="text" value="7"/>
To help adapt to impacts of climate change	<input type="text" value="9"/>
Future breed improvement in aquaculture	<input type="text" value="3"/>
<b><i>Please continue listing any other objectives as needed</i></b>	<input type="text"/>
Add 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***

In Sweden sea-ranching programs have been launched in order to compensate for the losses due to the construction of hydro-electrical power plants. Each river uses their native strains for that purpose.

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***

Oysters (Ostreidae) and mussels are exclusively using wild seeds

**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

Sea-ranching programs of Atlantic salmon (*Salmo salar*) and brown trout (*Salmo trutta*).

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

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

Add Row

Aquatic protected area	Effectiveness of conserving Aquatic Genetic Resources	Comments <i>provide any additional information</i>	
Kåvra - an area on the Swedish west coast	<input checked="" type="radio"/> Very effective <input type="radio"/> Somewhat effective <input type="radio"/> Not effective <input type="radio"/> Unknown	No-take area for the European lobster ( <i>Homarus gammarus</i> ) .	X

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

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

The specific objectives are:

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

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

28. Please list your country's existing collections of live breeding aquatic organisms that can be considered as contributing to the *ex situ* conservation of aquatic genetic resources. This includes not only collections of species farmed directly for human use, but also collections of live feed organisms (e.g., bacterial flocs, yeasts, microalgae, rotifers and brine shrimp (*Artemia*)).

Add Row				
Species (include information on subspecies or strain in comments if available)	Type of use <i>Please mark all that apply</i>	Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? <i>Please mark appropriate box</i>	Comments <i>Please list any additional information</i>	
Salmo trutta (more than 20)	<input checked="" type="checkbox"/> Direct human consumption <input type="checkbox"/> Live feed organism <input checked="" type="checkbox"/> Other	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	This species is reared at several large and small hatcheries throughout Sweden, mainly for stocking for sportfishing purposes.	X

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

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

Add Row					
Species (include information on subspecies or strain if available in comments)	Users and managers <i>List all that apply</i>	Type of <i>ex-situ</i> conservation collection <i>in vitro</i> <i>mark all that apply</i>	Facilities where collection is located <i>mark all that apply</i>	Comments <i>list all breeds, subspecies of the species and any additional information</i>	
		<input type="checkbox"/> In vitro collection of gametes <input type="checkbox"/> In vitro collection of embryos <input type="checkbox"/> In vitro collection of tissues <input type="checkbox"/> Spores <input type="checkbox"/> Other	<input type="checkbox"/> Aquaculture facilities <input type="checkbox"/> Research facilities <input type="checkbox"/> Universities <input type="checkbox"/> Zoos and aquaria <input type="checkbox"/> 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 <i>ex situ</i> conservation	Rank 1=Very Important 10=No importance
Preservation of aquatic genetic diversity	5
Maintain good strains for aquaculture production	2
Meet consumer and market demands	4
To help adapt to impacts of climate change	2
Future breed improvement in aquaculture	2
Other	
<i>Continue adding row as necessary</i>	
Add Row	Remove Row

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

The main objective of Chapter 5 is to provide an overview of the perspectives and needs of the principal stakeholders who have interests in aquatic genetic resources of farmed aquatic species and their wild relatives for food and agriculture. Stakeholder groups can be identified from existing institutional knowledge, from sectoral and sub-sectoral consultations conducted during the country reporting process and where necessary from expert opinions. Gender issues pertaining to the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives should be considered, as well as the perspectives and needs of indigenous peoples and local communities.

The specific objectives are:

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

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

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

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

Stakeholders	Role of stakeholder in regards og AqGR <i>mark all that apply</i>	Genetic resource of main interest <i>mark all that apply</i>	Comments <i>Please provide any information or explanation of stakeholders' role</i>
Fish hatchery people	<input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Marketing <input checked="" type="checkbox"/> Production <input type="checkbox"/> Processing <input type="checkbox"/> Feed manufacturing <input type="checkbox"/> Advocacy <input type="checkbox"/> Breeding <input checked="" type="checkbox"/> Outreach/Extension <input checked="" type="checkbox"/> Research <input type="checkbox"/> Other ( <b>specify</b> ) <div style="border: 1px solid black; height: 30px; width: 100%; margin-top: 5px;"></div>	<input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other	
People involved in marketing	<input type="checkbox"/> Conservation <input checked="" type="checkbox"/> Marketing <input type="checkbox"/> Production <input checked="" type="checkbox"/> Processing <input checked="" type="checkbox"/> Feed manufacturing <input type="checkbox"/> Advocacy <input type="checkbox"/> Breeding <input type="checkbox"/> Outreach/Extension <input type="checkbox"/> Research <input type="checkbox"/> Other ( <b>specify</b> ) <div style="border: 1px solid black; height: 30px; width: 100%; margin-top: 5px;"></div>	<input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other	
Government resource managers	<input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Marketing <input type="checkbox"/> Production <input type="checkbox"/> Processing <input type="checkbox"/> Feed manufacturing <input type="checkbox"/> Advocacy <input checked="" type="checkbox"/> Breeding <input checked="" type="checkbox"/> Outreach/Extension <input checked="" type="checkbox"/> Research <input type="checkbox"/> Other ( <b>specify</b> ) <div style="border: 1px solid black; height: 30px; width: 100%; margin-top: 5px;"></div>	<input checked="" type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other	

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

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

Stakeholders	Role of stakeholder in regards og AqGR <i>mark all that apply</i>	Genetic resource of main interest <i>mark all that apply</i>	Comments <i>Please provide any information or explanation of stakeholders' role</i>
Consumers	<input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Production <input type="checkbox"/> Feed manufacturing <input type="checkbox"/> Breeding <input type="checkbox"/> Research <input type="checkbox"/> Marketing <input checked="" type="checkbox"/> Processing <input checked="" type="checkbox"/> Advocacy <input type="checkbox"/> Outreach/Extension <input type="checkbox"/> Other ( <b>specify</b> ) <div style="border: 1px solid black; height: 20px; width: 150px; margin-top: 5px;"></div>	<input type="checkbox"/> DNA <input checked="" type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other	

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

Unknown.

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

None.

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

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

The specific objectives are as follows:

- To describe the existing national policy and legal framework for the conservation, sustainable use and development of aquatic genetic resources of farmed aquatic species and their wild relatives.
- To review current national policies and instruments for access to aquatic genetic resources of farmed aquatic species and their wild relatives and the fair and equitable sharing of benefits arising from their utilization.
- To identify any significant gaps in policies and legislation concerning aquatic genetic resources of farmed aquatic species and their wild relatives..

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

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

Add Row

National legislation, policy and/or mechanism	Date established	Scope <i>Select all that apply</i>	Comments <i>Please provide any additional information for example whether it has been effective or not; and main sources of information</i>	
SJVFS 2000: 157, Saknummer J12 Föreskrifter om ändring i Statens jordbruksverks föreskrifter (SJVFS 1995:125) om införsel av fisk, kräftdjur och blötdjur och produkter därav;	Dec 6, 2000	<input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input type="checkbox"/> Capture fisheries <input type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input checked="" type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X
SJVFS 2014:4, Saknummer K41 Statens jordbruksverks föreskrifter om djurhälsokrav för djur och produkter från vattenbruk;	Apr 16, 2014	<input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input checked="" type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X

National legislation, policy and/or mechanism	Date established	Scope <i>Select all that apply</i>	Comments <i>Please provide any additional information for example whether it has been effective or not; and main sources of information</i>	
SJVFS 2014:43, Saknummer K14 Föreskrifter om ändring i Statens jordbruksverks föreskrifter (SJVFS 2006:84) om befattning med animaliska biprodukter och införsel av andra produkter, utom livsmedel, som kan sprida smittsamma sjukdomar till djur;	Jan 12, 2015	<input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X
Fiskeriverkets föreskrifter (FIFS 2004:2) om genetiskt modifierade vattenlevande organismer	Feb 15, 2004	<input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input checked="" type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X
Fiskeriverkets föreskrifter (FIFS 2011:13) om utsättning av fisk samt flyttning av fisk i andra fall än mellan fiskodlingar	Jun 21, 2011	<input type="checkbox"/> Genes or molecules only <input type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X
Förordning (1994:1716) om fisket, vattenbruket och fiskerinäringen	Dec 20, 1994	<input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X

National legislation, policy and/or mechanism	Date established	Scope <i>Select all that apply</i>	Comments <i>Please provide any additional information for example whether it has been effective or not; and main sources of information</i>	
Förordning (2002:1086) om utsättning av genetiskt modifierade organismer i miljön	Dec 12, 2002	<input checked="" type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X
The Swedish Environmental Code	Jan 1, 1999	<input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input type="checkbox"/> Importation <input type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X
Artskyddsförordning (2007:845)	Nov 8, 2007	<input type="checkbox"/> Genes or molecules only <input checked="" type="checkbox"/> Aquaculture <input checked="" type="checkbox"/> Capture fisheries <input checked="" type="checkbox"/> Conservation <input type="checkbox"/> Intellectual property protection <input checked="" type="checkbox"/> Importation <input checked="" type="checkbox"/> Trade and commerce <input type="checkbox"/> Access and benefit sharing <input type="checkbox"/> Other		X

**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.

Control over import, export, transport of live aquatic organisms within aquaculture.  
Health control in aquaculture and economic compensation to farmers at forced measures making it difficult for effective implementation.

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
DNA	
Stock, breed or variety	Salvelinus alpinus "Arctic Superior". A farmed arctic charr breed used for production of meat for consumption.
Species	Basically all species has restricted access. Strain should not be transplanted between watersheds.
Other	
<b>Continue adding row as necessary</b>	
Add Row	Remove Row

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

Add Row

Action taken to enhance access to aquatic genetic resources outside your country	Type of genetic resource <i>Mark all that apply</i>	Comment <i>for example other types of genetic resources</i>	
	<input type="checkbox"/> DNA <input type="checkbox"/> Genes <input type="checkbox"/> Gametes <input type="checkbox"/> Tissues <input type="checkbox"/> Embryos <input type="checkbox"/> Living specimens	Not applicable.	X

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

Obstacles to accessing aquatic genetic resources	Please describe type of genetic resource <i>mark all that apply</i>	Comments <i>please include additional information as needed</i>
Intellectual property protection	<input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input type="checkbox"/> Species <input type="checkbox"/> Other	
National laws of your country	<input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input checked="" type="checkbox"/> Species <input type="checkbox"/> Other	
National laws of donor country	<input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input type="checkbox"/> Species <input type="checkbox"/> Other	
International laws or protocols	<input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input type="checkbox"/> Species <input type="checkbox"/> Other	
Too expensive	<input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input type="checkbox"/> Species <input type="checkbox"/> Other	
Material transfer agreements required	<input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input type="checkbox"/> Species <input type="checkbox"/> Other	
Knowledge gaps	<input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input type="checkbox"/> Species <input type="checkbox"/> Other	
Public perception	<input type="checkbox"/> DNA <input type="checkbox"/> Stock, breed or variety <input type="checkbox"/> Species <input type="checkbox"/> Other	

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

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

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

The specific objectives are:

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

### Research

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

*Please mark appropriate box*

- Yes  
 No  
 Unknown

*Please provide details*

1. Support of national breeding programs in Arctic charr and rainbow trout.
2. National activity plan for aquaculture points towards the need for active management of coming aquaculture species and their domestication (see under chapter 1 for details of relevant species).
3. Nobel cray fish. A research project aiming at developing suitable brood stocks for aquaculture of this critically endangered species is ongoing. An important aim of this project is also to map the population structure of this species in Sweden, to be able to guide managers in the process of choosing appropriate populations (from a conservation genetic perspective) for reintroduction programs in areas where this species has been extinct.
4. Baltic salmon. A research project is ongoing where the aim is to evaluate the genetic impacts of several decades of compensatory releases of sea-ranched (partly domesticated) salmon in rivers exploited by hydropower, on wild salmon populations in the Baltic Sea. Another aim of the project is to evaluate the conservation value of brood stocks used for sea-ranching, i.e. to what extent these stocks correspond genetically to the original populations that were extinct when rivers were exploited by hydropower.
5. Several smaller research projects/studies have been carried out in recent years (on several species like pikeperch, salmon, brown trout, catfish), addressing conservation genetic questions of relevance for the management of these species, including e.g. studies on effective population size and effects of releases of domesticated strains on wild populations. These studies have been financed at least partly by governmental funds.
6. Nationally funded project for development of sustainable farming protocols for *Anarhichas lupus*, minor and *Homarus gammarus*
7. Nationally funded projects for development of macro alga culturing
8. Nationally funded projects for development and implications of oyster catchers
9. Nationally funded projects for development of industrial planning of mussel meal plant for sustainable and circular aqua-feed production

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

Add Row

Main institutions, organizations, corporations and other entities	Area of research <i>Mark all that apply</i>	Comments <i>Please provide any additional information</i>	
Swedish University of Agricultural Sciences	<input checked="" type="checkbox"/> Genetic resource management <input checked="" type="checkbox"/> Basic knowledge on aquatic genetic resources Characterization and <input checked="" type="checkbox"/> monitoring of aquatic genetic resources <input checked="" type="checkbox"/> Genetic improvement <input checked="" type="checkbox"/> Economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Conservation of aquatic genetic resources <input checked="" type="checkbox"/> Communication on aquatic genetic resources <input checked="" type="checkbox"/> Access and distribution of aquatic genetic resources <input type="checkbox"/> Other	<p>SLU has responsibility for all fresh water aquatic species management, monitoring, and use of genetic resources from the Swedish Government.</p> <p>SLU has the research responsibility for development of the national breeding programs for Arctic charr and rainbow trout</p> <p>SLU is responsible for the gene bank in Kälarne, which holds frozen milt from several Atlantic salmon populations</p> <p>SLU has an active research agenda for domestication of promising aquaculture species.</p> <p>SLU has active research in regards to noble crayfish, signal crayfish etc</p>	X
Gothenborg university (and Chalmers university of technology)	<input checked="" type="checkbox"/> Genetic resource management <input checked="" type="checkbox"/> Basic knowledge on aquatic genetic resources Characterization and <input checked="" type="checkbox"/> monitoring of aquatic genetic resources <input checked="" type="checkbox"/> Genetic improvement <input checked="" type="checkbox"/> Economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Conservation of aquatic genetic resources <input checked="" type="checkbox"/> Communication on aquatic genetic resources <input checked="" type="checkbox"/> Access and distribution of aquatic genetic resources <input type="checkbox"/> Other	<p>GU has active research on basic biological functions as well as in collaboration with commercial interests on the following aquaculture species:</p> <p>Blue mussels, timing and efficiency of catching wild blue mussel spat</p> <p>Oysters, development of equipment for wild oyster spat collection Impact of climate changes on shell building, regeneration and quality of important commercial bivalve species, including oysters and mussels.</p> <p>Extensive research (several large projects) on development of macroalgae culturing techniques</p> <p>Development of protocols for diversification of farmed marine fish and shellfish species. Build up of hatchery and larval production for increased access and distribution of marine larvae.</p>	X

Main institutions, organizations, corporations and other entities	Area of research <i>Mark all that apply</i>	Comments <i>Please provide any additional information</i>	
		<p>Filtering techniques, both technical and biological for development of RAS facilities of different sizes and environments</p> <p>Development of alternative feeds for marine aquaculture, extensive research through several ongoing projects focusing on raw material from the marine environments based on extractive farming, use of sidestream from fish and shellfish processing industry, etc.</p> <p>Development of semi-closed and closed sea based systems for promoting aquaculture with minimized environmental effect and optimal health and welfare of the farmed organisms</p> <p>Development of farming protocols for "wild-like" cod and Atlantic salmon for conservation and/or re-stocking purposes</p>	
Aquaculture Center North AB	<input checked="" type="checkbox"/> Genetic resource management <input type="checkbox"/> Basic knowledge on aquatic genetic resources <input type="checkbox"/> Characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Genetic improvement <input type="checkbox"/> Economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Conservation of aquatic genetic resources <input type="checkbox"/> Communication on aquatic genetic resources <input type="checkbox"/> Access and distribution of aquatic genetic resources <input type="checkbox"/> Other	VBCN AB owns and is responsible for the maintains of the National breeding programs in Arctic charr and rainbow trout	X

Main institutions, organizations, corporations and other entities	Area of research <i>Mark all that apply</i>	Comments <i>Please provide any additional information</i>	
EM-Lax	<input type="checkbox"/> Genetic resource management <input type="checkbox"/> Basic knowledge on aquatic genetic resources <input type="checkbox"/> Characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Genetic improvement <input type="checkbox"/> Economic valuation of aquatic genetic resources <input type="checkbox"/> Conservation of aquatic genetic resources <input type="checkbox"/> Communication on aquatic genetic resources <input checked="" type="checkbox"/> Access and distribution of aquatic genetic resources <input type="checkbox"/> Other	Biggest producer of rainbow trout smolt from own brood stock in Sweden	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	3
Improve capacities for characterization and monitoring of aquatic genetic resources	3
Improve capacities for genetic improvement	1
Improve capacities for genetic resource management	2
Improve capacities for economic valuation of aquatic genetic resources	5
Improve capacities for conservation of aquatic genetic resources	7
Improve communication on aquatic genetic resources	2
Improve access to and distribution of aquatic genetic resources	1
Add other rows as appropriate and rank	
<div style="border: 1px solid black; height: 75px; width: 100%;"></div>	<div style="border: 1px solid black; height: 30px; width: 100%;"></div>
Add Row	Remove Row

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

Research and development of more resource efficient selective breeding methods and improved research capacity in domestication.

### 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	
Swedish University of Agricultural Sciences	Genetic resource management	<input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input checked="" type="checkbox"/> Extension	<p>SLU is the main Swedish university educating in animal breeding, including fish.</p> <p>SLU is developing courses in aquatic genetic resources at the department of Aquatic resources.</p> <p>Some courses in wild salmon genetic resources at the Department of Wild Life, Fish and Environmental Studies.</p>	X
	Characterization and monitoring of aquatic genetic resources	<input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input type="checkbox"/> Training <input type="checkbox"/> Extension	See above	
	Genetic improvement	<input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input type="checkbox"/> Training <input type="checkbox"/> Extension	SLU Department of Animal Breeding	
	Economic valuation of aquatic genetic resources	<input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input type="checkbox"/> Training <input type="checkbox"/> Extension	SLU Department of Animal Breeding	
	Conservation of aquatic genetic resources	<input checked="" type="checkbox"/> Undergraduate <input type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input type="checkbox"/> Extension	SLU is presently giving training and is developing courses in conservation aquatic genetic resources at the department of Aquatic resources.	

Gothenborg Univ	Genetic resource management	<input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input type="checkbox"/> Extension	Courses in aquaculture and aquaculture techniques, sustainable aquaculture, coastal management, management of marine resources, invertebrate biology, physiology, immunology and ecology.	X
	Characterization and monitoring of aquatic genetic resources	<input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input type="checkbox"/> Extension		
	Genetic improvement	<input type="checkbox"/> Undergraduate <input type="checkbox"/> Post-graduate <input type="checkbox"/> Training <input type="checkbox"/> Extension		
	Economic valuation of aquatic genetic resources	<input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training <input type="checkbox"/> Extension	Courses and PH D training in sustainable aquaculture, coastal management, management of marine resources and ecology.	
	Conservation of aquatic genetic resources	<input checked="" type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Post-graduate <input checked="" type="checkbox"/> Training	Courses and Ph D projects in aquaculture and aquaculture techniques, sustainable aquaculture for conservational and re-stocking	
		<input type="checkbox"/> 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
Aquaculture Centre West	Aquaculture centre West is gathering researchers, entrepreneurs, industry and authorities for joint development and promotion of a sustainable marine aquaculture sector in Sweden
NOMACULTURE	Based at Gothenburg University - gathers researchers from biology, technique, social-sciences and management of marine resources to create a holistic approach to development of sustainable marine aquaculture in Sweden
SEAFARM	A collaboration between Gothenburg univ, Chalmers univ of technology, Linne univ, Lund univ and Royal Institute of technology (financed by the Swedish Research Council Formas). Gathers technical and biological competence to exploration of marine macro algae culturing for utilization of biochemical, medical biomolecules to create "added value" products
SWEMARC	A newly funded centre of excellence at Gothenburg Univ. It will transcend traditional boundaries in aquaculture research by integrating expert competence in social, economic, environmental and biological sciences to establish truly trans- and interdisciplinary research approaches to the development of a sustainable marine aquaculture industry
NKfV (Swedish Centre for Aquaculture)	The Swedish Centre for Aquaculture is a strategic cooperative body for a long-term national development of aquaculture with focus on knowledge-based information and communication. The site is a joint effort by the Swedish University of Agricultural Sciences (SLU) and the University of Gothenburg (GU)

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

*Please rank the following in regards to capacity strengthening.*

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

*Please specify in box below*

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

Add Row

Network	Objectives of the network <i>Please mark all that apply</i> to your country	Comments	
ALF - a reference group on the adaptive management of Baltic salmon populations.	<input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for genetic improvement <input type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources	ALF is composed of representatives from the University of Agricultural Sciences, the national authority responsible for management of aquatic resources, and regional and local authorities involved in management. The group meets several times per year to plan data collection programs, prioritize conservation actions and communicate information to the public and relevant organizations.	X
ICES Aquaculture group	<input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources		X

Network	Objectives of the network <i>Please mark all that apply</i> to your country	Comments	
Swedish Centre for Aquaculture	<input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input checked="" type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources		X
Swedish Aquaculture Centre West	<input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources		X

Network	Objectives of the network <i>Please mark all that apply to your country</i>	Comments	
ELCE (European Lobster Centre of Excellence)	<input checked="" type="checkbox"/> Improve basic knowledge on aquatic genetic resources <input type="checkbox"/> Improve capacities for characterization and monitoring of aquatic genetic resources <input type="checkbox"/> Improve capacities for genetic improvement <input checked="" type="checkbox"/> Improve capacities for economic valuation of aquatic genetic resources <input checked="" type="checkbox"/> Improve capacities for conservation of aquatic genetic resources <input type="checkbox"/> Improve communication on aquatic genetic resources <input type="checkbox"/> Improve access to and distribution of aquatic genetic resources	European network of R&D and Industry farming the European lobster ( <i>Homarus gammarus</i> ). Most members farm for conservation purposes by seeding wild populations.	X

## Information systems

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

Add Row

Name of information system	Type of information stored <i>mark all that apply</i>	Main stakeholders <i>mark all that apply</i>	
<p>Scientific and popular science publications, teaching, and information meetings for relevant organizations and the public. However, no databases or other information systems on genetic resources, accessible for the public, have been developed, but may be</p>	<p> <input type="checkbox"/> DNA sequence  <input checked="" type="checkbox"/> Genes and genotype  <input checked="" type="checkbox"/> Breeds, strains or stocks  <input type="checkbox"/> Species names  <input checked="" type="checkbox"/> Production figures  <input checked="" type="checkbox"/> Distribution  <input checked="" type="checkbox"/> Level of endangerment  <input type="checkbox"/> Other         </p>	<p> <input checked="" type="checkbox"/> Fish farmers  <input type="checkbox"/> Fishers in capture fisheries  <input checked="" type="checkbox"/> Fish hatchery people  <input type="checkbox"/> People involved in marketing  <input checked="" type="checkbox"/> Government resource managers  <input checked="" type="checkbox"/> Fishing or aquaculture associations  <input checked="" type="checkbox"/> Aquatic protected area managers  <input checked="" type="checkbox"/> University and academic people  <input checked="" type="checkbox"/> Non-Governmental Organizations  <input type="checkbox"/> Intergovernmental Organizations  <input type="checkbox"/> Policy makers  <input type="checkbox"/> Donors  <input type="checkbox"/> Consumers  <input checked="" type="checkbox"/> Politicians         </p> <p><b>Please list other stakeholders as necessary</b></p> <div data-bbox="1057 1551 1446 1711" style="border: 1px solid black; height: 76px; width: 240px;"></div>	X

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

*Please describe what capacities need to be strengthened*

Long term national, governmental as well as regional support to the regional and national centres for aquaculture .

*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<sup>2</sup> 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:

<sup>2</sup> <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
Rådets direktiv 92/43/EEG av den 21 maj 1992 om bevarande av livsmiljöer samt vilda djur och växter	1992	<input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	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	
EUROPAPARLAMENTETS OCH RÅDETS DIREKTIV 2008/56/EG om upprättande av en ram för gemenskapens åtgärder på havsmiljöpolitiken s område (Ramdirektiv om en marin strategi)	2008	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
The EU Biodiversity Strategy	2010	<input checked="" type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input checked="" type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
OSPAR CONVENTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT OF THE NORTH-EAST ATLANTIC	1992	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
HELCOM - Baltic Sea Action Plan	2007	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> 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	
NASCO - North Atlantic Salmon Conservation Organization		<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
The Convention on Biological Diversity (CBD)	1992	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
Nagoya Protocol	2010	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
Ballast Water Management Convention	2004	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
United Nations Convention on the Law of the Sea (UNCLOS)		<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> 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	
Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat	1971	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
CITES -Convention on International Trade in Endangered Species of Wild Fauna and Flora	1975	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect		X
CMS - Convention on the Conservation of Migratory Species of Wild Animals	1979	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> No effect	<input type="radio"/> Strongly positive <input type="radio"/> Positive <input type="radio"/> Negative <input type="radio"/> Strongly negative <input type="radio"/> 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 <i>For example any critical gaps</i>
Improve information technology and database management	2	<input type="radio"/> To a great extent <input type="radio"/> To some extent <input checked="" type="radio"/> None <input type="radio"/> Unknown	There are few researchers and/or institutions working with this. A governmental investigation some years ago suggested a national database for genetic information.
Improve basic knowledge on aquatic genetic resources	1	<input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown	Basic knowledge varies considerably between species. For example good information on many salmonid species, but scarce information on Eurasian perch.
Improve capacities for characterization and monitoring of aquatic genetic resources	2	<input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown	Should be good for all species where farmed reared individuals are stock in the wild and could interfere with wild populations.
Improve capacities for genetic improvement	2	<input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown	For example: ongoing research on noble crayfish
Improve capacities for economic valuation of aquatic genetic resources	5	<input type="radio"/> To a great extent <input type="radio"/> To some extent <input checked="" type="radio"/> None <input type="radio"/> Unknown	
Improve capacities for conservation of aquatic genetic resources	1	<input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown	Good information on salmonids and pikeperch, but not so good for other species.
Improve communication on aquatic genetic resources	1	<input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown	Both public and authorities are becoming more aware this issue.

Collaboration is needed in order to ...	Rank 1=Very Important 10=No importance	To what extent are the needs being met	Comments <i>For example any critical gaps</i>
To improve access to and distribution of aquatic genetic resources	5	<input type="radio"/> To a great extent <input type="radio"/> To some extent <input type="radio"/> None <input checked="" type="radio"/> Unknown	
Other		<input type="radio"/> To a great extent <input checked="" type="radio"/> To some extent <input type="radio"/> None <input type="radio"/> Unknown	Just on the research level. This is a controversial political question. For example, the salmon industry in Norway unintentionally release a lot of fishes every year. Earlier studies indicate that this may have big impacts on wild populations.
<b>Continue adding row as necessary</b>			
access impact on wild populations of escaped fishes from farms other countries	1		
<input type="button" value="Add Row"/> <input type="button" value="Remove Row"/>			

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

On among research groups in Europe (different EU finansied projects) have been very fruitful. The work in the ICES working group are also good forums for international collaboration.

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

Yes

No

***If yes, please give details***

There are always a need for collaboration on internationally managed fish species.

50. Describe important roles that your country performs within its region (and/or sub-region) and globally in terms of being a keeper, user and sharer of aquatic genetic resources.

Sweden take part in several ICES working group where aqaculture or issues related to aquaculture are dealt with.

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