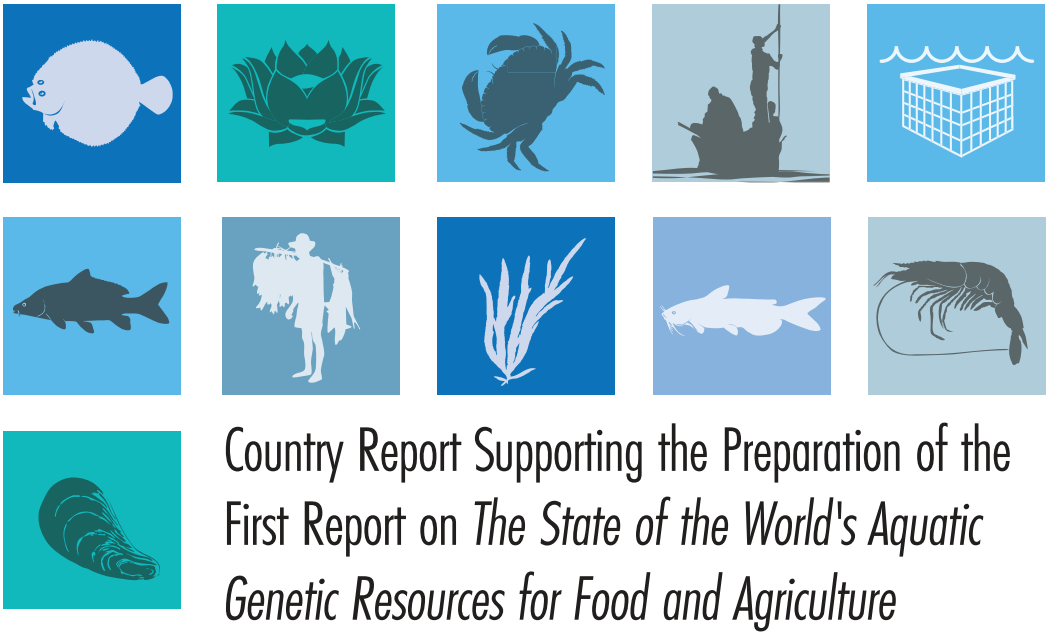
COUNTRY REPORTS

Bulgaria



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

Food and Agriculture Organization of the United Nations

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

INSTRUCTIONS FOR COMPLETING THE DYNAMIC GUIDELINES

How do I complete the dynamic guidelines?

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

Where can I get further assistance?
If you have any questions regarding the dynamic guidelines, please contact
Devin.Bartely@fao.org; Matthias.Halwart@fao.org; ruth.garciagomez@fao.org

Several websites provide useful information on aquatic species that can be consulted for proper species names and for information on aquatic genetic resources: AlgaeBase, Aquamaps, Barcode of Life, Census of Marine Life, FishBase, Frozen Ark, GenBank, Global Biodiversity Information Facility, International Union for Conservation of Nature, National Institutes of Health Database on Genomes and Bioinformatics, Ornamental Fish International, SealifeBase, Sea Around Us, and World Register of Marine Species.

How, by whom and by when must the completed dynamic guidelines be submitted?
Once officially endorsed by the relevant authorities, the completed dynamic guidelines should be submitted (click the “Submit form” button on the header banner) by the National Focal Point. **Completed dynamic guidelines should be sent by December 31st 2015.**

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

I. INTRODUCTION

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

II. COUNTRY REPORTS

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

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

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

Country Reports should:

- become powerful tools for improving the conservation, sustainable use and development of aquatic genetic resources for food and agriculture, at national and regional levels;
- identify threats to aquatic genetic resources, gaps in information about aquatic genetic resources and needs for the strengthening of national capacity to manage aquatic genetic resources effectively;
- inform the development of national policies, legislation, research and development, education, training and extension concerning the conservation, sustainable use and development of aquatic genetic resources for food and agriculture;
- contribute to raising public awareness about the importance of aquatic genetic resources for food and agriculture;
- complement other national reporting activities on the conservation, sustainable use and development of aquatic genetic resources.

Timeline and process

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

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

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

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

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

Country report supporting the preparation of

The State of the World's Aquatic Genetic Resources for Food and Agriculture

Country	Bulgaria
Prepared By	Assoc. Prof. Dr. Petya Ivanova
Date	Oct 24, 2016

TABLE OF CONTENTS

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.

The Bulgarian multiannual national strategic plan for aquaculture have been prepared in conformity with the provisions of Article 43 of draft proposal for a Regulation of the Common Fisheries Policy and draft proposal for a Regulation of the European Parliament and of the Council concerning the European Maritime and Fisheries Fund.

This plan covers all activities related to the production of fish and other aquatic organisms and is expanded by measures to diversify the activities of producers and the opportunities for marketing of the production.

Aquaculture production in Bulgaria is dominated by fish production, followed by the production of molluscs - black mussel and small quantity of crustaceans - only freshwater crayfish aquaculture have developed, and the main object of cultivation is crayfish (Astacus leptodactylus).

The tendency that the production of aquaculture in the country to be based mainly on the production of non-native (introduced, alien) species is a durable trend and marks its beginning from the origin of organized fish farming in Bulgaria. It should be noted that, in contrast to other countries, in Bulgaria all mentioned species are only successfully acclimated without occurred naturalization which means that they could not reproduce in wild and could not form their own populations. Among carp fishes dominate the production of common carp (Cyprinus carpio), followed by volume of production by silver carp, bighead carp and grass carp, as these species are an important element in polyculture and also find application in the biological control of the water quality. Traditionally, cold-water aquaculture in Bulgaria is dominated by the production of rainbow trout, while the amounts produced from the native trout species brown trout (Salmo trutta) are minor and mainly intended for restocking of natural water basins in order to maintain and restore natural fish populations. The production of other introduced North - American species in our country – brook trout (Salvelinus fontinalis) has long standing traditions, but it also has a minor share of the total production of Salmonidae. The only species reared in our marine aquaculture is black mussel (Mytilus galloprovincialis). The number of currently existing farms for black mussel is 43 with total production of about 878 tons in 2012. Other non-native species of molluscs, introduced accidently in the past into the Black Sea are also of market interest such as a sand gaper (Mya arenaria) and sea snail (Rapana venosa), which are currently subject to commercial fishery, without developing methods for breeding and rearing them.

At present, in Bulgarian aquaculture, the following main production farming systems are applied: free-extensive and semi-intensive fish farming in natural or artificial water bodies with still or running waters; intensive fish farming in specially constructed concrete or earthen basins; fish farming in net cages and recirculation systems. The largest share of production amounts to the basin farms (intensive and semi-intensive technologies) – 43% of total production, followed by super-intensive pond fish farms– 34.3%.The distribution of different types of production structures of the Aquaculture Sector in Bulgaria is uneven and this unevenness is mainly determined by the following factors - 1) availability of sufficient in quantity and quality water resources; 2) experience in production of fish and other aquatic organisms and 3) general economic level of development of the area in concern. In areas with significant number of large dams, the number of net cage fish farms is respectively high. A weak diversification of production systems in areas is observed. In the most common case, one type of production system is dominant, and it is probably justified by the traditions of the region, its geographical and climatic conditions. According to NAFA total number of active fish farms at the end of 2014 was 552, of which 517 are for freshwater aquaculture and 35 - Marine.

In Bulgaria specific breeding programme do not exist. Breeding stocks of aquaculture species are maintained almost exclusively by private farming businesses. Breeding material were produced according the plans of fish farms concerning the fish species production and depend from the supply and demand of the market.

The genetic examinations in the field of aquaculture breeding research in Bulgaria is rare, accidental and covered episodic scientific analyses for investigation of species and their hybrids . There are also genetic data on some wild populations of species farmed in aquaculture which was collected in connection with evaluation of species biodiversity as for example for sturgeons from Bulgarian Part of Danube River.

Bulgaria has not genetic database of aquatic genetic resources produced in aquaculture and living in the wild.
There are no publicly owned gene banks for AqGR in Bulgaria. There is needed national and international funds and international scientific cooperation in this area to develop the AqGR and to close the big gap that exist in Bulgaria in this regard.

The "Aquaculture" sector can contribute to achieving the overall objective of the Union – to fill the gap between consumption and production of aquatic organisms, mainly saltwater (according OPFS) in the EU in a sustainable environmentally, socially and economically friendly way.

Future development of the sector: For establishment of export-oriented, economically viable and socially and ecologically sustainable aquaculture sector is necessary to restructure the existing farms in the country by increasing the production capacity to reach production levels of similar in population and territory EU countries. The increase in production capacity should be done through diversification of production in line with market demand, the introduction of innovative technologies and optimization of existing production capacities. Unrealized potential for economic development is available primarily in the development of marine (saltwater production of fish), cold - water aquaculture and export-oriented and suitable for processing warm water species of aquaculture.

Growing consumer expectations for quality and variety of food products, especially those produced locally, offer new opportunities for giving value to coastal and inland areas. The coordinated local actions between entrepreneurs, public authorities, associations, research institutions and organizations for education and training can help to stimulate local economies and meet the growing demand for fish and fish products, produced locally in a sustainable way.

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

"Aquaculture" covers the cultivation of aquatic organisms – fish, molluscs, crabs and plants by interfering with the process of rearing and reproduction of aquatic organisms in order to increase the resulting production, and the management and ownership of the resource may be individual and/or collective. Aquaculture production provides opportunities for biodiversity conservation by reducing fishing pressure on wild populations.

Current Trends in Aquaculture Production in Bulgaria

According to official statistics of the National Agency for Fisheries and Aquaculture, the total production from Bulgarian aquaculture industry (fish and other aquatic organisms) increasing during the last 10 years and has a bigger amount in 2013 - 12 178 tons. According to the production quantities in 2012, the freshwater farms in Bulgaria dominated by "micro" production farms , having output to 10 tons per year and small sized industries , with over 11 tons to 49 tons , include 59 farms. The majority part of the farm in Bulgaria are warm-watered -134, 38 are for cold-water aquaculture, 33 are for production of marine aquaculture, and the 19 farms are mixed type. The ratio of warm-water to cold water aquaculture is predominated of warm-water species. The species structure of Bulgarian aquaculture industry is determined by both climatic and hydrological conditions in the country and the traditional preference of the population for these species. Mainly representatives of two fish families are forming the aquaculture production in Bulgaria for the period 2007-2013. Since beginning of aquaculture activities in Bulgaria, more than a century ago till now, the most significant production remains that of carps, followed by trout. Over the past 5 -10 years is observed a trend of change in the species structure of the cultivated hydrobionts resulting in variety diversification. The reason for these changes might be resulting from one side in the amended legislation of the Republic of Bulgaria, directed to protection of some species (sturgeon species) by restricting fishery of natural populations, and from other side introduction of modern technologies and equipment, allowing cultivation of non-domestic species (exotic ones), despite of the local natural climatic conditions. Production of catfish species also tends to increase, probably due to the introduction of new species, such as African catfish and Channel catfish (Ictalurus punctatus). Introduction of closed recirculation systems allowed the cultivation of some exotic species in our country such as barramundi (Lates calcarifer). Still there is a tendency that the proportion of native species, such as perch species pikeperch (Sander lucioperca), perch (Perca fluviatilis)) and northern pike (Esox lucius), to be at significant, compared to the total production . The greater variety of aquatic organisms on the market (including imports) also stimulates the demand modifications.

The future diversification in the production of aquatic organisms in Bulgaria should be orientated to the introduction of valuable species of the local fauna, which for one reason or another have not been subject to cultivation in the country. Successful could be also the implementation of innovative new technologies and approaches for their cultivation.
The species that have proven their perspective cultivation are pikeperch, perch, tench, huchen, grey mullets, turbot etc.

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.

Implementation of the genetic data in Aquaculture in Bulgaria - the application of biochemical-genetic markers in Bulgaria for identification in the aquaculture started in 80s of the 20th century with the analyses of yugoslav carp, imported into Bulgaria in 1974. On the basis of established myogenes (general muscle proteins) polymorphism the lethal gene was found. The one-age specimens with this allele died during the winter. During the next years the samples from the broodstock (heterozygote on this allele) were eliminate and were selected only samples with "normal" allele. After this selection the population was "cleaned" form the lethal allele (Tsekov and Dobrovolov, 1985). Tsekov et al. (1990) investigated the electrophoretical spectra of miogenes on silver carp and bighaet carp and their hybrids. The data received could be used for the control of gene purity of the broodstock as well as for control of breeding material, imported in Bulgaria.

Tsekov and Dobrovolov (1999) on the base of allozyme analyses showed that some samples from the Plovdiv fish farm were hybrids F 1 (first generation) between carp (Cyprinus carpio) and gibel carp (Carassius auratus gibelio). The uncontrolled hybridization and possibility to include the fertile hybrid speciemens into the fish farm broodstock is a prerequisite for genetic contamination of the carp not only in this particular farm, but on large scale in the country as well.

Two carp strains were registered in the patent office "Trakiya -1" (№10312/31.05.2001) and mirror carp "Plovdiv" (№10521/30.04.2003). For both of them there are allozyme data for identification.

The data for production and detection of triplod brook trout (Salvelinus fontinalis) and it's artiffical introduction in Bulgarian aquaculture were presented (Uzunova et al., 2000; Uzunova et al., 2001; Uzunova , 2002, 2004).

Dobrovolov et al. (2005) presented biochemical genetic identification of sturgeon filet and caviar form Black Sea, Danube, Volga, Lena, and also A.nacarii (not published yet).

Sturgeon hybrids were determined on morphological and genetic level in Bulgarian waters of Black Sea and Danube River. Three different hybrids (Acipenser gueldenstaedti x Acipenser ruthenus; Acipenser ruthenus x Acipenser stellatus; Huso huso x Acipenser ruthenus) of various offspring generations with participation of Acipenser ruthenus were identified (Tsekov et al., 2008).

Chelenkova et al. (2012) on the base of DNA analyses offers evidence that the genetic diversity in Bulgarian native populations of brown trout (Salmo truta fario) is already failing because of alteration of the population structure via enhanced human-mediated assortative mating and/or interspecies hybridisation with other salmonids.

Restocking programes are tools to recover stock of commercially overexploited fish species. Fish species undergoing to restocking is need information about the genetic identity of the existing fish populations.

On 2014 and 2015 sterlet species identification (Danube origin) before using of the offspring for restocking programme according to the project "Application of the activities from the National action plan for sturgeon species with aim to improve the state and protect the sturgeons in Bulgaria", № 5103020–C-012, Operational programe Environment 2007-2013using selected allozymes and microsatellite DNA markers, which allowed identification of the stellate sturgeon from Bulgarian farms and could be applied to test and control the broodstocks, used for the restocking programs.

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.

a)The genetic data are available for sturgeons farmed species and their hybrids (based on allozyme data, Dobrovolov et al. 2005) as well as DNA markers were used for analyses of brown trout (Chelenkova et al., 2012) in the hatchery and in the wild. Genetic data (allozyme data) were available in the past for different carp strains (Tsekov and Dobrovolov, 1985) and for marker assisted selection, for bighaet carp and silver carp hybridisation, as well for uncontroled hybridisation between common carp and gibel carp. There are data about the polyploidity of the grass carp, rainbow trout and tench and triplod brook trout were available (Popov and Tsekov, 1981,1984 and 1985; Uzunova et al., 2000; Uzunova et al., 2001).
The genetic examinations in the field of aquaculture breeding research in Bulgaria is rare, accidental and covered episodic scientific analyses for investigation of species and their hybrids . There are also genetic data on some wild populations of species farmed in aquaculture which was collected in connection with evaluation of species biodiversity as for example for sturgeons from Bulgarian Part of Danube River (Tsekov et al., 2008, Peycheva et al. 2004).
b)The genetic data were used for identification of sterlet sturgeon (Danube origin), used on 2014 and 2015 for restocking purposes according to the project "Application of the activities from the National action plan for sturgeon species with aim to improve the state and protect the sturgeons in Bulgaria", № 5103020–C-012, Operational programme Environment 2007-2013. Selected allozymes and microsatellite DNA markers allowed identification of the stellate sturgeon from Bulgarian farms and could be applied to test and control the broodstocks, used for the restocking programs.
Bulgaria has not of genetic database of aquatic genetic resources produced in aquaculture and living in the wild.

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.

In Bulgaria for 2012 sturgeon production declared 15 registered farms growing almost the entire range of species native living in the Bulgarian waters of the Danube and the Black Sea (sterlet (Acipenser ruthenus), Russian sturgeon (Acipenser gueldenstaedtii), stellate sturgeon, (Acipenser stellatus), and beluga (Huso huso).
For Bulgaria brood stock is only obtained form wild population for some sturgeon species, used for restocking purposes .
Wild brood stock were occasionally used for nortern picke (Esox lucius), pikeperch (Sander lucioperca) and european catfish (Silurus glanis) for suppling deficiencies of the stock in the hatcheries.
The only species reared in Bulgarian marine aquaculture is black mussel (Mytilus galloprovincialis). The number of currently existing farms for black mussel is 35 with total production of about 2 474,6 tons in 2014.

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** 1
- Percent managed by private sector. **Please Enter Percentage Here** 99
- Percent managed by private /public partnership. **Please Enter Percentage Here** 0

Total

Please add any explanation here.

Under the Fishery and aquaculture Low breeding of fish and other aquatic organisms are carried out by legal entities and sole traders registered in NAFA. Breeding work in Bulgaria aquaculture is undertaken mainly by private fishery farms, according to the market tendency for offering and demand. Small percentage about 1% is breeding work done in public facilities (institutes) and organization with public-private partnerships.

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

Please mark appropriate box.

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

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

Add Row

Species	Type of genetic improvement *mark all that apply*		Developed By *mark all that apply*	
Cyprinus carpio	☒ Traditional selective breeding		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	X
	☒ Hybrids	Specify parental species in the box below: Carassius auratus gibelio	☐ Private Sector ☒ Public Sector ☐ Private/Public partnership	
	☐ Triploids and other polyploids		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Mono-sex production		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Hypophthalmichthys molitrix	☒ Traditional selective breeding		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	X
	☒ Hybrids	Specify parental species in the box below: Hypophthalmichthys nobilis	☐ Private Sector ☒ Public Sector ☐ Private/Public partnership	
	☐ Triploids and other polyploids		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Mono-sex production		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	

	☒ Traditional selective breeding		☒ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☒ Hybrids	Specify parental species in the box below Acipenser baerii	☒ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Acipenser gueldenstaedtii	☐ Triploids and other polyploids		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	X
	☐ Mono-sex production		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Traditional selective breeding		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Hybrids		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Oncorhynchus mykiss	☒ Triploids and other polyploids		☐ Private Sector ☒ Public Sector ☐ Private/Public partnership	X
	☐ Mono-sex production		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other		☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	

	☒ Traditional selective breeding	☒ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Hybrids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Salvelinus fontinalis	☒ Triploids and other polyploids	☒ Private Sector ☒ Public Sector ☐ Private/Public partnership	X
	☐ Mono-sex production	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	

9. Please fill in table 1.1

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

Add Row

Farmed species	Genetic type	Availability of genetic data	Trends in production	Future trends in production	Genetic improvement	Future genetic improvement	Comments	
List species (scientific names), strains and varieties as scientific names (put in brackets the most widely used national common name or names) and indicate whether native or introduced	*Indicate all genetic types that apply to the species*	Are genetic data available for farmed populations? If yes, give summary details in comments	Over the last 10 years, production has been ***(mark one)***	Expected trend over the next 10 years is that production will ***(mark one)***	Which genetic technologies are currently being used on the species ***(mark all that apply)***	***mark all that apply***	For example important traits improved, how data are used in management or name of breed, source of information, etc.	
◉ Native ○ Introduced Cyprinus carpio	☒ Wild Type ☒ Selective bred type ☒ Hybrids ☐ Cross breeds ☒ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☒ Marker assisted selection ☐ Other (specify in comment)	strain "Trakiya 1" (№ 10312/31.05.2001) and mirror carp "Plovdiv"(№10521/30.04.2003) Tsekov and Dobrovolov (1999) on the base of allozyme analyses showed that some samples from the Plovdiv fish farm were hybrids F 1 (first generation) between carp (Cyprinus carpio) and gibel carp (Carassius auratus gibelio). The uncontrolled hybridization and possibility to include the fertile hybrid speciemens into the fish farm broodstock is a prerequisite for genetic contamination of the carp not only in this particular farm, but on large scale in the country as well.	X

◉ Native ○ Introduced Silurus glanis	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Genetic identification of S. glanis and S. aristotelis was made (Tsekov at al., 2006)	X
○ Native ◉ Introduced Clarias gariepinus	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

○ Native ◉ Introduced Ctenopharyngodon idellus	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X
◉ Native ○ Introduced Salmo trutta	☒ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Chelenkova et al. (2013) investigated the genetic diversity in Bulgarian native populations of brown trout based on molecular markers	X

○ Native ◉ Introduced Salvelinus fontinalis	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Uzunova et al. 2000 ; Uzunova et al. 2001; Uzunova 2002, 2004. analyzed survival, growth and maturation of triploid brook trout as well as application of erythrocyte measurements for distinguishing of diploid and triploid brook trout; Production and detection of triplod brook trout and potential application in Bulgarian aquaculture were also discussed.	X
○ Native ◉ Introduced Ictalurus punctatus	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

○ Native ◉ Introduced Lates calcarifer	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ◉ Not known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ◉ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X
◉ Native ○ Introduced Perca fluviatilis	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

◉ Native ○ Introduced Acipenser gueldenstaedtii	☒ Wild Type ☒ Selective bred type ☒ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Identification based on allozyme data (Dobrovolov et al. 2005)	X
◉ Native ○ Introduced Acipenser ruthenus	☒ Wild Type ☒ Selective bred type ☒ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Dobrovolov et al. 2005; Identification of broodstock and offspring based on allozyme and microsatelllite analyses, in connection of the restocking programes (unpublished data).	X

◉ Native ○ Introduced Acipenser stellatus	☒ Wild Type ☒ Selective bred type ☒ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Dobrovolov et al. 2005	X
◉ Native ○ Introduced Huso huso	☒ Wild Type ☒ Selective bred type ☒ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Dobrovolov et al. 2005	X

◯ Native ◉ Introduced Acipenser baerii	☐ Wild Type ☒ Selective bred type ☒ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ◯ No ◯ Not Known	◯ Increasing ◉ Stable ◯ Fluctuating ◯ Decreasing ◯ Stopped ◯ Not known	◯ Increasing ◉ Stable ◯ Fluctuating ◯ Decreasing ◯ Stopped ◯ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Dobrovolov et al. 2005	X
◉ Native ◯ Introduced Mytilus galloprovincialis	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ◯ No ◯ Not Known	◉ Increasing ◯ Stable ◯ Fluctuating ◯ Decreasing ◯ Stopped ◯ Not known	◉ Increasing ◯ Stable ◯ Fluctuating ◯ Decreasing ◯ Stopped ◯ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

◉ Native ○ Introduced Astacus leptodactylus	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ○ No ◉ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X
○ Native ◉ Introduced Oncorhynchus mykiss	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☒ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

◉ Native ○ Introduced Tinca tinca	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X
○ Native ◉ Introduced Hypophthalmichthys molitrix	☐ Wild Type ☒ Selective bred type ☒ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Tsekov et al. (1990) investigated the electrophoretical spectra of miogenes on silver carp and bighaet carp and their hybrids. The data received could be used for the control of gene purity of the broodstock as well as for control of breeding material, imported in Bulgaria.	X

○ Native ◉ Introduced Hypophthalmichthys nobilis	☐ Wild Type ☒ Selective bred type ☒ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☒ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Tsekov et al. (1990) investigated the electrophoretical spectra of miogenes on silver carp and bighaet carp and their hybrids.	X
○ Native ◉ Introduced Mylopharyngodon piceus	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

○ Native ◉ Introduced Polyodon spathula	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X
○ Native ◉ Introduced Anguilla anguilla	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ◉ Not known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ◉ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

◉ Native ○ Introduced Scardinius erythrophthalmus	☒ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X
○ Native ◉ Introduced Salmo salar	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ◉ Not known	○ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ◉ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

◉ Native ○ Introduced Astacus astacus	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	○ Increasing ◉ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☐ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)		X

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

Add Row

Species ***Type and select a species***	Is the species native to your country?	Comments ***For example main sources of information***	
Sander lucioperca	(•) Yes ( ) No ( ) Not Known		X
Tinca tinca	(•) Yes ( ) No ( ) Not Known		X
Perca fluviatilis	(•) Yes ( ) No ( ) Not Known		X

Ictalurus punctatus	(•) Yes ( ) No ( ) Not Known		X
Mugil cephalus	(•) Yes ( ) No ( ) Not Known		X
Psetta maxima	(•) Yes ( ) No ( ) Not Known		X

Clarias gariepinus	○ Yes ◉ No ○ Not Known		X
Esox lucius	◉ Yes ○ No ○ Not Known		X
Lates calcarifer	○ Yes ◉ No ○ Not Known		X

Chamelea gallina	(•) Yes ( ) No ( ) Not Known		X

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

Add Row

Species	Genetic alteration of exchanged material **Mark all that apply**	Details of transfer or exchange	Type of genetic material exchanged **Mark all that apply**	Country or countries involved with exchange **Hold CTRL button to select more than one country**	Comments ***Please add main purpose or objective of the exchange and main sources of information***	
Oncorhynchus mykiss	☐ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Central African Republ Chad Chile China Colombia Comoros Cook Islands Costa Rica Côte d'Ivoire Croatia Cuba Cyprus Czech Republic Republic of Korea Democratic Republic Denmark Djibouti		X
Cyprinus carpio	☐ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Niue Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland Portugal Qatar Republic of Korea Republic of Moldova Romania Russian Federation		X

Hypophthalmichthys nobilis	☐ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Niue Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland Portugal Qatar Republic of Korea Republic of Moldova Romania Russian Federation		X
Hypophthalmichthys molitrix	☐ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Niue Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland Portugal Qatar Republic of Korea Republic of Moldova Romania Russian Federation		X
Ctenopharyngodon idellus	☐ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☐ Living specimens ☐ Other	Niue Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland Portugal Qatar Republic of Korea Republic of Moldova Romania Russian Federation		X

Lates calcarifer	☐ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Ghana Greece Grenada Guatemala Guinea Guinea-Bissau Guyana Haiti Hungary Iceland India Indonesia Iran (Islamic Republic Iraq Ireland Israel Italy		X
Perca fluviatilis	☐ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☒ Import ☐ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Ghana Greece Grenada Guatemala Guinea Guinea-Bissau Guyana Haiti Hungary Iceland India Indonesia Iran (Islamic Republic Iraq Ireland Israel Italy		X

Wild relatives of farmed aquatic species

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

Add Row

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

Species	Use *(mark all that apply)*	Comments	
Psetta maxima	☒ Capture fisheries ☐ Recreational fishery ☐ Aquaria ☐ Biological control ☒ Research and develpment ☐ Other (specify in comments)		X
Perca fluviatilis	☒ Capture fisheries ☐ Recreational fishery ☐ Aquaria ☐ Biological control ☐ Research and develpment ☐ Other (specify in comments)		X
Sander lucioperca	☒ Capture fisheries ☒ Recreational fishery ☐ Aquaria ☐ Biological control ☐ Research and develpment ☐ Other (specify in comments)		X

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

Add Row

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

Species	Details of transfer or exchange ***mark all that apply***	Type of genetic material exchanged	Country **Hold CTRL button to select more than one country**	Comments ***main sources of information, if the transfer was legal or not***	
	☐ Import ☐ Export	☐ Tissues ☐ Gametes ☐ DNA ☐ Genes ☐ Embryos ☐ Living specimens ☐ Other	Afghanistan Albania Algeria Andorra Angola Antigua and Barbuda Argentina Armenia Australia Austria Azerbaijan Bahamas Bahrain Bangladesh Barbados Belarus		X

14. Please fill in table 1.2

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

Add Row

Target species, stocks or other management units	Characteristics of species	Capture fisheries	Management measures	Availability of genetic data	Use of genetic data in management	Trends in catches	Future trends in catches	Ecosystem(s) where the fishery is located	Changes in ranges and habitats	Reasons for change in abundance of species	
For each row, list the species as scientific names (put in brackets the most widely used national common For each species, include the named stocks and name of other management units if known)	Is the species ***(mark as appropriate):***	Is this species targeted by capture fisheries?	Are there any management measures in place?	Are genetic data available for the fishery?	Are genetic data used in management?	Over the last 10 years, catches have been:	Expected trend over the next 10 years.	Indicate the ecosystem where the fishery is located (***mark all that apply)***	The habitat or range is	What are likely reasons for changes? (***mark all that apply)***	
Acipenser gueldenstaedtii	☐ Straddling ☒ Transboundary ☐ Introduced ☐ Native	○ Yes ◉ No ○ Not Known	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☒ River ☐ Swamp ☐ Other **(specify)**	◉ Increasing ○ Stable ○ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☒ Pollution ☒ Rehabilitation of habitat ☐ Others ☐ Not known	X

Target species, stocks or other management units	Characteristics of species	Capture fisheries	Management measures	Availability of genetic data	Use of genetic data in management	Trends in catches	Future trends in catches	Ecosystem(s) where the fishery is located	Changes in ranges and habitats	Reasons for change in abundance of species	
Acipenser ruthenus	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	○ Yes ◉ No ○ Not Known	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	☐ Intertital ☐ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☒ River ☐ Swamp ☐ Other **(specify)**	◉ Increasing ○ Stable ○ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☒ Pollution ☒ Rehabilitation of habitat ☐ Others ☐ Not known	X
Acipenser stellatus	☐ Straddling ☒ Transboundary ☐ Introduced ☐ Native	○ Yes ◉ No ○ Not Known	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☒ River ☐ Swamp ☐ Other **(specify)**	◉ Increasing ○ Stable ○ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☒ Pollution ☒ Rehabilitation of habitat ☐ Others ☐ Not known	X

Target species, stocks or other management units	Characteristics of species	Capture fisheries	Management measures	Availability of genetic data	Use of genetic data in management	Trends in catches	Future trends in catches	Ecosystem(s) where the fishery is located	Changes in ranges and habitats	Reasons for change in abundance of species	
Huso huso	☐ Straddling ☒ Transboundary ☐ Introduced ☐ Native	○ Yes ◉ No ○ Not Known	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	☐ Intertital ☒ Coastal in EEZ ☐ High seas ☐ Lake ☐ Reservoir ☒ River ☐ Swamp ☐ Other **(specify)**	◉ Increasing ○ Stable ○ Decreasing ○ Not known	☒ Habitat ☐ Climate ☐ Invasive species ☒ Pollution ☒ Rehabilitation of habitat ☐ Others ☐ Not known	X
Esox lucius	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	☐ Intertital ☐ Coastal in EEZ ☐ High seas ☐ Lake ☒ Reservoir ☒ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ○ Stable ○ Decreasing ◉ Not known	☐ Habitat ☐ Climate ☐ Invasive species ☒ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	X

Target species, stocks or other management units	Characteristics of species	Capture fisheries	Management measures	Availability of genetic data	Use of genetic data in management	Trends in catches	Future trends in catches	Ecosystem(s) where the fishery is located	Changes in ranges and habitats	Reasons for change in abundance of species	
Sander lucioperca	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	◉ Yes ○ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	☐ Intertital ☐ Coastal in EEZ ☐ High seas ☒ Lake ☒ Reservoir ☒ River ☐ Swamp ☐ Other **(specify)**	○ Increasing ○ Stable ○ Decreasing ◉ Not known	☐ Habitat ☐ Climate ☐ Invasive species ☒ Pollution ☐ Rehabilitation of habitat ☐ Others ☐ Not known	X
Salmo trutta	☐ Straddling ☐ Transboundary ☐ Introduced ☒ Native	○ Yes ◉ No ○ Not Known	○ Yes ◉ No ○ Not Known	◉ Yes ○ No ○ Not Known	○ Yes ◉ No ○ Not Known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	○ Increasing ○ Stable ○ Fluctuating ◉ Decreasing ○ Depleted ○ Not known	☐ Intertital ☐ Coastal in EEZ ☐ High seas ☒ Lake ☐ Reservoir ☒ River ☐ Swamp ☐ Other **(specify)**	◉ Increasing ○ Stable ○ Decreasing ○ Not known	☐ Habitat ☐ Climate ☐ Invasive species ☒ Pollution ☒ Rehabilitation of habitat ☐ Others ☐ Not known	X

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

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

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

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

Driver impacting aquaculture	Effect on AqGR ***Mark appropriate box***	Comments ***List examples or other relevant information***
Human population increase	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◉ No effect ◯ Unknown	Bulgarian population decreasing, whithout any effect in AqGR of farmed fishe species.
Increased wealth and demand for fish	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	
Governance (ability of government, industry and the public to work together in managing resources)	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	
Climate change	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◉ Unknown	
Competition for resources, especially freshwater	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◉ Unknown	Water resources in Bulgaria are negligible – about 20.1 billion m3. In water resources per capita the country ranks last among those at the Balkan Peninsula. Bulgaria is one of the most water-poor countries in the European Union. Water resources are unevenly distributed throughout the territory of the country.

Driver impacting aquaculture	Effect on AqGR ***Mark appropriate box***	Comments ***List examples or other relevant information***
Changes in values and ethics of consumers	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ◉ Unknown	According data from an NSI national representative survey in 2012 carried out under a project , implemented with the financial support of the Operational programme for the development of the Fisheries sector, financed by the EU European Fisheries Fund, the average annual consumption of fish and other aquatic organisms , per household in 2012 was 11.8 kg, and the average per person was 5.1 kg. Carp is the most commonly consumed species in households throughout the country, followed by rainbow trout and pikeperch. Several factors influenced the relatively low level of fish consumption: economic crisis in the transition to a market economy; lack of tradition in fish consumption; seasonality of production and fishing due to the specific climatic conditions in the country; lack of well-organized market infrastructure for fish and fish products, ineffective advertising; and high product prices. Nevertheless, demand for fish and fish products on global and European level is increasing, particularly in countries with high consumption of fish and fish products. The major share in demand is for marine aquatic organisms. Therefore, operators of farms for production of carp and other freshwater species without good export potential should review their long-term activities and should focus on production of new types of aquaculture with better marketing opportunities.
Other ***Add other drivers as necessary*** Add Row Remove Row	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	

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

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

Driver impacting aquaculture	Effect on AqGR ***Mark appropriate box***	Comments ***List examples or other relevant information***
Human population increase	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◉ No effect ◯ Unknown	Bulgarian population is decreasing, therefore, the increase has no effect.
Increased wealth and demand for fish	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	
Governance (ability of government, industry and the public to work together in managing resources)	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	The prohibition of commercial fishing of sturgeons from 2010 up to 2020 may have positive impacts on the wild fish populations.
Climate change	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◉ Unknown	
Competition for resources, especially freshwater	◯ Strongly positive ◯ Positive ◉ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	limited water resources

Driver impacting aquaculture	Effect on AqGR ***Mark appropriate box***	Comments ***List examples or other relevant information***
Changes in values and ethics of consumers	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	increasing the fish consumption form the aquaculture will reduce the negative effect on natural populations, that have been proven to be diminishing
Other ***Add other drivers as necessary*** Add Row / Remove Row	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	

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

Describe countermeasures

Measures for reducing of the negative effects are:

- Prohibition for the sturgeon catches up to 2020
- Including the seasonal prohibition of the catches in the period of spawning .
- Specification and enlarging of the MPA for protection of wild populations
- Prohibiting the production of non-indigenous species in systems, which are connected to the natural freshwater system.
- Live and cryopreserved gene banks for aquaculture species
- Exchange of best practices
- Improving the current legislation for aquaculture (including subsidies)

Biotechnologies

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

Biotechnology	Extent of use	Comments ***main sources of information, important species for which the biotechnology is applied***
Selective breeding	◯ Not at all ◯ To a minor extent ◉ To some extent ◯ To a great extent	
Hybridization	◯ Not at all ◉ To a minor extent ◯ To some extent ◯ To a great extent	
Polyploidy (chromosome set manipulation)	◉ Not at all ◯ To a minor extent ◯ To some extent ◯ To a great extent	
Monosex production	◉ Not at all ◯ To a minor extent ◯ To some extent ◯ To a great extent	
Marker assisted selection	◉ Not at all ◯ To a minor extent ◯ To some extent ◯ To a great extent	
Gynogenesis/androgenesis	◉ Not at all ◯ To a minor extent ◯ To some extent ◯ To a great extent	
Other **Continue adding row as necessary** Add Row | Remove Row	◯ Not at all ◯ To a minor extent ◯ To some extent ◯ To a great extent	

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

Drivers that are changing aquatic ecosystems	Effect on AqGR ***mark appropriate box***	Countermeasures and effects
Habitat loss and degradation	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Aquaculture activities are aditionally awkward also, due to the complex use of the water bodies as for example (power generation, irrigation, drinking water, recreational tourism activity), that often conflicts with aquaculture activities. During the summer season, the water inflow of reservoirs is reduced and often even stops, which is also a limiting factor, especially in terms of stocking density.
Pollution of waters	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	In case where dams are located near urban areas, manufacturing plants, agricultural areas, livestock farms, etc., a negative cumulative effect is often observed such as water pollution. The consequences from the impact of these factors result in highly degraded parameters of the water quality. As a promising activity, complementing the extensive fish-farming is the development of fishery tourism.
Increased frequency of extreme climatic events and long-term climate change	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ◉ Unknown	
Establishment of invasive species	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Negative consequence with significant importance that has occurred as a result of uncontrolled stocking of the water basins in Bulgaria is the spread of potentially invasive species such as Lepomis gibbosus, Pseudorasbora parva, and some pathogens and parasites that cause disease. In recent years, of particular concern is the invasion of the zebra mussel Dreissena polymorpha. Mussel Dreissena has entered for the first time in the basin of the Maritsa River Basin (Dam Ovcharitsa and Zhrebchevo), North-western Bulgaria (Dam Ogosta, Dam Rabisha, Ogosta River, Vit River), and probably many other places (Dam Sopot). The risk for the country is very large, especially if affected drinking water reservoirs or strategic sites for industrial and irrigation water (e.g. Dam Mandra, Dam Iskar, Dam Yovkovtsi, Dam Rozov Kladenets, the dams along Dolna Arda River, etc.). The economic damages may turn out beyond the Bulgarian abilities if they affect a large number of strategic sites in the near future. It is believed that the new invasion of mussels is related to the rapid development of extensive fish-farming in Bulgaria in the last decade, and fishermen practicing recreational fishing may also have possible contribution to it. Countermeasures should include: - prohibition of import and stocking of non-indigenous species into natural waters; - in case of production of non-indigenous species at fish farms their escape should be avoided;

Drivers that are changing aquatic ecosystems	Effect on AqGR ***mark appropriate box***	Countermeasures and effects
Introductions of parasites and pathogens	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Countermeasures should include prohibition to release non-indigenous fish species into natural surface waters because of the risk of introducing new pathogens and diseases.
Impacts of purposeful stocking and escapes from aquaculture	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	The impact on purposeful stocking of farmed species on wild fish stocks is difficult to assess. Uncontrolled and illegal stocking of carp with non-typical genetic background for the given water system in the farms and natural waters lead to the fact that the wild carp (C. carpio) did not exist and could not be find in the natural water. That problem with no pure wild stock exist on some other farmed species. One of the countermeasures could be ecologically based fisheries management in natural freshwater systems.
Capture fisheries	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	Prohibition of the capture fishing during the spawning periods as well as prohibition of the catches of sturgeon species up to 2020, have positive effect because the number of the aquaculture producer was increased.
Other ***Continue listing other driverst*** species, escaping from aquaculture Add Row / Remove Row	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	Negative effect from the implementation of the non-native and exotic species from the aquaculture into the natural waters and wild populations.

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

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

The specific objectives are as follows:

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

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

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

Please mark appropriate box.

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

Please include any additional information

Stocking of dams with fish and other aquatic organisms and their catch upon reaching the market size is widely spread practice in Bulgaria. The production is based mainly on natural fish productivity, which for reservoirs in Bulgaria ranges from 20 to 70 kg ha-1. ranges from 20 to 70 kg ha-1. The extensive and semi-intensive production methods are environmentally friendly, although often based on the introduction of non-native species (bighead carp, grass carp, paddlefish) in the water basins, which in many cases represent a potential threat to native species due to competition for food or space. Negative consequence with significant importance that has occurred as a result of uncontrolled stocking of the water basins in Bulgaria is the spread of potentially invasive species such as Lepomis gibbosus, Pseudorasbora parva, and some pathogens and parasites that cause disease.
In order to create optimal conditions for natural reproduction of spring - summer breeding fish, the Minister of Agriculture and Food, in consultation with the Minister of Environment order and the water determines the ban on catching fish and other aquatic organisms during the breeding in accordance with Annex № 1 of the Law on Fisheries and aquaculture. By Order № RD 09-98 / 26.02.2016, the fishing is prohibited in 2016, 2017 and 2018 in the areas of rivers and inland sites. In accordance with Annex № 1 to Art. 32, paragraph. 1 of the FAA in the draft order is determined prohibited to catch fish species as follows:
- for sturgeons - fishing is banned until the end of calendar year 2020 in the Bulgarian waters of the Danube River and Black Sea entered a joint Order № RD - 9 / 07.01.2016, and the RD 09-42 / 26.01. 2016 the Minister of Agriculture and food Minister of environment and water.
-for all others spring - summer breeding fish depending on the altitude of the fishery sites in the country are set two periods: from 04.15.2016 until 05.31.2016, at fishery sites located up to 500 meters above sea level and from 01.05 .2016 until 15.06.2015, at fishery sites located from 500 m to 1500 m. altitude.

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

The production of stocking fish in aquaculture as a separate branch of industry is not well developed in Bulgaria .
The breeding programme existed only in the Institute of fishery and aquaculture Plovdiv for carp (two strains), bighaed carp, silver carp, grasscarp, pikeperch, european catfish and northern pike.
Breeding it developed for endangered sturgeon speices as well as for non-native rainbow trout and brook trout in private farms.
The isolated restocking campaigns of some sturgeon species (e.g. sterlet) in 2014 and 2015 was based on genetic identification of broodstock and offspring, done in the Institute of oceanology, BAS.

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

Please describe examples

According the Habitat Directive, a number of water areas of Bulgaria are set as special Areas of Conservation due to fish species of Community importance and described in Annex 2 of the Directive. The effective management of protected areas with fishes from Annex 2 requires the creation and implementation of monitoring programs to ensure adequate assessment, both in terms of their conservation status, and in terms of their spatial distribution.
Protected areas under Natura 2000 in Bulgaria cover 35% of the country's area. In connection with the implementation of the commitments of the Republic of Bulgaria in accordance with Article 8 of Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, a national framework for priority action under Natura 2000 (NFPA) 2014 – 2020 was developed. The purpose of NFPA is to better define priorities for Natura 2000 at national and regional level, and to determine the financing needs. This document will facilitate the integration of the above mentioned needs into future programs financed by EU financial instruments.
Sturgeon species are listed in Appendix No. 3 (ship sturgeon and European sea sturgeon) and Annex No. 4 (Russian sturgeon, sterlet, stellate sturgeon, beluga) of the Biological Diversity Act (BDA); based on the provisions of the Biological Diversity Act was created an Action Plan for Sturgeon Species in Bulgarian Waters of the Danube River and Black Sea.
As a current activities for protection of sturgeons fishing is banned until the end of calendar year 2020 in the Bulgarian waters of the Danube River and Black Sea entered a joint Order № RD - 9 / 07.01.2016, and the RD 09-42 / 01.26.2016 the Minister of Agriculture and food Minister of environment and water.
According to order of the Minister of Agriculture and Food № RD 09-98 / 26.02.2016 recreational fishing, retention and catch (brown trout) during the period 2016-2018 year was prohibited.
According to the national legislation - Fisheries and Aquaculture Act (FAA) there are introduction of bans on fishing during spawning; introducing temporary bans on catch in change in the status of stocks of certain fish species; introduction of specific prohibitions on the use of equipment and gear for catching fish;

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

Objectives of *in situ* conservation	Rank 1=Very Important 10=No importance
Preservation of aquatic genetic diversity	1
Maintain good strains for aquaculture production	1
Meet consumer and market demands	1
To help adapt to impacts of climate change	4
Future breed improvement in aquaculture	1
Please continue listing any other objectives as needed	
Add Row / Remove Row	

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

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

Please mark appropriate box

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

If yes, please give examples

Restocking programs for sterlet sturgeon
Sturgeons fishing is banned until the end of calendar year 2020 in the Bulgarian waters of the Danube River and Black Sea entered a joint Order № RD - 9 / 07.01.2016, and the RD 09-42 / 26. 01. 2016 the Minister of Agriculture and food Minister of environment and water.
According to order of the Minister of Agriculture and Food № RD 09-98 / 26.02.2016 recreational fishing, retention and catch (brown trout) during the period 2016-2018 year was prohibited.
In accordance with the Law on Fisheries and Aquaculture was introduced prohibition of catches, transport and sale of fish and other aquatic organisms with dimensions - smaller than the minimum, pointed in the document.
According to the national legislation - Fisheries and Aquaculture Act (FAA) there are introduction of bans on fishing during spawning; introducing temporary bans on catch in change in the status of stocks of certain fish species; introduction of specific prohibitions on the use of equipment and gear for catching fish;

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

Seed material for aquaculture from wild populations is only used in Bulgarian aquaculture for strgeons, pike perch ,northern pike, european catfish and mediterranean mussel.

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

In order to create optimal conditions for natural reproduction of spring - summer breeding fish, the Minister of Agriculture and Food, in consultation with the Minister of Environment order and the water determines the ban on catching fish and other aquatic organisms during the breeding in accordance with Annex № 1 of the Fisheries and aquaculture Law. By Order № RD 09-98 / 26.02.2016, the fishing is prohibited in 2016, 2017 and 2018 in the areas of rivers and inland sites. In accordance with Annex № 1 to Art. 32, paragraph 1 of the FAA in the draft order is determined prohibited to catch fish species as follows:
- All kinds of sturgeon - fishing is banned until the end of calendar year 2020 in the Bulgarian waters of the Danube River and Black Sea entered a joint Order № RD - 9 / 07.01.2016, and the RD 09-42 / 26. 01. 2016 the Minister of Agriculture and food Minister of environment and water.
-for all others spring - summer breeding fish depending on the altitude of the fishery sites in the country are set two periods: from 04.15.2016 until 05.31.2016, at fishery sites located up to 500 meters above sea level and from 01.05 .2016 until 15.06.2015, at fishery sites located from 500 m to 1500 m. altitude.
This includes among other things the establishment of closed seasons and minimum landing sizes for each individual fish species, as well as the coordination of the fishing methods used to regulate stocking and removal which form the legal framework for fishery management.

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

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

Add Row

Aquatic protected area	Effectiveness of conserving Aquatic Genetic Resources	Comments ***provide any additional information***	
National park areas in aquatic habitats	( ) Very effective (•) Somewhat effective ( ) Not effective ( ) Unknown	National parks in Bulgaria are three - National Park "Rila","Central Balkan" and "Pirin" . They are primarily managed for biodiversity conservation in very strict regime regarding the use of natural resources, according to the Protected areas act. The fish breeding and fishing are prohibited in these areas. "Central Balkan" become a member of the PAN Parks - an international recognition for its well preserved and managed wildlife. There is management plan from 2001. From the fish species brown trout (Salmo trutta fario) is object of conservation through prohibition of the fishing in the area and restocking of this species as well as monitoring . National park "Pirin"- in 1983 the national park was included in the UNESCO List of Natural Heritage. To restrict the human effect on the national park rivers and lakes the fishing is strictly regulated and allowed only outside the reserve according to the management plan from 2004. For the period 2008-2012 there are restocking programe for brown trout (Salmo trutta fario) was done. Two north american speciesspecies rainbow trout (Oncorhynchus mykiss) and brook trout (Salvelinus fontinalis) are introduced . National park "Rila" - management plan existed form 2001,	X

Aquatic protected area	Effectiveness of conserving Aquatic Genetic Resources	Comments ***provide any additional information***	
		special measures for protection of brown trout (Salmo trutta fario), fishing prohibition and restocking were applied, as well as restocking on non-indiginous species brook trout (Salvelinus fontinalis) species.	
NATURA 2000 area in aquatic habitats	○ Very effective ◉ Somewhat effective ○ Not effective ○ Unknown	According the Biological Diversity Act, which implement the EU Habitat Directive 92/43/EEC and the Bird Directive 2009/147/EC, special restriction or treatment to protect the aquatic genetic resources of farmed aquatic species such as sturgeons.	X
Ramsar Sites on Wetlands	○ Very effective ◉ Somewhat effective ○ Not effective ○ Unknown	Bulgaria currently has 11 sites designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 49,912 hectares. They are under the prohibition from the Protected areas act. Protected area "Poda" - there was a management plan from 2002 where the catches of fish species were prohibited. Durankulashko and Shabla lakes has management plans since 2002. In these areas also introduction of non-native species, exept grasscarp and silvercarp are prohibited. The reserve Srebarna has managememt plan form 2001.	X

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

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

The specific objectives are:

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

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

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

Add Row

Species (*include information on subspecies or strain in comments if available*)	Type of use ***Please mark all that apply***	Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? ***Please mark appropriate box***	Comments ***Please list any additional information***	
Huso huso	☒ Direct human consumption ☐ Live feed organism ☒ Other	◉ Yes ○ No ○ Unknown	critically endangered For the sturgeon species, there are parent fish collections in a private hatchery ("Esetra Commerce" EOOD) that are kept for production of fingerling and caviar as a genetic reserve for the purpose of reproduction and also fish for consumption.	X
Acipenser naccarii	☒ Direct human consumption ☐ Live feed organism ☒ Other	◉ Yes ○ No ○ Unknown	non-indigenous critically endangered For the sturgeon species, there are parent fish collections in a private hatchery ("Esetra Commerce" EOOD) that are kept as ex-situ collections for resettlement purposes as a genetic reserve for the purpose of reproduction.	X

Species (*include information on subspecies or strain in comments if available*)	Type of use ***Please mark all that apply***	Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? ***Please mark appropriate box***	Comments ***Please list any additional information***	
Acipenser baerii	☒ Direct human consumption ☐ Live feed organism ☒ Other	◉ Yes ○ No ○ Unknown	non-indigenous endangered For the sturgeon species, there are parent fish collections in a private hatchery ("Esetra Commerce" EOOD) that are kept as ex-situ collections for resettlement purposes as a genetic reserve for the purpose of reproduction.	X
Acipenser gueldenstaedtii	☒ Direct human consumption ☐ Live feed organism ☒ Other	◉ Yes ○ No ○ Unknown	critically endangered For the sturgeon species, there are parent fish collections in a private hatchery ("Esetra Commerce" EOOD) that are kept as ex-situ collections for resettlement purposes as a genetic reserve for the purpose of reproduction.	X
Acipenser ruthenus	☒ Direct human consumption ☐ Live feed organism ☒ Other	◉ Yes ○ No ○ Unknown	vulnarable For the sturgeon species, there are parent fish collections in a private hatchery ("Esetra Commerce" EOOD) that are kept as ex-situ collections for resettlement purposes as a genetic reserve for the purpose of reproduction.	X
Acipenser stellatus	☒ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ○ No ○ Unknown	critically endangered For the sturgeon species, there are parent fish collections in a private hatchery ("Esetra Commerce" EOOD) that are kept as ex-situ collections for resettlement purposes as a genetic reserve for the purpose of reproduction.	X
A. gueldenstaedti x A. baeri	☒ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ○ No ◉ Unknown	For the sturgeon species, there are parent fish collections in a private hatchery ("Esetra Commerce" EOOD) that are kept as ex-situ collections for resettlement purposes as a genetic reserve for the purpose of reproduction.	X
Sander lucioperca	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Live gene bank in the Institute of Fishery and aquaculture, Plovdiv kept for stocking and reproduction	X

Species (*include information on subspecies or strain in comments if available*)	Type of use ***Please mark all that apply***	Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? ***Please mark appropriate box***	Comments ***Please list any additional information***	
Silurus glanis	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Live gene bank in the Institute of Fishery and aquaculture, Plovdiv kept for stocking and reproduction	X
Hypophthalmichthys nobilis	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Live gene bank in the Institute of Fishery and aquaculture, Plovdiv kept for stocking and reproduction	X
Ctenopharyngodon idellus	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Live gene bank in the Institute of Fishery and aquaculture, Plovdiv kept the broodstock for stocking and reproduction	X
Hypophthalmichthys molitrix	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Live gene bank in the Institute of Fishery and aquaculture, Plovdiv kept the broodstock for stocking and reproduction	X
Cyprinus carpio	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Stain "Trkiya 1", scaly common carp ilve gene bank in the Institute of Fishery and aquaculture, Plovdiv kept the broodstock for stocking and reproduction	X
Cyprinus carpio	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Strain"Plovdiv" mirror-common carp, live gene bank in the Institute of Fishery and aquaculture, Plovdiv kept the broodstock for stocking and reproduction	X
Esox lucius	☐ Direct human consumption ☐ Live feed organism ☒ Other	○ Yes ◉ No ○ Unknown	Live gene bank in the Institute of Fishery and aquaculture, Plovdiv kept the broodstock for stocking and reproduction	X

Species (*include information on subspecies or strain in comments if available*)	Type of use ***Please mark all that apply***	Is the species (or subspecies) threatened or endangered for example in the IUCN Red List, CITES Appendices or national lists? ***Please mark appropriate box***	Comments ***Please list any additional information***	
Clarias gariepinus	☒ Direct human consumption ☐ Live feed organism ☐ Other	○ Yes ◉ No ○ Unknown	"Elmet" EOOD farm for intensive aquaculture on recirculation principle produce samples for direct human consumption	X

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

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

Add Row

Species (include information on subspecies or strain if available in comments)	Users and managers ***List all that apply***	Type of *ex-situ* conservation collection *in vitro* ***mark all that apply***	Facilities where collection is located ***mark all that apply***	Comments ***list all breeds, subspecies of the species and any additional information***	
		☐ In vitro collection of gametes ☐ In vitro collextion of embryos ☐ In vitro collection of tissues ☐ Spores ☐ Other	☐ Aquaculture facilities ☐ Research facilities ☐ Universities ☐ Zoos and aquaria ☐ Other		X

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

Objectives of *ex situ* conservation	Rank 1=Very Important 10=No importance
Preservation of aquatic genetic diversity	3
Maintain good strains for aquaculture production	1
Meet consumer and market demands	7
To help adapt to impacts of climate change	8
Future breed improvement in aquaculture	1
Other ***Continue adding row as necessary***	
Add Row / Remove Row	

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

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

The specific objectives are:

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

- To describe the roles of stakeholder groups and the actions they are taking for the conservation, sustainable use and development of the aquatic genetic resources in which they have interests.

- To describe the further actions that stakeholder groups would like to see taken for the conservation, sustainable use and development of aquatic genetic resources in which they have interests, and the constraints that are hindering those actions, including lack of capacity and perceived threats.

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

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

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Fish Farmers	☒ Conservation ☒ Production ☐ Feed manufactoring ☒ Breeding ☐ Research ☒ Marketing ☒ Processing ☒ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	Interested farmers to produce hybrid caviar between A. gueldenstaedtii and A. baeri, because of their big size
Fishers	☒ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☒ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	According to the production quantities in 2012, the freshwater farms in Bulgaria dominated by "micro" production farms , having output to 10 tons per year and small sized industries , with over 11 tons to 49 tons , include 59 farms.

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Fish hatchery people	☐ Conservation ☒ Production ☒ Feed manufactoring ☒ Breeding ☐ Research ☒ Marketing ☐ Processing ☒ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	There are no specialized hatcheries in Bulgaria that would limit their activity to seed production. Fish farmers generally have their own hatcheries producing their own seed.
People involved in marketing	☐ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	Fish farmers organizing them selfs the process of buying of fish fingerlings. In NAFA provide a protocol for restocking.
Government resource managers	☒ Conservation ☒ Production ☒ Feed manufactoring ☒ Breeding ☒ Research ☒ Marketing ☒ Processing ☒ Advocacy ☒ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	indirect role

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Fishing or aquaculture associations	☒ Conservation ☐ Production ☐ Feed manufactoring ☒ Breeding ☐ Research ☒ Marketing ☐ Processing ☒ Advocacy ☒ Outreach/Extension ☒ Other (**specify**) mostly focused on fishing licence and quota	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	
Aquatic protected area managers	☒ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☒ Research ☐ Marketing ☐ Processing ☒ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	
Policy Makers	☒ Conservation ☒ Production ☒ Feed manufactoring ☒ Breeding ☒ Research ☒ Marketing ☒ Processing ☒ Advocacy ☒ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	indirectly

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

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

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

The percentage of women engage in the sector is approximately 10%. At present, the Bulgarian aquaculture apply the following basic production systems - free fish breeding in standing water reservoirs (lakes, reservoirs), fish farming in specially constructed concrete or earth ponds, fish farming in cages. In both these ways, the steps of growing fish are not yet sufficiently mechanized, which in turn is a factor which requires the role of mens in the sector. In recent years, the introduction of recirculating systems is of great importance for the sector. A great advantage of this type of system is an opportunity for - good technological development and modernization of farms in each stage of the production process, which in turn will improve the working conditions. Expectations are increasing competitiveness, increasing women's employment and stimulate economic growth in the sector.

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

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

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

The specific objectives are as follows:

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

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

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

Add Row

National legislation, policy and/or mechanism	Date established	Scope ***Select all that apply***	Comments ***Please provide any additional information for example whether it has been effective or not; and main sources of information***	
Biological Diversity Act (BDA)	Promulgated, State Gazette No. 77/9.08.2002	☐ Genes or molecules only ☒ Aquaculture ☒ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☒ Trade and commerce ☒ Access and benefit sharing ☐ Other	BDA transposes the basic principles and requirements of the Birds Directive and the Habitats Directive. The Law regulates the establishment of the National Ecological Network as part of the European ecological network Natura 2000.	X
Fisheries and Aquaculture Act (FAA)	Promulgated, SG 41/24.04.2001	☐ Genes or molecules only ☒ Aquaculture ☒ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☒ Trade and commerce ☐ Access and benefit sharing ☐ Other	Registration of persons keeping and breeding fish and other aquatic organisms, control of fisheries and aquaculture; introduction of bans on fishing during spawning, in certain subjects or areas thereof; introducing temporary bans on catch in change in the status of stocks of certain fish species; introduction of specific prohibitions on the use of equipment and gear for catching fish; aquaculture development as a measure limiting pressure on natural resources.	X

National legislation, policy and/or mechanism	Date established	Scope ***Select all that apply***	Comments ***Please provide any additional information for example whether it has been effective or not; and main sources of information***	
Water Act (WA)	Promulgated, State Gazette No. 67/27.07.1999	☐ Genes or molecules only ☐ Aquaculture ☐ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other	Regulates key issues concerning the rules for the use and protection of water resources.	X
Environmental Protection Act (EPA)	Promulgated, State Gazette No. 91/25.09.2002	☐ Genes or molecules only ☐ Aquaculture ☐ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other	Fundamental law, the provisions of which are developed in numerous special laws such as the BDA and the FAA.	X
Food Law	Promulgated, State Gazette No.90 от 15 October 1999г.,	☐ Genes or molecules only ☐ Aquaculture ☐ Capture fisheries ☐ Conservation ☐ Intellectual property protection ☐ Importation ☒ Trade and commerce ☐ Access and benefit sharing ☐ Other	Control of production, transport, processing and marketing of fish and fish products.	X
Ordinance adopted by Decree № 120 of 31.08.2007 of the Council of Ministers, promulgated in State Gazette No. 73	11/09/2007	☐ Genes or molecules only ☐ Aquaculture ☐ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other	Ordinance on the conditions and procedures for assessing the compatibility of plans, programs, projects and investment proposals with the object and purpose of the conservation of protected areas	X

National legislation, policy and/or mechanism	Date established	Scope ***Select all that apply***	Comments ***Please provide any additional information for example whether it has been effective or not; and main sources of information***	
Ordinance № 37	10.11.2008	☐ Genes or molecules only ☒ Aquaculture ☒ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☒ Trade and commerce ☐ Access and benefit sharing ☐ Other	Ordinance on the use of dams – state property, in regard to fish husbandry and the conduct of business, recreational fisheries and aquaculture production sites – state property, under Article 3, paragraph 1 of the Fisheries and Aquaculture Act (promulgated, State Gazette No. 100 of 2008,. Amended and supplemented. State Gazette No. 18 of 01.03.2011).	X
Order № РД -09-43/20.01.2012	20.01.2012	☐ Genes or molecules only ☐ Aquaculture ☒ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other	Order of the Minister of Agriculture and Food on ban on sturgeon species catch in Bulgarian waters of the Danube and the Black Sea for a period of 4 years as of 01.01.2012 on.	X
Multiannual National Strategic Plan for Aquaculture of Bulgaria	09.2013	☐ Genes or molecules only ☒ Aquaculture ☐ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other	The Multiannual national strategic plan for aquaculture have been prepared in conformity with the provisions of Article 43 of draft proposal for a Regulation of the Common Fisheries Policy and draft proposal for a Regulation of the European Parliament and of the Council concerning the European Maritime and Fisheries Fund. This plan covers all activities related to the production of fish and other aquatic organisms and is expanded by measures to diversify the activities of producers and the opportunities for marketing of the production.	X
Law on the Bulgarian Agency for Food Safety	Promulgated, State Gazette No.8 , 25.01.2011	☐ Genes or molecules only ☒ Aquaculture ☒ Capture fisheries ☐ Conservation ☐ Intellectual property protection ☐ Importation ☒ Trade and commerce ☐ Access and benefit sharing ☐ Other	Control of production, transport, processing and marketing of fish and fish products.	X

National legislation, policy and/or mechanism	Date established	Scope ***Select all that apply***	Comments ***Please provide any additional information for example whether it has been effective or not; and main sources of information***	
Order № RD - 9 / 07.01.2016 and RD 09-42 /26. 01.2016	1/7/16	☐ Genes or molecules only ☐ Aquaculture ☒ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other	Fishing of sturgeons is banned until the end of calendar year 2020 in the Bulgarian waters of the Danube River and Black Sea according to the joint Order № RD - 9 / 07.01.2016, and the RD 09-42 /26. 01.2016 of the Minister of Agriculture and food and Minister of environment and water.	X
Regulation (EU) 511/2014 on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation in the Union	Promulgated, SG No. 68/30.08.2016	☐ Genes or molecules only ☒ Aquaculture ☒ Capture fisheries ☒ Conservation ☒ Intellectual property protection ☒ Importation ☒ Trade and commerce ☒ Access and benefit sharing ☐ Other	On 2016 Bulgaria ratify the Nagoya Protocol and implement the relevant compliance obligations through transposition of the EU Directive.	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.

- The genetic control of introduction of the fish species in the fish farm, as well breeding material and broodstock is insufficient. These have to be regulated more efficient to avoid uncontrolled hybridization especially for the specimens used for restocking purposes. The genetic certificate for fish species used in aquaculture and for commercial species have to be as a part from the requirements applied in the Fisheries and Aquaculture Act as well as on Veterinary Act in view to protect the customer. These issues are expected to be regulated in the FAA on fisheries and the protection of fish regulating the rules of conducting aquaculture activities.
-Translocation and introduction of fish between water basins (stockiing of the river) is uncontrolled and have to be more effective regulated.
- Improving the competitiveness of the aquaculture sector and supporting the research and development activity
- Lack of unified and systematic information on the sector – currently information on activities in the aquaculture sector is collected by a number of institutions (NAFA, Bulgarian Food Safety Agency, Customs Agency, National Statistical Institute, etc.). It is identified a lack of a unified basis for collection and processing of economic data, as well as the need to provide reliable sources for their supply. This prevents the development of sectored analysis with a long enough time range to ensure the development of a reliable prognosis and conclusions for the sector development.
- lack of the statistical data about the transfered and exchanged farmed aquaculture species
- Scattered legal framework, different responsible institutions, inconsistent procedures;
- Lack of strong associations of producers and industry organizations that are able to support the work of their members;
-Lack of structured market of the sector - there is no effective auction market for the products of the sector
- Ineffective control of the state and the lack of traceability of the production from the sector ;
- Administrative simplification in particular with regard to licenses

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

Type of genetic resource (can be species name, DNA, gametes or other descriptor)	Comments ***Please, provide verifiable main sources of information, effectiveness of the restriction, description of type of restriction and for whom does the restriction apply***
DNA	
Stock, breed or variety	
Species	Restriction of accesses to sturgeon species (H. huso, A. rhutenus, A. gueldenstaedtii, A. stellatus) for capture fishes. Only allowed for aquaculture for restocking purposes. The restriction is not very effective due to limited human and financial resources to control the captures.
Other **Continue adding row as necessary** limitation of access for breeding period Add Row | Remove Row	

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

Add Row

Action taken to enhance access to aquatic genetic resources outside your country	Type of genetic resource ***Mark all that apply***	Comment ***for example other types of genetic resources***	
	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☐ Living specimens		X

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

Obstacles to accessing aquatic genetic resources	Please describe type of genetic resource ***mark all that apply***	Comments ***please include additional information as needed***
Intellectual property protection	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	not known
National laws of your country	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	Implementation of the Nagoya Protocol in Bulgaria is via transposition of EU Regulation No. 511/2014 (ratify 30.08.2016)
National laws of donor country	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	
Internationl laws or protocols	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	
Too expensive	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	There are no experiences to date in Bulgaria with the implementation of the Nagoya Protocol for AqGR.
Material transfer agreements required	☐ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	
Knowledge gaps	☐ DNA ☒ Stock, breed or variety ☒ Species ☐ Other	
Public perception	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	

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

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

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

The specific objectives are:

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

Research

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

Please mark appropriate box

- ○ Yes
- ◉ No
- ○ Unknown

Please provide details

Conservation of genetic resources of farmed animals, including fish is partly developed. There are not natioal research programe for conservation and sustainable use and development of aquatic genetic resources.
Particular research activities depend on priorities of competitive research funds (e.g. the National Science Fund or funds provided by the Ministry of Agriculture and Ministry of Environment). There are no special funds (projects) for investigation of genetic diversity of aquatic farmed organisms. There is episodic research investigations according to the MOEW project for example of sterlet identification used for restocking purposes.

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

Add Row

Main institutions, organizations, corporations and other entities	Area of research ***Mark all that apply***	Comments ***Please provide any additional information***	
Institute of oceanology, BAS	☒ Genetic resource management ☒ Basic knowledge on aquatic genetic resources ☒ Characterization and monitoring of aquatic genetic resources ☐ Genetic improvement ☐ Economic valuation of aquatic genetic resources ☒ Conservation of aquatic genetic resources ☒ Communication on aquatic genetic resources ☐ Access and distribution of aquatic genetic resources ☐ Other		X
Institute of Fisheries and aquaculture, Plovdiv	☒ Genetic resource management ☐ Basic knowledge on aquatic genetic resources ☐ Characterization and monitoring of aquatic genetic resources ☐ Genetic improvement ☐ Economic valuation of aquatic genetic resources ☒ Conservation of aquatic genetic resources ☐ Communication on aquatic genetic resources ☐ Access and distribution of aquatic genetic resources ☐ Other		X

Main institutions, organizations, corporations and other entities	Area of research ***Mark all that apply***	Comments ***Please provide any additional information***	
Institute of Fishery Resources, Varna	☐ Genetic resource management ☒ Basic knowledge on aquatic genetic resources ☐ Characterization and monitoring of aquatic genetic resources ☐ Genetic improvement ☐ Economic valuation of aquatic genetic resources ☒ Conservation of aquatic genetic resources ☐ Communication on aquatic genetic resources ☐ Access and distribution of aquatic genetic resources ☐ Other		X
The Medical University "Prof. Dr. P. Stoyanov, Varna	☐ Genetic resource management ☐ Basic knowledge on aquatic genetic resources ☐ Characterization and monitoring of aquatic genetic resources ☐ Genetic improvement ☐ Economic valuation of aquatic genetic resources ☐ Conservation of aquatic genetic resources ☐ Communication on aquatic genetic resources ☐ Access and distribution of aquatic genetic resources ☒ Other	Determination of persistent organic pollutants (PCBs, DDT and metabolites) in the Black Sea and freshwater fish as well as molluscs	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	2
Improve capacities for genetic improvement	1
Improve capacities for genetic resource management	2
Improve capacities for economic valuation of aquatic genetic resources	1
Improve capacities for conservation of aquatic genetic resources	3
Improve communication on aquatic genetic resources	3
Improve access to and distribution of aquatic genetic resources	4
Add other rows as appropriate and rank To create and develop the accessible genetc database for farmed species and their wild relatives. Add Row Remove Row	1

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

Education, training and extension

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

Add Row

Institution	Thematic Area	Type of courses **mark all that apply**	Comments	
Department "General and Applied Hydrobiology" at the Faculty of Biology, Sofia University "St. Kliment Ohridski"	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Characterization and monitoring of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☒ Training ☐ Extension		
	Genetic improvement	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		X
	Economic valuation of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Conservation of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☒ Training ☐ Extension		

Department "Biology and Aquaculture" at the Faculty of Agriculture of the Trakiya University.	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Characterization and monitoring of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Genetic improvement	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		X
	Economic valuation of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Conservation of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
Institute of oceanology, Bulgarian Academy of Sciences	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Characterization and monitoring of aquatic genetic resources	☐ Undergraduate ☒ Post-graduate ☒ Training ☐ Extension	Ph.D sudents trained in the area of biodiversity based on genetic identification and sustainable stock utilization mainly of wild relatives and also on sturgeon farmed species.	X
	Genetic improvement	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Economic valuation of aquatic genetic resources	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Conservation of aquatic genetic resources	☐ Undergraduate ☒ Post-graduate ☒ Training ☐ Extension		

Coordination and networking

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

If no mechanism exists check here: ☐

Add Row

Name of mechanism	Description of how mechanism operates	
Multiannual National Strategic Plan for Aquaculture of Bulgaria, 2013	The national development plan has been developed in cooperation and communication between all sectors shearing some resources and interests, including objectives, targets, institutions, ect., according to the requirements of Strategic Guidelines for the sustainable development of EU aquaculture, 2013.	X
Common Fisheries Policy (CFP) of the EU	The CFP aims to ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that they provide a source of healthy food for EU citizens. Its goal is to foster a dynamic fishing industry and ensure a fair standard of living for fishing communities.	X
Habitats Directive /Natura 2000	According Habitat Directive, a number of water areas of Bulgaria are set as special Areas of Conservation due to fish species of Community importance and described in Annex 2 of the Directive. The effective management of protected areas with fishes from Annex 2 requires the creation and implementation of monitoring programs to ensure adequate assessment, both in terms of their conservation status, and in terms of their spatial distribution. In connection with the implementation of the commitments of the Republic of Bulgaria in accordance with Article 8 of Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, a national framework for priority action under Natura 2000 (NFPA) 2014 – 2020 was developed.	X
Water Framework Directive (WFD)	The overall objective of this Directive is to achieve good ecological status of surface waters (rivers, lakes/dam lakes) by 2015. To achieve this objective, the Directive introduces a new, integrated approach to assessing the status of surface waters, which is based on the concept of water ecosystems.	X
Marine Strategy Framework Directive (MSFD)	The main aim of the Marine Strategy Framework Directive is to maintain or achieve a Good Environmental Status (GES) in the marine environment by 2020. The main human activities that affect the state of the marine environment refer to the aquaculture sector. Their impact on the marine environment results in habitat loss, decrease of biodiversity, nutrient enrichment, input of contaminants, physical damage of the seafloor, litter and noise pollution, etc. In order to reduce the anthropogenic pressure on the marine environment caused by human activities it is necessary to plan and implement measures so as to ensure the achievement and maintenance of a good environmental status, according to MSFD requirements.	X

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

Please rank the following in regards to capacity strengthening.

Capacities	Rank 1=Very Important 10=No importance
Increase awareness in institutions	1
Increase technical capacities of institutions	1
Increase information sharing between institutions	1
Add other rows as appropriate and rank Add Row Remove Row	

Please specify in box below

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

Add Row

Network	Objectives of the network ***Please mark all that apply*** to your country	Comments	
General Fisheries Commission for the Mediterranean (GFCM)	☐ Improve basic knowledge on aquatic genetic resources ☒ Improve capacities for characterization and monitoring of aquatic genetic resources ☐ Improve capacities for genetic improvement ☐ Improve capacities for economic valuation of aquatic genetic resources ☒ Improve capacities for conservation of aquatic genetic resources ☐ Improve communication on aquatic genetic resources ☐ Improve access to and distribution of aquatic genetic resources		X
Network of Aquaculture Centers in Central and Eastern Europe (NACEE)	☒ Improve basic knowledge on aquatic genetic resources ☐ Improve capacities for characterization and monitoring of aquatic genetic resources ☒ Improve capacities for genetic improvement ☐ Improve capacities for economic valuation of aquatic genetic resources ☐ Improve capacities for conservation of aquatic genetic resources ☒ Improve communication on aquatic genetic resources ☒ Improve access to and distribution of aquatic genetic resources		X

Network	Objectives of the network ***Please mark all that apply*** to your country	Comments	
European Inland Fisheries Advisory Commission (EIFAC)	☐ Improve basic knowledge on aquatic genetic resources ☒ Improve capacities for characterization and monitoring of aquatic genetic resources ☐ Improve capacities for genetic improvement ☐ Improve capacities for economic valuation of aquatic genetic resources ☒ Improve capacities for conservation of aquatic genetic resources ☐ Improve communication on aquatic genetic resources ☐ Improve access to and distribution of aquatic genetic resources		X

Information systems

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

Add Row

Name of information system	Type of information stored ***mark all that apply***	Main stakeholders ***mark all that apply***	
National Agency for Fisheries and Aquaculture (NAFA) maintains a database collected information--statistical system in fisheries and aquaculture.	☐ DNA sequence ☐ Genes and genotype ☐ Breeds, strains or stocks ☒ Species names ☒ Production figures ☒ Distribution ☐ Level of endangerment ☐ Other	☒ Fish farmers ☒ Fishers in capture fisheries ☒ Fish hatchery people ☒ People involved in marketing ☒ Government resource managers ☒ Fishing or aquaculture associations ☒ Aquatic protected area managers ☒ University and academic people ☒ Non-Governmental Organizations ☒ Intergovernmental Organizations ☒ Policy makers ☐ Donors ☒ Consumers ☒ Politicians **Please list other stakeholders as necessary**	X

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

Please describe what capacities need to be strengthened

- Unified and systematic information on activities in the aquaculture sector
- To improve the template for data collection in aquaculture sector, concerning important information about aquatic genetic resources. The data about the species, strains, and genetic improvements of farmed aquatic organisms have to be required.
- Create geographic information system (GIS) as effective instrument for spatial planning
- Improving the data analyses, dissemination and mapping (GIS)
- To create the national data base for AqGR with information for the genetic diversity of breeding stock in the farms
- To create data-base for genetic differentiation of wild relatives of the farmed species.
- Cooperation between the production sector and research institutions

The coordinated actions at local level between entrepreneurs, public authorities, associations, research institutions and organizations for education and training can help to stimulate local economies and meet the growing demand for seafood, sustainably produced at local level.

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

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

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

The specific objectives are:

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

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

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

46. Please list the international, regional or sub-regional agreements your country subscribes to that cover aquatic genetic resources of farmed species and their wild relatives, such as the Nagoya Protocol[2] the Convention on Biological Diversity and the Cartagena Protocol and how they have impacted aquatic genetic resources and stakeholders in your country. Examples could include:

[2] http://www.cbd.int/abs/nagoya-protocol/signatories/

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

Add Row

International, Regional, bilateral or Sub-Regional agreement	Year your country ratified or subscribed to the agreement	Impact on aquatic genetic resources	Impact on stakeholders	Comments	
Nagoya Protocol	28.06.2016 ratified	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect		X

International, Regional, bilateral or Sub-Regional agreement	Year your country ratified or subscribed to the agreement	Impact on aquatic genetic resources	Impact on stakeholders	Comments	
Convention on Biological Diversity	29.02.1996	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect		X
Washington Agreement on International Trade in Endan-gered Species of Wild Fauna and Flora (CITES, EU species protection regulation (EC) No. 338/97)	16.04.1991	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect		X
Cartagena Protrcol	25.05.2000	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◉ No effect	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◉ No effect	There is no genetically modified aquatic species either for cultivation or for food or feed uses approved in Europe.	X
United Nations Convention on the Law of the Sea, UNCLOS)	30.08. 1996	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect	◯ Strongly positive ◉ Positive ◯ Negative ◯ Strongly negative ◯ No effect		X

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

Collaboration is needed in order to ...	Rank 1=Very Important 10=No importance	To what extent are the needs being met	Comments ***For example any critical gaps***
Improve information technology and database management	1	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve basic knowledge on aquatic genetic resources	2	◉ To a great extent ○ To some extent ○ None ○ Unknown	
Improve capacities for characterization and monitoring of aquatic genetic resources	2	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve capacities for genetic improvement	3	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve capacities for economic valuation of aquatic genetic resources		○ To a great extent ○ To some extent ◉ None ○ Unknown	
Improve capacities for conservation of aquatic genetic resources	3	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Improve communication on aquatic genetic resources	1	○ To a great extent ○ To some extent ◉ None ○ Unknown	

Collaboration is needed in order to ...	Rank 1=Very Important 10=No importance	To what extent are the needs being met	Comments ***For example any critical gaps***
To improve access to and distribution of aquatic genetic resources	7	○ To a great extent ◉ To some extent ○ None ○ Unknown	
Other **Continue adding row as necessary** collaboration to developing of the fish marine aquaculture Add Row / Remove Row	1	○ To a great extent ○ To some extent ◉ None ○ Unknown	

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

International collaboration and experience are needed in the are of:
- creation of AqGR data base for farming species.
- creation of ex-situ live gene bank and to develop cryoconcervation for the most farmed species
- exchange of genetic material of farmed fish
- introduction of modern innovative technologies and optimization of existing production capacities.
- research, expertise and knowledge transfer

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

Collaboration is needed for conservation of sturgeons as a trans boundary species. The same effort hate to be applied for other migratory species.
The collaboration is need also for application of the reliable and innovative indicators (molecular markers) for assessment of the fish stocks in the Black Sea and to develop strategy for its sustainable exploitation.

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.

sturgeon species conservation and keeping for aquaculture
prohibition for sturgeon catches up to 2020 and restocking programes for protection of natural sturgeon populations.

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