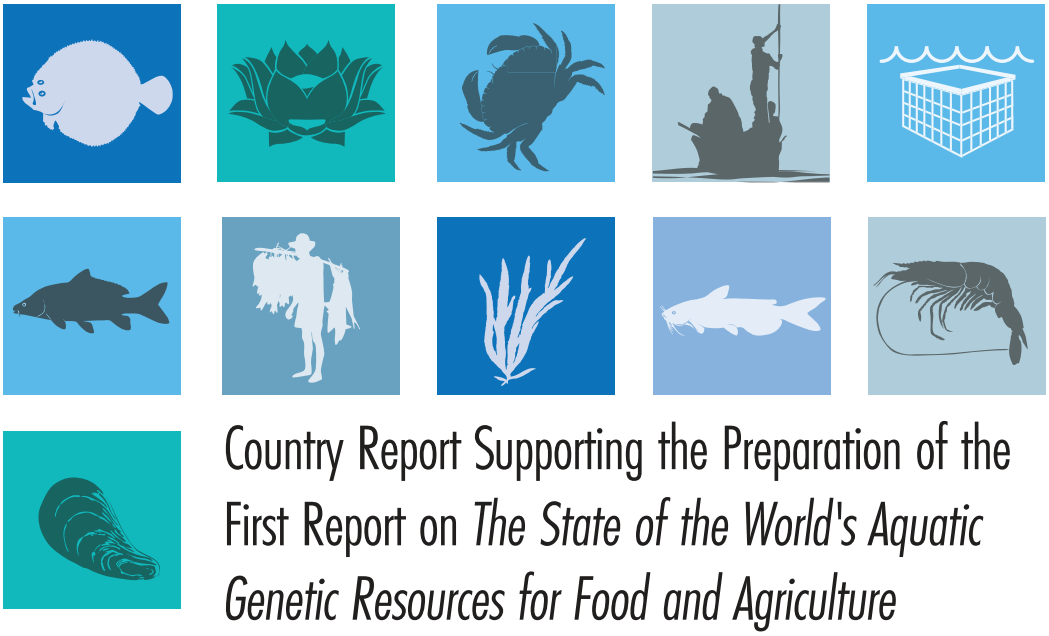
Food and Agriculture Organization of the United Nations

COUNTRY REPORTS

Belize



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	Belize
Prepared By	Miguel Manuel Sosa
Date	Feb 15, 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.

Exert from most recent Aquaculture Program Abstract.

Small Scale Aquaculture Program Abstract
By: Aquaculture Unit, Agriculture Department
Date: 16 November 2015

1. Background

• Small Scale Fish Farming- Tilapia farming has been an activity of the GOB since 2003 when the first fish farming activities were being carried out in government farm in Biscyane village. Progress at that hatchery was minimal with the limited production of 10,000 fingerlings per month. Fortunately the new hatchery at Central Farm has been designed to have a production capacity of 1,000,000 fingerlings per year (83,333 fingerlings per month.) Over the years, the Aquaculture Unit has worked with 113 farmers. Some of these farmers are still actively farming tilapia while others have left the practice for various reasons.
• Fingerling Production- The Tilapia Hatchery Centre (THC) is a government facility which produces tilapia fingerlings, (baby fish) to supply the demand for seed (fish for stocking) to small scale tilapia farmers in Belize. The THC was built by the GOB-ROC Aquaculture Project which is a joint project between the Republic of China, (Taiwan) and the Government of Belize. The THC was inaugurated in May 20th 2015 but has been producing tilapia fingerlings for the public since August 2014.
• GOB ROC Aquaculture Project- The Aquaculture Unit, which is a part of the Agriculture Department, received assistance from Taiwan, through the GOB ROC Aquaculture Project. The project commenced when the Memorandum of Understanding which was signed in February of 2012. The five year project will end on February of 2017. The project is funded by the Republic of China (Taiwan) with 2.5 million USD to cover the construction of the building, farm and operate the farm over the course of the 5 years. The Government of Belize has made contributions as well with the provision of the land, in the electrification of the property, road works, and staff.
• Ministry of Health "Improving Children's Health and Nutrition" Project- This is a project between the Ministry of Health (MoH) and the World Bank, with funding from the Japan Social Development Fund (JSDF.) The project consists of several approaches to combat child malnutrition in the Toledo district. These approaches include the establishment of clinics and health centres in the rural communities of Toledo, the publication of manuals on good child nutrition, training of health workers in the monitoring of child nutrition, audiovisual equipment for schools, kitchen equipment and utensils for schools, green houses, poultry farming equipment and fish farms for school. The Aquaculture Unit has assisted the Project Management Unit of the MoH with the implementation of the tilapia farming aspect of this project. Site selection began in February, construction done from June to August and the farms began to receive fingerlings in October and will continue to receive on a monthly basis until March 2016.

2. Current Situation

• Small Scale Fish Farming-
The Small Scale Fish Farming sector in Belize focuses on the rearing of Nile Tilapia. The Nile Tilapia is available in two variations in Belize. These are the Red and the Gray variations. The Red is considered as the "Taiwan Red" and the Gray is the "Chitralada." The local market demands both colours of tilapia but there is a greater preference for Reds since the middle of this year.

Figure No. 1. Location of 52 active fish farmers in Belize, 2015

A recent review of the sector has shown that there are currently 52 active farmers and 61 non-active farmers in Belize. The Cayo district has the most number of active farmers with 30 individuals active while the Corozal district has zero farmers active. (See Fig. No. 1) The Cayo district also has the highest number of non-active farmers (25) followed by the Orange Walk district (15.) In Belize there are currently 19.8 acres of water surface being used for small scale tilapia farming. However there are also 19.09 acres of inactive pond area in Belize. The 19.8 acres of active water surface consists of 124 pond and or tanks. The breakdown of these ponds and tanks is shown in Figure No. 2.

Figure No. 2. Breakdown of 124 active ponds/tanks in Belize, 2015

Small scale fish farmers in Belize experienced very expensive feed costs in 2011-2013. The removal of the General Sales Tax from animal feeds did little to reduce the price. Ingredients such as corn, wheat and fish meal had all separately been experiencing supply shortages and price increases during these years. Feed availability was also difficult in Belize at the time. Belize Mills Limited stopped producing locally made shrimp feed and this negatively affected fish farmers as they used shrimp feed to feed their tilapias. Importers of fish feed were also an unreliable source of fish feed since they imported the 'factory made' fish feed in too few quantities and too infrequently from Guatemala and Honduras. These factors combined with poor pond design in some cases led to both low productivity and low profitability. These are considered the reasons for the non-active status of half the small scale fish farming sector. Today the price of feed is as much as thirty dollars cheaper than it was during the 2011-2013 time period (85 dollars BZD for 100 lbs. sack of 28% protein content.)

Tilapia farmers are currently experiencing prices for tilapia ranging from $3.50 to $5.50 per pound. Tilapia is sold in Belize in a size range of ¾ to 1 pound. The product is sold, whole, gutted, gutted, de-scaled, and filleted. The outlets for the product are supermarkets, grocery stores, markets and the farm gate.

• Fingerling Production-

Figure No. 3. Monthly tilapia fingerling production in THC for 2015.

The Tilapia Hatchery Centre has sold to the public 172,530 tilapia fingerlings from the period January to October of 2015. (See Fig. No. 3.) The increase amount of fingerlings sold in the months of July and September are related to the new demand of fingerlings from one of the shrimp farms in Belize. The Royal Maya Shrimp Farm is stocking tilapias in its farm to help combat the growth of pathogens to its shrimp production.

Figure No. 4. Distribution of tilapia fingerlings throughout Belize.

The Cayo district has the most number of active fish farmers and as such has the highest number of tilapias stocked for small scale tilapia production. The Stann Creek district has the greatest number of tilapias stocked in Belize. However, the majority of these tilapias in the Stann Creek district are being used for biosecurity measures at Royal Maya Shrimp Farm. They are not expected to enter the local market for fish consumption in the near future.

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 began in Belize in 1982 with the establishment of the countries first shrimp farm. Up to 2014, the shrimp industry was the second largets contributor to GDP. Fish farming has been done with both Cobia and Nile tilapia. Cobia has since ceased in Belize while small scale tilapia farming and commerical tilapia farming both had setbacks due to excessive cost of feed during 2012-2014.

The industry is based on two exotic species, this make the management of AqGRs a bit unclear as no local species is currently being farmed on a commercial scale in Belize.

Our AqGRs are imported brood-stocks of non native species.

The country does have a few native species which have the potential to be used for aquaculture purposes.

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.

The species of Pacific white shrimp and Nile tilapia are known in Belize. However the exact strain is unclear. The nation of origin is known but because the lines are purchased from abroad the details of the variety being received is sometimes unclear in the case of Tilapia.

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.

Once the hatchery managers are aware that their are genetic distinctions between broodstocks, they tend to maintain the two families separate. No hybridization between tilapias or between white shrimp has been done in Belize.

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

Please mark appropriate box.

- (•) Not at all
- ( ) To a minor extent
- ( ) To some extent
- ( ) To a great extent

Please add any explanation here.

The Pacific White shrimp broodstock in Belize originated from a shrimp farming company named "Peces" in Yucatan, Mexico. The broodstock now being used are the descendants of that original variety. Pacific white shrimp is not a native species to the Caribbean sea. This variety was imported to Belize for its proven resistance to the Taura Syndrome Virus, TSV.
Nile Tilapia is present in the wild in Belize although it is not a native species. Theses animals entered the country through a river that crosses in to neighboring Guatemala and renters Belize. There were escapees from Guatemalan fish farms. These wild tilapias are not used for breeding purposes in tilapia aquaculture.

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** 30
- Percent managed by private sector. **Please Enter Percentage Here** 70
- Percent managed by private /public partnership. **Please Enter Percentage Here** 0

Total

Please add any explanation here.

The breeding of tilapia in Belize is done by the two sectors. The private sector has a hatchery which supplies the needs of the large scale commercial fish farm. The Government of Belize, GOB, supplies tilapia fingerlings to the small scale fish farmers of the country.
In the case of Pacific White shrimp, the private sector has three hatcheries which supply post larvae, pl's, to the various grow-out farms in the country. The GOB does not have a hatchery to produce shrimp pl's.

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*	
Penaeus vannamei	☒ Traditional selective breeding	☒ Private Sector ☐ Public Sector ☐ Private/Public partnership	X
	☐ Hybrids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Triploids and other polyploids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Mono-sex production	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Oreochromis niloticus	☒ Traditional selective breeding	☒ Private Sector ☐ Public Sector ☐ Private/Public partnership	X
	☒ Hybrids — Specify parental species in the box below: Chitralada, Spring Genetics, Taiwan Red	☒ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Triploids and other polyploids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Mono-sex production	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Other	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	

	☒ Traditional selective breeding	☒ Private Sector ☐ Public Sector ☐ Private/Public partnership	
	☐ Hybrids	☐ Private Sector ☐ Public Sector ☐ Private/Public partnership	
Rachycentron canadum	☐ 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 Oreochromis niloticus	☒ 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)	"Taiwan Red Tiapia" is a selectively breed tilapia used in Belize by the public sector hatchery. "Dutch Gray Tilapia" is a hybrid which was imported from Guatemala to Belize. It is used by the public sector hatchery. "Chitralada" is a hybrid gray used by the public sector hatchery. "Spring Genetics" is a hybrid gray used by the private sector hatchery.	X

○ Native ◉ Introduced Penaeus vannamei	☐ Wild Type ☒ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	◉ Yes ○ No ○ Not Known	○ Increasing ○ Stable ◉ Fluctuating ○ Decreasing ○ Stopped ○ Not known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	The whiteleg shrimp broodstock used in Belize, originated from a farm in Mexico. These animals were imported to the country for their resistance to TSV. The variety was then maintained by selective breeding in Belize.	X
○ Native ◉ Introduced Rachycentron canadum	☒ 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)	The Cobia breeders utilized on Belize were original from Florida. Cobia is locally available. The hatchery however grew their broodstock from a group of Cobia juveniles from Florida, USA. The Florida juveniles were sourced from the wild. Only selective breeding improvement was performed on these breeders.	X

◉ Native ○ Introduced Eucheuma spp	☒ Wild Type ☐ Selective bred type ☐ Hybrids ☐ Cross breeds ☐ Strains ☐ Varieties ☐ Polyploids	○ Yes ◉ No ○ Not Known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	◉ Increasing ○ Stable ○ Fluctuating ○ Decreasing ○ Stopped ○ Not known	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	☒ Selective breeding ☐ Hybridization ☐ Polyploidy (chromosome set manipulation) ☐ Monosex ☐ Marker assisted selection ☐ Other (specify in comment)	Aquaculture of Eucheuma isiforme (C.Agardh) is bieng done in Belize with the local variety located in the atolls of Belize. No genetic work has been done locally on this red marine macro-algae. It is a small farm and relies on its own production to seed long lines for the future crop.	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***	
Lutjanus spp	(•) Yes ( ) No ( ) Not Known	Central American Fisheries and Aquaculture Organization (OSPESCA) and the Caribbean Regional Fisheries Mechanism (CRFM)	X
Petenia splendida	( ) Yes ( ) No ( ) Not Known	Petenia splendida is a carnivorous fish species native to the freshwaters of Belize, Northern Guatemala and Southern Mexico. Attempts have been made in these three regions to breed this species in captivity. Attempts at breeding were successful. Challenges still remain in the grow-out techniques needed to grow these fishes. The common English name is "Baysnook" and the common Spanish name is "Pez Blanco" or "Bocona." The species is a favorite dish and its meat is white, firm and has a good flavour. The fish also is targeted by fishing and is a good candidate for native fish restocking projects as well.	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***	
Eucheuma spp	☒ 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	Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland Portugal Qatar Republic of Korea Republic of Moldova Romania Russian Federation Rwanda Saint Kitts and Nevis Saint Lucia	Saint Lucia and St. Kitts and Nevis applied for living samples of Eucheuma isiforme from The Fisheries Department of Belize many years ago. the living samples formed the start of seaweed farming in those countries. Belize herself is only now attempting to farm these seaweeds.	X
Petenia splendida	☒ No deliberate genetic alteration ☐ Traditional selective breeding ☐ Hybrids ☐ Triploids and other polyploids ☐ Mono-sex production ☐ Other	☐ Import ☒ Export	☐ DNA ☐ Genes ☐ Gametes ☐ Tissues ☐ Embryos ☒ Living specimens ☐ Other	Thailand Timor-Leste Togo Tokelau (Associate Me Tonga Trinidad and Tobago Tunisia Turkey Turkmenistan Tuvalu Uganda Ukraine United Arab Emirates United Kingdom United Republic of Ta United States of Amer Uruguay	Belize is one of the few countries that has Petenia splendida. In addition, Belize is the only country that has the RED variety of Petenia splendida. Juveniles of the red variety were exported to the USA because the the aquarium trade there had an interest in breeding this variety for sale aquarium hobbyists.	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	
Holothuria mexicana	☒ Capture fisheries ☐ Recreational fishery ☐ Aquaria ☐ Biological control ☐ Research and develpment ☐ Other (specify in comments)	The "Donkey Dung" sea cucumber is native to Belize, the Yucatan Peninsula of Mexico, and parts of Honduras. Reproduction research is being done currently in both Mexico and Honduras on this species but no research has begun in Belize. They were being fished in Belize for export but the stock has been depleted and the fishery is now closed.	X
Crassostrea rhizophorae	☐ Capture fisheries ☐ Recreational fishery ☐ Aquaria ☐ Biological control ☐ Research and develpment ☒ Other (specify in comments)	Mangrove oysters are a native species in Belize. Jamaica, Cuba and Brazil have all done research on this species of oyster. Production of oysters in the Caribbean is still in its development stage. Colombia and Brazil might have the most progress.	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***	
Eucheuma spp	☐ Import ☒ Export	☐ Tissues ☐ Gametes ☐ DNA ☐ Genes ☐ Embryos ☒ Living specimens ☐ Other	Palau Panama Papua New Guinea Paraguay Peru Philippines Poland Portugal Qatar Republic of Korea Republic of Moldova Romania Russian Federation Rwanda Saint Kitts and Nevis Saint Lucia	Same as question 11.	X
Petenia splendida	☐ Import ☒ Export	☐ Tissues ☐ Gametes ☐ DNA ☐ Genes ☐ Embryos ☒ Living specimens ☐ Other	Timor-Leste Togo Tokelau (Associate Memb Tonga Trinidad and Tobago Tunisia Turkey Turkmenistan Tuvalu Uganda Ukraine United Arab Emirates United Kingdom United Republic of Tanzar United States of America Uruguay	Same as question 11.	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)***	
Oreochromis niloticus	☐ 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	The AqGR of farmed tilapia and shrimp are bieng updated to meet production needs. The AqGR must grow larger and breed easily in our climate.
Increased wealth and demand for fish	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	Similar to above answer. The hatcheries try to use the best AqGR to meet the market needs.
Governance (ability of government, industry and the public to work together in managing resources)	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	The work of AqGR management is administered my the government in the case of broodstock importation. However the documentation and quarentines of imported broodstock is left to the private sector. in addtion the goverment does not assist the private sector with research. It in-fact does not have a research program for AqGR.
Climate change	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	The rainy and dry seasons are becoming more intense. The flooding affects water quality for farms and hatcheries. The cooler than average temperatures at the beginning of the year also cause sickness for these tropical species.
Competition for resources, especially freshwater	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	The management of AqGR has become more efficient as competition for resources, especially freshwater has increased over the years. Aquaculture hatcheries practice good aquaculture practices to obtain the best water quality possible and separate solid wastes from discharge water before release.

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	The consumer wants AqGR to be healthy and natural animals. They do not accept GMO's but are open to other methods of AqGR improvement methods.
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	The wild tilpia AqGR is not adversly affected by this driver because the gray tilapia in the wild is not currently over fished in Belize.
Increased wealth and demand for fish	◯ Strongly positive ◯ Positive ◉ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	The demand for wild tilapia AqGR is actually lessened since the flavour of the wild caught tilapia is not as pleasant and the farm raised tilapia in Belize.
Governance (ability of government, industry and the public to work together in managing resources)	◯ Strongly positive ◯ Positive ◉ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	Little to no local research by the government in wild AqGR.
Climate change	◯ Strongly positive ◯ Positive ◉ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	Could result in the population depletion of wild AqGR.
Competition for resources, especially freshwater	◯ Strongly positive ◯ Positive ◉ Negative ◯ Strongly negative ◯ No effect ◯ Unknown	Wild AqGR are not being protected as agriculture will use freshwater resources for itself and waste management in many communities needs to be imporved.

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	The public is is very concerned about the sustainable use of natural resources in Belize. The media helps in alerting the public when overfishing, illegal fishing or pollution occurs in Belize.
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

Irrigation systems for agriculture will better improve water management and reduce the competition for fresh water resources. Reservoirs and irrigation canals need to be built in Belize to address climate change and ensure that the wild AqGR recieve their supply of water as well.

The use of bio-security measures will help keep the AqGR healthy and freed from disease epidemics.

Increased funding and projects geared towards AqGR surveying and farming techniques will ensure that the AqGR in Belize are valued and administered properly.

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	Selective breeding has been used to maintain imported AqGR of Tilapia and White leg shrimp in Belize.
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	Fresh water and salt water habitats are being lost due to agriculture and tourism. The habitat loss affects the reproduction phase of many of the wild AqGR as the mangroves and swamps serve as nurseries for the juveniles of these AqGR.
Pollution of waters	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	Sewage and agricultural run-off are entering the Belize River. The effect on the early stage of life of most AqGR in the wild is the negative effect of high bacteria levels in the water.
Increased frequency of extreme climatic events and long-term climate change	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	The effects of climate change will affect both the rainy and dry seasons of Belize. The supply of water from wells and rivers will become unstable and will negatively affect both wild and farm AqGR.
Establishment of invasive species	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	The establishment of the Lion Fish in the salt water ecosystem of Belize is negatively affecting the wild reef species that can potentially be used for the aquarium trade in Belize.
Introductions of parasites and pathogens	○ Strongly positive ○ Positive ◉ Negative ○ Strongly negative ○ No effect ○ Unknown	This normally occurs by accident but the effect on AqGR can be severe. The importation of new species for aquaculture or the introduction new brood-stocks of existing species can cause an epidemic to occur. This was the case of the introduction of the Taura virus in Belize.

Drivers that are changing aquatic ecosystems	Effect on AqGR ***mark appropriate box***	Countermeasures and effects
Impacts of purposeful stocking and escapes from aquaculture	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ◉ Unknown	The effects of escapee Tilapai is unkown in Belize. The same can be said for White Leg Shrimp escapees. These animales are exotic to Belize. Cobia escapee are similar to the local Cobia population and as such little if any effect might have occurred.
Capture fisheries	○ Strongly positive ◉ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	The effect of capture fisheries on wild tilapia populations is positive as it keeps the population from growing larger that the ecosystem can sustain it.
Other ***Continue listing other driverst*** Add Row Remove Row	○ Strongly positive ○ Positive ○ Negative ○ Strongly negative ○ No effect ○ Unknown	

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

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

The specific objectives are as follows:

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

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

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

Please mark appropriate box.

- (•) To a great extent
- ( ) To a limited extent
- ( ) Not at all
- ( ) Not applicable

Please include any additional information

Farm raised Tilapia and Shrimp AqGR are being well managed by the private sector and the government tilapia hatchery.

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

Tilapia in Belize is the only farm raised aquatic species that has wild relatives. Tilapia is an exotic species here and as such there is little effort needed to create in situ conservation. The species adapted well to the wild freshwater bodies of Belize. Local fishing keeps the tilapia under control.

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

No current or planned activities for the in situ conservation of farm species and their wild relatives. Tilapia is the only species with farmed and wild populations in Belize.

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	2
Maintain good strains for aquaculture production	3
Meet consumer and market demands	4
To help adapt to impacts of climate change	1
Future breed improvement in aquaculture	5
Please continue listing any other objectives as needed	
Add Row / Remove Row	

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

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

Please mark appropriate box

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

If yes, please give examples

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

Again, in Belize aquaculture is based on the farming of Tilapia and White Leg. Both are exotic species so no wild seed is used to contribute to their aquaculture. If we were farming Lutjanus sp. or Petenia splendida then perhaps yes.

The farming of the red algea does get all its seed from the wild but there is no conservation of this red algea, Eucheuma isiforme.

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

- ○ Yes
- ○ Not yet, but under development
- ◉ No
- ○ Unknown

If yes, please give examples

Conservation of wild cobia would be a good idea for AqGR development. So too for the conservation of Eucheuma sp.

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***	
Crooked Tree Wild Life Sanctuary	○ Very effective ◉ Somewhat effective ○ Not effective ○ Unknown	The fishing in the Crooked Tree Wild Life Sanctuary is regulated by the community and the Audubon Society. The Petenia splendida is to some degree conserved in this protected area. The red algae is found in Glover's Reef wild life sanctuary so it too is protected there.	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***	
Eucheuma isiforme	☒ Direct human consumption ☐ Live feed organism ☐ Other	○ Yes ◉ No ○ Unknown	There are no government facilities that store living animals or genetic material and no aquariums to hold native species in captivity.	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	2
Maintain good strains for aquaculture production	3
Meet consumer and market demands	3
To help adapt to impacts of climate change	1
Future breed improvement in aquaculture	5
Other ***Continue adding row as necessary***	
Add Row / Remove Row	

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

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

The specific objectives are:

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

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

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

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

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

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Fish Farmers	☐ Conservation ☒ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☐ Species ☐ Other	The fish and shrimp farmers maintain the varieties that have been imported into Belize
Fishers	☒ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☒ Stock, breed or variety ☐ Species ☐ Other	Fishers are farming the Eucheuma isiforme from wild stocks. They therefore aid in the conservation of wild stock.

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	Maintain the varieties of tilapia and shrimp that were imported in to Belize.
People involved in marketing	☐ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☒ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	The small scale tilapia farmers receive outreach and extension services from the government extension officers.
Government resource managers	☒ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	Depart of Fisheries and Department of the Environment participate in this.

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Fishing or aquaculture associations	☐ Conservation ☒ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	Tilapia fish farming association on Belize
Aquatic protected area managers	☒ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	Crooked Tree Wild Life Sanctuary and Glover's Reef Wild Life Sanctuary
Policy Makers	☐ Conservation ☒ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	Promotion of aquaculture as a viable sector of the agriculture industry

Stakeholders	Role of stakeholder in regards og AqGR ***mark all that apply***	Genetic resource of main interest ***mark all that apply***	Comments ***Please provide any information or explanation of stakeholders' role***
Non-Governmental Organizations	☐ Conservation ☒ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	Some NGO's inBelize are interested in promoting the production of tilapia for the benefit it can give to rural communities.
Intergovernmental Organizations	☐ Conservation ☒ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☐ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	Intergovernmental organizations have worked in the monitoring of diseases in the shrimp farming sectors of neighboring Central American countries.
Donors	☐ Conservation ☐ Production ☐ Feed manufactoring ☐ Breeding ☐ Research ☐ Marketing ☐ Processing ☐ Advocacy ☒ Outreach/Extension ☐ Other (**specify**)	☐ DNA ☐ Stock, breed or variety ☒ Species ☐ Other	Donors often assist by providing technical training workshops to government extension officers and hatchery employees.

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

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

In Belize there are a few cases women fish farmers. The role of women in AqGR management is very little since Belize in general does little work in term of its development of AqGR.

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

Similar to above.

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***	
National Agriculture and Food Policy	draft	☐ Genes or molecules only ☒ Aquaculture ☐ Capture fisheries ☐ Conservation ☐ Intellectual property protection ☒ Importation ☐ Trade and commerce ☐ Access and benefit sharing ☐ Other	The Department of Agriculture is in the final stages of reviewing the agriculture policy. This policy includes aquaculture as Belize considers it to be a form of agriculture. The Belize Agriculture and Health Authority would monitor that new AqGR are imported into Belize according to standards that prevent the accidental importation of diseases brood-stocks into the country.	X
National Living Aquatic Resources Act	draft	☐ Genes or molecules only ☐ Aquaculture ☒ Capture fisheries ☒ Conservation ☐ Intellectual property protection ☐ Importation ☐ Trade and commerce ☒ Access and benefit sharing ☐ Other	The Fisheries Department is in the final stages of reviewing its fisheries policy. This document would describe how research and development of mariculture in Belize is carried out.	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.

Constraints for any policy in Belize are the lack of funding or insufficient human resources to monitor and evaluate the implementation of a policy geared towards AqGR. Stakeholders need to see implementation.

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

Type of genetic resource (can be species name, DNA, gametes or other descriptor)	Comments ***Please, provide verifiable main sources of information, effectiveness of the restriction, description of type of restriction and for whom does the restriction apply***
DNA	GMOs of any kind are not currently being officially permitted into Belize.
Stock, breed or variety	Shrimp broodstocks that are developed solely in outdoor environments are not a popular option for the aquaculture industry of Belize.
Species	
Other **Continue adding row as necessary** Add Row | Remove Row	

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

Add Row

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

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

Obstacles to accessing aquatic genetic resources	Please describe type of genetic resource ***mark all that apply***	Comments ***please include additional information as needed***
Intellectual property protection	☐ DNA ☐ Stock, breed or variety ☐ Species ☒ Other	Not an issue.
National laws of your country	☐ DNA ☐ Stock, breed or variety ☐ Species ☒ Other	Regulations have in the past requested fitosanitary certificates that are not issues by the donor country.
National laws of donor country	☐ DNA ☐ Stock, breed or variety ☐ Species ☒ Other	Not an issue.
Internationl laws or protocols	☐ DNA ☐ Stock, breed or variety ☐ Species ☒ Other	Not an issue.
Too expensive	☐ DNA ☐ Stock, breed or variety ☐ Species ☒ Other	Local authorities here in Belize require an all expense paid trip for 2 animal health officer to the farm or hatchery of the donar country from which the AqGR will be exported. This added cost is too expensive for some producers.
Material transfer agreements required	☐ DNA ☐ Stock, breed or variety ☐ Species ☒ Other	Belize's ministry of agriculture, does not have any agreements for the sharing or transfer of AqGRs with any other countries. Such agreements would indeed help the sector to share native genetic material with neighboring countries.
Knowledge gaps	☒ DNA ☐ Stock, breed or variety ☐ Species ☐ Other	There are no technicians in Belize with experience in the use of genetic markers to monitor and control brood-stocks. Such knowledge would help to modernize our management of AqGRs.
Public perception	☐ DNA ☐ Stock, breed or variety ☐ Species ☒ Other	The public is to some degree concerned about the possibility of escapees of exotic AqGR that might be brought into the country.

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

A national research programme to support the conservation, etc. has not been prepared. The country needs assistance from a regional neighbor with experience in this type of matter.

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***	
Belize Agricultural Health Authority (BAHA)	☐ 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	The importation of fish and shrimp broodstocks has always been regulated by the BAHA.	X
Belize Fisheries Department (BFD)	☐ 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	The exportation of marine flora and fauna for genetic research and AqGR purposes is regulated by the fisheries department.	X

Main institutions, organizations, corporations and other entities	Area of research ***Mark all that apply***	Comments ***Please provide any additional information***	
Ministry of Agriculture,Fisheries, Forestry and the Sustainable Development (MAFFSD)	☐ 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	Both BAHA and the BFD are departments and institutions which fall within the MAFFSD.	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	2
Improve capacities for genetic resource management	1
Improve capacities for economic valuation of aquatic genetic resources	2
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	5
Add other rows as appropriate and rank Add Row Remove Row	

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

Trained geneticist and a laboratory for this are lacking in Belize.

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	
University of Belize, Faculty of Natural Resource Management	Genetic resource management	☐ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension		
	Characterization and monitoring of aquatic genetic resources	☒ Undergraduate ☐ Post-graduate ☐ Training ☐ Extension	The undergraduate course does cover aquaculture and the taxonomy course teaches students to identify wild marine and freshwater AqGR.	
	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	The course covers general conservation of Flora and Fauna in Belize and is not specific to AqGRs.	

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	
		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	2
Add other rows as appropriate and rank Add Row Remove Row	

Please specify in box below

A commitee of government departments such as the Department of Agriculture, the Environment, Fisheries and the University of Belize would be a good way to improve intersectoral coordination on these matters.

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	
OSPESCA, Central American Organization for Fisheries and Aquaculture	☒ 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	More focus is placed on production but some work has been done on the identification of AqGRs in the region.	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***	
	☐ 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

PCR laboratory is needed in Belize to screen incoming AqGRs for viruses.
The use of genetic markers to track and monitor AqGRs.
A research facility to carry out hybridization of fresh water fishes.
A research facility to store genetic material such as native species of fresh and salt water fishes and salt water macro algae.

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

An Aquaculture Development policy needs to be established with the support of the Government local stakeholders in the Aquaculture Industry in Belize.

On a slightly related note the National Biodiversity Strategy and Action Plan which was adopted in 1998, highlighted the need for a comprehensive and integrated approach to the management of protected areas and the creation of greater efficiencies in the management and conservation of Belize's national biodiversity. It was felt that these outcomes could be achieved by facilitating greater coordination and increasing capacities in regulatory agencies through legislative reform and targeted management mechanisms. Community participation was emphasized as being critical to the implementation and success of the NBSAP. Significant progress has been made in NBSAP implementation; the document has been used as a reference and influenced the policy and direction of various programs implemented by the Government and international and local NGOs working in Belize. However, there is an immediate need to review the NBSAP in an effort to update its strategies and timelines to ensure its effective implementation

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		◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect	◯ Strongly positive ◯ Positive ◯ Negative ◯ Strongly negative ◯ No effect	Not signed.	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	Lack of human resources.
Improve basic knowledge on aquatic genetic resources	2	(•) To a great extent ( ) To some extent ( ) None ( ) Unknown	No local training available.
Improve capacities for characterization and monitoring of aquatic genetic resources	2	(•) To a great extent ( ) To some extent ( ) None ( ) Unknown	These are outsourced.
Improve capacities for genetic improvement	1	(•) To a great extent ( ) To some extent ( ) None ( ) Unknown	Not being done in country.
Improve capacities for economic valuation of aquatic genetic resources	2	(•) To a great extent ( ) To some extent ( ) None ( ) Unknown	Registry of the AqGrs is needed. Valuation the can proceed.
Improve capacities for conservation of aquatic genetic resources	2	( ) To a great extent (•) To some extent ( ) None ( ) Unknown	Live conservation can be done in the wild and within control environments.
Improve communication on aquatic genetic resources	2	( ) To a great extent (•) To some extent ( ) None ( ) Unknown	Discussion can begin after the registry and valuation is established.

Collaboration is needed in order to ...	Rank 1=Very Important 10=No importance	To what extent are the needs being met	Comments ***For example any critical gaps***
To improve access to and distribution of aquatic genetic resources	2	◯ To a great extent ◉ To some extent ◯ None ◯ Unknown	The cost is the limiting factor. The lack of a national quarantine facility for imported AqGR is also needed.
Other **Continue adding row as necessary** Add Row / Remove Row		◯ To a great extent ◯ To some extent ◯ None ◯ Unknown	

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

Extraction of AqGRs from Belize has been beneficial to other countries in term of the aquarium trade and seaweed cultivation.

The importation of improved tilapia and white leg shrimp have allowed the aquaculture industry in Belize to adapt to market demands and fitosanitary challenges in the past and present.

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

Belize needs to create a registry of its native/wild AqGRs. It has five major rivers with three running through the centre and two forming its northern and southern boarders with Mexico and Guatemala respectively.
It's salt water resources are unmatched in the Central American and Caribbean region. It has in its territorial waters, the second longest barrier reef in the world and three of the the four coral reef atolls in the Caribbean region.

The lack of development on the monitoring and administration of Belize's AqGRs is a setback to the development of aquaculture in Belize.

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.

Belize is a keeper of AqGRs. The country possess wild Cobia, Lutjanus sps., sea cucumbers, mangrove oysters, spiny lobster and Queen conch in its marine ecosystem that may hold useful genetic material for regional or global aquaculture use. Its fresh water resources also hold potential in the aquarium trade, catfish culture and bivalve culture. Its tropical climate also makes it an ideal place for marine and freshwater research into the improvement of native and non native AqGRs.

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