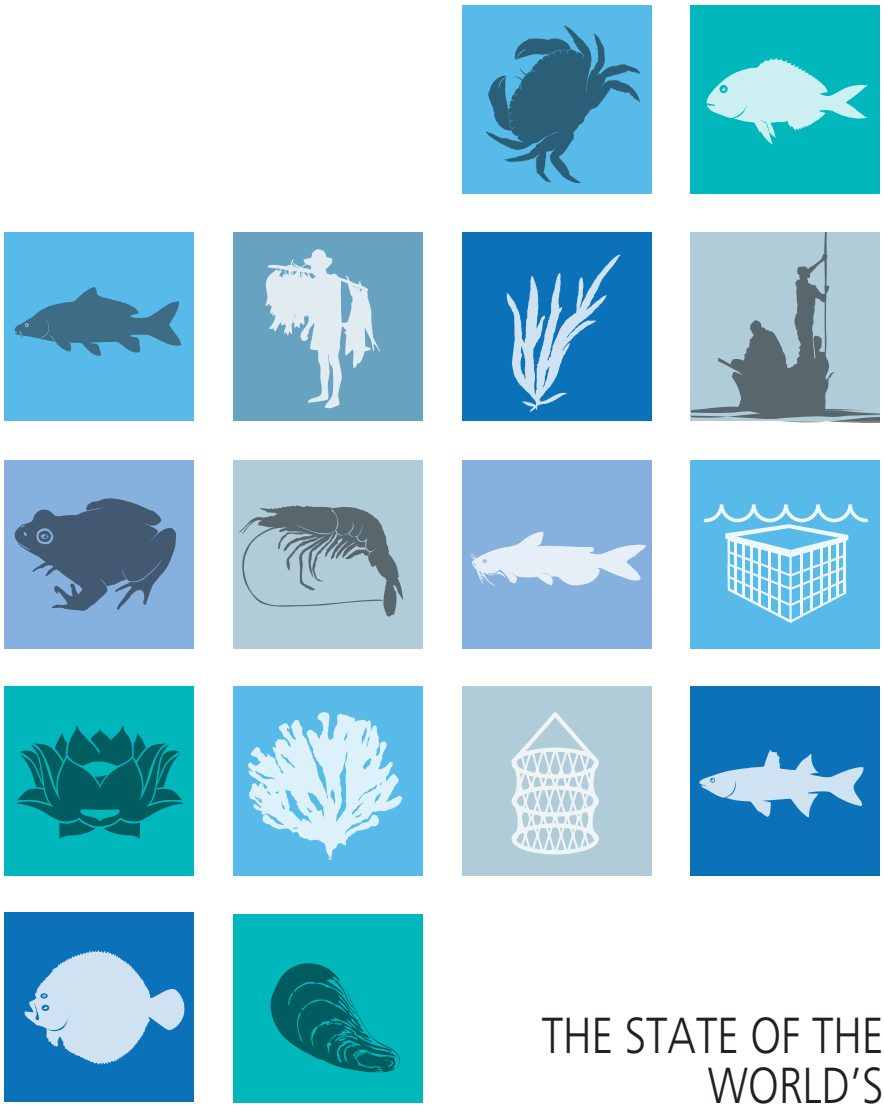
Food and Agriculture Organization of the United Nations

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE



# THE STATE OF THE WORLD'S AQUATIC GENETIC RESOURCES FOR FOOD AND AGRICULTURE *in brief*

FAO COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE
ASSESSMENTS • 2019

In 2007, the Commission on Genetic Resources for Food and Agriculture (Commission) of the Food and Agriculture Organization of the United Nations (FAO) added the preparation of the report on *The State of the World's Aquatic Genetic Resources for Food and Agriculture* (Report) to its Multi-Year Programme of Work. The Commission later determined that the scope of the Report be "farmed aquatic species and their wild relatives within national jurisdiction".

Following a country-driven process, the Fisheries and Aquaculture Department prepared a draft Report for review by the Commission, its Ad Hoc Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture and FAO's Committee on Fisheries (COFI). COFI also consulted its Sub-Committee on Aquaculture and its Advisory Working Group on Aquatic Genetic Resources and Technologies.

Other experts in the field served as external reviewers.



For the full Report, please visit: www.fao.org/3/ca5256en/CA5256EN.pdf

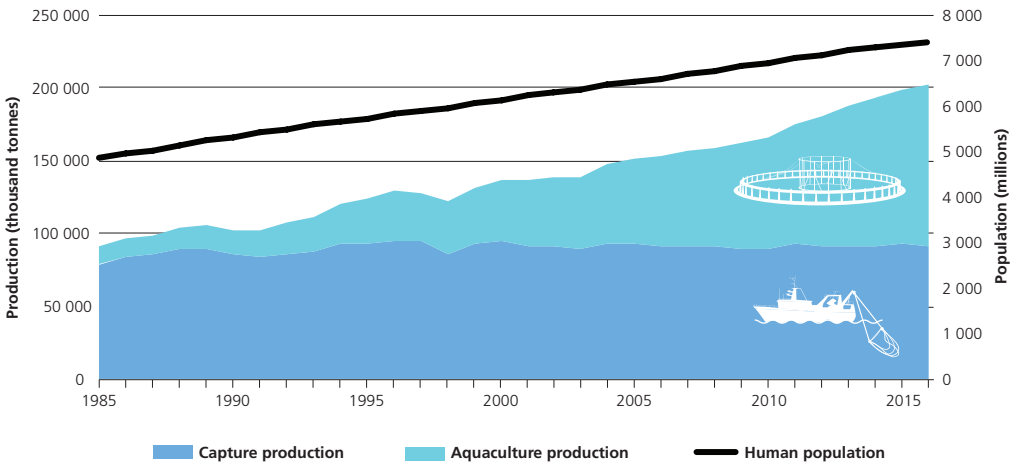
# The indispensable role of aquatic genetic resources in food production

Aquatic genetic resources (AqGR) for food and agriculture underpin production in both capture fisheries and aquaculture. They are the basis on which the aquaculture sector and capture fisheries will be able to exist and grow sustainably. AqGR allow organisms to grow, to adapt to natural and human-induced impacts such as climate change, to resist diseases and parasites, and to continue to evolve. The diversity of AqGR determines the adaptability and resilience of species to changing environments and contributes to the wide variety of shapes, colours and other characteristics of aquatic species. Variability in AqGR is the foundation for genetic improvement for aquaculture.

A growing human population is expected to drive an increase in fish consumption of approximately 1.2 percent per annum up to 2030. Production of fish and fish products (capture plus aquaculture, excluding aquatic plants) is estimated to reach 201 million tonnes by this date.

Production from the world's major fisheries has plateaued at about 90–95 million tonnes per annum with little scope for additional production for the foreseeable future. Thus, the expected growth in production needs to be derived mainly from aquaculture. The responsible use of AqGR will be essential in helping aquaculture fulfil this role.

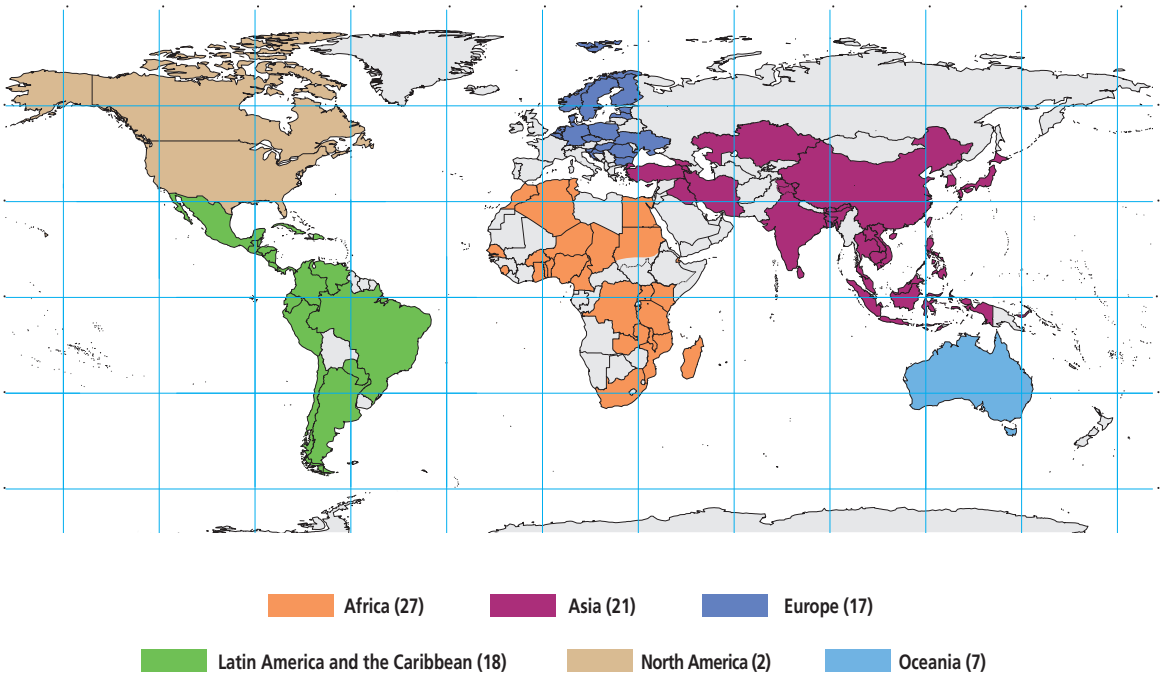
**The growth of total aquaculture and capture fisheries production (including aquatic plants) relative to human population growth**



# About the Report

The Report is based on 92 Country Reports, submissions from international organizations, five thematic background studies, and reviews of relevant literature. The 92 countries that submitted reports account for 96 percent of global aquaculture production and over 80 percent of capture fisheries production, making the Report a truly representative assessment of the sector. This overview (In Brief) of the main findings of the Report includes the most important needs and challenges that present and future generations will have to address in order to ensure that AqGR continue to support food security, poverty alleviation and sustainable development.

**Map showing reporting countries, by region**




The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries. Dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Source: FAO

# Features of aquatic genetic resources

***AqGR for food and agriculture have some distinct features that differ significantly from genetic resources for terrestrial agriculture and that will impact the priorities for their conservation, sustainable use and development.***

Although humans have been fishing for millennia, aquaculture is a relatively new food production system that has been growing steadily and rapidly over recent decades, primarily in developing countries. Fisheries and aquaculture production is composed of aquatic macrophytes, seaweeds, algae, molluscs, crustaceans and echinoderms, as well as finfish. This taxonomic diversity is reflected in the variety of behaviours, environmental tolerances, feeding strategies and culture systems prevalent in aquaculture. Unlike terrestrial agriculture, where well-recognized breeds and varieties have been developed over the millennia, aquaculture has very few well-developed farmed types (see page 5 for a definition of this important term).

Aquaculture production has grown at

6%

per annum (2001-2016) and is expected to continue to grow, albeit at a slower rate


Farmed Nile tilapia in Bangladesh

Many farmed aquatic organisms are highly similar to their wild relatives. These wild relatives are not only important fishery resources, but they are also exploited in aquaculture as sources of eggs and broodstock or are collected directly from the wild for on-growing under farm conditions. Conversely, farmed aquatic species are often released back into the wild to support

Over

8 000 breeds

of livestock and a far higher number of varieties of crops are recognized in terrestrial agriculture but there are few distinct strains of aquatic species

Aquaculture currently makes up

53%

of global food fish production

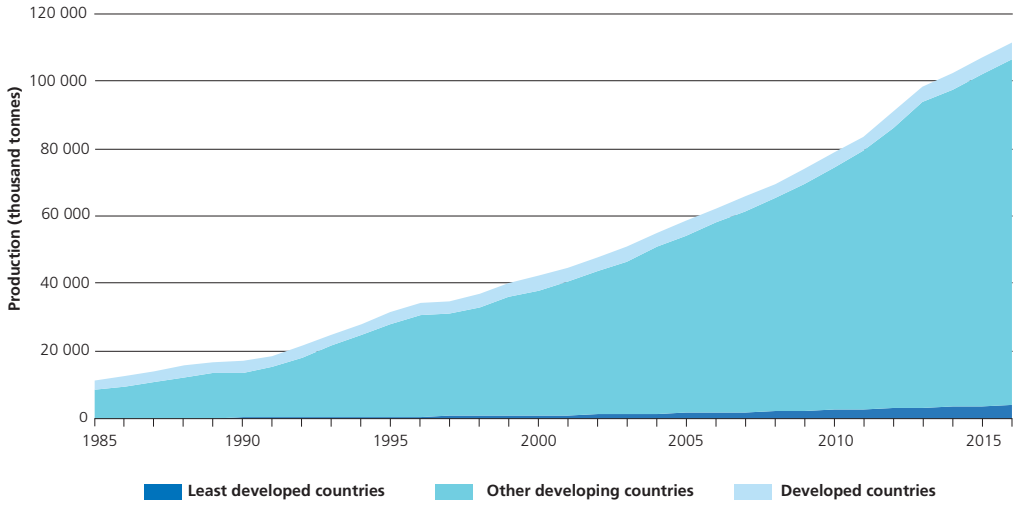
All farmed aquatic species still have wild relatives in nature, although many are threatened

capture fisheries. These interactions highlight the important linkages between capture fisheries and aquaculture.

This interactivity between cultured species and their wild relatives can also present threats to AqGR. Threats to cultured AqGR can come from declining populations of important wild relatives on which aquaculture depends, for example due to habitat loss or change or due to overexploitation. Conversely, wild stocks can be threatened by impacts of aquaculture through, *inter alia,* genetic contamination from released or escaped cultured stocks or by competition with non-native species or farmed types that become invasive.


Farmed mussels grown in tubular nets in Tunisia

**Graph of aquaculture production by economic class of countries**



**Domestication and genetic improvement have had a dramatic impact on the major terrestrial genetic resources developed for food and agriculture but this is rarely the case for farmed AqGR**

Teosinte, a grass from Latin America (left) is considered to be the origin of modern day maize.

The Eurasian wild boar (left) from which modern day commercial pigs are thought to be derived.

Today's domesticated salmon are different in performance from wild salmon but do not differ significantly in appearance.

**The use of standardized terms in describing aquatic genetic resources is essential. The Report uses the following definitions based in part on the customs of crop and livestock nomenclature. However, the terms "strain" and "farmed type" have been newly elaborated and it is proposed that they be adopted as standard**

| Term | Definition |
|---|---|
| Variety | A plant grouping, within a single botanical taxon of the lowest known rank, defined by the reproducible expression of its distinguishing and other genetic characteristics. |
| Farmed type | Cultured aquatic organisms that could be a strain, hybrid, triploid, monosex group, other genetically altered form, variety or wild type. |
| Strain | A farmed type of aquatic species having homogeneous appearance (phenotype), homogeneous behaviour, and/or other characteristics that distinguish it from other organisms of the same species and that can be maintained by propagation. |
| Stock | A group of similar organisms in the wild that share a common characteristic that distinguishes them from other organisms at a given scale of resolution. |
| Wild relative | An organism of the same species as a farmed organism (conspecific) found and established in the wild, i.e. not in aquaculture facilities. |

# Drivers of change

***Increasing numbers of humans, increasing wealth, habitat destruction and climate change present challenges to and opportunities for the conservation, sustainable use and development of AqGR.***

## CORE MESSAGES

There are drivers for consolidation of production around a few major aquaculture species but there are also drivers for diversification into new species.

Wild relatives in nature and farmed species in aquaculture may respond differently to present and emergent drivers such as human population growth and increased wealth, climate change and environmental degradation.

Use of AqGR for non-food purposes remains under-reported or under-recorded, and is often legislated differently from AqGR for food.

Evolving markets, research initiatives, the continued poor state of many wild stocks and the search for species resilient to climate change all drive the continuing search for new species for aquaculture. However, the development and commercialization of new species for aquaculture is time-consuming and costly, and the economic returns unpredictable. In the livestock and crop sectors, the majority of today's production has consolidated around a small number of species, for which long-term domestication and selective breeding have created thousands of breeds and varieties. In aquaculture, there are relatively few distinct domesticated strains. It remains uncertain whether aquaculture will follow the same developmental trajectory as in terrestrial agriculture, or whether there are drivers in the aquatic sector that will lead to the maintenance of greater species diversity in production and thus perhaps fewer developed strains or other farmed types.

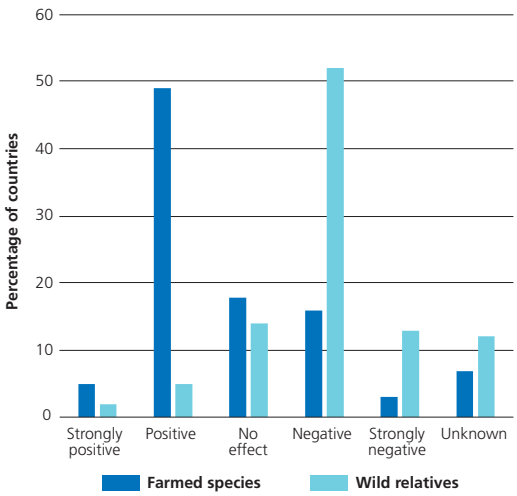
The Report examined multiple drivers that impact farmed AqGR and their wild relatives, both directly and indirectly. Human population growth, as a major driver of change, is reported by countries to negatively impact wild relatives through increased pressure on land and water use, but is reported to positively impact farmed AqGR by providing more market opportunities and demand for fish and fish products.

**Drivers will have differential levels of impact, both positive and negative, on farmed AqGR and their wild relatives**

| Drivers impacting farmed AqGR and their wild relatives | Farmed AqGR | Wild relative AqGR |
|---|---|---|
| Effect of human population increase on AqGR | ↗ | ↘ |
| Effect on AqGR from competition for resources | ↘ | ↘ |
| Effect of governance factors on AqGR | ↑ | ↗ |
| Effect of increased wealth on AqGR | ↑ | ↘ |
| Effect of human preferences and ethical considerations on AqGR | ↗ | ↗ |
| Direct effects of climate change on AqGR | ↘ | ↘ |

Note: The direction of the arrows reflects the extent of the impact of each driver on AqGR, either postively or negatively

**Summary of country responses on the relative impact of human population growth on farmed aquatic genetic resources and their wild relatives**




Climate change is also reported to be an important driver of predominantly negative change in both farmed AqGR and their wild relatives, especially in tropical regions.

While AqGR remain primarily exploited for food purposes, there is a growing demand for AqGR for non-food uses, including as ornamental species, for biological control, as feed ingredients and as sources of bioactive compounds for nutraceuticals. The culture and exchange of AqGR used for these non-food purposes are often governed by policies and regulations other than those for food fish, creating the need to monitor non-food use of AqGR alongside that of food fish to identify related risks and needs.


Mola caught from a fish farm in Jessore, Bangladesh, can form an important component of local diets

## WHAT NEEDS TO BE DONE?

Balance cost and benefit to guide allocation of resources between the demand to develop new species for aquaculture and the need to improve farmed types of existing cultured species.

Improve understanding of how the use of terrestrial and aquatic habitat impacts AqGR in order to identify and conserve AqGR that are at risk and promote responsible fishing and aquaculture through appropriate land and water management.

Monitor current and future impacts of environmental change on both farmed AqGR and their wild relatives and develop capacity to respond accordingly.

Monitor the use and exchange of AqGR for food and non-food use, identify related risks, and design and implement policies and practices that minimize risk and optimize opportunity.

# Characterization, inventory and monitoring of aquatic genetic resources

***Do we know and understand what AqGR we have and what we are losing? Accurate characterization and monitoring are essential.***

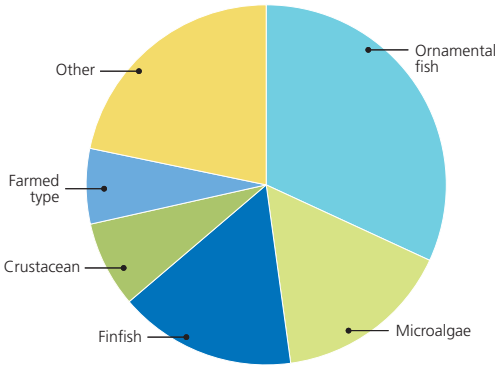
## CORE MESSAGES

There is insufficient monitoring and reporting of AqGR, especially below the level of species, which can undermine efforts to conserve, manage and develop these resources.

Access to standardized and authoritative information on AqGR is difficult and data can be completely lacking, especially at the level below species.

Harmonization and standardization of procedures and terminology used by those responsible for data collection, monitoring and reporting on AqGR are lacking.

**Countries reported more than 250 species or species items used in aquaculture that were not previously reported to FAO. Many of these species were for non-food purposes**




Country reports highlighted the need for greater standardization and harmonization of the use of terminology and nomenclature for the characterization and description of AqGR. Additionally, there are inconsistencies in the reporting systems, with many Country Reports listing farming of species that are not recorded in the country production data routinely reported to FAO and vice versa.

The top ten species or species items account for

**50%**

of aquaculture production

## WHAT NEEDS TO BE DONE?

Develop, promote and institutionalize national, regional and global information systems for the collection, validation and reporting on AqGR below the level of species (i.e. farmed types and stocks).

Improve and harmonize reporting procedures and expand existing species-based information systems to cover unreported AqGR, including ornamental species, micro-organisms and aquatic macrophytes.

Promote the standardized use of terminology, nomenclature and descriptions of AqGR.

# Development of aquatic genetic resources for aquaculture

***We are still essentially farming wild fish; we need to grasp the opportunity for sustainable genetic improvement of our farmed AqGR.***

## CORE MESSAGES

Numerous genetic technologies exist for improving production efficiency and profitability, but their advantages and disadvantages are not always well understood and appropriate assessment of risks and benefits is often lacking.

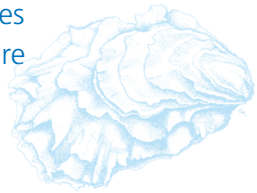
Planned development and management of AqGR are lacking for most farmed aquatic species, and countries are not realizing the benefits of effective and appropriate application of genetic management and improvement.

Adoption of genetic improvement programmes is very slow even for some major aquaculture species. Such programmes can be expensive to initiate but there is evidence that public–private partnerships can be effective in building and sustaining long-term genetic improvement programmes.

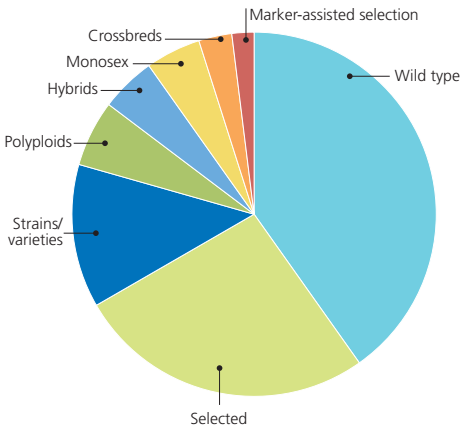
Numerous technologies are available to improve AqGR, including selective breeding, hybridization and crossbreeding, chromosome-set manipulation, gene transfer and gene editing. Advances in molecular genetics have increased the power of selective breeding programmes through inclusion of whole genome selection; gene editing allows specific changes to be made to an organism's DNA to improve desirable traits. For sustained gains over generations scientifically sound and well-managed selective breeding programmes are essential. While all of the above technologies provide opportunities for increased food security and poverty alleviation, they can also present risks to native biodiversity.

With the exception of a very few species, the effective genetic management and improvement of AqGR have not been widely practised. As a result, many farmed types are genetically very similar to their wild relatives. The great advances

Almost half of the reported farmed types of cultured species are wild types



**Farmed types of all farmed species or species items reported by countries**



made in terrestrial agriculture from long-term domestication and genetic improvement of crops and livestock have not yet been realized for most aquatic species. For aquaculture to contribute to sustainable increase in food supply there must be wider but appropriate and long-term application of genetic technologies. If selective breeding were applied to all farmed aquatic species, the projected increase in demand for fish and fish products could be met with relatively little extra feed, land, water or other inputs. Effective genetic improvement requires resources and capacity, which may present challenges to public agencies and private industry in many countries. However, public institutions and financing in the form of public–private partnerships have been shown to help initiate and maintain genetic improvement programmes.

Only **55%** of countries reported that genetic improvement is having a significant impact on their aquaculture production


Tilapia cages integrated with wetlands in Asia

Well-designed selective breeding programmes can increase productivity of aquatic species by **10%** per generation

## WHAT NEEDS TO BE DONE?

Promote the uptake of genetic improvement technologies in aquaculture through raising awareness of the properties, benefits and risks of both traditional, e.g. selective breeding, and new generation molecular technologies, and how best to manage these risks.

Focus on well-managed and long-term selective breeding for continuous genetic improvement programmes, into which other genetic technologies can be integrated.

Promote public–private partnerships and an appropriate enabling environment to help initiate and maintain genetic improvement programmes.

# Sustainable use and conservation of aquatic genetic resources

***Some AqGR are under threat and need to be conserved. Their sustainable use in both fisheries and aquaculture can be an important element of conservation.***

## CORE MESSAGES

Non-native species are very important in aquaculture but can potentially harm indigenous biodiversity. Their introduction, use and impact are inadequately monitored.

Wild relatives are important in fisheries and to aquaculture but are declining in many areas, largely as a result of habitat loss and degradation and in some cases overexploitation.

Aquatic protected areas and well-managed fisheries are effective mechanisms for *in situ* conservation. Aquaculture can play a similar role in conserving farmed types and strains.

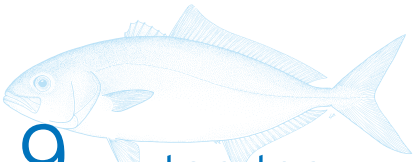
Well-designed *ex situ* and *in situ* programmes are important for the conservation of AqGR.

The prevalence of non-native species in aquaculture carries the potential to harm indigenous biodiversity and the lack of effective monitoring of their use exacerbates this risk.

Populations of many wild relatives are threatened and declining due to, *inter alia,* habitat loss and degradation. Wild relatives critical to aquaculture development and to capture fisheries need to be prioritized for conservation in their natural surroundings, i.e. *in situ* conservation.

Well-managed fisheries, especially those with associated aquatic protected areas, are recognized by countries as important contributors to *in situ* conservation.

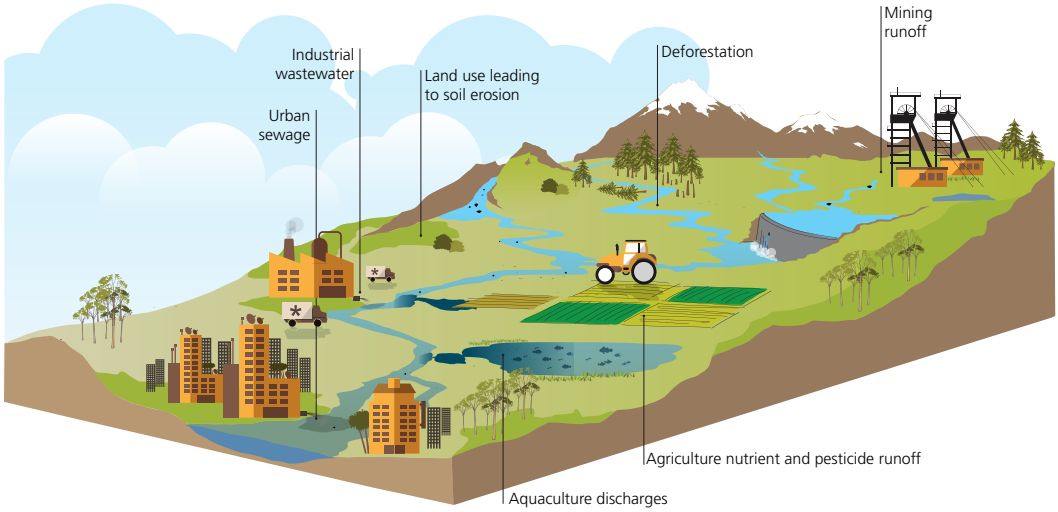
Conservation of AqGR outside of their natural habitat, i.e. *ex situ* conservation, can be an important adjunct where wild relatives are not effectively conserved *in situ*. *In vivo ex situ* conservation is practised in live gene banks and breeding centres.



**9** of the **top ten** cultured species or species items reported by countries are farmed in more countries where they are introduced than where they are native

*In vitro* conservation can be effective for certain AqGR, particularly microorganisms, male gametes and some early life history stages of molluscs, but has limited application to other


Mass fish kills can occur due to natural events and/or human-induced habitat change




Many human activities can impact on watersheds that are important habitats for wild relatives

AqGR, such as finfish, due to the difficulties of cryopreserving eggs and embryos.

Genetic resource management, for example through monitoring of effective population size and inbreeding and the control of deliberate or accidental selection, is essential to the effective application of both *in situ* and *ex situ* conservation.

Assessment of how *in situ* conservation in the form of aquatic protected areas, effectively integrated with *ex situ* conservation, can support fisheries and aquaculture, while conserving AqGR, could assist countries in the design of effective conservation programmes. Countries report that there are conservation benefits of well-managed capture fisheries and aquaculture, but it is necessary to recognize the limits of integrating conservation objectives within commercial systems.

## WHAT NEEDS TO BE DONE?

Identify and/or focus conservation and management efforts on the wild relatives of AqGR that are most at risk, emphasizing *in situ* conservation and integrating this with *ex situ* conservation where necessary.

Develop risk–benefit guidelines on the use of non-native species (including stocks and farmed types) in fisheries and aquaculture and promote them widely.

Incorporate and promote measures to conserve AqGR into the development of fisheries management and aquaculture plans, especially for threatened species.

Promote the benefits of collaboration among the conservation, fishery and aquaculture sectors.

Improve the potential of *in vivo* and *in vitro* *ex situ* conservation of AqGR by developing guidelines and best practices, and develop effective technologies for preservation of eggs and embryos.

# Policies and institutions

***Policies and institutions that address AqGR exist, but may not always be effective and usually do not consider AqGR below the level of species.***

## CORE MESSAGES

Policies and institutions addressing AqGR are many and complex because they must deal with multiple influences.

Policies on AqGR usually do not address AqGR at the level below the species, thus often compromising conservation, management and development.

Policies and management plans exist at national and international levels, but may be ineffective due to lack of awareness and inadequate human and financial resources.

Policies and institutions that address AqGR have the challenging task of dealing with conservation, sustainable use and development in a variety of habitats, economic situations and sociocultural environments. Fishing involves numerous stakeholders, often including women, indigenous peoples and migrant groups. The stakeholders operate in diverse habitats, from rice fields to the oceans. Aquaculture is dependent on many of the same habitats and resources as fisheries, agriculture and even industry, and these sectors often compete for resources such as land and water.

Policies must consider transboundary management of AqGR, import and export of AqGR, use of non-native species, access and benefit-sharing (ABS), long-term development strategies for aquaculture, conservation, stock enhancement, climate change, the role of financial subsidies and non-food uses. As a result, policies are complex and must include many sectors and disciplines to be effective.

This complexity has resulted in inconsistencies and gaps in national policies. For example, conservation sectors often oppose introductions of non-native aquatic species that are promoted by the aquaculture sector.

Food security and adequate nutrition depends on a diverse food basket of which aquatic food is an important component. AqGR should be, but are often not, included in broader policies that can potentially impact upon them.

There is often a lack of awareness of the value of AqGR and the needs of people that depend on them. Global mechanisms and instruments for sustainable use and conservation of AqGR do exist, such as the Convention on Biological Diversity and the FAO Code of Conduct for Responsible Fisheries, but local awareness of

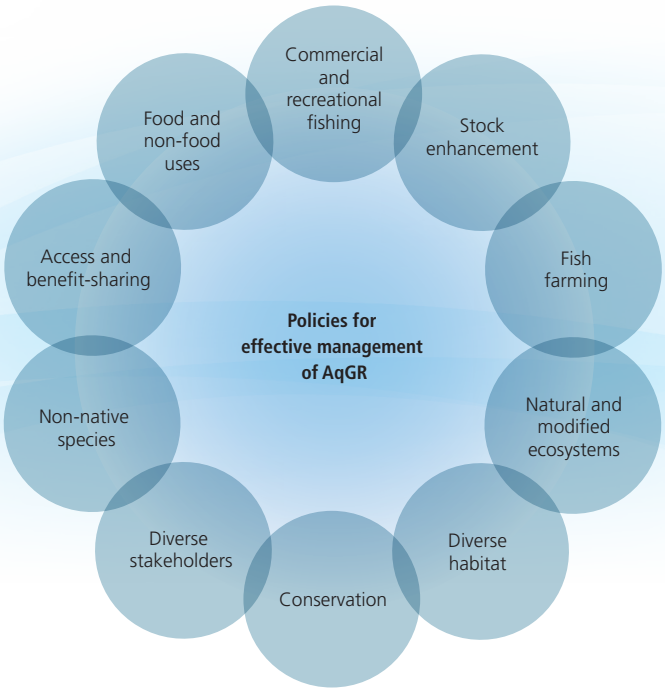
Integrated aquaculture can take place in rice terrace systems

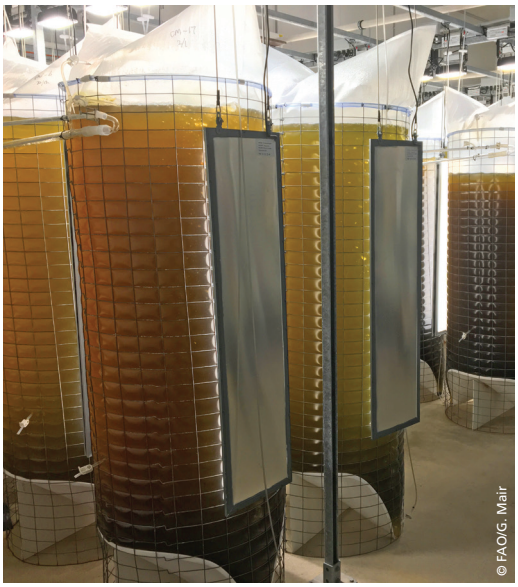
them and the role they can play in sustaining AqGR is often lacking.

ABS measures specific to AqGR are poorly developed and documented. Moreover, the specific characteristics of AqGR often necessitate the development of AqGR-specific ABS, presenting an additional challenge. While it is essential to develop national and regional policies on ABS for AqGR, there is also a need to consider measures to protect intellectual property in the development of ABS measures.

Given the complex policy environment, it is not surprising that policies very rarely extend to AqGR below the level of species, such as farmed types and wild stocks. As a result AqGR at this level can be poorly managed or inadequately protected. However, in some countries, such policies do exist (see Box). Even at the level of species, existing policies and fishery management plans can be ineffective due to lack of financial and human resources.

**An illustration of the complexity of issues that need to be considered in the development and implementation of effective policy for the conservation, sustainable use and development of aquatic genetic resources**






Cultures of various species of microalgae are important components of many aquaculture hatcheries

**BOX: Policy for the conservation of aquatic genetic resources below the level of species**

The United States of America's Endangered Species Act (ESA) recognizes genetically distinct stocks of Pacific salmon as a "species" and therefore eligible for protection under the Act. Under the ESA, a species, subspecies or a distinct population segment may be listed as threatened or endangered. Numerous stocks of Pacific salmon and steelhead (*Oncorhynchus* spp.) on the west coast of North America are threatened due to overfishing, loss of habitat, hydropower facilities, ocean conditions, and fish hatchery practices. As a result, the National Marine Fisheries Service listed 28 stocks of salmon and steelhead in California, Idaho, Oregon and Washington as "endangered species" under the ESA.

Source: www.nmfs.noaa.gov/pr/pdfs/species/sacramentoriver_winterrunchinook_5yearreview.pdf

Countries reported a total of

**619** national-level policies that address AqGR for food and agriculture

## WHAT NEEDS TO BE DONE?

Promote development, awareness, monitoring and enforcement of policies and governance that adequately address the complex issues affecting conservation, sustainable use and development of AqGR, especially at the level below species.

Review and harmonize policies related to AqGR across different sectors of government to address inconsistencies and gaps.

Adapt existing policies to take account of how non-native species and developed farmed types impact aquaculture development and native AqGR and how to strengthen biosecurity.

Promote understanding among regulators and policy-makers of the roles and interests of stakeholders, including indigenous communities and women, and develop means to effectively engage these stakeholders.

Enhance awareness and implementation of the roles that international agreements and instruments can play in the conservation, sustainable use and development of AqGR.

Promote the development of national and regional policies on access and benefit-sharing specific to properties of AqGR and the safe and sustainable exchange of AqGR.

# Capacity building

***Capacity building in conservation, sustainable use and development of AqGR is needed at many levels.***

## CORE MESSAGES

Key stakeholders, including institutions, policy-makers, extension providers, resource managers, fishers and fish farmers, lack the capacity to fully address the complexities of conservation, sustainable use and development of AqGR within or across sectors.

Capacity building needs and priorities differ among regions and according to the economic status of countries.

There is a lack of awareness of the value of AqGR in fisheries and aquaculture.

International networks dedicated to AqGR have been partially successful at capacity building and awareness raising, but have often not been sustained.

There is a need to build awareness and capacity in research, development, education and training in order to ensure that the conservation, sustainable use and development of AqGR are based on sound science and natural resources management. Countries prioritized capacity building on technologies for characterization and genetic improvement of AqGR in aquaculture, as well as on basic knowledge of AqGR. For example, in aquaculture, greater capacity to develop and sustain genetic improvement is needed, including the training of quantitative geneticists to support breeding programmes.

Priority capacity needs are different among regions. For example, Africa and Europe ranked capacity in genetic improvement as their highest priority, whereas the other regions identified characterization and basic knowledge of AqGR as their highest priority. Research priorities also varied, based on the economic status of countries. For example, "Conservation of AqGR" was a more common research theme in developed countries. The relatively low level of research on genetic improvement in all economic classes of countries is recognized as an important opportunity to increase production in aquaculture through increased research and extension.

Nearly 75 percent of countries reported on one or more intersectoral collaboration mechanisms related to management and conservation of AqGR. Increasing the technical capacities of institutions is the most important capacity requirement to strengthen intersectoral collaboration.

Regional and global networks that have, in the past, facilitated capacity building and communication on conservation, sustainable use and development of AqGR have proved difficult to sustain, mainly due to a lack of long-term funding.

## WHAT NEEDS TO BE DONE?

Build capacity among scientists and educators to promote and implement the conservation, sustainable use and development of AqGR, especially in technologies related to characterization and genetic improvement of AqGR.

Improve the technical capacity of institutions, according to national and regional priorities, and improve their awareness of AqGR issues, in part to promote more effective intersectoral collaboration on AqGR.

Explore opportunities to enhance cooperation through the promotion and development of sustainable regional and global networks on AqGR and/or the strengthening of capacity to promote AqGR-specific issues within existing networks.

# The way forward

***AqGR are underutilized resources that must be developed, managed and conserved to improve food security and livelihoods in a sustainable manner.***

The preparation of the first report on *The State of the World's Aquatic Genetic Resources for Food and Agriculture* was a global and interactive process. The Report provides a snapshot of the current status of global AqGR and expected future trends. It reveals the tremendous diversity of AqGR found in the world's freshwater, brackish–water and marine environments. This diversity is used widely by both fishers and fish farmers to improve livelihoods and increase food security and enhance nutrition. However, the Report also reveals that characterization and monitoring of the use of AqGR, especially at the level below species, will have to be improved to ensure effective conservation, sustainable use and development. It further highlights the complex policy and institutional setting relevant to AqGR at local, regional and international levels.

A growing human population will increase the demand for fish and fish products and put further pressure on the habitats of farmed species and their wild relatives. AqGR are essential resources that will need to be more fully developed to help aquaculture and capture fisheries provide food and livelihoods in a responsible manner for the growing human population and to alleviate increasing pressure on natural resources. Urgent action is needed to raise awareness of the value of AqGR and to develop or improve cross-sectoral policies and management plans that address AqGR, especially at the level below species. Capacity building will also be required at all levels.

The Report highlights the strong connection between aquaculture and fisheries, and that wild relatives are an important but endangered resource in both fisheries and aquaculture. Habitat loss and degradation, and overexploitation of stocks, are major factors in the decrease of wild relatives. Policies and actions will need to address the conservation of AqGR and the aquatic habitats that support them and promote the responsible exchange and use of native and especially non-native AqGR.


Indian major carp play an important role in food security

The Report identifies specific needs and challenges for the conservation, sustainable use and development of AqGR. It is intended to be a catalyst for future action. Countries that have spent time and financial resources preparing Country Reports are to be congratulated and encouraged to incorporate information from these reports into national policy documents and action plans.

The conservation, sustainable use and development of aquatic genetic resources (AqGR) is critical to the future supply of fish. *The State of the World's Aquatic Genetic Resources for Food and Agriculture* is the first ever global assessment of these resources. The Report draws on 92 reports from FAO member countries and five specially commissioned thematic background studies. The reporting countries are responsible for 96 percent of global aquaculture production.

The Report represents a snapshot of the present status of AqGR and forms a valuable technical reference document, particularly where it presents standardized key terminology and concepts. There is little doubt that the process of preparing the global Report and the work done within countries to prepare Country Reports has improved the level of understanding and awareness of the vital importance of AqGR. The Report thus represents the first step in building a broad knowledge base on AqGR as a basis for future actions towards improved conservation, sustainable use and development of these valuable resources, at national, regional and global levels.

Full report at: www.fao.org/3/ca5256en/CA5256EN.pdf



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