



## Expert Workshop on the “*Improvement of seed supply for small-scale inland aquaculture*”

Szarvas, Hungary, 27 – 28 March 2024

FAO initiative with technical support of the Global Sustainable Aquaculture Advancement Partnership

### Background

Most of the aquaculture production relies on seed produced in hatcheries or other controlled or semi-controlled environments, and this ‘closing of the life cycle’ has been a major reason for the phenomenal growth in food supply from aquaculture over recent decades. Domestication and genetic improvement of aquatic genetic resources (AqGR) have played significant roles in the increased production of major cultured species. However, the production of and access to quality seed remain critical elements of the success of aquaculture despite efforts by governments and development agencies. Limitations in seed supply still constrain aquaculture development in some cases, especially for small-scale aquaculture in developing countries. Numerous studies in developing countries have identified the lack of good quality broodstock and quality seed as the most prominent constraints affecting the development of aquaculture.

One of the strategic priorities that has been identified by the Global Conference on Aquaculture Millennium +20<sup>1</sup> is about strengthening broodstock and seed production and distribution systems of these AqGR.<sup>2</sup> FAO’s Guidelines for Sustainable Aquaculture<sup>3</sup> also stress the need for strengthening broodstock development, and seed production and distribution and, in addition, highlight the importance of: the roles of the public and private sectors in seed supply systems, particularly in the case of genetic improvement programmes; and building technical capacity, in both public and private hatchery sectors, on broodstock genetic management and husbandry, seed and larval rearing methods and seed transport.

An Expert Workshop on “*Freshwater Fish Seed as Global Resource for Aquaculture*” was organized by FAO in 2006 in Wuxi, China.<sup>4</sup> The workshop made a series of recommendations to enhance the supply of quality seed to small-scale aquaculture covering the following issues:

- Seed quality, genetics, technology and certification
- Seed networking, distribution and entrepreneurship (and related certification)
- Development of the freshwater fish seed production sector to the benefit of rural producers

<sup>1</sup> <https://aquaculture2020.org/declaration/>

<sup>2</sup> Shanghai Declaration: Aquaculture for food and sustainable development.

[www.fao.org/3/cb8517en/cb8517en.pdf](http://www.fao.org/3/cb8517en/cb8517en.pdf)

<sup>3</sup> [www.fao.org/3/cc7093t/cc7093t.pdf](http://www.fao.org/3/cc7093t/cc7093t.pdf), Appendix F

<sup>4</sup> [www.fao.org/publications/card/en/c/74014e08-9806-5c8b-a372-461aac7d2151/](http://www.fao.org/publications/card/en/c/74014e08-9806-5c8b-a372-461aac7d2151/)



Food and Agriculture Organization  
of the United Nations



The workshop made a series of recommendations for action to address constraints and advance seed supply, including some recommendations to FAO.

This workshop will focus on seed supply in inland aquaculture, briefly review the recommendations from the previous workshop, and identify and promote best practices in response to some of those key recommendations.

With regard to genetic management in seed supply, in 2019, a global assessment of the status of AqGR was conducted (FAO, 2019) and recognized that genetic improvement of AqGR remains far behind the progress made in terrestrial agriculture. The adoption of breeding programmes is still limited, to the extent that it is estimated that only 10-15 percent of aquaculture production is derived from breeding programmes. This slow adoption is particularly prevalent for low-value species, especially in developing countries. In addition, the basic genetic principles are not often followed in broodstock management practices, resulting in the production of low-quality broodstock due to inbreeding, genetic drift and even loss of species purity, which can consequently affect seed quality. It is thus apparent that some challenges identified in the earlier workshop in this regard remain to be met.

In 2023, the *Guidelines for Sustainable Aquaculture* were endorsed at the 12th Session of COFI Sub-Committee on Aquaculture. One area that is also fundamental to ensuring the supply of quality seed is the design and management of effective and efficient hatcheries that are appropriate to small-scale regional production. For the main aquaculture species used in small-scale aquaculture, namely the carps, tilapias and catfish, hatchery technologies are well established. However, detailed designs and guidelines for simple, effective hatcheries capable of producing consistent volumes of high-quality seed, particularly for investors and entrepreneurs wishing to move into the seed production sector, are generally not available or hard to find.

## Objectives

The Expert Workshop aims to: 1) briefly review the progress of regional and national policies, seed supply systems and breeding programmes against the recommendations made in the previous workshop; 2) identify, and understand the critical bottlenecks in seed supply systems; 3) identify good seed quality and supply practices from various regions of the world and promote science-based solutions in developing regions to unlock the aquaculture's potential, particularly in Asia, Africa, and Latin America and the Caribbean, for species key to small-scale aquaculture and food security.

Specific objectives will be to:

- Briefly review the progress of regional and national policies, seed supply systems and breeding programmes against the recommendations of the previous workshop.
- Identify key geographic areas, species and production systems where seed supply remains a constraint to the growth of sustainable small-scale aquaculture.



- Identify the issues impacting the effective genetic management and the uptake of genetic improvement programmes for enhanced seed quality in key species used in small-scale aquaculture, including the role for broodstock certification systems.
- Promote good practices on hatchery design for key species and identify the needs for the development of effective hatcheries for seed production in small-scale aquaculture of one or more key species.
- Produce, through Working Group sessions, proposals for and detailed outlines of knowledge products (e.g. guidelines and/or technical manuals as appropriate) for the following:
  - To promote the acceleration of genetic improvement programmes for species important in small-scale aquaculture;
  - Identifying and promoting the role of certification of broodstock quality in expanding the dissemination of quality seed; and
  - Best practices in hatchery design and management for one or more key species.

A draft annotated agenda is provided in Annex 1.

## Logistics

The Expert Workshop will be co-organized by FAO and the Research Institute for Fisheries and Aquaculture (HAKI) of the Hungarian University of Agriculture and Life Sciences (MATE). This event will be held in presence from 27 to 28 March 2024 in Szarvas, Hungary.

Due to limited funds, only a limited number of experts will be provided with an economic round-trip airticket, meal and accommodation. All invited participants will be booked into a hotel room near the meeting venue. The venue will be informed after the reservation is made.

## Language

The working language of the Expert Workshop is English.

## Expert nomination and selection

FAO is working closely with country authorities on expert nominations. The experts invited to this Expert Workshop are being identified based on their technical background and expertise in relation to the workshop objectives and taking into account geographical balance in the final composition of the expert group.

## Contact

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## Annex 1

### Draft annotated agenda

Day I: 27 March 2024			
Draft Agenda		Presenter/Moderator	Room
09:00-09:30	Registration of participants – Meet and Greet  Welcome remarks Workshop objectives	Hungarian Ministry of Agriculture (tbc) FAO HAKI	Riverside Conference Room
<b>Plenary Session</b>			
09:30-10:00	Presentation 1 <ul style="list-style-type: none"> <li>• <i>Key issues in global fish seed supply for small-scale inland aquaculture</i></li> <li>• <i>Recap of the recommendations of the Expert Workshop on “Freshwater Fish Seed as Global Resource for Aquaculture” held by FAO in 2006 in Wuxi, China</i></li> </ul>	FAO and HAKI	Riverside Conference Room
10:00-10:20	Presentation 2 <ul style="list-style-type: none"> <li>• <i>FAO strategies and programmes to support small-scale inland aquaculture through the improvement of seed supply (FAO AqGR programme; Global Conference on Aquaculture Millennium +20; FAO’s Guidelines for Sustainable Aquaculture)</i></li> </ul>	FAO	Riverside Conference Room
10:20-10:45	Presentation 3 <ul style="list-style-type: none"> <li>• <i>Progress review on research and innovation programmes and projects in genetic improvement of key species for inland aquaculture</i></li> </ul>	HAKI and WorldFish	Riverside Conference Room
10:45-11:00	Plenary discussion	All	Riverside Conference Room
11:00-11:30	Coffee/Tea Break – Group Photo		Hotel restaurant
11:30-11:50	Presentation 4 <ul style="list-style-type: none"> <li>• <i>Issues in certifying broodstock quality (incorporating case studies)</i></li> </ul>	HAKI & tbc	Riverside Conference Room
11.50-12.00	Plenary discussion		
12:00-12:30	Presentation 5 <ul style="list-style-type: none"> <li>• <i>Good practice design and operation of hatcheries that produce and supply seed of key species for small-scale inland aquaculture</i></li> </ul>	To be confirmed	Riverside Conference Room



12:30-12:50	Presentation 6 <ul style="list-style-type: none"> <li>• <i>Good management practices in fish seed supply</i></li> </ul>	Tbc	Riverside Conference Room
12:50-13:00	Plenary discussion		
13:00-14:30	Lunch		Hotel restaurant
<b>Working Group 1: Accelerating the uptake of genetic improvement for key species critical to small-scale aquaculture, and certifying broodstock quality</b>			
14:30-16:00	Working group session <ul style="list-style-type: none"> <li>• <i>Discuss needs, challenges and opportunities for accelerating the uptake of genetic improvement</i></li> <li>• <i>Agreement on preparation and scope of a knowledge product to promote acceleration of uptake of genetic improvement</i></li> </ul>	Participants	Riverside Conference Room
<b>Working Group 2: Improvement of the design and operation of species-specific hatchery complexes</b>			
14:30-16:00	Working group session <ul style="list-style-type: none"> <li>• <i>Overview, technical issues, gaps, and opportunities in the operation of fish hatcheries (fish seed supply centres)</i></li> <li>• <i>Agreement on scope and preparation of a draft table of contents for technical manuals on small-scale hatchery design</i></li> </ul>	Participants	Palm Conference Room
16:00-16:30	Coffee/Tea Break		Hotel restaurant
<b>Working Group 1: Accelerating the uptake of genetic improvement for key species critical to small-scale aquaculture, and certifying broodstock quality"</b>			
16:30-18:00	Working group session <ul style="list-style-type: none"> <li>• <i>Final discussion and agreement on key content for the components of an agreed knowledge product for promoting acceleration of uptake of genetic improvement</i></li> </ul>	Participants	Riverside Conference Room
<b>Working Group 2: Improvement of the design and operation of species-specific hatchery complexes</b>			
16:30-18:00	Working group session <ul style="list-style-type: none"> <li>• <i>Discussion of key content for the technical manuals on small-scale hatchery design</i></li> </ul>	Participants	Palm Conference Room
19:00	Gala Dinner		Hotel restaurant



Day II: 28 March 2024			
Draft Agenda		Presenter/Moderator	Room
09:00-09.30	Introduction to FAO Assessment Framework for seed supply systems	FAO	Riverside Conference Room
09:30-10.00	Review and discuss the FAO Assessment Framework for seed supply systems	Plenary	
10:00-10:30	Coffee/Tea Break – Group Photo		Hotel restaurant
<b>Working Group 1: Accelerating the uptake of genetic improvement for key species critical to small-scale aquaculture, and certifying broodstock quality</b>			
10:30-12:30	Working group session <ul style="list-style-type: none"> <li>• Overview of existing certification schemes in small-scale aquaculture seed supply chain</li> <li>• Key issues in broodstock certification</li> <li>• Agreement of scope, preparation of a draft table of contents for knowledge product on quality broodstock certification</li> <li>• Final discussion and agreement on key content for the components of the agreed knowledge product on certification of broodstock</li> </ul>	Participants	Riverside Conference Room
<b>Working Group 2: Improvement of the design and operation of species-specific hatchery complexes</b>			
10:30-12:30	Working group session <ul style="list-style-type: none"> <li>• Discussion of key content for the technical manuals on small-scale hatchery design including species specific content</li> </ul>	Participants	Palm Conference Room
12:30-13:30	Lunch		Hotel restaurant
13:30-15:00	Round table discussion (WG1 and WG2) on Workshop findings and conclusions  Presentations of the main findings of the two WGs	Plenary	Riverside Conference Room
15:00-15:30	Closing remarks		Riverside Conference Room
<b>Facility visit</b>			
15:30-17:30	Visit to HAKI live carp gene bank and experimental infrastructures		HAKI
19:00	Dinner		Hotel restaurant