



INCiTiS-FOOD

Fish Welfare Booklet



incitis-food.eu

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Funded by
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1. Background of this fish welfare booklet

What can we do to improve food and nutrition security (FNS) in African city regions and reduce the food-system-related environmental footprint while contributing to circularity? This simple question was the basic guideline in setting the objectives of INCiTiS-FOOD (Integrated and Circular Technologies for Sustainable city region FOOD systems in Africa). The project's objectives are to enhance African city region food systems such that they address the four dimensions of FNS: (i) availability of nutritious and safe food through local production, (ii) food access, incl. affordability, (iii) food utilization, incl. reduction of food waste, and (iv) food stability at all times. Furthermore, the project will empower communities by opening up opportunities for agri-food businesses along the supply and value chain and will achieve environmental justice through transformative food policies. This is done through interdisciplinary research, integrated best-fit technologies, stakeholder-led action, capacity-building, research-practitioner-policy collaborative engagement, and Europe-Africa partnership.

To achieve these objectives, INCiTiS-FOOD will co-create circular agri-food technologies, practices, and business models for an inclusive food system in African cities and towns. The project is based on a multi-actor approach, involving 8 Living Labs (LLs) in 6 countries from 3 African regions (East: Kenya; West: Ghana, Nigeria, Sierra Leone; Central: Cameroon, Gabon), see Figure 1.



Figure 1 : Geographical distribution of INCiTiS-FOOD living labs (LLs)



1.1 Fish Welfare as an Ethical Issue

On June 28, 2022, the Research Executive Agency (REA) of the European Union (EU) informed the consortium of the INCiTiS-FOOD research project, that it was awarded the grant. The Ethics Summary Report requested to ensure that among other ethics issues, the following issue is monitored and framed throughout the project

Farm animals: The use of fish (vertebrates) farm animals (vertebrates; animal directive 2010/63).

The present Fish Welfare Booklet of INCiTiS-FOOD is giving guidance on how to effectively adhere to and implement the welfare of fish as farm animal .

This is of particular relevance, as the LLs of INCiTiS-FOOD are located in six non-EU countries

1.2 Document Structure

This document is comprised of the following chapters:

Chapter 1 provides a summary of the background.

Chapter 2 summarizes EU regulations related to fish as farm animals.

Chapter 3 outlines the fish welfare guidelines.

Appendix 1 shows the designed poster to be print out and displayed in all eight LLs to contribute to spreading the awareness about fish welfare.



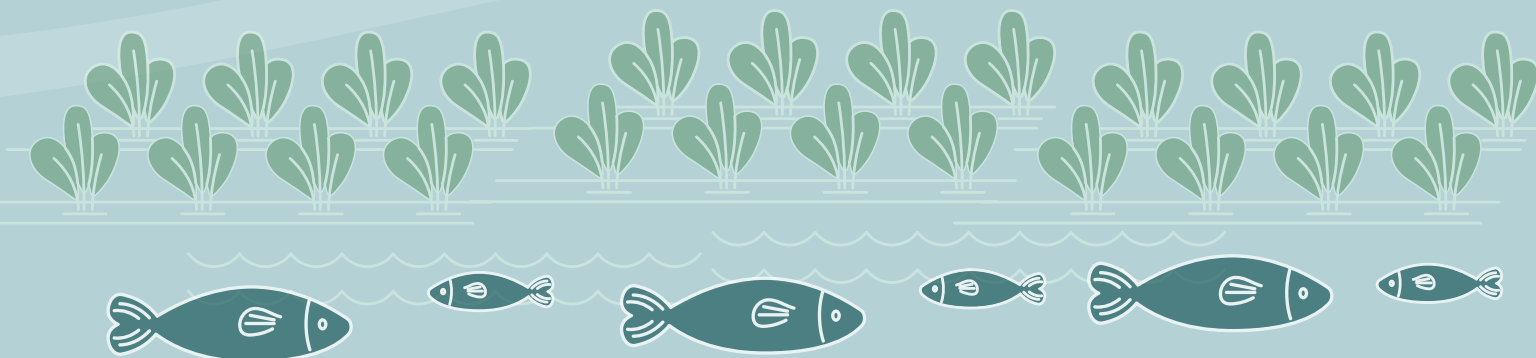
2. Regulations for Fish as Farm Animals

INCiTis-FOOD includes an ASF (animal-sourced food) component, i.e., fish.¹ However, there will be NO animal experiments conducted. All animals are always considered farm animals. Fishes (i.e., African Catfish and Pangasius) are reared in recirculating aquaculture systems (RAS) and aquaponics systems.

Animal Directive 2010/63 on the protection of animals used for scientific purposes needs to be respected. But the most relevant legislation is the EU Regulation 2021/695 covering explicitly farm animal welfare. Furthermore, INCiTis-FOOD complies with the ethical standards and regulations related to the Treaty on the Functioning of the European Union (TEFU), particular Art. 13 TEFU (farm animal welfare requirements. Since animals are sentient beings, the project will pay full regard to the welfare requirements of the reared farm animals.

This is further specified in the EU Council Directive 98/58/EC, which is concerned with the protection of animals kept for farming purposes. The EU Council Directive concerning the protection of animals kept for farming purposes has defined minimum standards to protect fish in fish farming. This includes the Council's recommendation on the welfare of farmed fish as well as the guiding principles of the World Organization for Animal Health. For instance, animals shall be cared for by a sufficient number of staff who possess the appropriate skills or inspected at least once a day. Equipment (i.e., prototypes, standard training facilities) related to fish farming that is newly built is going to be designed and sized according to established calculation and dimensioning guidelines.²

The EU legislation (Council Regulation (EC) N° 1099/2009) on the killing of animals aims to minimize the pain and suffering of animals using properly approved stunning methods before killing/slaughtering farmed animals. This regulation also covers farmed fish. The 2018-Report from the EC to the European Parliament and the Council on the possibility of introducing certain requirements regarding the protection of fish at the time of killing further substantiates the EC regulation. The stages of the welfare practices at slaughter consist of stunning and the final killing stage. According to the Report and in line with the World Organization for Animal Health (OIE), electrical or mechanical (e.g., percussive stunning) methods for farmed fish is advised before killing the fish through a gill cut. For practicality reasons, INCiTis-FOOD will primarily rely on percussive stunning. Other methods, i.e., carbon dioxide (CO₂) stunning, live chilling with CO₂, or asphyxia in ice or ice water are more stressful to the fish. After stunning, the fish will be killed through a gill cut.



¹ For additional information on ethical issues in general and ethical issues related to farm animals see D7.2 "Other Ethical Issues (OEI) – Requirement No. 2: INCiTis-FOOD Ethical Framework – A Living Document".

² Timmons, J.M., & M.B. Ebeling (2013): *Recirculating Aquaculture*. Ithaca Publishing Company.

3. INCiTIS-FOOD Guidelines for Fish Welfare

The following summarizes the guidelines for fish welfare. A poster depicting the guidelines is found in Appendix 1.

3.1 Aquatic Environment

- Maintain a suitable and controlled aquatic environment for fish, including sufficient oxygen content, appropriate water temperature, pH, and nitrogen levels.
- Regularly monitor, test, and document water parameters to ensure they are within the optimal range for the fish species being farmed.
- Provide adequate water exchange, filtration, and aeration to maintain water quality and oxygen levels at all times.
- Ensure sufficient space and appropriate tank sizes for the fish, considering their growth and behaviors. Maintain appropriate stocking density to avoid overcrowding, minimize stress, and prevent disease outbreaks.

3.2 Fish Feeding and Nutrition

- Provide a high-quality and species-specific diet for the fish, considering their nutritional requirements and growth stages. This means providing a correct balance of macronutrients and enough micronutrients in fish feed.
- Feed the fish in appropriate quantities and frequencies to prevent overfeeding or under-feeding. Monitor the fish's feeding habits and adjust the feeding regime as needed.
- Weigh a subsample of the fish at intervals of two weeks to assess growth performance and for feeding rate adjustments.



3.3 Health and Disease Management



- Observe the fish daily for signs of disease, stress, or abnormal behavior.
- Quarantine newly acquired fish before introducing them to the rearing facility to prevent the spread of potential diseases (carryover diseases).
- Implement appropriate biosecurity measures to minimize the risk of introducing pathogens to the fish by other fish, predators, or people.
- Maintain a clean and well-maintained environment to minimize the risk of disease outbreaks.
- Do not expose fish to extensive noise, direct sun radiation, and vibration levels.
- Avoid feeding fish with carcasses, moldy, and/or contaminated feed.
- Isolate/euthanize fish showing signs of disease and/or parasitic infection to prevent spread.

3.4 Safety Rules for Feed Storage

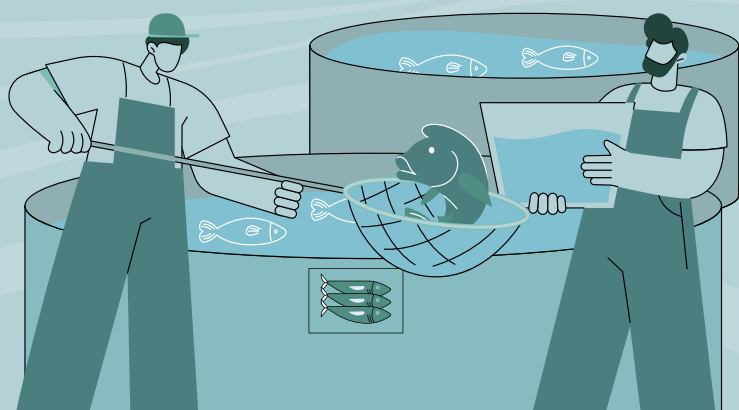
- Choose a storage area that is cool, dry, dark, and well-ventilated. Keep the storage area clean and free from debris, dust, and pests.
- Store fish feed in dedicated, clean, dry, and closed containers, away from heat, moisture, contaminants, and pests, to maintain its quality and freshness.
- Use containers made of food-grade materials and with tight-fitting lids that are resistant to moisture, pests, and contamination.
- Ensure good feedstock management by maintaining a systematic inventory of feed (including the type, quantity, and expiration dates) and by adhering to the “first in – first out” (FIFO) principle.
- Regularly inspect the storage area for signs of pests such as rodents, insects, or birds.
- Take appropriate measures to prevent pests from accessing and contaminating the fish feed storage area, such as sealing entry points and using pest control methods approved for food storage areas.
- Wash hands thoroughly before handling fish feed or entering the storage area to prevent contamination.
- Avoid storing or handling fish feed near chemicals, cleaning agents, or other potential sources of contamination.
- Contaminated, rotten, or spoiled feed should be promptly disposed of.

3.5 Hygiene Rules for Materials Used to Handle Fish

- Rinse all material with clear water after use and let dry completely.
- Wash, disinfect, and let dry all used materials weekly. Ethical Framework (Living document)
- Repair broken material or infrastructure immediately. Ensure spare parts are always available for the most important items (pumps, pipes, cables, air compressors, etc.).
- Save money by ensuring that all material (from nets and buckets to pumps and tools) has a designated storage place where it can be found easily and does not get broken.

3.6 Slaughter and Processing

- Do not feed fish 2-3 days before slaughtering to empty their guts.
- Only catch the fish from the tanks shortly before slaughter.
- Stun (make unconscious) the fish before the killing (ensuring death), and make sure no fish regain consciousness before being killed.
- **Methods for stunning:**
 - Blunt force trauma to the head (hitting the brain area with a round, heavy stick or pipe)
 - Electrical stunning (5-15 seconds of electrical current)
- **Methods for killing:**
 - Bleed out by cutting all gill arches on one or both sides or cutting the heart artery
 - Degutting (also cut the gills to ensure proper bleeding)
 - Longer electrical stunning until irreversibly dead
 - Decapitation
- **Avoid the following to ensure good meat quality and longer shelf life:**
 - Asphyxiation of the fish
 - Bleeding or degutting fish while conscious (fish should have no eye-roll reflex)
- **Ensure the following to ensure good meat quality and longer shelf life:**
 - Put dead fish on ice or in ice slurry until further processing.
 - Process the fish shortly after slaughter.
 - Separate slaughter waste from the desired meat; do not use the same buckets, knives, tables, or containers.
 - Ensure all personnel are well-trained and familiar with hygiene rules, processing methods, and storage regulations.



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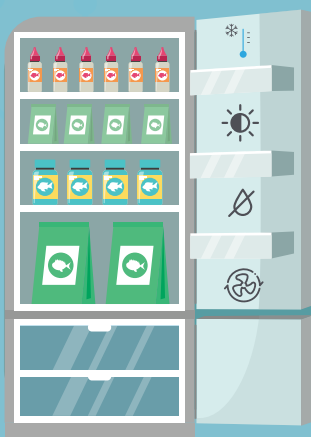
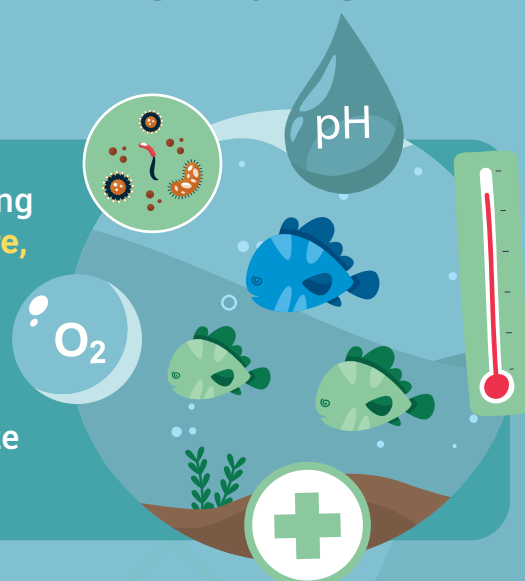
Milica Nenadic, Foodscale Hub
Part of INCiTiS-FOOD Work Package 7

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Guidelines for fish welfare



- Maintain a suitable aquatic environment for fish, including **sufficient oxygen content, appropriate water temperature, pH, and nitrogen levels.**
- Observe the fish daily for signs of **disease, stress, or abnormal behavior.**
- Implement appropriate **biosecurity measures** to minimize the risk of introducing pathogens to the fish.



- Choose a storage area that is **cool, dry, dark, and well-ventilated** for feed storage.
- Provide a **high-quality** and **species-specific diet** for the fish, considering their nutritional requirements and growth stages.
- Store fish feed in **dedicated, clean, dry, and closed containers**, away from heat, moisture, contaminants, and pests.

- Ensure all personnel are **well-trained** and familiar with hygiene rules, processing methods, and storage regulations.
- **Rinse** all material with clean water after use and let dry completely.
- **Repair** broken material or infrastructure immediately.



- Do not feed fish **2-3 days** before slaughtering to empty their guts.
- Avoid asphyxiation of the fish and bleeding or degutting fish while conscious.
- **Stun** (make unconscious) the fish before the killing (ensuring death).

