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Waste management and reduction from aquaculture facilities in natural water bodies — Principles and guidelines

Gestion et réduction des déchets des installations aquacoles dans les plans d'eau naturels — Principes et lignes directrices

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Foreword

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This document was prepared by Technical Committee ISO/TC 234, *Fisheries and aquaculture*.

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Introduction

A productive, healthy, and clean aquatic environment is vital for aquaculture. It is therefore essential to avoid littering and other types of pollution to reduce the environmental footprint of marine sectors. Despite of this, marine and fresh waters are recipients for litter and other pollutants, intentionally or unintentionally.

Waste and litter occurring in marine and fresh waters are to a large extent transported over large distances, often following the ocean currents. Problems due to marine pollution therefore need to be solved at an international level as well as at a national one. Reduced release of waste into the marine and fresh water bodies will also make a significant contribution to improved resource management, increased sustainable food-production and improved circular economy.

Waste management in aquaculture could contribute to:

— Reduction of litter and other pollutants from aquaculture.

— Reduced macro and micro plastic levels in marine and fresh waters, and on the seabed.

— Reduction of litter in the littoral zone and nearby terrestrial areas, as well as on recreation areas.

— Reduced environmental impact from the seafood industry, e.g. on fish species, invertebrates, reptiles, birds and mammals.

— Increased contribution to circular economy, e.g. reuse and recycling of equipment from aquaculture.

— Healthy aquatic ecosystems.

Waste management and reduction from aquaculture facilities in natural water bodies — Principles and guidelines

1 Scope

This document specifies a system for waste management and reduction of solid waste in aquaculture. It includes management plans, methods, principles and guidelines. This document is relevant for aquaculture in marine and fresh water bodies.

This document does not apply to land-based aquaculture and does not comprise biological waste.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Materials and waste

3.1.1
waste
substance or object which are disposed of, are intended to be disposed of or are required to be disposed of by the provisions of national law

Note 1 to entry: In this document, "waste" does not include biological waste.

[SOURCE: ISO 5020:2022, 3.1.1]

3.1.2
litter
solid material, object or fragment which has been deliberately discarded or unintentionally lost

Note 1 to entry: According to the International Convention for the Prevention of Pollution from Ships, MARPOL 73/78 (Appendix V "Rules for the Prevention of Pollution by Garbage from Ships"), litter means all types of food, household and operational waste, all types of plastics, cargo residues, ash from incinerators, cooking oil, fishing gear and carcasses of animals that are formed during the normal operation of the vessel and are subject to constant or periodic removal[1].

[SOURCE: ISO 5020:2022, 3.1.2]

3.1.3
plastic
polymer to which additives or other substances may have been added, and which can function as a main structural component of final products

Note 1 to entry: In the context of this document, the polymers are mainly petroleum based.

Note 2 to entry: All types of plastics, including bioplastics and biodegradable plastics, should be treated as plastics.

[SOURCE: ISO 5020:2022, 3.1.3, Modified – In Note 2 to entry has "Onboard a fishing vessel (3.2.1)," been deleted]

3.1.4
biodegradable plastic
plastic capable of undergoing physical, biological decomposition, such that it ultimately decomposes into carbon dioxide (CO_2), biomass and water

Note 1 to entry: Biodegradable plastics biodegrade in certain conditions at their end of life. Compostable plastics - a subset of biodegradable ones – typically decompose in industrial composting facilities, and first need to be collected. Biodegradable and compostable plastics may be made from biological resources or fossil raw materials[2].

3.1.5
microplastic
solid plastic articles or fragments smaller than 5 mm, insoluble in water and not degradable

[SOURCE: ISO 5020:2022, 3.1.4]

3.2 Aquaculture

3.2.1
aquaculture
farming of aquatic organisms, including but not limited to fish, molluscs, crustaceans and aquatic plants

Note 1 to entry: Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated. For statistical purposes, aquatic organisms which are harvested by an individual or corporate body which has owned them throughout their rearing period contribute to aquaculture, while aquatic organisms which are exploitable by the public as a common property resource, with or without appropriate licences, are the harvest of fisheries.

3.2.2
main component
part of an aquaculture facility that holds one or more of the installation's load-bearing main functions

EXAMPLE Enclosure, barges, anchoring system, raft or integrated main component.

3.2.3
extra equipment
equipment that is not a *main component* (3.2.2), where actions, such as loads from the equipment or failure or defects in the equipment, can lead to increased danger of fish escaping

3.2.4
other equipment
equipment used at an aquaculture facility that is neither a *main component* (3.2.2) nor *extra equipment* (3.2.3)

3.2.5
geolocate
identify a geographic location

[SOURCE: ISO 5020:2022, 3.2.2]

3.3 Principles and planning

3.3.1
circular economy
CE
economic system that systemically maintains a circular flow of resources, by regenerating, retaining or adding to their value while contributing to sustainable development

[SOURCE: ISO 5020:2022, 3.3.1]

3.3.2
recycling
<waste> recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes

[SOURCE: ISO 5020:2022, 3.3.2]

3.3.3
reuse
operation by which products or main components are used again for the same purpose for which they were conceived

[SOURCE: ISO 5020:2022, 3.3.3]

3.3.4
waste plan
waste management plan
plan describing how to minimize, handle, treat and offload *waste* (3.1.1)

[SOURCE: ISO 5020:2022, 3.3.5]

3.3.5
waste management system
waste handling system
systematic actions and activities required to manage waste from its inception to its final disposal

[SOURCE: ISO 5020:2022, 3.3.6]

3.3.6
waste hierarchy
waste pyramid
tool used in evaluation of processes and prioritizes them from the most favourable to the least favourable actions to achieve sustainability

[SOURCE: ISO 5020:2022, 3.3.7]

3.3.7
risk assessment
process of identifying and analysing potential events, related to *waste* (3.1.1), that may impact the environment and *circular economy* (3.3.1), making judgments on the tolerability of the risk on the basis of a risk analysis while considering influencing factors

[SOURCE: ISO 5020:2022, 3.3.8]

4 Principles

4.1 General

The principles described in this clause are fundamental to the process of avoiding littering and other types of pollution from aquaculture. They are the basis for the requirements described in Clauses 4 to 8. This

document does not provide specific requirements for all situations, and these principles provide guidance for decisions that need to be made in day-to-day situations as well as in unanticipated situations.

These principles of waste management are for organizations to apply, considering the identification of interested parties and their needs and expectations.

4.2 Avoid littering and pollution

4.2.1 General

To avoid littering and pollution:

— Planning to optimize waste minimization.

— Establish waste management routines and provide for physical measures such as waste bins.

— Make sure that appropriate routines to avoid littering and pollution are followed.

— Discarded main components and extra equipment, and other equipment should never end up in marine or fresh waters intentionally or accidentally.

— Waste from aquaculture should never end up in marine or fresh waters intentionally or accidentally.

— Packaging should be minimized or avoided as far as possible.

4.2.2 Main components and extra equipment, and other equipment and products

Main components and extra equipment, and other equipment should

— be labelled to identify the owner, if lost,

— be less likely to pollute,

— be possible to geolocate if lost,

— be durable and should meet expected exposure where used,

— deteriorate to non-hazardous products if lost,

— use available and suitable equipment with a reduced risk of fragmentation during operations,

— be possible to repair, reuse and recycle.

4.2.3 Best practice

When purchasing main components or extra equipment, and other equipment that could generate or end up as waste, one should put emphasize characteristics such as quality, including recyclability, dismantlability, lifespan, ability to repair, and environmentally friendly product design (eco-design). One should strive to use subcontractors capable of providing sustainable products and/or services.

Strategies to minimizes for unintended loss (see 4.2.1) should be checked and improved. Lost main components and extra equipment, and other equipment from aquaculture should be:

— recaptured immediately after the incident that led to the loss, if possible;

— reported to relevant authorities.

Strive to avoid wear on main components and extra equipment, and other equipment (e.g. feeding pipes) to minimize emission of microplastic. Ensure complete removal of main components and extra equipment, and other equipment when moving a site. Captured litter should be taken care of.

4.3 Waste to be treated as a resource

4.3.1 Optimize circular economy (CE)

To facilitate for circular economy:

— Use products that can be separated in identifiable main components for reuse and recycling.

— Use products that include recycled materials or reused parts.

— Sort out reusable items and recyclable materials.

— Keep key waste fractions separated.

4.3.2 Avoid reducing waste quality

To maintain high quality of waste materials:

— Waste should be handled and stored in a way that ensures likelihood of reuse and/or recycling.

— Relevant recyclable materials should be cleaned, dried, e.g. cans.

— Avoid exposure to external conditions that diminish quality of parts and materials.

4.3.3 Adapt to local waste management systems

An aquaculture facility should have a plan for where to deliver waste, and as far as possible provide waste that the onshore waste management facilities can make use of.

Better networking with official authorities such as municipalities etc. can help to utilize and recycle the waste optimally.

Relevant interested parties, e.g. waste management organizations, and their needs and expectations, should be identified and taken into account when planning waste management. Waste plans should be adapted to relevant waste management systems.

4.3.4 Use the waste hierarchy for planning and prioritization

When planning an overall waste management system, one should use the waste hierarchy as an important input, see Figure 1.

Use the waste hierarchy as a guideline to identify the best ways of dealing with different types of waste. Aim for options towards the top of the hierarchy to achieve the most beneficial environmental impacts.

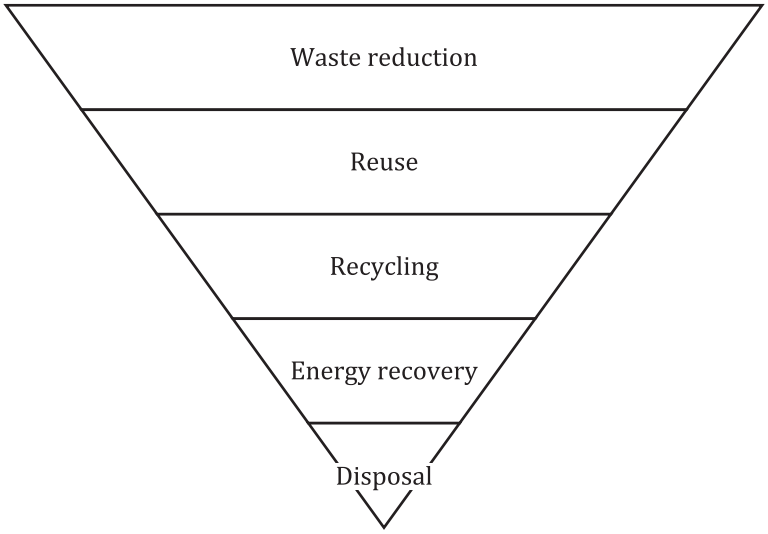

Figure 1 — Waste hierarchy

4.3.5 Make awareness raising a priority

Ensure that all personnel, processors, transporters, suppliers and other relevant parties are aware of the impacts of litter on species, the environment and human health. This can be achieved through one or more of the following:

— in the waste plan and when communicating the waste plan;

— incorporated into the facility's employee training program;

— a dedicated employee course;

— in the employee handbook;

— illustrated on information posters;

— tailormade handouts or leaflets on the topic;

— as part of the facility's dialogue with processors, transporters, suppliers and other relevant parties.

5 Waste plan

5.1 General

All aquaculture facilities should have a waste plan, based on a specific risk assessment. A waste plan includes appropriate management of all kinds of operational waste generated and discarded main components and extra equipment, and other equipment. The waste plan should be communicated to all personnel to ensure they understand the plan and their role in the successful implementation of the plan. If applicable, internal control or auditing should be used, in line with procedures for all waste management and storage activities.

5.2 Classification of waste

Waste should be classified in the following types and the types should not be mixed:

— Solid waste

EXAMPLE 1 Plastic waste, old and damaged aquaculture equipment, abandoned, lost and discarded aquaculture equipment, fish boxes, packaging materials, household waste etc.