Food and Agriculture Organization of the United Nations

SUSTAINABLE DEVELOPMENT GOALS

TRAINING ON THE IMPLEMENTATION OF HACCP FOR FISHERIES AND AQUACULTURE

HACCP in Fish Farms

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Objectives

Applications of HACCP Principles to the aquaculture sector

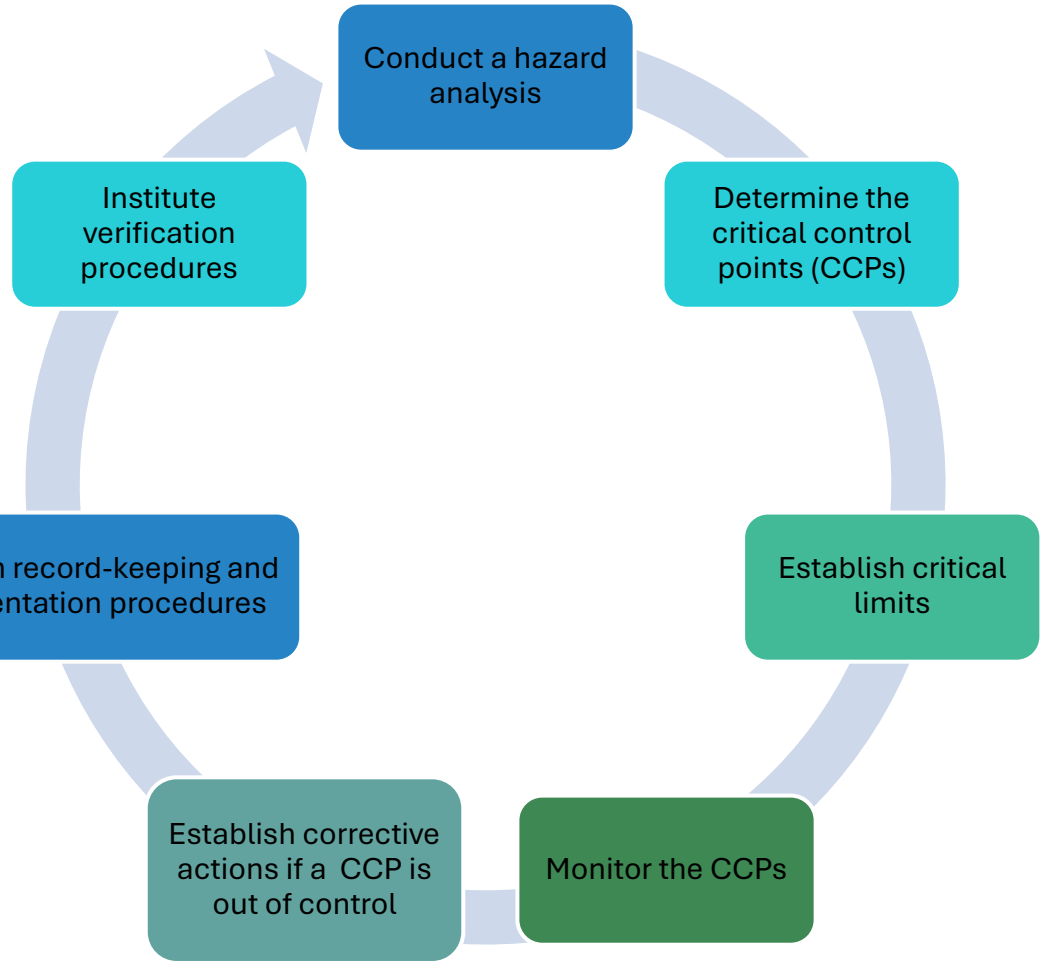
Regulatory exemptions and impact on operators

Dive into a case study of HACCP at farm level

- The basic requirements –PPRs and SOPs
- Operational flowchart
- Identification of specific aquaculture hazards
- The decision making
- Control measures and potential CCPs

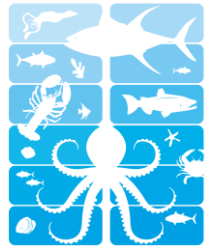
Benefits of applying HAACP principles and methodology in fish farming

Applications of HACCP Principles to the aquaculture sector



- Unique production process-based risks and factors associated with aquaculture products must be addressed and controlled
- Powerful preventive tool for managing biological and chemical hazards in fish farming, harvesting and processing
- Proactive approach that can help fish farms to produce safer products/meet regulatory and voluntary standards requirements and enhance consumer trust
- Support downstream compliance with traceability and FS requirements
- Resource-intensive process

PRPs and SOPs for Aquaculture – Basic requirements



Site Selection and location	Located in areas where the risk of contamination by chemical, physical or microbiological hazards is minimal and where sources of pollution can be controlled Inlets and discharge canals Effluent Management Good Agricultural Practices
Growing Water Quality	Use safe and uncontaminated water sources, suitable to produce fish products that are safe for human consumption, monitored regularly
Design and construction of equipment and utensils	Such that it minimizes the buildup of residues and prevents them becoming a source of contamination
Personal hygiene and health	Ensure key personal hygiene practices, use of appropriate clothing and footwear, worker health screenings
Sanitation and Hygiene control programme	Cleaning and disinfection schedules; Designation of personnel; Maintenance of premises, equipment and utensils; Pest control systems (exclusion of livestock); Waste Management
Water Quality Management	Supply of water for processing operations Supply of water for ice
Pond/Cage Management (Fertilization/Cleaning and disinfection)	Develop systematic procedures for cleaning and disinfection protocols, fertilization, outlining type of products, quantities, application methods, safety considerations, monitoring of water quality and record keeping

PRPs and SOPs for Aquaculture – Basic requirements

Traceability	Operate an effective record-keeping system that provides accurate entries for at least: • each culture unit and production cycle, • all supplying facilities (feed mills and hatcheries/nurseries); • records concerning any antibiotic or other therapeutic drug use (including dosage and dates of treatment initiation and completion); • therapeutic chemical or water quality amendment (fungicides, parasiticides, herbicides, algicides, pesticides, oxidants, probiotics), including dosage and dates of treatment. • Harvest date, harvest quantity, • Movement all product receiving facilities (Upstream)
Seed supply	The source of post-larvae, fry and fingerlings should be such to avoid the carryover of potential hazards into the growing stocks. Records of stocking and sources of seed
Feed supply and feeding Management	Detailed raw material records and certification that feed ingredients should not contain unsafe levels of pesticides, chemical contaminants, microbial toxins, or other adulterating substances. Clear identification of medicated feeds
Storage and Management of farm supplies	Farm supplies (fuels, lubricants, agricultural chemicals, feed, etc.) should be labelled, stored, used and disposed of in a safe and responsible manner. Stock rotation practices must be implemented (in the case of feed, FIFO)

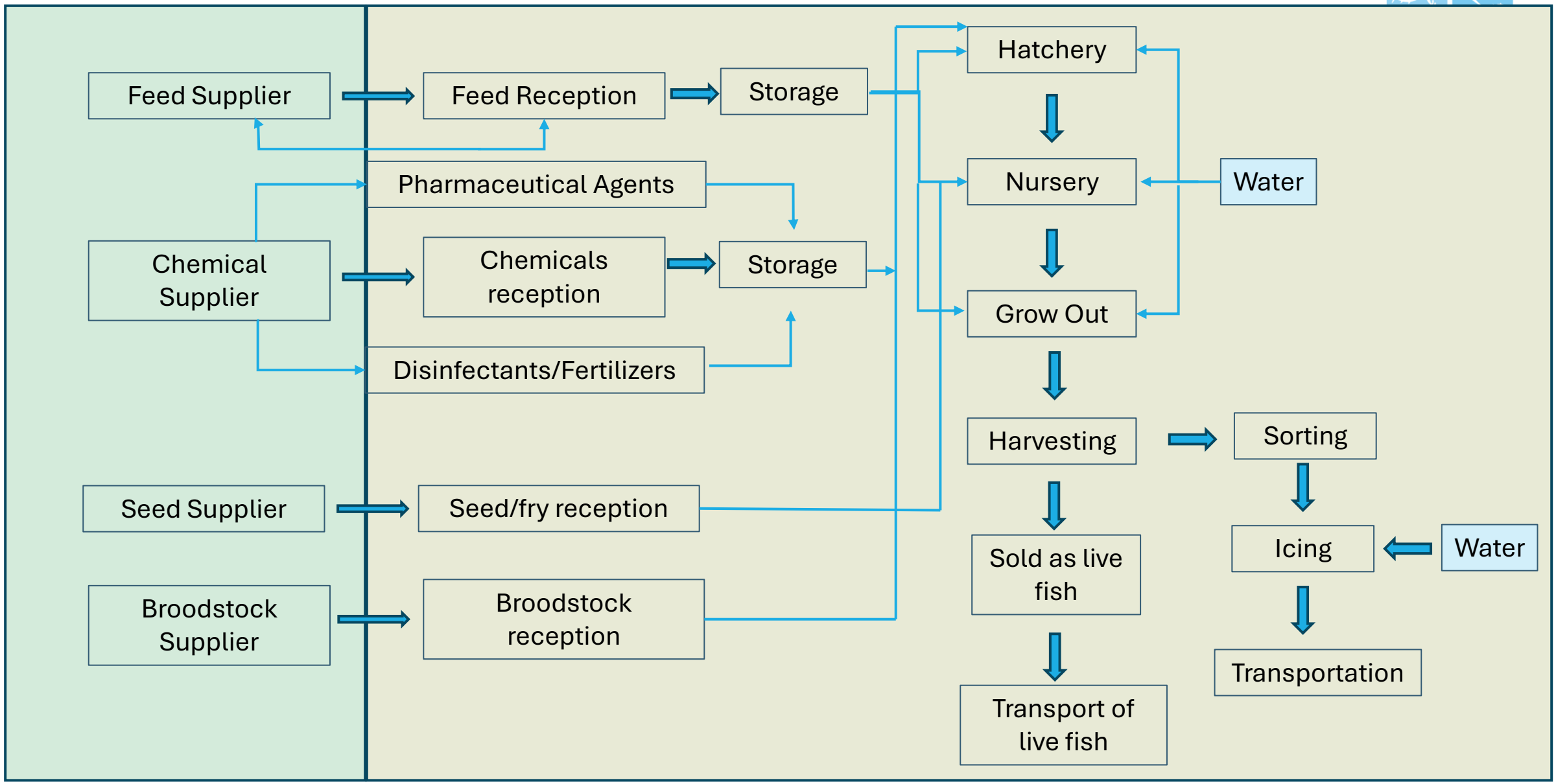
PRPs and SOPs for Aquaculture – Basic requirements

Chemical management	Detailed inventory and usage records for all chemicals supplied (fertilizers, disinfectants, pharmaceuticals); selection of approved only chemicals and substances purchase from certified suppliers (to ensure product authenticity and quality); designated chemical storage area; safe handling and application procedures
Veterinary drug Management	All veterinary products should be registered and authorized by competent authority. Keep detailed records on the use of antimicrobial agents. Records shall include date, compound used, reason(s) for use, drug sensitivity test results, dose, required withdrawal period and harvest date for treated production lots.
Animal Health Management Plan	Animal health plans (practical guide to the activities and practices that are implemented to maintain aquatic animals in good health) and biosecurity control plan (practices, activities and policies that minimize the risks from the introduction and spread of aquatic animal diseases)
Harvesting and Post harvest handling	Outline of stop feeding procedures, Harvest period hygienic practices post harvest, record keeping and label of fish batches

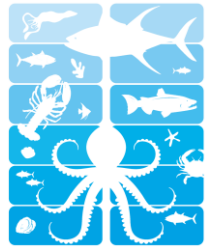
Regulatory exemptions and impact on operators

- HACCP application may apply to aquaculture depending on regulatory regime of **country or region** and the **intended market** for the farmed fish products
- The CAC (Code of practice for fish and fishery products) recommends the implementation of HACCP across the food chain, including aquaculture
- Operators who process their own fish will be directly affected by the HACCP regulations
- Operators who sell their fish to a processor will be indirectly affected being responsible to provide specific and satisfactory information
- Positive impact but also demands significant investment and effort

Example flow diagram



Hazard Analysis – some considerations



- The same hazards are generally present in products of aquaculture as in corresponding varieties caught in the wild
- A farm-level HACCP plan should identify, evaluate and control the food safety risks that occur during production.
- Potential hazards that are specific to aquaculture products include residues of veterinary drugs, other chemicals used in aquaculture production or environmental contaminants, microbiological contamination due to poor water quality used in production systems; contamination via inputs supply
- Parasite infection can have distinct scenarios where in controlled systems (RAS) parasites can be very much reduced or even absent but often a hazard with high probability due to intensive farming and inefficient pond management

Identify hazards and determine their significance

Step	IDENTIFICATION OF THE POTENTIAL HAZARD TO BE INTRODUCED, CONTROLLED OR INCREASED AT THIS STAGE		DOES THIS POTENTIAL HAZARD NEED TO BE TAKEN INTO ACCOUNT IN THE HACCP PLAN?		JUSTIFY THE PREVIOUS DECISION	WHAT PREVENTIVE MEASURES CAN BE APPLIED TO PREVENT, ELIMINATE OR REDUCE THIS DANGER TO ACCEPTABLE LEVELS?
			YES	NO		
Seed supply	**B**	Presence of pathogens	NO		Fingerlings are grown under strict sanitary conditions and is unlikely that human pathogenic organisms would proliferate at this stage of life	
	C	residues of veterinary drugs	YES		Residues of unauthorized drugs (chloramphenicol, Malachite green)	Suppliers' declarations Do not accept seed that have been subject to treatments with banned substances, only use certified hatchery and verify with periodic analysis. Audit your suppliers
	P		NO			
Feed supply	**…**	…	**…**		**…**	…
Chemical supply	**…**	…	**…**		**…**	…

Applying the decision tree

Step	Preventive measures	Q1: Do control measures exist? If yes – go to Q2. If no – consider whether control measures are available or necessary within the process. Proceed to next identified hazard.	Q2: Is the step specifically designed to eliminate or reduce the likely occurrence of the hazard to an acceptable level? If yes – this step is a CCP. If no – go to Q3.	Q3: Could contamination occur in excess of acceptable levels or could this increase to unacceptable levels? If yes – go to Q4. If no – not a CCP.	Q4: Will a subsequent step eliminate or reduce the hazard to an acceptable level? If yes – not a CCP. If no – CCP. What about consideration of a previous step?	CCP nº
Feed reception Potential Hazards Chemical Contamination with pharmaceutical residues	Veterinary drug and other chemical treatments should be administered in accordance with recommended practices and comply with regulations. Medicated feeds should be clearly identified on the package and stored separately to avoid errors and farmers should follow manufacturer instructions	Q1- YES	Q2-YES			CCP1

*other hazards to be considered include Mycotoxin and Microbiological contamination. A full hazard analysis should be conducted by the multidisciplinary team and according to the specific production conditions

Control strategy – How to
Step 1 Feed supply

CCP	Significant Hazard	Critical limit	Monitoring				Corrective action(s)	Records	Verification
			What	How	Frequency	Who			
Reception of feed	Chemical contamination	Suppliers' certification Certificate indicating no drug usage Correct identification of medicated feeds	Presence of a certificate Presence of a visible and adequate label	Visual check	Each lot received	Reception supervisor	Reject the lot Evaluate and discontinue use of supplier until evidence of compliance is obtained	Feed supplier drug usage certificate Technical specifications of medicated fees	Collect a representative sample of the feed quarterly, and analyze for those drug residues that are reasonably likely to be present Conduct supplier's audit

Benefits of applying HACCP principles and methodology in fish farming

- HACCP is a predictive approach to **improve food safety**. In the case of aquaculture, some hazards must be controlled at the farm level ensuring safety of final product

- HACCP principles applied to aquaculture allow that potential hazards related to water quality, inputs safety, and production phases are systematically identified, monitored, and controlled

- Helps fish farms produce safer products, **meet regulatory requirements**, and enhance **consumer trust**.

- Minimizes likelihood of product recalls or rejections

- The methodology can and should be used also in the context of biosecurity and as a risk management tool to proactively control aquatic diseases in farms

- Significant **upfront investment** with **long-term benefits**

Category	Type	Subject	Date	Origin	Notifying	Class.	Decision
Fish and fish products	food	(Leuco)malachite green in fish.	7 NOV 2023		Netherlands	border rejection notification	serious
Fish and fish products	food	Exceeede RPA value for the sum of malachite green and luecomalachite green in frozen Catfish fillets from Vietnam	6 SEP 2023		Slovenia	border rejection notification	serious
Fish and fish products	food	Leucomalachite green in catfish fillets (Clarias gariepinus) from Vietnam	13 JUL 2023		Germany	alert notification	serious
Fish and fish products	food	Unauthorised leucomalachite green in frozen catfish fillets (Claria gariepinus) from Vietnam	26 APR 2023		Slovenia	border rejection notification	serious
Fish and fish products	food	Malachite Green-Leuco in Frozen Catfish from Viet-Nam	9 MAR 2023		Italy	information notification for attention	serious
Fish and fish products	food	Detection of malachite green on fish	29 NOV 2022		France	border rejection notification	serious
Fish and fish products	food	Unauthorised substance malachite green (205 µg/kg - ppb) in frozen asian sea bass (Lates calcarifer) from Vietnam	31 OCT 2022		Netherlands	border rejection notification	serious
Fish and fish products	food	Unauthorised substances malachite green and leucomalachite green in frozen salted snake head fish from Thailand	30 AUG 2022		France	information notification for attention	serious
Fish and fish products	food	Unauthorised substance malachite green in frozen catfish (Clarias macrocephalus) from Vietnam	28 JUL 2022		France	alert notification	serious
Fish and fish products	food	Malachite green and leukomalachite green in pangasius filet from Vietnam	8 JUL 2022		Norway	information notification for attention	serious
Fish and fish products	food	Malachite green and leucomalachite green in frozen red tilapia from Vietnam	1 APR 2022		Netherlands	alert notification	serious
Fish and fish products	food	Malachite green in Red-tailed Tinfoil Barb from Vietnam	8 DEC 2020		Sweden	alert notification	serious

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Thank you!