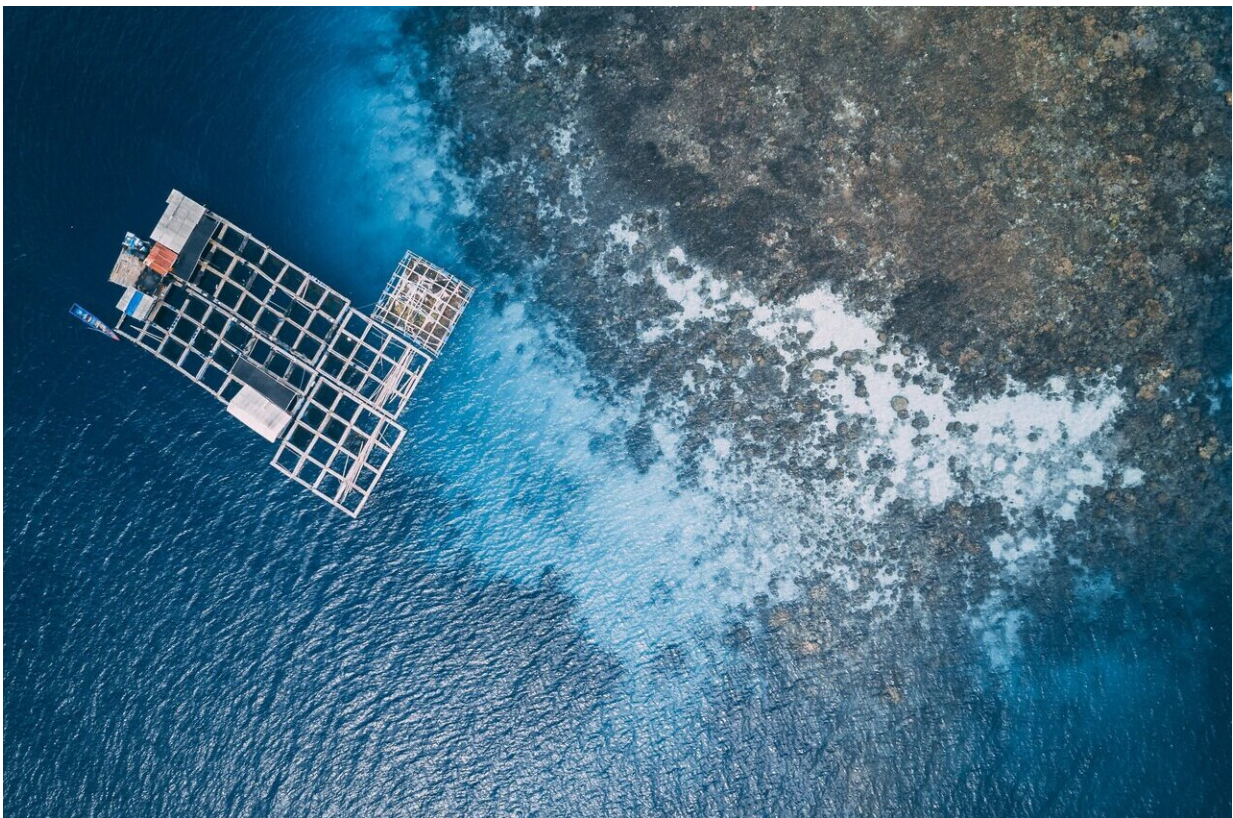


# Scientists develop new way to identify and reduce impact of chemicals, diseases in fish farming

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Scientists have developed a new way to identify and reduce the impact of chemicals and diseases in global aquaculture (fish farming).

Aquaculture already provides about half of all [seafood](#) consumed by humans, and by 2050 it is expected to provide as much as 70%.

In 2020 seafood consumption reached an all-time high, and sustainable aquaculture is playing a vital role in this "blue food" revolution.

In a new paper, scientists from Cefas (Centre for Environment, Fisheries and Aquaculture Science) and the University of Exeter describe a "Seafood Risk Tool" to support the development of sustainable aquaculture.

"Much of the discourse relating to sustainability of aquaculture has focussed on the potential impact of the sector on the natural systems in which it operates," said co-lead author Professor Grant Stentiford, from Cefas.

"Whilst this is entirely appropriate, given the intricate relationship between aquatic organisms and their environment, the wide array of [hazards](#) in that environment, and our increasing reliance on aquaculture to provision our seafood, it is timely to also place emphasis on creating an enabling aquatic environment where the sector has greatest chance of succeeding.

"Controlling the impact that diverse chemical and pathogen hazards may have on safe and sustainable production from the sector may thus lead us to closer alignment of policies for protection of aquatic environments, and those focused on future food production from these natural systems.

"This is particularly pertinent for low- and middle-income countries where the vast majority of aquaculture currently occurs and where policies aimed to protect natural waterways from diverse hazards are least developed."

Aquaculture—the farming of fish, mollusks, crustaceans, other animals, seaweeds, and plants in our rivers, lakes, seas, and oceans—is ranked amongst the fastest growing and highly traded global food sectors.

It is rooted within higher relative efficiencies of production of aquatic protein compared to many land-based alternatives, and the potential benefits of eating aquatic protein as part of a healthy and nutritious diet.

Inevitably, alongside this expansion have come calls to ensure adequate sustainability is designed in the sector, with due attention paid to protection of health and welfare of organisms on the farm, the environment in which the farm occurs, and the consumers of seafood.

The so-called "One Health Aquaculture" approach, previously described by the research team, proposes that such a balance must be urgently factored into local to international plans to expand the sector.

Aquatic organisms are particularly responsive to their environment and the hazards that may occur within it.

These hazards, ranging from natural and industrial chemical pollutants, pathogens that impact health of farmed stock, and human pathogens that may contaminate seafood and reach the consumer, can combine to impact not only farm yield and profit but also the safety of consumers eating seafood products from the sector.

The Seafood Risk Tool calculates the combined impact of these complex hazards on seafood supply chains, and demonstrates how impacts can be minimized by government, industry and even the consumer.

Co- author Professor Charles Tyler, co-director of the Centre for Sustainable Aquaculture Futures at the University of Exeter, said, "The Seafood Risk Tool is an innovative step forward in seeking to better

integrate effective assessment of animal and public [health risks](#) in seafood production.

"Importantly, the tool helps us to focus on what is most needed for the development of safe aquaculture futures.

"Critical in this equation is the water we grow the plants and animals in.

"Access to good water quality is crucial for safe and efficient aquaculture, and more so now than ever as production is intensified to meet demands to feed the world.

"Ensuring the wastes from aquaculture do not impact adversely on the environment is equally important to help protect our water supplies and the biodiversity upon which future aquaculture will rely.

"The development of the Seafood Risk Tool underpins the ethos of our Centre for Sustainable Aquaculture Futures at the University of Exeter, which is to support approaches that harmonize societal needs for aquaculture with good animal welfare and environmental protection, in turn supporting a truly sustainable approach in food production systems."

Co-lead author Dr Rachel Hartnell, also from Cefas, said, "The elaboration of a simple harmonized framework, the Seafood Risk Tool enables assessment of animal and public health risks throughout seafood production chains.

"This standardized all-hazards profiling approach helps us make informed go/no-go decisions based on data, and where needed provides evidence for targeted policy interventions to support development of sustainable and safe aquaculture.

"The drivers for increased [aquaculture](#) are well known, but it is critical

that as the industry expands over coming decades, we manage the animal welfare and economic impact of production diseases and protect consumers of end products from food safety risks.

"In this paper we test the Seafood Risk Tool on bivalve mollusks intended for raw consumption, a scenario considered high [risk](#) in terms of food safety as through filter feeding these animals take on the characteristics of their complex [environment](#).

"We show that application of the Seafood Risk Tool enables identification of both major risks and effective mitigation points; thus, informing risk-based decisions on development, and focusing interventions where they can realize maximum benefits; in doing so, delivering positive food security outcomes."

Cefas Chief Scientist Professor Stuart Rogers added, "Hazard detection and management has been a strong feature of science and advice at Cefas and our Centre for Sustainable Aquaculture Futures at the University of Exeter for many years.

"However, the approach described in this paper, considering for the first time the combined impact of diverse hazards on aquatic food supply, and importantly tangible measures to de-risk supply from these sectors, is highly novel and timely, particular as we increasingly rely on aquatic habitats for production of safe and sustainable blue foods."

**More information:** G. D. Stentiford et al, A seafood risk tool for assessing and mitigating chemical and pathogen hazards in the aquaculture supply chain, *Nature Food* (2022). [DOI: 10.1038/s43016-022-00465-3](#)

Provided by University of Exeter

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