

Impact and sustainability in fisheries and aquaculture.

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Introduction

The global seafood industry (capture fisheries and aquaculture) is an important source of food, income, employment, and culture. Seafood demand is steadily increasing as the global human population, affluence, and per capita consumption increase. Despite declining wild fish stocks, seafood supply is increasing due to phenomenal advances in aquaculture, or the cultivation of aquatic organisms. Aquaculture supplied 42% of the world's fish in 2012 and is expected to surpass capture fisheries production in the coming years. It is presented a quantitative analysis of the ethics and sustainability of capture fisheries and aquaculture. The ethical matrix, a conceptual tool for analysing the wellbeing, autonomy, and justice of different interest groups, and Rapfish, a rapid appraisal technique used to evaluate the sustainability of fisheries along six performance modalities, including ethics, are adapted in an innovative practical ethics approach. Using case studies of large- and small-scale capture fisheries around the world, as well as generalised carnivorous and omnivorous aquaculture systems [1].

The Technical Paper on inland fisheries emphasises that in the competition for scarce water resources, the valuable contributions of inland fisheries are frequently overlooked or undervalued. Some positive effects have also been identified, such as increased precipitation leading to the expansion and improved connectivity of some fish habitats, but in order to capitalise on them, new investments as well as flexibility in policies, laws, and regulations, as well as post-harvest processes, are required [2]. To maximise success, adaptive management measures should be implemented within the framework of an ecosystem approach to fisheries.

Microbiota in aquaculture systems reflect ecological characteristics of the ecosystem, play an important role in water quality regulation and ecological stability, and have an impact on farm animal growth and health. The microbiota is a collection of microorganisms that live in a specific environment, including commensal, symbiotic, and pathogenic microorganisms. The microbiome is defined as the genome collection of microorganisms within the microbiota. Microbiome analysis has been extensively researched in mammals, and microbiome-wide association studies have revealed that various diseases are associated with variations in the microbiota. The microbiome's importance extends beyond individual host health, and microbiota from different hosts and ecosystems can be highly interconnected. The importance

of the microbiome for human health and productivity is becoming more widely recognised [3].

The composition of the surrounding microbial community is frequently linked to disease occurrence in aquaculture systems. Environmental microbiome changes have a significant impact on the mechanisms of host gut microbiome assembly and environmental adaptation. Microbe-microbe and host-microbiome interactions in the host gut may also have an impact on the environmental microbiome. Because of the importance of the interaction between the gut microbiome and the environment in aquaculture systems, a thorough study of the microbiome can contribute to the development of microbial ecological strategies [4].

Aquaculture offers numerous opportunities for adaptation. The most important of these are to capitalise on newly created aquaculture opportunities on flooded or salinized land, as well as in reservoirs and ponds built to store water, and to integrate aquaculture with agriculture. Many aquaculture systems rely on declining wild stocks of fish for seed, and seed production facilities will be needed to compensate for the declines in wild populations. The scarcity of wild fish as a source of feed will necessitate a shift away from carnivorous species culture. Measures should be put in place to cultivate low-level food chain species like seaweed and shellfish, which essentially sequester carbon (FAO, 2009b) [5].

Recognize the high reliance of small-scale fishers and fish farmers in developing countries on ecosystem services, and take steps to improve the health of these ecosystems by reducing other stresses such as over-exploitation and pollution. Communities must be strengthened by providing services such as insurance and weather warnings to reduce risk, as well as support for participatory natural resource management and sustainable fishing operations, as well as assistance in post-harvest processing and preservation to maximise value-added and employment while minimising waste from both fisheries and aquaculture.

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