

## Promoting sustainable mariculture to increase food security

“Expanding ocean food production under climate change” is an article published on 27 April 2022 in the journal *Nature* and written by Christopher M. Free, *et al.* The world’s oceans and fishery resources will be strongly impacted by climate change. To feed a growing population that is consuming more and more animal protein, sustainable mariculture (or marine aquaculture) could meet demand wherever the quantities of fish available from traditional fishing threaten to be insufficient in the future.

**#1** In the face of future climate scenarios, measures to adapt traditional fishing will prove insufficient to maintain the current *per capita* supply of fish and seafood. Although itself also challenged by climate forecasts, mariculture, which is defined as aquaculture taking place in the world’s seas and oceans, offers good growth prospects. With a greatly improved rate of input conversion (“*fish in, fish out*”, the ratio of wild fish consumed to farmed fish produced), mariculture is sustainable when it combines effective planning and governance. Aquaculture can be operated on land, but it then competes for space with agricultural production, livestock farming and ongoing urban expansion. In addition, the effects of climate change will be strongly felt on land-based food production.

**#2** On a global scale, projections vary considerably between different geographical areas. Climate change will have a different impact on the polar oceans compared with their tropical counterparts, for example. Due to very different demographic prospects between the regions, traditional fishing will not be placed under the same pressure of demand in all locations. Moreover, better management alone will not be enough to safeguard production levels, particularly in low-income tropical countries. While international trade may provide some recourse, the single most important solution will continue to be the development of sustainable mariculture, which has the advantage of occupying only a small percentage of countries’ Exclusive Economic Zones (EEZ). This can be further optimised by recourse to so-called *integrated multi-trophic aquaculture*, which associates several aquatic organisms to recreate an interspecies servicing system and thus save space.

**#3** Mariculture concerns both bivalve molluscs (mussels, oysters, etc.) and finned fish. The latter category, less impacted than the former by sea acidification, offers a stable potential for growth under all climate scenarios if practised in a reasoned manner, i.e., in line with the comprehensive planning of local ecosystems, the optimisation of farmed species, selective breeding and an innovative approach to feeding practices. Reducing the share of marine fish and increasing that of more nutritious and sustainable land-based foodstuffs (such as insects, algae, etc.) will conserve the resource and enjoy a much better feed conversion rate than the rearing of livestock. These adaptive measures for mariculture would make it more resilient to climate change, less impactful on the environment and capable of feeding people sustainably.

### Mariculture in France

In France, the picture is rather bleak for an activity with a poor social image and suffering from a lack of attractiveness. In addition, existing facilities suffer from conflicts of use and the difficulty of obtaining authorisation, together with a regulatory and political attitude of general suspicion towards finfish mariculture (marine fish farming). The country is Europe's second largest shellfish producer, a sector that regularly suffers losses due to climatic (and other) hazards, but which still accounts for a large majority of the country's mariculture. Marine fish farming (sea bass, gilthead bream, etc.) also remains limited compared to land-based aquaculture (trout, caviar, etc.), even though it is a high-quality activity, geared towards exports and operating to stringent environmental standards.

### *The opinion of Pauline Bureau, the Vice-Chair of La Fabrique Écologique.*

*Mariculture is a promising field that challenges us to combine measures of good governance, a detailed knowledge of our local marine ecosystems and an understanding of the climate risks to these ecosystems.*