

AQUACULTURE, A FUNDAMENTAL SUPPORT FOR OUR EXISTENCE

At the end of 2013 an editorial of my authorship was published in *Interciencia* and again I have the honor to do so maintaining the same concept and manifestation of aquaculture as part of the solution to our existence. By that time we were on the planet 7.2 billion inhabitants, today we exceed 8.1 billion, almost 1 billion more than 10 years ago!

Aquaculture and population growth interact in a complex network of influences and effects. However, its technological development is essential to address the challenges presented by the world population, which, although it tends to stabilize in its growth, projections for two more decades indicate that we are with a high growth rate.

Aquaculture is constantly innovating, enabling significant improvements in production, efficiency and sustainability. Great efforts are being made to diversify it, including more species for food and other human benefits. Gradually, advances in nutrition and feeding generate more sustainable diets that optimize growth. Animal health is strengthened by using various natural additives and reducing the use of antibiotics. Biotechnology has enabled advances of incalculable importance, such as genetic improvement for disease resistance, increased growth rates, or the development of appropriate drugs. Extensive open farming systems are changing to intensive recirculation systems, which reduce the need for large volumes of water use, enhance biosecurity and minimize the release of polluting effluents. Technology allows automated monitoring for the control of culture parameters, timed feed dosing and early detection of pathogens, all with greater precision and efficiency, which will undoubtedly increase with the application of artificial intelligence. Engineering applied to aquaculture has allowed the development of better culture systems such as cages for the open sea, enhancing mariculture, or support equipment based on alternative energies. There is a boom in integrated multi-trophic aquaculture, which takes advantage of dissolved and particulate organic matter and nutrients released, in a culture system with several species of different trophic levels, which reduces environmental impacts. On the other hand, the use of aquaculture in the ecological restoration of marine resources is under development, last but not least, communication and education on aquaculture, beyond what is formally received in the academy, has improved, effec-

tively spreading the importance of sustainable aquaculture. Here, traceability, which guarantees the origin and quality of aquaculture products, is playing a preponderant role.

Aquaculture also produces pollution and sometimes devastating effects on both biota and the environment. However, these effects are far outweighed when compared to the contributions of aquaculture to humanity, mainly in terms of food security, since its products are of much higher nutritional quality and healthier than other food products, apart from being more efficient in production and, when compared to any agricultural activity, it is the productive activity with the lowest carbon footprint. In this sense, and without a doubt, aquaculture products are food of unquestionable value.

But the challenges of this growing world are not only focused on food, but also on many other factors, with the priority today and tomorrow being to stop or mitigate pollution and climate change. Here too, aquaculture must be part of the solution, with a sustainable production that involves not only food products but also ecosystem services, prioritizing the production of organisms at the base of the food chain, in order to leave a smaller ecological footprint. To this end, we should focus on cultivating producers (algae) and primary consumers (such as oysters that filter microalgae), which are ideal for reducing pollution and mitigating climate change since they are useful tools for reducing eutrophication and ideal for CO₂ sequestration, an important aspect of the use of aquaculture to be a large part of the solution for the sustainability of the planet.

Undoubtedly, aquaculture brings benefits to multiple companies, which is extraordinary, as it contributes to the sustainability of the socio-economic base of the planet. Aquaculture is also a source of food subsistence for many families, particularly in Asian regions, a practice that should be expanded in western rural populations; but the challenges of this growing world are not only focused on food, but we must appreciate and promote more the ecosystem service role that aquaculture plays on the planet, and, undoubtedly, this vision must be part of the state policies for a better global development.

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