Proposals to boost sustainable development in aquaculture: the case of Mexico



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INTRODUCTION:

Mexico is one of the five countries with the greatest biodiversity in the world, but it also ranks first in Latin America in threatened species. Aquaculture is no stranger to these threats, as it faces risks to conserve native species when their natural habitats suffer intentional and negligent environmental impacts. As well as by untreated wastewater, resulting from non-substantial practices. Fish farming is an activity that has evolved over time, strengthening substantially at the end of the twentieth century. In this century its development took place without considering its environmental impact, which implies challenges in terms of sustainability, in accordance with the guidelines of the code of responsible aquaculture and Mexican environmental policy. By the end of the twentieth century, Harrison and Stiassny (1999) reported the loss of 54 percent of the world's native aquatic fauna due to aquaculture. In order to contextualize that data, McCauley et al. (2015) highlighted that extinction in species is greater in inland waters than in oceans. In the case of Mexico, aquaculture was considered the main route of introduction of exotic fish, causing the extinction of 60 percent of native species (Contreras, 1999: 31-52). According to Contreras et al. (2008), in the period 1963-2005, the number of species at risk accelerated, from 17 to 192. Given the benefits and impacts of the activity, its development is debated between the productivist and environmentalist perspectives, which would seem contradictory and irreconcilable. Hence the importance of knowing the level of compliance of Mexican aquaculture with environmental and international policy, a decade away from the objectives of the 2030 Agenda.



OBJECTIVE:

METHODOLOGY:

RESULTS:

The objective is to assess the contribution of aquaculture to Sustainable Development Goals 2 and 12 in terms of the national environmental policy that has governed it in the period from the sixteenth to the twenty-first century

Los The results show a critical situation of compliance with environmental policy by farmers in several states of the country that began in the 21st century. Aquaculture law, which began at the end of 2010, has been insufficient and does not prioritize solutions.

"The species of commercial interest in Mexico are mostly exotic that were introduced in the mid-nineteenth century, a

few others in the early twentieth century, and most in the mid- and late twentieth century more consistently (map 1)"



A historical review of this activity is made in terms of the productivist model and environmental management paradigms of the BORDER ECONOMY, ENVIRONMENTAL PROTECTION, RESOUR-CE MANAGEMENT AND SUSTAINABLE DEVELOPMENT. The review was done in three phases: 1) promotion and guiding process of aquaculture development, the evolution of styles of aquaculture production and managed species, between the sixteenth and twenty-first centuries. 2) the impact of the environmental agent on aquaculture in Mexico: institutions, legislation and environmental and water regulation; and 3) the adoption of environmental policy by stakeholders in the sector.

The twentieth century was the protagonist of a series of changes to the public administration of aquaculture and, with it, various bodies of supervision and regulation of the breeding, capture and exploitation of aquatic products arise. In the first decades there was a boom in fishing and in the middle of the century in aquaculture. At the end of the twentieth century, due to environmental concerns about the externalities of this model, aquaculture began to be regulated for the purposes of ecological sustainability when it first passed to the Ministry of the Environment in 1994.



The analysis of fish farming in Mexico under a sustainable approach from pre-Hispanic times to the XXI century indicates that although there are bases for sustainability, they are still lacking.



Due to the environmental impacts caused by the model adopted at the beginning of the activity, which aimed not to leave any body of water in the country without being exploited by fish, the first efforts of the government to integrate the environmental paradigms that emerged in the world were given. The government



"Due to the late arrival of environmental paradigms, the dominance of a frontier economy paradigm has prevailed despite efforts to integrate resource management, environmental protection and sustainable development into public management".

Invasive alien species predominated from 80 to 90% in aquaculture production in the late twentieth century. It did so under the typology of aquaculture fisheries (promotion fishing). By the beginning of the XXI century the tons produced of these species increased, but it fell with respect to the percentage of total production due to the increase in shrimp. Controlled systems also

PROPOSALS:

Dimension and causes of the problem of compliance with the environmental policy

With the passage of time, different contributions have been undertaken to opt for sustainable development in the productive sector and in the government, but they have been insufficient. Those of the government stand out for its 72 orders in the last decade, but the effort is discreet because it is not reflected in the solution of the problem. Progress on the regulatory program is slow and is aimed at few states in the country, and other initiatives have not been strong enough. To achieve the scope of the SDGs, this study proposes a series of 45 ideas of its own that will not be successful if they are not combined with 7 fundamental challenges for their scope.



It was identified that approximately 78-99% of non-compliance with environmental and water laws by aquaculturists in several states of the country. The factors that are identified with the problem of aquaculture-environmental management are: 1) Non-compliance with environmental permits; (2) Fines, penalties and closures; (3) Pollution disputes; (4) Complaints from society; (5) Lack of federal zone concessions; (6) Lack of up-to-date records; and (7) Administrative responsibility. However, the causes that could cause it are different:



Having ignored environmental policy, gave rise to the current state of informality that affects the sector today, where the illegal aquaculturist was left without rights to receive subsidies for a long time. Much of this aquaculture was fostered by the authority itself due to the lack of institutional capacities to offer solutions in a timely manner. Under this situation, stakeholders adopted the position of not accepting the legal bases and environmental regulation. Thus, in the cases supported with federal resources, there was discretion in executing the programs of the federal public administration, an administrative failure to public service that directly involves them, while the rights of the legal aquaculturist were ignored. The combination of these cases, as well as those that occurred from private investment without permits, forged the irregular development of the sector in the country, causing the known negative externalities, which affected aquatic ecosystems, generated popular complaints, fines and sanctions for socio-environmental effects by Conagua-Semarnat, as well as closures or criminal complaints by Profepa and PGR.



CONCLUSIONS:

To address the sustainability problems of Mexico's aquaculture sector towards the 2030 agenda, a series of proposals are suggested around an obligatory application of the responsible code of conduct, regarding water quality and the introduction of invasive alien species into ecosystems and the greatest risks when producing food from aquaculture. Surveillance must go beyond fish farmers to others involved, such as authorities and fishermen, in order to respect vulnerable areas protected by other regulations and link them to aquaculture regulations and their promotion instruments. Legislative improvements are needed for the small aquaculture that predominates in Mexico (its correct identification and registration), reduce the costs of payments of rights and fair adaptations to the most sustainable forms of production.

One of them may be the promotion of conservation aquaculture; a landmark on the road to sustainability. As inter-agency improvements, sustainable aquaculture programmes (native and endemic, rational use of water, management, good practices and controlled systems) and environmental and water regularization (such as the application of IWRM, updating of closures, priority for its nonover-consumer use of water and differentiated from agricultural over-the-top uses of agriculture should be promoted, a concession for over-concession, differentiated policies in regulation and payment of duties, and affordability for sustainable aquaculture and self-consumption).

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