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Aquaculture, society and environment: A Cuban approach

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Beginnings

Before the triumph of the Revolution in January 1959, the fishing activity in Cuba was limited to artisanal fishing on the Cuban platform and in some surrounding areas such as the Bank of Campeche and the Bahamas, from where little more than of 20,000 tons per year.

The fishing infrastructure was scarce and backward, and in the case of the platform it depended on small sailboats in very poor condition (Figure 1). The inhumane exploitation to which the fisherman was subjected conditioned not only his culture (high degree of illiteracy), but also his health and physical safety. There was, therefore, an established pattern of "society - fishing activity" that framed the classic trilogy: owner, means of production and productive forces, and in this area an activity with little chance of progress was discussed, fundamentally in the social sphere.

Figure 1 Fisheries before 1959 depended on small sailboats in very poor condition. (La Coloma, Pinar del Rio).

Aquaculture was practically unknown, there was a lack of incentives that would provide interest in thispractice, given in the first place by the absence of objective conditions in social development, call it ignorance of the case and the absence of the need for a non-traditional food alternative, in addition to aculture not introduced or initiated until that moment.

A determining factor in the poor incidence, not only of aquaculture, but of catches from freshwater in the overall national catch, is the poverty of the country's lacustrine and river fishing resources. The mostimportant river in Cuba, the Cauto, on the southern slope of the eastern zone, is only 343 km long and has a total basin of almost 9,000 km^2. (Figure 2).

Figure 2 Cauto River: the mightiest in Cuba.

The rest of the important rivers range between 62 and 145 km in length with basins that vary between 226 and 2400 km^2. This scarcity of water resources, together with the almost complete lack of reservoirs and exploitable biological resources, colored the Cuban situation before 1959.

An event of significant national connotation was the disaster caused by the cyclone «Flora» in October 1963. This determined that the Revolutionary Government promote a hydraulicdevelopment program, which would materializewith the construction of dams in the main basins ofthe country.

The main objective was to regulate the flow of the rivers to prevent the natural disasters that the frequentcyclones caused to the economy and the population. Secondly, to serve as sources of supply for the main urban centers, and for the irrigation systems necessary to ensure the agricultural development of the country.

This program led to the construction of a large number of medium and large reservoirs with surfaces ranging from 200 to more than 11,000 ha from the end of the 1960s to the mid-1980s. This increased the water storage capacity, from just over 47 million m^3 at the triumph of the Revolution, to more than8,000 million m^3 today.

Along with the construction process of the medium and large reservoirs, a construction program was undertaken for small reservoirs - less than 100 ha -, whose main objective was to ensure irrigation for small agricultural and livestock plans, peasant cooperatives, as well as to individual farmers.

The rapid development in many socioeconomic aspects of Cuba, and especially agriculture, created the basis for the appearance of a productive and economic phenomenon that did not exist before: Aquaculture.

The basic aspects that allowed the rapid increase in fish production in inland waters and the placement of Cuba among the first producing countries in Latin America and the Caribbean in a short time - 1965

- 1980 - were:

I. The understanding by the Cuban State of the need to create and promote a freshwater fish production activity, to feed the population, at low cost and rapid progress.

II. The emergence of a generation of aquaculture technicians and biologists who quickly assimilate the different disciplines of aquaculture.

III. The development of a support structure for extensive aquaculture and exploitation ofreservoirs.

IV. The introduction of species of high fish value, very prolific and fast growing.

V. The introduction of technological and methodological advances related to effective fish farming in world practice in this field.

VI. The active work of the Ministry of the Fishing Industry (MIP) channeled the development strategy and progressively reached higher levels in the technologies of farming and fishing exploitation in reservoirs.

VII. This allowed that, at the beginning of the 90s, freshwater production exceeded the figures reached by all the fisheries of the insular platform in 1958.

The turn of national aquaculture: The collapse of socialism in Eastern Europe resulted in an unfavorable economic repercussion in Cuba, abruptly falling trade relations with former socialist countries and especially with the former Soviet Union.

The food levels of the population fell due to these causes, fundamentally those of a protein nature.

This situation determined a deep analysis of the economic possibilities of the country and the detection of the most efficient means and methods in food production. As a result of this, the Cuban state paid greater attention to aquaculture, as the only activity capable of sustaining itself and at the same time increasing production levels and supply of low-cost food rich in animal protein to the population. In thisway, aquaculture acquires a strategic connotation in the politics of the Cuban state.

Even with a plan to be developed by the state aquaculture, this was not enough to place the per capita consumption of fish at the levels required by the moment of crisis, in the feeding of Cuban society, based on the fact that the remaining supplies of meat They were almost nil. Only one form of aquaculture was capable of providing the feeding possibilities quickly. A widespread aquaculture already practiced in other countries with an ancient tradition such as China.[1]

Small-scale popular aquaculture, also called community or family aquaculture, was one of the ways to create a new culture, in accordance with the historical moment in which the Cuban population lived. Despite being a successful alternative, its follow-up as a practical activity had to overcome difficulties in the subjective order.[2,3]

The problem consisted in making both leaders and the population understand and accept a new techniquewith a consequent fulfillment of biological, organizational and economic requirements. The question was how to generalize this?

Starting from that idea, a massive movement was initiated, promoted and supported by the Cuban State and advised by the aquaculture Ministry of the Fishing Industry, to build ponds and use the existing small reservoirs, without any aquaculture link, in each neighborhood or community. to allow fish farming.

Simple and understandable manuals of farming methods were issued, lectures were given in communities, family groups, etc., which allowed us to understand, in essence, the objectives of developing this variant of aquaculture at the family level. The entire government structure at the provincial, municipal, popular council and constituency levels worked to achieve this objective,fundamentally in rural areas.

In 1993, the MIP approved a series of measures aimed at promoting aquaculture production, including measure No. 6, which establishes: "Accelerate the development plans drawn up by the provinces: Stimulate popular aquaculture through fishing in small reservoirs and dams for the consumption of the popular councils directed and attended by the provincial aquaculture companies".[5] (Figure3,4).

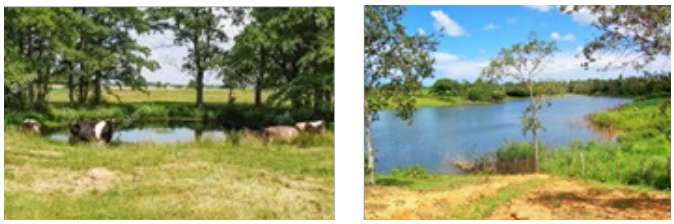

Figure 3,4 Small reservoir of 10 ha and dams in semi-intensive polyculture of fish, in Pinar del Río.

Aquaculture spread even further, and in 1992 and 1993 the Ministries of Sugar, Education, Agriculture, the Armed Forces, the Revolutionary Forces, the Ministry of the Interior, civil society organizations such as the Committees for the Defense of the Revolution (CDR), the National Association of Small Farmers (NASF) and thePopular Councils, all based on aquaculture in small reservoirs,cataloged in the Latin American framework, as Small-Scale RuralAquaculture (SSRA).

This situation responded to a productive alternative to satisfy the fish consumption needs of the workers of these organisms, without affecting distribution to the population, while establishing the bases for an aquaculture culture in society, an unprecedented situation in the field. world. Practically more than 60% of the country's small reservoirs were linked to fish farming, in addition to fulfilling the objectives for which they were built.

The productions of non-aquaculture organisms amounted to more than 4,000 tons of fish per year (1993-1989) and their tendency was to increase.

After 2004, when a favorable economic and social situation presented itself, many organisms and organizations decreased their interest in popular-type aquaculture, to the detriment of a positive trajectory of aquaculture extension in the country.

Small-scale aquaculture: Another important aspect in the aquaculture exploitation of small reservoirs was the so-called: Mountain aquaculture

An objective of state aquaculture was to develop this activity in the aforementioned area, whose main direction has been aimed at the cultivation of fish in existing reservoirs and the construction of new areas of dams and ponds, without affecting the environment. Looking for the possibility of integrating

agricultural crops and livestock facilities, to thereby allow maximum use of organic waste as an important alternative to contribute to the self-sufficiency of the communities in this rural area.

To fulfill this objective, it was necessary to face the following directions:

I. Population survey and needs to meet the demands.

II. Micro location of areas for aquaculture development.

III. Training of personnel for work and providing the mountain people with both the technical advice and the systematic and permanent information that this type of work needs.

Like the popular aquaculture developed in the plains, the mountain aquaculture intention has also beenweakened by improvements in the availability of livestock and agricultural food.

Aquaculture-society: Policy to deploy: The policy of the Cuban state has been aimed at achieving a balanced development of each of the economic activities framed in the economic-social formation that characterizes it. Among them, fishinghas played a prominent role, covering the broadest productive and scientific-technical spectrum, in correspondence with the world's advances in this field.

Aquaculture has opened space in its vertiginous development that transcends other productive branches, not only because of the substantial contribution of food, but also because of the link it has had with thesocial events where it has been inserted.

Converting each farmer into a practical aquaculturist leads to the integration of activities, and to the productive interdependence of the result of agricultural and livestock work. The possibilities in the rational exploitation of the aquaculture potentialities of the country, in the multiple manifestations of the cultivation of fish or other aquatic organisms, would bring about a substantial increase in fish production, and the development of a technological material infrastructure and knowledge in the executing and consuming society. The necessary premise to achieve a total link between man and aquaculture work is given by the dissemination of theoretical-practical knowledge of the problem.

Conclusions

Aquaculture has been inserted into Cuban society as a present and prospective self-sustaining activity, and also constitutes a palliative in the solution of serious short-term food problems. The advantages of converting aquaculture, in its most general sense, into a productive socio-environmental paradigm, is given by the degree and agility that is printed in its diffusion and execution, in the constant development of its productive essence and in the practical consideration of its sustainable nature.

The government's willingness to deploy a development strategy friendly to the environment and consistent with the conditions of social coexistence, is essential to achieve the purposes of balanced development with the socio-environmental interests mentioned above.

In Cuba there is a long way to go to diversify aquaculture to levels of productive generalization in non-governmental actors who are also protagonists, which corresponds to the current hydraulic developmentand the low supply of animal protein. The practice of an aquaculture committed to the food satisfactionof society and friendly to the environment, makes it worthy of an attempt by man to achieve ecologically sustainable productive activities for current and future generations.

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None.

Conflict of interest

Author declares there are no conflicts of interests.

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