

FISH FARMING ALONG THE CROATIAN CENTRAL ADRIATIC COAST DEVELOPMENT POTENTIAL AND CONFLICTS WITH TOURISM

UZGOJ RIBE NA SREDNJEM JADRANU, RAZVOJNI POTENCIJALI I SUKOB S TURIZMOM

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Izlaganje sa stručnog skupa

Summary

The recent history of fish culture along Croatia's Central Adriatic coast demonstrates the ways in which aquaculture and tourism interact, and how they can coexist to the benefit of each.

Keywords: aquaculture, potentials, conflicts

Sažetak

U ovom je radu pregledno opisan dio spoznaja u vezi s uzgojem ribe uz obalu hrvatskog dijela Jadrana. Posebno su naglašene moguće smjernice razvitka akvakulture i turizma i njihov međusobni odnos.

Ključne riječi: akvakultura, potencijali, konflikti

Recent history

Novija povijest

It is not by accident that the first Croatian attempts at cage culture were located along the Central Adriatic coast. This area—and particularly its islands—offers suitable temperatures, many protected sites of the proper depth and circulation pattern, an able workforce, and nearby markets both on the Croatian mainland and in Italy.

During this early stage of development techniques were refined for the efficient cultivation of seabass (*Dicentrarchus labrax*) and sea bream (*Sparus aurata*), as well as for their early life-history stages.

Results promising commercial potential also were obtained from trials on salmonids in the estuary of the Krka River (Teskeredžić *et al.*, 1991). Grow-out technology was based exclusively on use of relatively lightly constructed cages that required the shelter afforded by nearshore sites.

Many of the farms established during this period were small, so-called 'family' farms, each of which produced less than 50 MT/yr. One motivation for the proliferation of farms of this rather small size was the legal stipulation that set this level of production—50 MT/yr—as the threshold below which farms did not have to incur the expense of preparing an environmental impact assessment (EIA).

Contemporary predictions of production from aquaculture were optimistic (Filić, 1984). Some observers suggested annual yields on the order of 2,000 MT. These yields were not so quickly realized: Production in the early 1990s was on the order of 1,000 MT/yr. Government policies in place encouraged entrepreneurs to establish new small farms (Katavić 1994).

At about the same time, increased knowledge of seabass and sea bream developmental biology, along with the subsequent growth in hatchery production and technological advances deriving from the fast-developing cage culture in Northern Europe, particularly Norway, opened up new possibilities for expansion of Mediterranean fish farming.

Seabass and sea bream production, already strongly subsidized in EU countries, continued to increase in the Mediterranean. The increased competition and decreasing market prices that ensued naturally spurred further attempts within firms to increase production efficiency. The contemporary Croatian political situation, however,

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was unfavorable for soliciting investments; and the loan terms for financing—or re-financing—such projects were not at all attractive. The Croatian industry had to rely, instead, on increasing per-unit-labor, rather than investing in capital improvements. The alternative was to be driven from the marketplace by their more efficient competitors.

Regarding competition, larger farms generally have an edge, as they may more easily lower their per-unit production costs; that is, they better are able to capture the economies of scale. The protected coastal sites at which the Croatian industry had developed are unsuitable for installing large cage farms. One very practical reason for this is the conflict that such large-scale developments instigate with tourism.

Moving production facilities farther offshore would seem an attractive solution: Offshore sites offer fewer chances for conflict with other sectors, such as tourism; and water quality in the offshore environment generally is superior to that found at inshore sites, thereby promoting better growth and enhanced product quality (PAP RAC, 1996).

On the downside, offshore equipment must be constructed so as to withstand the chronically more challenging—and, periodically, extremely severe—conditions that characterize truly exposed locations. The salmon culture industry has employed such equipment—large, very robust Bridgestone and Dunlop cages, among others—with admirable success for over twenty years. Cages in which seabass and sea bream have been cultured, however, traditionally use nets with a smaller mesh; this leads to greater drag on the cage structure and its mooring system. Indeed, this engineering problem—as well as others—has been solved to a satisfactory degree by a new generation of open-ocean production equipment. Seabass and sea bream now are grown commercially at several offshore sites around the Mediterranean. Such initiatives, nevertheless, require a relatively large infusion of capital, owing to the expensive nature of the gear. That level of investment generally has been unavailable in Croatia.

Partly owing to the difficulties in raising capital, something of a technological compromise was struck in Croatia: Large cage farms were installed at what may be termed “semi-offshore” sites. Rather than qualifying as true open-ocean sites, these more accurately may be classified as “exposed coastal sites”. Developing these sites reduced both the initial capital outlay and much of the risk associated with true offshore locations. Yet the larger cages—and the larger number of cages—that can be put into service at these locations indeed permit some lowering of per-unit production cost. This enhances a firm’s competitive position in the larger marketplace.

Current situation

Trenutačno stanje

Cage culture in Croatia’s Central Adriatic currently consists of:

- 14 small family farms with a combined annual production of 700 MT
- 3 medium-sized farms with a combined annual production of 240 MT
- 3 large farms, each of which produces about 400 MT/yr
- 6 tuna farms, with a total capacity of about 1.200 MT/yr

As the last bullet indicates, the Central Adriatic is home to Croatia’s very successful tuna-culture industry. Firms involved in this activity raise wild-caught Bluefin Tuna (*Tunnus tynnus*) and export their production exclusively to Japan. Of particular note, this sector developed in a very different manner than the culture of seabass and sea bream: Both the grow-out technology and investment were ‘imported’ by ex-patriate Croatians already active in this industry in Australia.

Planning with a multidisciplinary scope—planning that equitably balances all competing interests—must be applied to resolve properly use conflicts in the coastal zone, especially between tourism and aquaculture. As perhaps is only natural, one side will attempt to gain the advantage by emphasizing the unacceptable environmental impact of the other. For balance, it must be emphasized that aquaculture production is very important to the health of the tourist industry—tourism and cage culture, after all, both are strongly dependent on environmental conditions.

Renewed growth of tourism in Croatia, as well as the increased demand for seafood in the Croatian domestic market, compensate somewhat for declining market prices of farmed fish in the traditional Italian market. With the increasing awareness that seafood is a healthy source of protein, and with the documented decrease in supply of seafood deriving from the capture fishery, opportunities for farmed seafood certainly must expand in the foreseeable future.

Potentials

Potencijali

Croatia’s Central Adriatic coast and islands are replete with suitable sites for developing mariculture. They thus will be expected to play a significant role in reaching—and surpassing—the recently announced national production goal: 10.000 MT/yr of farmed fish by the end of this decade (Katavić and Vodopija, 2001).

Competition for suitable space within the coastal zone is among the more critical challenges that must be overcome to meet this objective. Aquaculture and tourism, two sectors that often vie for use of the same locations, must be encouraged to work together for the benefit of each other—and for the nation as a whole—rather than lose time and dissipate already scarce resources in mutually debilitating conflicts.

Modern techniques employed on efficient farms can supply the tourism sector with a reliable supply of healthy food *and* maintain any pollution-related effects deriving from the production process below an acceptable minimum. Indeed, pollution of the sort that attracts valid public criticism generally is a feature only of inefficient, poorly managed farms. Well managed farms, in addition to controlling the quantity and nature of their impact on the local environment, provide a source of refuge for wild fish, thereby enhancing recruitment to traditional fisheries (ICES, 1995).

A comprehensive approach to development will minimize conflicts between seemingly incompatible activities competing for use of limited coastal resources. Integrated Management of Coastal and Marine Areas can help in this regard, not only through the possibilities of commercial activities and recreation, but also through biological and ecological conservation (UNEP, 1995). Of relevance, the Bangkok Declaration and Strategy for Aquaculture Development Beyond 2000 concentrates on the quality of logistic and executive conditions of aquaculture development (FAO, 2000).

Finally, several topics related to further development of fish culture in Croatia are:

- Establish clear principles of decision
- Evaluate the full potential of the Central Adriatic coastal zone
- Project market trends of particular importance to the grow-out sector

- Facilitate long-term financing to cover high working capital requirements
- Implement background research programs on potential development areas
- Implement a monitoring and regulation program
- Institute a continuing education program to upgrade farmers' general skills
- Encourage constructive relationships between farmers, local authorities, and scientific institutions
- Protect fish farming areas from the potentially negative impacts of other coastal activities

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