# INTRODUCTION OF AQUACULTURE ALONG TURKEY'S BLACK SEA COAST: ENTREPRENEURS, KNOWLEDGE AND REGULATIONS

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**Presented at the Fifth Annual Common Property Conference of the International Association for the Study of Common Property. Bodø, Norway, 24-28 May, 1995.**

## Introduction

Since the 50s the fisheries in the Turkish Black Sea region have developed to become one of the major fisheries in the Middle East. Most of the fleet and many associated processing factories are locally owned and operated, contributing substantially to income and employment in the region. Since 1989/90 the fisheries have been hit by a severe ecological crisis which has especially affected the important stocks of anchovy. In this context, the nascent aquaculture development was, in the beginning of the 90s, seen by many as a promising field for developing alternative business and employment in the coastal areas. But marine aquaculture is a completely new adaptation in this region. A salient question is what kind of management regime(s) will come into being. Can systems of co-management evolve? This spurs two sub-questions: (1) will there be any conflict with existing users of the coastal waters, and (2) who manage to venture into this risky, but potentially profitable, business? Who are the entrepreneurs?

I have previously done 9 months' fieldwork in the eastern Black Sea region, mainly concentrating on the fisheries. In October 1994 I returned on a brief visit to monitor and study recent developments in the aquaculture sector. This material is based upon informal interviews and conversations with a range of people; managers of big companies (Norwegian as well as Turkish) heads of small family firms, bureaucrats at national and provincial levels, marine scientists, private consultants and a representative of the World Bank. Conversation was when possible in English. Otherwise I communicated in Turkish.

**High hopes, unfulfilled expectations**

In the light of the very optimistic estimates some years ago, the initial development of aquaculture in the Turkish Black Sea region has been disappointing. The water in the Black Sea is naturally brackish and oxygen rich Moreover it is warmer than e.g. the North Atlantic. This makes the sea attractive for rearing salmon and rainbow trout. But these species have problems surviving the warm summer months. Based on this, there are two main developments. The new fish farmers that can afford the vaccination and the risk go for salmon which must stay in salt water during the summer to reach the market size of 2-3 kg. Others specialise in trout, mainly of portion size which can be reached during one winter season in sea-water.

During 1991-93 close to 30 small and medium scale operators, most family firms in the eastern part of the Black Sea, ventured into marine trout farming. Due to technical problems and diseases many soon ran into trouble and few made any profit. This season only 8-10 trout farms are left. Some of them are very small, operating inside harbours to avoid the difficulties and hardships of the open sea. Others are still investing and expanding. But the general impression is one of failure. I would estimate total production during the 93-94 season at a mere 100 tonnes. One main, and perhaps unexpected problem, is marketing the fish. Some trout is marketed nationally but the bulk is sold locally. Since most producers try to sell in May and June, before high water temperatures take their toll, the market is easily saturated and the trout attract low prices. There is little interest among consumers and limited equipment among producers for frozen fish. There are also indications that some may have run "fake" farms only to obtain the 25% investment grant from the government

Until now, there have been only four establishments for farming salmon, all of them from Sinop and westwards and these occupy some of the most attractive sheltered locations along an otherwise very exposed coastline. These salmon farms, which are generally much bigger than the trout farms, are owned by large Istanbul or foreign companies which have invested much more than the trout farmers. One of the producers has also invested heavily in processing (smoked salmon) and marketing. With demand in both "upmarket" Istanbul and in Southeast Europe and the Middle East the market potential here seems more promising. But despite reliance on foreign expertise and equipment, also these farms have encountered the problems of cages being drowned in storms and fish dying during warm summer months. Total production during the 93-94 season probably amounted to only 500-1000 tonnes.

**Conflicts over use-rights?**

Aquaculture is a kind of production which needs firmer control over sea space than fishing normally does. Both the ecological-technical aspects as well as the high investment\risk make it necessary for the operator to secure use right for an extended period (Weeks 1992). Coastal waters in Turkey are formally state property. There are yet no integrated set of rules to regulate licenses and leases. Everything is in a state of flux. Formally the provincial office of the Control and Protection Agency (*Kontrol ve Korunma Subesi)* under the Ministry of Agriculture and Rural Affairs has the authority to handle applications. Regional marine research institutions are consulted on matters of suitability of location etc. Small farms with potential less that 10 tonnes/year are free to start without licence. But fish farmers will need one to obtain grants. It seems to me it has been no problem to elicit a licence and lease a suitable sea space for a nominal annual fee (25 USD). Parallel to this there has been a race to register "ownership" of sea-space in front of shore property. All this is however not settled yet, awaiting new laws and regulations to be specified in a new aquaculture legislation. This legislation will probably, among other things, secure lease durations of 30 years and make leases conditional upon actual operation (Howarth & McGillivary 1994).

While the sea farm owners say fishermen are no obstacle to their leases and operations, some fishermen are sceptical. I spoke with one of my best informants from my previous fieldwork about this. He leads a family fishing firm which has made a fairly ambitious venture into fish farming. They first placed the cages, as recommended by the regional research institute, in a bay to be sheltered from the strong north-westerly winds. But due to complaints from fishermen, he moved the cages further off-shore. Still, he underlined the fact that according to the law, fishermen have no say as regards location of cages. Perhaps he was sensitive to their wishes since he usually recruits most of his crew from the nearby communities. Since there were no fish farms in the area operated by fishermen I know from my previous more extensive fieldwork, it was difficult to observe in practice, on this short visit, fishermen's responses to

fish farming. Anyway, due to the small scale of the aqua-culture adaptation, the areas occupied by the cages are yet too limited to pose any serious threat to fishing.

**Three sources of knowledge**

While access to use-right of appropriate sea-space has been easy to establish, developments have been more constrained by lack of knowledge. There are three main sources of knowledge. Firstly, entrepreneurs may accumulate "productive knowledge" - or local knowledge - by "trial and error", learn by doing in practice. This is clearly an unrecognised aspect of developments in aquaculture. Risk-taking small entrepreneurs, most often without formal training in aquaculture, were for instance instrumental in early developments in Norway (Osland 1990). In my conversations with several trout farmers in the eastern Black Sea region it was indicated that initial failures have been followed by (bitter) learning. Most of this knowledge will probably not be written down.

A second source of knowledge is the regional research institutions, especially Trabzon Marine Research Institute (TMRI). They were instrumental in creating the early optimism which led to many over-optimistic projects. Unfortunately, the research institutions are, despite fine and interested staff, rather incompetent as regards aquaculture. Access to the international pool of scientific knowledge is restricted because of limited English competence and lack of funds to travel. Some are interested in developing turbot farming, but because of lack of funds it is impossible to go to e.g. Norway to study research and experiences there. Furthermore, the scientific community is marred by an excessive degree of division and lack of co-operation between the research institutions. To conclude, these institutions are not able to convey to the entrepreneurs internationally accumulated experience in marine farming of salmon, trout, turbot etc. Moreover, their capacity to do independent research is limited. They have absolutely no experience in salmon farming and, to be elaborated below, their involvement in trout farming might actually have hampered developments. The leader of World Bank studies on aquaculture in Turkey claimed that these institutions should be completely ignored in further developments of the business.

The abovementoned leader instead wants to rely on the third source of knowledge, namely the international scientific community and foreign experts. All the salmon farms depend upon foreign expertise, mostly Norwegian. Also most of the equipment is imported. Many Norwegians have worked at or regularly visited the farms to oversee the work and do jobs which require special skills. Foreign know-how and equipment is crucial for the production of high quality salmon. A special vaccination to suit the conditions of the Black Sea has been developed by Norwegian experts. This vaccination helps salmon endure the warm summer months with fewer diseases. At a salmon farm which I visited, I was told the vaccination comes

from Norway in bottles without labels. They use it as they have been instructed by Norwegian experts, but do not know what the result would have been without. They rely completely on the experts. On the other hand, the staff at the research institute in Trabzon hardly knew about the vaccination at all (they asked me for the relevant address). Thus (restricted) access to this source of knowledge is confined to the companies with clout to engage themselves in the salmon sector. The owners of the salmon farms are reaffirmed in their opinion of the "ignorant" village Turk by the initial lack of success in trout farming.

Co-operation between scientists and early entrepreneurs was instrumental in developing Norwegian fish farming (Grytås 1991, Osland 1990. The accumulated expertise puts Norway in the lead internationally, and the involvement in Turkey can be seen as part of a global process where Norwegian companies have established themselves from Chile to Tasmania as expert consultants or operate farms in joint ventures (Wood, Anutha and Peschken 1990). This makes it harder in poor and peripheral areas to develop the business independently. The investments, risks and operating costs in "Norwegian-style" aquaculture can only be carried by companies with considerable financial strength. A Norwegian/Turkish joint venture has invested approximately 4 million USD during the first 5 years. They have been unable to cash in any profit yet, but have financial muscle to continue operations. Even the biggest local companies investing in aquaculture, with investments in the range of 150,000 - 500,000 USD, have not managed to venture into salmon farming. The owner of one company claims the vaccination is too expensive. Another company bought salmon-smolt from Sweden, but without the advice of foreign experts the smolt died before transfer to sea-water.

In the contemporary economic climate in Turkey, investors expect a quick profit to counter the effect of hyper-inflation (on average around 100% during the last couple years). Among small entrepreneurs there has evolved a culture of "doing it quickly and smart" (*köseyi dönmek*, lit. to turn the corner). Continued experiments in fish farming for several years without any profit are of course not compatible with this business culture.

**Co-management and participation?**

Diverse categories of users and several governmental institutions have an interest in management of marine coastal resources in this region. Recent debates have focused on the advantages of co-management which may involve various user-groups, scientists as well as local bureaucrats (Jentoft 1989, Palsson 1991, Pinkerton1989). In a similar vein, there has been an increased focus on the importance of local participation in the development process (e.g. Cernea 1991, Chambers 1989, Ghai & Vivian 1992, Oakley 1991). What has been the degree of local participation in management of coastal waters this far and what are the potentials in further developments?

Management of resources in capitalistic fishing is an outcome of a balance between formal rules and regulations and fishermen's lobbying through social networks. Despite a formal framework of co-operatives, there really exist no fishermen's organisations. Small boat fishing is very much ignored by the authorities, and to a certain extent informal regulations develop in the resulting vacuum (Knudsen 1995). As is often the case, local ~~participation~~ management is here based on local knowledge. The process of replacing local skills, or "technique" - context dependent, tacit 'knowledge how' - with explicit, objective and context-independent "technological knowledge" (Ingold 1993) has been going on in the fisheries sector for many years. But, despite reliance on modern technology, actual operations are still controlled by locals without much "technological knowledge" or interference of experts.

In salmon farming, local skills are relegated to mere "execution". The approach to the tasks is rather guided by "technological knowledge" commanded by scientists and big companies. In addition to lack of financial muscle to buy the knowledge, most locals are secluded from developments in salmon farming by lack of connections and language competence. The manager of one of the biggest trout companies did not know about the vaccination or how to make an international telephone call and could not speak English. This is obviously also a problem as regards policy formulation in aquaculture since even the proposal for aquaculture legislation is only written in English, by foreign experts hired by the WB.

Licenses are not conditional upon local (or even Turkish) ownership or management (as they were for a period in Norway (Grytås 1991)). According to some informants, the authorities may be sensitive to interests of the tourist industry (insignificant in this region), but disregard fishermen's interests. Although fishermen might offer their opinion informally, they have not been consulted by the authorities on fish-farm location. The proposal for aquaculture legislation states that "[I]nitially, all licence applications should be determined centrally in Ankara...", but hopes that in the future "...licensing powers may be devolved to regional or local level." (Howarth & McGilivary 1994:6) The procedure and rules of licensing thus hardly facilitate local participation.

In addition to an unfavourable general framework for local participation in salmon farming, several developments in the region also inhibit co-management in trout farming. The incompetence of the research institutions has already been mentioned. This has been compounded by overtly ambitious and - according to many - even deceiving information and advice from the former leader of TMRI. Many feel initial problems of cage anchoring etc. were due to his (bad) advice and that he underplayed the market problem for trout. In 1990 I myself once experienced him exaggerating the potentials of fish farming during an information

session to which local notables were summoned. There is now a very serious lack of trust between the entrepreneurs and TMRI, even though that leader has been removed. Also possible misuse of grants and instances of corruption contribute to the lack of trust between local governmental representatives and the fish farmers.

There are some signs local authorities want to strengthen local developments in aquaculture. Important persons in the town of Trabzon were invited to a "fish party" (*balik ziyafeti*) to promote trout and develop the market for it. The local branch of the Control and Protection Agency will - in co-operation with TMRI - establish a hatchery and a factory for production of feed. The *Vali* (provincial governor) of Trabzon wants to promote trout-farming by giving approximately 30 fishermen and unemployed people with relevant educational background a free offer of smolt, cages and feed to run a small "experimental" farm for one year. The effect of these initiatives remains to be seen. But this indicates that local experiments and accumulation of experience will continue.

On the other hand, there is yet no formal co-operation among fish-farmers or between fish farmers and authorities. There is probably individual person to person conveyance of information, but no organisation where the entrepreneurs can discuss their work, as was once so important in the early Norwegian development (Osland 1990). My guess is that developments will be led by private entrepreneurs. A limited aquaculture milieu, based more on private social relations in the typical Turkish networking manner, may develop. The separateness of the trout farming from the salmon farming may give locals time to develop substantial local knowledge. But this of course hinges on the market potential for trout. Local developments may also be strengthened by experiments with other species as e.g. grey mullet (*keful*) which are common in the Black Sea waters and which there may be a more stable market for. There is also a 25 year tradition in the region for fresh water farming of trout which seems to be a growing adaptation as new fresh water establishments combine hatchery to serve the sea farms and also produce marketable portion size fresh water trout.

**Conclusions**

Despite the initial problems, I expect aquaculture to become a very important business in this region. But there is a danger locals might be completely by-passed as aquaculture makes inroads into coastal waters. As long as salmon farming is contingent upon "technological knowledge" and foreign equipment, and locals are unable to handle this kind of knowledge and lack capital to buy know-how and equipment from abroad, the dividing line between locally based trout farming and externally controlled salmon farming will endure. When the knowledge is more or less available, as "technological knowledge" to be activated in exchange for capital, the management regime will very much be dictated by the large companies and a liberal law

acceptable to the WB and a government committed to economic liberalism. The evolving management regime will approach a system of quasi-private property where local interests in both fishing and fish-farming are disregarded. The local embeddedness of trout farming may result in a more complex management regime, but this will depend upon its economic viability.

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