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Aquaculture and Food Security in Iraq

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When notions of natural resources come to mind in the Arab world, most people think of oil, gas and phosphates. In an area where most climates are arid, it would be difficult to imagine aquaculture even exists in the region, let alone has expansion potential¹. In Mesopotamia one of the sources of early human civilization, fish, crustacean, molluscs and turtles in the Euphrates and Tigris rivers with their tributaries and the coastal waters of the Arabian/Persian gulf were a major food source already 5000 years ago².

Water diversion has caused serious environmental damage to large areas of Iraq's wetlands. Thick reed beds teeming with life once covered 8,000 square miles (20,480 square kilometers). Now 97 percent of the main marshes are dry. Less than one-third is left of eastern marshes that reach into Iran. Rice paddies and fishing grounds are gone. Some birds are now extinct³, and global migrations have been disrupted. When the wind blows, blinding sandstorms strip off what topsoil remains.

The marshes have suffered badly during the political upheavals of the past few decades. According to the UN Environment Program, some 7,000 square miles, or a staggering 93 percent, of the Mesopotamian Marshes drained between 1991 and 2000. This has had a serious impact on the estimated 1 billion migratory birds - flamingoes, storks, cranes - that used to stop over on flights between Asia and Africa. Tribesman no longer haul 500-pound fish to market in trucks. Vanished, too, probably, are endangered species such as the smooth-coated otter⁴. Marsh Arab villages still cling to some of those roads. They look like Arab villages anywhere, including the middle of the Sahara. The only clues to their aquatic origins lie in stately council houses, with cathedral-like spires, constructed entirely of bleached reeds.

Inland fishery

Iraq's inland fishery is based on the Tigris-Euphrates riverine system, its lakes, and seasonal floods (with a flooded area of 15 000 to 20 000 km²) and it plays an important role in the country's economy. The Tigris and Euphrates rivers and their branches are the main sources of inland fresh water in Iraq. The inland fresh water bodies cover between 600 000 and 700 000 ha, made up of natural lakes (39%); dams and reservoirs (13.3%), rivers and their branches (3.7%) and marshes (44%). There is a potential to develop these resources through management, stocking and enhancement of extensive culture practices. Fisheries in many small water bodies and reservoirs can be enhanced through stocking and management approaches that take into account particular features of the individual fishery. Stocking and other operations, including quasi-culture methods may, where successful, increase catches significantly. The inland fisheries are based in great part on carps *Cyprinus* spp., while the most important Iraqi indigenous fishes are barbs belonging to the genus *Barbus*. The most common commercially important fishes in Iraq are:

Marine fishes

- *Tenualosa ilisha*
- *Liza oligolepis*
- *Pampus argenteus*
- *Arius thalassinus*
- *Acanthocybium solandri*

Freshwater fishes

- *Cyprinus sharpey*
- *Barbus xanthopterus*
- *Barbus grypus*
- *Liza abu*
- *Silurus triostegus*
- *Barbus luteus*
- *Asalus eorase*
- *Cyprinus carpio*

Main culture species

- *Cyprinus carpio*
- *Hypophthalmichthys molitrix*
- *Ctenopharyngodon idellus*

Aquaculture Status

The total area under aquaculture production in Iraq is estimated to be 7500 ha. The main species cultured is common carp and to a lesser extent grass and silver carp. The mean annual production for 1986-1997 was 4000 t. In 1998, production is reported to have been increased to about 7500 t. A total of 1893 fish farms are licensed for aquaculture, all operated by the private sector (companies and individuals). Ten of the farms are relatively large (100 ha each), but the average is about 4 ha. The only system of aquaculture is in earth ponds. Aquaculture in Iraq depends on freshwater resources, with no marine aquaculture practiced. Sufficient hatcheries are available, although most production is of common carp. Cage farming expanded in the early 1980's Habania Lake, but was eventually abandoned for commercial production, limiting its use for research⁵.

The latest information available indicates that the total area under fish farming is estimated at 7500 ha consisting of about 1900 farms. They are mostly near sources of fresh water where the land is not suitable for agriculture. The size of these farms range between 0.5 ha and 200 ha but most are between 5 and 10 ha each. These are earthen ponds with out proper lining or insulation. Only the Babel fish farm, a government owned venture, is an integrated farm that is fully insulated and well equipped, established on a 500 ha area. All other farms are smaller, owned and operated by private companies and individuals. Productivity per unit area is low in most fish farms, ranging from 1400 to 2000 kg/ha. This is attributed mainly to the shortage of adequate fish feed. Iraq



Greening aquaculture - quest for success with Euphrates river shining like a mirror.

has had no trade in fish and fishery products due to economic sanctions imposed on the country since 1991⁶. The fisheries sector in Iraq is currently of no significant value to the national economy due to absence of export and import activities at present.

Fisheries research and related activities are carried out at a number of sites by various institutions – the Fish Research Center (Zafaraniyah, Baghdad), Marine Science Center, Basra, Agriculture Research Center IPA, Central Hatchery at Swairah, Fisheries and Marine Resources Department, College of Agriculture, Basra.

Future trends

Today, when the sky itself seems to melt into chrome-coloured lakes-rippling pools that shimmer like mirrors in the vast salt pans of southern Iraq. These days, however, those liquid sheets of light are no mirage. They are real water - unshackled for the first time in years, the Tigris and Euphrates rivers were now refilling thousands of acres of dry marsh⁴.

The turmoil in Iraq since the 1960s does not provide a solid foundation for establishing a national agricultural and food system. In some parts of the country, from the Southwestern Bedouins to the Northeastern Kurds, traditional self-reliant food systems have been maintained. However, in most of the country, food security has necessitated imports both of carbohydrates and proteins. Vitamins

and micronutrients have all too often been in short supply. Today's outlook for international food relief and agricultural technology does not bode well for short- or long-term community or national food security in Iraq. Interim measures have focused on importing wheat and emergency food, rather than on building self-sufficiency in food production.

While neighboring Kuwait, Bahrain and the UAE have invested in fish farming, especially in shrimp production Iraq's 2001 total fish production was 22,800 tons of which only 2000 tons come from aquaculture. Situated in what is historically known as the Fertile Crescent, Iraq is supplied with copious amounts of water from the Tigris and Euphrates. In addition to this, there are water resources in the form of lakes and ponds, especially in the northern part of the country and the Shatt Al-Arab delta area in the south. Testament to this is the amount of development that took place in Iraqi fish farming before 1990. Now, more than ever, as the country looks for ways to feed itself, aquaculture may be an area of serious growth. However, many of the farms have fallen into disrepair because of poor management and lack of investment under economic sanctions. Due to their importance to the country's present and future needs, they should be considered as a major

investment opportunity. Fisheries should not by any means be considered a side or marginal activity and should be given sufficient, priority, support and protection to allow growth and development.

Research needs

Aquaculture research needs vary with development priorities and constraints at the country level, but key research targets in many countries of the region include: Sustainable intensification of production from existing freshwater pond farms, development of culture-based fisheries, including the evaluation of the potential for development and selection of species, development of viable models for integrated aquaculture-agriculture systems, including the development of low-input polyculture systems, development of management strategies to reduce the use of water in pond fish farming, development of aqua feeds from locally available ingredients (at the national or farm level) and improvement of feeding strategies, seed production and improvement of the genetic quality of brood stock, optimization of production economies and market analysis, diversification of species for marine aquaculture⁶.

In order to sufficiently develop aquaculture, governmental and research agencies should improve research, the results applied inland and along the coastlines. Research in aquaculture must address improvements in technologies, contribute to reduction in the cost of production, and consider the increasing need to ensure that aquaculture is eco-friendly and that farming native and popular species on demanded as well as the possible introduction of new exotic species can be achieved without endangering the ecological balance. Sustainable aquaculture development calls for strategies to improve the quality of water used by the fish farmers, and farm management technologies, as well as environment friendly coastal and inland water sites. If these are ensured,

Table 1: Fresh water aquaculture production (t) in Iraq⁸

Year	1997	1998	1999	2000
Production (t)	3400	7500	2183	1745

aquaculture projects can be efficiently, effectively and profitably implemented⁷.

Iraq must have its own unique agricultural and food system. It cannot copy other countries. Its situation and potential are unique. There are great variations in its climate and landscape from South to North. The Kurdish diet in the North owes much to the cultures rooted in Turkey, Armenia, Azerbaijan, and the Kurdistan portion of neighboring Iran. Mountainside herding and valley orchards and gardens are typical. In the South, the diet has similarities to that of the peoples of the Persian Gulf and Central Iran. Iraq's agricultural and food system must be based on its traditional preferences and on what it can learn from other Middle Eastern countries, and from countries around the world, that have promoted small-scale farming systems.

Strategies that would help Iraqi farmers and citizens to reinvent their food system are implementing Iraq technologies such as aquaculture and the use of waste water, building up locally-based food systems rather than top-down ones, involving women and

youth as a priority, and including both rural and urban systems, from rooftop gardens to hillside farms. The objective will be to create a new agricultural / food system in Iraq based on Mesopotamian history and leading edge 21st century Middle East agricultural technology. The process should aim at digesting what has been learned at the wider-level meetings and reaching preliminary decisions concerning new farming methods, restoring old farming methods, and establishing pilot farms. Another goal would be to define what is missing in terms of what is needed for education, supplies and hardware to implement the new food systems. Demonstration farms in several places throughout Iraq would be an early imperative, to provide training facilities and technical assistance to women, youth and men. Foreign assistance, primarily from Middle Eastern countries, will be needed if some of the relatively new farming methods are to be adopted. Exchange programs involving young innovative farmers are essential. Above all, the inspiration and understanding to start a new system, and not revert to

the failed system of preceding generations, can only come "on-site" and not on-page, through field visits of Iraqi leaders and farmers to the practices of sustainable small-scale agriculture and self-reliant food systems.

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Entrepreneurship problems of shrimp farmers in planning, project preparation and project implementation stages

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Aquaculture makes a very strong contribution to foreign exchange earnings, food production and employment generation in India. The profitability of shrimp farming has been relatively high as the entrepreneurs have been able to realise their investment in a couple of years. However, the current state of the industry is quite volatile due to global trade and market access concerns, uncertainty over regulation of the industry and relatively low levels of cooperation between farmers. If the potential contributions of aquaculture

are to be realised the issues and challenges faced by the entrepreneurs need to be determined. We conducted a random survey of 50 shrimp entrepreneurs to assess their views on the social, economic, psychological, technological, environmental and political problems facing the industry. The survey was carried out in May 2001 in Nagapattinam and Tiruvallur districts of Tamil Nadu state of India. Nagapattinam district was selected due to the presence of the highest number of shrimp entrepreneurs having the maximum area

under shrimp culture; while Tiruvallur district was chosen, because it has maximum availability of infrastructural facilities in coastal areas for development of shrimp farming. The major issues raised by the entrepreneurs are summarised below.