5. Egypt

Grow your own

Is freshwater fish farming a sensible business approach where water is extremely scarce? Murdoch Mactaggart learns of how Egypt uses innovative aquaculture approaches to produce 65% of its fish consumption and hopes to become self-sufficient in the near future.

Egypt is pretty much square in shape, just over 1,000km in each direction and so around twice the size of France. However, in common with its North African and West Asian neighbours much of its territory is desert and 99% of Egypt’s 82 million population occupy only a small fraction of its land area, mainly the 40,000 or so square kilometres of the Nile Valley and the river’s delta by the Mediterranean, as well as a few other places. Egypt’s only arable land, under 3% of its total land area, is found beside the Nile.

Water is a major problem for Egypt and one which is getting worse with its growing population. About 95% of its water is from the Nile - the world’s longest river at some 4,130 miles - part of which rises in central Africa and part in Ethiopia and which flows through eight countries before reaching Egypt. Under a 1959 agreement Egypt and Sudan share 90% of the river’s flow, Egypt then taking three quarters of that amount. Now the southerly countries where the river rises or through which it passes want a greater share, something which Egypt resists, arguing that as its rainfall is minimal it cannot exist without the river water.

Second after China

Despite the pressure on water Egypt has the largest aquaculture industry in Africa with a market value of over $1.3 billion. The industry now provides 65% of the country’s fish needs, with virtually all the output coming from small and medium scale privately owned farms. The main farmed fish is Nile tilapia and Egypt is the world’s second largest producer of farmed tilapia after China. Grey mullet and carp are also farmed, sometimes in mixed ponds with tilapia.

From minuscule levels of production in the early 1990s fish farming has expanded rapidly while capture fishing has remained fairly constant, even declining somewhat after peaking at the beginning of the 21st century. The General Authority for Fisheries Resources Development (GAFRD) wants to increase aquaculture further with a target production level of 1.1 million tonnes of farmed fish by 2012, around 75% of total fish needs, so reducing imports and improving food security. Aquaculture is also important in providing employment.

With a very few exceptions aquaculture takes place in the Nile Delta Region and mainly around the Northern Lakes areas. The traditional approach to fish farming is the hosha system where natural enclosures like lakes or lagoons are used and fish, trapped by constructed barriers such as reinforced embankments, rely on what natural food they can find. The Egyptian unit of area is the feddan, 0.42 of a hectare or nearly enough an acre, and these enclosures vary from 2 to 50 feddan. Costs are very low but so also is yield, varying from about 250Kg/Ha to three times as much.

Because of environmental damage and interference with lake fishing the hosha system is now prohibited although it still continues illegally.

Semi-intensive culture in earthen ponds of both fresh water and brackish water is the most widely practised system, accounting for about 86% of production. Ponds vary from one to 25 feddan in size and production ranges from about five to 25 tonnes per Ha. There’s very wide variation among ponds in terms of stocking densities, infrastructure and management approach.

Intensive production is growing fast and takes two forms. Around 10% of total aquaculture production is from cage culture, principally of Nile tilapia. Cages generally varying in size from around 32m³ to 600m³ are used and produce between 5 and 35Kg of fish per cubic metre. Fish farmers in rural area sometimes also use very small cages suspended in drainage canals.

An alternative is one of using concrete tanks, typically within integrated aquaculture and desert agriculture systems because of the high rate of return on the utilisation of water. The usual fish reared is Nile tilapia and the annual production will range from 40 to 60 tonnes per feddan.
**Integrated water use**

Egypt’s old laws prioritise water for drinking and for agriculture and so the great bulk of fish farms must make do with water run-off from agriculture. This can be a serious problem if fertilisers or pesticides have been used, particularly if used excessively, although there is a loophole allowing fish farmers to use clean water from aquifers. Consequently there’s now considerable interest in developing integrated water use schemes. In a typical approach clean water might be used first for tilapia in concrete tanks, then for carp before being used to water fields of alfalfa on which sheep and goats graze. This efficient reuse of scarce water gives farmers much improved returns and makes it possible to have aquaculture and other agricultural units in desert or other arid areas. Total production is still small at under 1% but an individual fish farm annual production will range from 95 to 145 tonnes per Ha.

Fish farming, particularly intensive farming in tanks, seems to be a very profitable business. However, both capital and running costs for all forms except, perhaps, the now illegal *hosha* system are high. Farmers usually rent land, mainly from the government through GAFRD. Rents are low but leases are short, traditionally only five years, although there’s growing pressure to lengthen this. Land costs about $35 to $85 per feddan per year to rent, depending to the source and quantity of available water.

Installing the infrastructure for intensive farming is expensive and so such farmers prefer to buy land if possible in order to gain security of tenure and avoid the risk of losing expensive fixed infrastructure. However, the government discourages land sales and prices are fairly high, typically between $9,000 and $26,000 a feddan. In addition, building tanks will cost perhaps $43,000 to $52,000 per feddan and additional equipment a further $14,000 to $21,000 per feddan. If the farm needs aquifer access then that may add a further $26,000 to drill the well. In contrast, semi-intensive ponds will cost only around $500 to $1,000 per feddan for the construction and necessary equipment. However, the returns from semi-intensive ponds might be around $2,250 per feddan per annum after meeting all running costs and relevant depreciation costs compared with over ten times that amount, as well as higher profits, from an intensive tank system.

Running costs are also quite high, feed costs accounting for about 85%. A fairly typical pond system of perhaps 10 units, each of two feddan in size (around 0.85Ha), might with incur costs of some $125,000 to produce fish at just over a dollar a kilo selling these on at perhaps $1.50/kg to give a nett profit of some $56,000. In contrast an intensive farm of 24 tanks might need only around 1.25 feddan of land in total (210 square metres per tank) to produce the same number of fish. The initial investment would be significantly higher and the annual running costs somewhat higher, perhaps $142,000, in turn making the production cost about $1.18/kg. However, the fish would also sell for more, reaching perhaps $1.72/kg and returning a nett profit of around $65,000. This difference is return is largely a consequence of the greater flexibility which the tank system offers. Tilapia need warm water and the higher running costs of, say, providing heating during cooler periods are more than met by the fact that five or six ‘crops’ of tilapia can be reared each year and sold when fish is scarcer and returns are higher.

**Increasing competition**

Over the recent past the Egyptian banking sector came to be dominated by four large public banks: National Bank of Egypt (NBE), Misr Banque, Banque du Caire, and the Bank of Alexandria. Between them these institutions had a significant network of branches and so served a much greater proportion of the population than did the smaller private banks. However, banking had been ineffective and poor at offering loans, particularly to SMEs. State companies had also failed to repay large proportions of loans and so a four-year Financial Sector Reform Programme was instituted in 2004 as a result of external pressure. Banking practice, ownership and regulation changed and the Central Bank of Egypt (CBE) was made responsible for supervision, control and industry regulation. The number of banks was reduced from 61 in 2004 to 39 by 2009, of which five were public and seven joint venture. State owned banks still dominate the urban areas but competition has increased and modern services such as providing ATMs, offering mortgages and loans for vehicles purchases and the like have been introduced.

Despite the changes the ratio of loans to deposits remains poor. In 2009, for instance, banks received deposits amounting to around $140 billion but lent only around $74 billion, a pitiful performance even without taking into account the leverage typically brought by fractional reserve banking practice. In fairness, the generally poor level of business record keeping and information management often makes it difficult for banks to determine lending risk accurately. According to CBE figures for 2009 lending to the private business sector amounted to 62% of total lending and of that 43% went to the industrial sector and 55% to other sectors leaving just 2.5% for the whole of agriculture, aquaculture included.

Small and medium enterprises are perhaps not as significant a part of the business sector as in Europe but they still make up over 90% of private companies and are the mainstay of the aquaculture industry. Despite this being potentially a very valuable sector for the financial services industry both public and private banks remain wary, claiming not to be able to calculate risk accurately and preferring not to deal with a plethora of tiny businesses. Where banks do lend to SMEs they tend to impose onerous terms, including high interest rates.
Development and other finance

Bangladesh, India and parts of sub-Saharan Africa have benefited considerably from an active microfinance sector but microfinance in Egypt is very undeveloped and apparently also charges very high interest rates. Although there are nearly 450 microfinance institutions the numbers of active loan recipients is thought to be no more than 1.2 million, roughly half of them in respect of SME businesses. However, there’s also some finance including development-focused soft loans funded in part through European Commission or World Bank support, such as the Social Fund for Development (SFD) or other programmes and managed by relevant government departments through the banks.

SFD began as a short-term emergency support fund but has changed to a long-term programme charged with fostering the development of small and micro businesses. Although aquaculture is potentially profitable it can also be quite risky, particularly where technical understanding and experience is lacking. The insurance sector as a whole is relatively undeveloped in Egypt and is almost non-existent in aquaculture. However, in order to facilitate access to SFD funds for small enterprises the Social Fund established the Cooperative Insurance Society (CIS) for SMEs. Supervised by the Egyptian Insurance Supervisory Authority, the CIS provides credit guarantee services so that 80% of an SME’s loan through a participating bank is covered in the event of default with the remaining 20% shared equally by the bank and the Small Enterprise Development Organisation. This guarantee removes the need for small businesses to lodge collateral or give third-party guarantees.

Other important finance sources include large companies or traders who may offer credit for feed and other inputs, deferring repayment until fish are sold. While this clearly helps cash flow it often means that fish often have to be sold at less than they might otherwise bring, perhaps when there’s a glut of produce.

Fish farming is seasonal, in part because tilapia require warmer water - during the colder months this can’t easily be managed in open ponds, with or without cages, although farmers raising fish in tanks can more easily provide heat and so can control the timing of harvesting better.

Nevertheless, most fish farmers, including even larger producers, use such informal sources of credit quite extensively and particularly before becoming fully established.

Supporting small farmers

As part of its aid initiatives the European Commission has helped to fund development programmes of Egypt’s Ministry of Agriculture and Land Reclamation (MALR). The first of these, which ran from 1996 to 2004, was the Multi Sector Support Programme (MSSP). This had the overall objectives of increasing income and job opportunities in rural areas and generally increasing food production through providing financial and technical support to farmers and agricultural entrepreneurs involved in production, processing and marketing activities. The main target group was small and medium enterprises and the programme provided loans for investment in the distinct sectors of horticulture, poultry, aquaculture, and irrigation and drainage development.

In the case of aquaculture MSSP focussed particularly on intensification of existing production operation, development of both freshwater and marine hatcheries, investment in feed mills and extrusion plants in order to reduce shortages, and investment in improved marketing facilities, mainly around refrigeration facilities to improve the keeping qualities of fresh fish.

When MSSP ended in 2004 a new fund to support SMEs in the agricultural sector took its place, again working through participating banks. This was the Agricultural Research and Development Fund (ARDF) and was again funded through European Commission credit. Unfortunately, because the banks’ knowledge of the aquaculture sector was poor – this despite efforts to train them through MSSP-funded workshops and seminars about the economic viability and potential of fish farming – the number of soft loans offered to the sector was not high. In the case of the MSSP, for instance, only 8.6% of loans by value went to aquaculture and their mean size, $57,800, was half that of the mean size to horticultural businesses and only two sevenths of the mean loan to those in the poultry business.
What of the future?

Egypt’s rising population is putting pressure on water resources and although aquaculture is recognised as a very important business area it will still continue for it to be difficult to find enough water. Innovative approaches such as that of integrated aquaculture where the same water is used for several different purposes will increasingly become necessary to make best use of the scarce resource. At present very little marine aquaculture, mariculture, takes place but Egypt has nearly 2,500km of coastline along both the Mediterranean and the Gulf of Suez leading into the Red Sea, much of which could be used.

Egypt had already held talks with Vietnam about sharing their specialist aquaculture knowledge and experience with each other and in April 2011 Egypt’s deputy Foreign Minister in the interim government, Mohamet Hagazy, paid an official visit to Hanoi and discussed measure to improve cooperation.

Vietnam has over two decades of mariculture experience, particularly in shrimp farming, although lobster, molluscs and marine fish species like grouper are also reared but it’s now looking to develop a freshwater tilapia industry.

Given the ingenuity Egypt’s already displayed in successful fresh water fish farming in an arid land and with the need for fish to feed a growing population, Egypt’s aquaculture will continue to grow. This is desirable from a food security perspective but it’s also a potentially highly profitable sector with good employment opportunities. There are several constraints, including lack of land and lack of finance, the latter perhaps particularly affecting SMEs, but they are by no means the only ones.

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