National Aquaculture Sector Overview

Bahrain

Replaces: Arabic version (2005), Spanish version (2005), French version (2005), Chinese version (2005)

Characteristics, structure and resources of the sector

Summary

Commercial mariculture in the Kingdom of Bahrain begun at the end of 2014, when Asmak Bahrain's private company started producing gilthead seabream (*Sparus aurata*) and sobaity bream (*Sparidentex hasta*) after the sign of the agreement with the Ministry of Municipalities Affairs and Urban Planning. Recognizing the importance of aquaculture development, the Government's represented by the Directorate of Fisheries, has established the National Mariculture Centre to undertake applied research in this field. The National Mariculture Centre began as a pilot project in 1979 in cooperation with the Food and Agriculture Organization of the United Nations (FAO). The centre is located at Ras Hayan on the South-Eastern coast of Bahrain.

The National Mariculture Centre (NMC) has successfully achieved the mass propagation of seed from the following commercially important local species: rabbit fish (*Siganus canaliculatus*), Sobaity seabream (*Sparidentex hasta*), gilthead seabream (*Sparus aurata*), mangrove red snapper (*Lutjanus argentimaculatus*), brown-spotted grouper (*pinephelus coioides*). For many years, the National Mariculture Center has been supplying marine finfish seed to all Gulf Cooperation Council (GCC) countries and other member countries of the Regional Commission for Fisheries (RECOFI). The Kingdom of Bahrain has maintained its position as a leading marine finfish seed producer and exporter in the region.
Currently there are no commercial mariculture projects in operation in Bahrain, mariculture activities are limited to the applied research activities of NMC which includes studies in the areas of nutrition, reproduction, hatchery techniques, nursery and growout of the species indicated above, and the mass production of finfish juveniles.
Due to scarcity of freshwater resources in Bahrain, all efforts have been diverted towards marine species, there are very limited land-based culture activities carried out in tanks.

A pilot-scale project using cage production systems was implemented with the aim of promoting this type of

system. Bahrain is a small island nation with limited land resources. The expansion of extensive land-based developments is not feasible and would be at the expense of other urban developments and the marine environment. It is advantageous, however, for the country to promote private sector investments in intensive land based mariculture activities and open-water cage culture.All research and production efforts are focused on the development and refinement of appropriate economically efficient technologies and the production of marine finfish juveniles for sale, for stock enhancement programmes as well as for the limited use in land based grow-out tanks.

History and general overview

The Kingdom of Bahrain has good potential for fish farming considering the advantages offered by the climate, location, coastal area, and market. Many types of aquaculture activities are feasible and a wide range of aquatic species could be cultured. Bahrain, by virtue of its location, possesses rich finfish and shellfish resources, some of these have already been identified as potentially suitable for aquaculture development by the National Mariculture Centre within the Directorate of Fisheries, an affiliate of the Ministry of Municipalities Affairs and Urban Planning in the Kingdom of Bahrain.

Fish landing statistics in the country indicate a large and steady deficit in its supply of fish. Meanwhile, the demand and per capita consumption of fish products has continued to increase over the last two decades. This is due primarily to the increased public awareness about the health benefits of fish consumption. The fisheries resources in the waters surrounding the Kingdom cannot meet this increased demand. In the long-term, it is felt that investment in the development of an aquaculture sector will contribute to the food security and self-sufficiency of Bahrain and its ability to earn foreign exchange through the export of aquatic products.

Human resources

Currently, the Directorate of Fisheries consists of the Director, 4 professional, 18 technical staff and 11 support staff who are involved in all mariculture activities undertaken by the National Mariculture Centre. The Director and the senior staff all have post graduate degrees. All technical staffs are well educated and trained in mariculture sciences with many years of experience in this field. The technicians are school graduates with extensive training and experience, working in different areas of mariculture research, such as brood stock management, hatchery techniques, live food production, juvenile and grow-out production, nutrition and fish pathology.
There are at present, proposals to increase the staff in order to meet the requirements for the proposed expansion of research activities and the promotion of commercial mariculture projects in the Kingdom.

Farming systems distribution and characteristics

At present, The Ministry of Municipalities and Urban Planning, has signed an agreement with two private companies. One of these companies are Asmak Bahrain Company which has planned to produce 1 500 tonnes of fish by using floating cages allocated in Gumais area within an area of 240 000 m^2.

The company began to setup 36 cages at the end of 2012. They used 12 units of 40 m circumference, 635 m^3 in volume constructed from HDPE pipes - for acclimatizing introduced fry and growing them up to 30 grams and 24 units of 60 m circumference, 1 720 m^3 in volume for growing the fish to market size. They started producing gilthead seabream and sobaity bream at the end of 2014.

The other investor is Aquatic Company and its facilities are still under construction. Aquatic will work on the land using recycling system in an area of 6 000 m^2 and they aimed to produce 250 to 300 tonnes of different fish species per year. This company is expected to commence by the end of 2015. The hatchery at National Mariculture Center is producing different marine fish species and gilthead seabream using open systems.

Cultured species

The National Mariculture Centre has been improving the mass propagation of seed of the following

commercially important local species: rabbit fish (Safee) (*Siganus canaliculatus*), Sobaity bream (Sobaity) (*Sparidentex hasta*), brown-spotted grouper (Hamoor) (*Epinephelus coioides*), gilthead seabream (*Sparus aurata*), mangrove snapper (Sheggar) (*Lutjanus argentimaculatus*), and cobia (*Rachycentron canadum*).

Currently, production is taking place for the first four of the species listed above, gilthead seabream being the major contributor. Due to scarcity of freshwater resources in the country, all efforts are now being oriented towards marine species.

Practices/systems of culture

Pilot-scale projects using cage production systems was carried out in an effort to promote this type of aquaculture. Bahrain is a small island country which possesses limited land resources for development. Expansion of extensive land-based developments is not feasible. It is advantageous, however, for the country to promote private sector investment in intensive land-based mariculture activities and open water cage culture.

Sector performance

Production

The National Mariculture Center is currently the leading producer of juveniles in the region for a wide range of marine finfish species. In 2008, juvenile production from three fish species nearly reached five million. The production of market size fish was about 2.0 tonnes.

The center's production capacity could be significantly increased if problems related to seawater quality, shortage of facilities, improvement of the organizational structure and shortage in manpower and resources are resolved.

The graph below shows total aquaculture production in Bahrain according to FAO statistics:

Market and trade

Bahrain's aquaculture industry is still in its infancy; currently the production harvested from NMC is marketed locally. Significant numbers of Sobaity bream, gilthead bream and grouper juveniles have been exported to all the countries in the region over the last few years. Asmak Company production from the cages will be sold first to local market and then abroad if national demand for fish is satisfied.

The per capita fish consumption in Bahrain was 18.2 kg in 2000, this figure declined to 8.5 kg in 2009. The total fish landing showed an increase of 15.3 percent in 2009 as compared to 2008, while the population showed an estimated 52 percent increase over a period from 2000 to 2010.

Contribution to the economy

Aquaculture has good prospects for boosting the national economy of the country in the near future.

Promotion and management of the sector

The institutional framework

The Directorate of Fisheries within the Ministry of Municipalities and Urban Planning represented in Agriculture and Marine Resources Affairs is a leading government agency responsible for the management and development of the aquaculture sector. The Directorate also liaises with other government bodies on issues relating to aquaculture development.

Within this Directorate there are a number of different sections and units with various responsibilities for aquaculture development and sustainable management issues.

The governing regulations

The government has recognized the importance of regulation to ensure the sustainable development of aquaculture, an unregulated and uncontrolled aquaculture sector will inevitably lead to many environmental, economical and social problems. All the rules and regulations relating to aquaculture are set within one framework that is transparent, enforceable and interlinked with other laws and regulations applicable within the Kingdom as well as relevant international law.

The Royal Decree on Exploitation and Utilization of the Marine Resources, issued in 2002, has provisions for controlling the culture of organisms using aquaculture such as licensing and quality issues. According to the law, a company may not undertake any aquaculture activities without permission from the authorized government body (Directorate of Fisheries). It also controls the collection of seed from the wild. Aquaculture laws and regulations in Bahrain are constantly revised and up-dated in conformity with international standards and requirements. A new law will be endorsed soon, the country is also a participant in the common GCC fisheries law to be endorsed in the near future.

The government's strategy is designed to guide the sustainable growth and management of Bahrain's aquatic resources for the production of high quality fish and seafood, also for the generation of wealth and employment for the local population. All strategy initiatives are being designed to promote sustainable development - "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
Recognising the importance of environment, the Directorate of Fisheries is committed to eco-friendly and environmentally sound aquaculture development.

Applied research, education and training

The National Mariculture Centre under the jurisdiction of the Directorate of Fisheries is the government body that conducts applied and scientific research in the field of aquaculture. Its main objectives are:

- To create the scientific and technical base for the development of mariculture operations in Bahrain.
- To conduct appropriate scientific research projects and developmental programmes on the mariculture of living marine resources.
- To develop suitable culture systems for the environmental conditions found in Bahrain.
- To assist and encourage private sector investment in commercial fish farming and similar activities in the country.
- To mass produce seed of suitable and commercially important species for the fish farming sector.
- To produce market size fish in suitable culture systems for the local and international markets.
- To train national staff in aquaculture technology.
- To assist stock enhancement programmes through the mass production of seeds, fry and fingerlings to protect the local endangered marine resources from extinction.

The Biology Department of the University of Bahrain also conduct related academic oriented research in this field.

The University of Bahrain offers a BSc. degree course in marine science within the Biological Sciences Department.

Trends, issues and development

The Ministry of Municipalities and Urban Planning has allocated six investment pieces of land in the area of

Ras Hayan, to support the private sector in the field of aquaculture and to achieve food security national plans. Each area has a surface of 6 000 m^2 to produce 250-300 tonnes of several types of fish using a closed recirculating system (RAS). This will be an important step in enhancing food security of the nation and contributing in narrowing the gap between demand and supply. The National Mariculture Center has to be developed and equipped to give the necessary technical support for the upcoming industry.

The future strategy of the Directorate of Fisheries will diversify to cover many important mariculture and marine issues such as legislation and the integration of the approval process, environmental monitoring, fish disease control, sustainable management and development. This strategy will also include the nature of involvement of the different government authorities as well as the private sector in the management process of the mariculture sector.

More research in different fields of aquaculture is needed for improved future management of this growing sector. The main areas of research that could be focused on in future are:

- Identification of suitable local and exotic species for culture.
- Environment monitoring programmes.
- Fish health and disease control.
- Enhancement of the legal and administrative framework.

References

Bibliography

FAO publications related to aquaculture for Bahrain.

Abdulredha J. Shams 2010. National Aquaculture Sector Review for the Kingdom of Bahrain. Directorate of Marine Resources, General Directorate for the Protection of Marine Resources, Public Commission for the Protection of Marine Resources, Environment & wildlife. Kingdom of Bahrain, pp. 10

Fisheries Resources in the Kingdom of Bahrain 2009 - Public Commission for the Protection of Marine Resources, Environment and Wildlife, General Directorate for the Protection of Marine Resources, Directorate of Fisheries Resources, Fisheries Assessment Section. Technical Circular No.95, pp.82

Related links

Central Informatics Organization (CIO) - Bahrain

FAO FishStatJ – Universal software for fishery statistical time series

Regional Aquaculture Information System (RAIS)