



AQUACULTURE: A GEOGRAPHIC STUDY AT THANE DISTRICT

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ABSTRACT:

In recent decades, the importance of aquaculture has substantially grown in most countries. This development generates profit and income, but it also bears risks of negative and wide-ranging impact, from aesthetic aspects to direct pollution problems and even ecosystem destruction.

KEYWORDS: *Aquaculture , controlled conditions , global aquaculture operations.*

INTRODUCTION

Aquaculture, also known as **aqua farming**, is the farming of aquatic organisms such as fish, crustaceans, mollusks and aquatic plants. Aquaculture involves cultivating freshwater and saltwater populations under controlled conditions, and can be contrasted with commercial fishing, which is the harvesting of wild fish. Mari culture refers to aquaculture practiced in marine environments.

The reported output from global aquaculture operations would supply one half of the fish and shellfish that is directly consumed by humans, however there are issues about the reliability of the reported figures. Further, in current aquaculture practice, products from several pounds of wild fish are used to produce one pound of a piscivorous fish like salmon

Particular kinds of aquaculture include fish farming, shrimp farming, oyster farming, alga culture (such as seaweed), and the cultivation of ornamental fish. Particular methods include aquaponics, which integrates fish farming and plant farming.

Top ten aquaculture producers in 2004

Country	Million tones
China	30.61
India	2.47
Vietnam	1.20
Thailand	1.17
Indonesia	1.05
Bangladesh	0.91
Japan	0.78
Chile	0.67
Norway	0.64
United States	0.61
Other countries	5.35
Total	45.47

COMMON DEFINITION

Aquaculture is the farming of aquatic organisms such as fish, shellfish and even plants. The term aquaculture refers to the cultivation of both marine and freshwater species and can range from land-based to open-ocean production. . Mari culture is another term used for the farming of marine organisms in their natural habitats.

The culture or husbandry of marine organisms by any person. Storage or any other form of impounding or holding of wild marine organisms, without more, shall not qualify as aquaculture. In order to qualify as aquaculture a project must involve affirmative action by the lessee to improve the growth rate or quality of the marine organism.

India is making rapid stride with its Blue revolution & today ranks third in the world in aquaculture. "Prawns" rank as highest foreign exchange earner among or marine product exports with farmed shrimp exports in volumes & fetching over 70 per cent in value.

Aquaculture: A Brief History

Aquaculture was operating in China circa 2500 BC. When the waters subsided after river floods, some fishes, mainly carp, were trapped in lakes. The origin of aquaculture is still not clearly known. It probably started from Egypt and then spread to China about 2500 years ago. Wen Fang, the first fish farmer built ponds and kept records on the growth and behavior of the fish. Fan Li wrote about aquaculture in 475B.C and suggested the idea of carp culture. . The Greek philosopher Aristotle suggested that the Europeans were also interested in farming carp fish. Carp culture was brought to England in the 15th century for the first time. In France during 19th century, salt pans were constructed which soon became great reservoirs to be fished. In Czechoslovakia nearly 900 years old tradition of fishpond culture exists. In 16th century extensive fish farms were built in that area which covered more than 120000 hectares of land. The method of fish farming was brought from Polynesia in about 1000 A.D. to Hawaii, where especially on Oahu, ponds were built to catch, store and grow small brackish water organisms like shrimps and fish. These ponds were generally built of stone and could be quite large. In 1673 Gorohachi Koroshiya found that oyster larvae would settle and grow on bamboo stakes that were attached into the ocean bottom and this laid the foundation for the culture methods using floats and rafts.

India has a long tradition of both freshwater and brackish water aquaculture. Freshwater fish culture of carps has been a long tradition in eastern states like Bengal. As far as brackish water culture is concerned, the State of Kerala with its Chemmeenketu is the major traditional producer. Traditional shrimp culture has also been practiced on a smaller scale in Bengal, Goa and Karnataka.

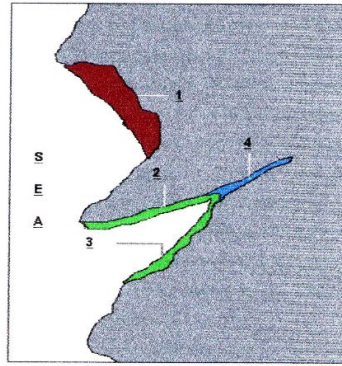
The global significance of aquaculture can be understood better if we consider that it contributes nearly 22% of the 72 million tones of global supply of food fish. The contribution of aquaculture to food fish is even more significant in the case of Asia. China has been the traditional world leader in aquaculture and contributes nearly 50% of the world's production while India, with 10%, is the second largest aquaculture producer

Aquaculture is the art of cultivation and rearing of fish in enclosed ponds. It is the rearing of aquatic organisms under controlled or semi-controlled conditions. It is considered to be the large-scale husbandry or rearing of aquatic organisms for commercial purposes. But it can be more than a potential means of reducing our need to import fisheries products. It has a potential to increase number of jobs and commercial fishing and is a source of protein for the future. All of these can be achieved effectively by aquaculture.

In this activity a suitable site is required to be chosen. The engineers should be consulted to design the ponds and to work efficiently. The system requires building of ponds and pumps. Filters are used and water treatment is necessary. The seeds are normally grown out to a marketable size, harvested and sold for the best price. In the total business problems related to water quality and health normally arise.

The coastal fish farming

1. Beach Area.
2. Mangrove Area.
3. Intertidal Area
4. Upstream Area.



STUDY AREA

Thane District has geographical area of 9558 sq. kms. Positioned at 72.45 & 73.48 east longitude and 18.42 & 20.20 north latitude. Based on the population, districts stand second in the state while on the basis of the area, stands sixteenth in the state. As the study area lies in the macro tidal range, to understand the sediment distribution pattern on the shore platform and water layer weathering the tidal data of Dahanu is used. In this area tide is 5 m high and the tidal range decreases up to highest is 4 m and lowest is 1.5 m. The highest level reaches up to 6.3 m.

Tarapur creek near Dahanu at Chichani. North of Tarapur on Maharashtra coast was selected for the assessment where the aquaculture is being practiced. It is located along 19°58N latitude & 72°43 E Longitudes. Field observation showed that the tidal creek has thick growth of mangroves some area along its banks. Some areas are cultivated but the high salinity & salt encrustation are the bank has larger potential for aquaculture, as it has good roads linkages & the creek provide better quality prawns. The intertidal area within estuary is extensive flat & therefore suitable for aquaculture. The breeding of prawns is possible in the area as they can sustain the salt levels of the tidal water.

iii) Climatic Conditions, rainfall seasons.

The District has a usual average rainfall measuring 2567.50 mm from June to September, the temperature in the districts ranges from a minimum of 17.50 Celsius to maximum of 34.4 Celsius.

METHODOLOGY

FIELD AND ANALYTICAL PROCEDURE

In order to study the aquaculture pond the field and analytical procedures were adapted. Planning & preparation of the aquaculture area was selected in the Thane district that is Tarapur creek near chichani village.

FIELD WORK & DATA COLLECTION

The actual field work was include information collection at the source of the aquaculture pond at chichani. The data collection done by following segments

1. Direct personal investigation ;-

The direct method of interview was used for capturing the details. The assessment was done on the basis of field observations & interview of the personal Mr. Sayyad Ali ponds are owned by company (Mumbai). Basic data was collected directly from field from the in charge of the system. Then we visited all the ponds one by one & collected Information about their feed, growth & ideal environment required for them

2. Secondary Data Collection

GIS used in secondary data collection .The google also used in secondary data collection.

OBJECTIVES OF COSTAL AQUACULTURE

- To get proper knowledge about the whole system of coastal aquaculture.
- To know present condition of this culture systems.
- To detect the problems that exists in the coastal aquaculture system.
- To know the prospects of coastal aquaculture.
- To master the different types of prospects of coastal aquaculture practiced in coastal area.
- To have knowledge about the water quality maintenance in relation to productivity.
- To utilize fully the natural water resources available to the maximum.
- To acquire proficiency in farm management by knowing farm management techniques.
- To adopt befitting technique of hatchery and nursery management.
- To improve socio-economic condition.
- To remove unemployment problem.
- To earn foreign exchange revenue by transport of fish to foreign countries. To increase production of food, in the form of fish, and decreasing the pressure on other food items.
- To meet the demand of protein.

Types of Coastal Aquaculture

There are many types of coastal aquaculture in the basis of culture system, species base and so on in our country. On the basis of culture system it is:

- Raft culture
- Cage culture
- Pen culture
- Floating cage culture
- Crop rotation culture
- On bottom.

On the basis of species type it is:

- Shrimp culture
- Crab culture
- Mullet culture
- Sea Bus culture
- Mollusk culture
- Sea weed culture
- Turtle culture Crocodile culture
- To earn foreign exchange.

Description & Suitability and problems for coastal aquaculture Environmental problems

Sr No	Site	Description	Suitability and problems for coastal aquaculture	Environmental problems
1	Beach area	Landward area of coastal zone above high tide level: sandy soils	Highly percolating soil, will require additional pumping of sea water, salinity on higher side for tiger shrimp growth needs groundwater extraction to dilute sea water	Salinization of ground water in surrounding areas: contamination of groundwater with pond sediments over time due to seepage: where seepage too high it can affect floors and walls of fishermen huts.
2	Mangrove area	Low-lying clayey area in the intertidal zone	High reclamation costs: acidic soil will cause failure after 2-3crops	Destruction of nursery grounds for fin fish and shell fish: destruction of natural barrier against cyclones.

3	Supratidal/ intertidal area	Mud flats or vacant lands surrounded by natural brackish water resources(estuarine creeks, river mouths, back waters)	Best site for coastal culture with suitable salinity and each drainage of waste water: if too many farms using same water source, will lead to deterioration of inlet water quality and affects coastal crop	Organic pollution of creek waters if too many farms: if ponds put up on mud flats that provide outlet for flood water, then flooding of nearby agriculture farms and villages possible during monsoon.
4	Upstream areas	Beyond coastal zone and having agriculture lands with alluvial soil	Low salinity causing stress to shrimp: pesticide residues may also cause stress to shrimp	Loss of good soils, salinization of nearby agricultural lands, and freshwater aquifers.

METHODOLOGY

FIELD AND ANALYTICAL PROCEDURE

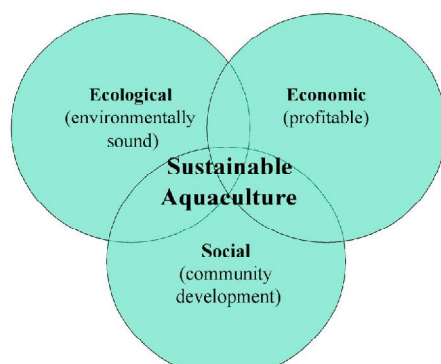
In order to study the aquaculture pond the field and analytical procedures were adapted. Planning & preparation of the aquaculture area was selected in Dahanu Taluka in Thane district Maharashtra. The actual field work was included information collection at the source of the aquaculture pond at Dahanu Creek. The data collection done by following segments

1. Direct personal investigation ;-

The direct method of interview was used for capturing the details. The assessment was done on the basis of field observations & interview of the personal Mr. Sayyad Ali ponds are owned by company (Mumbai). Basic data was collected directly from field from the in charge of the system. Then we visited all the ponds one by one & collected Information about their feed, growth & ideal environment required for them.

2. Secondary Data Collection

Various journals, articles, information from Google sites and GIS used in secondary data collection.



PROBLEMS WITH AQUACULTURE

Environment: Like a giant aquarium, land-based fish farms must change their tanks' dirty water. Depending on the system's set-up, this can result in the discharge of significant amounts of

wastewater containing feces, nutrients and chemicals into the environment. Nutrients can result in algae blooms which eventually remove dissolved oxygen in the receiving waterway, or eutrophication. A zero oxygen content results in fish kills. In addition, chemicals are commonly used in the aquaculture industry, such as antibiotics and water treatment agents. Aquaculture systems should be closed, or its wastewater treated prior to discharge.

Disease: Aquaculture operations can spread parasites and disease into the wild. Just as commercial chicken coops must be kept clean and are notorious for disease, farmed fish and shellfish are subject to the same circumstances. Farmed fish have an increased chance of getting parasites such as sea lice, as opposed to fish in their natural environment.

Construction: Both land-based and aquatic wildlife can lose their habitats through the building of aquaculture facilities along the coast, where clean and natural water can be accessed for its processes

Element of sustainable aquaculture.

Child labour in fishery and aquaculture is essentially a socio-economic problem inextricably linked to poverty and illiteracy; it requires concerted efforts from all sections of the society to address the problem.

Apart from agriculture, fishery and aquaculture alone engage big numbers of child labours. However, it is difficult to get sector-wise disaggregated data in this regard as often children engaged in fisheries and aquaculture belong to small scale and artisanal fisheries and the figures are combined with agriculture related data. Apart from small scale fisheries, children are also working in large scale fisheries and in particular fish processing industries.

i. Children in aquaculture related work which is extremely hazardous. Collection of shrimp seeds in brackish water is highly hazardous as children work in local water bodies which are highly contaminated due to discharges of polluted effluences from nearby aquaculture farms. Many girls are engaged in this practice. The crude way of collection of seeds (sucking the water with the seed and spitting the same in a container) results into serious health hazards among the children (Halim 2003). The most common complains are irritations in eyes, skin diseases of various natures, stomach problems and in some cases even cancers were reported. Shrimp seeds are also collected in delta areas (estuaries) and seas, children are engaged in this work for 8-12 hours a day during high season and they do not use gumboots or gloves while doing this work.

ii. Aquaculture is a growing industry with a great potential towards the contribution of the country's total fish requirement. Serious efforts have been done to develop and improve the production of fish by rearing high value fish in tanks or ponds. Under the Third National Agricultural Policy (1998-2010), the target is to annually produce 1.93 million tones of fish worth approximately RM8.3 billion by the year 2010.

Consequently, the development of an automatic fish feeding machine can be very beneficial to the growth of the aquaculture industry. This device was developed to overcome labour problems in the industry and introduce a semi-automatic process in the aquaculture industry. It has the ability to dispense dried fish food in various forms such as pellets, sticks, tablets or granules into fish tanks or ponds in a controlled manner for a stipulated time. The automatic fish feeder is controlled by a digital timer and it is capable of feeding the fish in accordance with a pre-determined time schedule without the presence of an operator, and at a feeding rate of 250g/min.

FINDINGS AND CONCLUSION

The area along the creek bank has large potential for aquaculture as it has good roads linkages and the creek provides better quality prawns and shrimps. The intertidal area within the estuary is extensive flat and therefore suitable for aquaculture. The breeding of shrimps and prawns is possible in the area as they can sustain the salt levels of the tidal water. The height of the aquacultural site is 3 m.

Ponds are square because they are easy to build and little space is wasted between ponds. There is a slope towards the drain gate, as it assists easy draining of wastewater.

Child labour problems in the industry and introduce a semi-automatic process in the aquaculture industry.

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