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Coastal Aquaculture: Case Studies from Mhasala and Adhe Creek, Maharashtra, India

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Abstract:- Aquaculture is the cultivation and raising of fish in enclosed ponds. It is considered to be the large-scale husbandry of rearing of aquatic organisms for commercial purposes. The activity is increasing rapidly in the coastal areas of Maharashtra. Many resourceful areas with fertile lands of these areas have been converted into ponds for aquaculture. Keeping these points into consideration, an attempt is made to study the existing Aquaculture, particularly brackish water aquaculture on the west coast of Maharashtra and to understand the aquaculture techniques to assess the geomorphic importance of the sites selected. Many people, particularly in coastal areas, consider seafood as essential to their diet; Prawns are one of the nutritious products which can be harvested in India considering the environmental conditions suiting for the prawn harvesting.

Keywords: - Coastal Aquaculture, fish, prawn harvesting.

I. Introduction

Fish farming which is also known as aquaculture is one of the rapidly growing industries of the world (FAO, 2009). 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 spite of environmental dangers due to improperly run aquaculture projects, practices like right management and precautions can help aquaculture farms to operate with minimal environmental impact. The reason behind aquaculture industry lagging behind other industries is that it is a relatively new industry, lack of new techniques and technologies and it is not environmentally friendly.

II. Study Area

The area under study is Rajpuri and Mhasala creek and Adhe creek on Maharashtra coast. Mhasala creek is located on the southern shore of Raigad district and extends between 18^0 8' N and 18^0 15' N latitudes. The total length of this creek is 30km.The Mhasala creek is basically an arm of the main creek called Rajpuri creek. Rajpuri is a tidal creek system joined

by river Mandad from north and Mhasala creek from south. Tidal water in Rajpuri and Mhasala creek penetrates upto Mhasala to a distance of 30 km. The entrance of Mhasala creek can be roughly identified near Turumbadi, whereas the entrance of the Rajpuri creek is 5km seaward of Dighi and Dande. The creek is bordered by mud and mangrove swamps on its seaward margin. The geomorphic map of the creek prepared from 1:50000 S.O.I. toposheet which shows the topographic positions and extent of various sedimentary environments in the creeks.

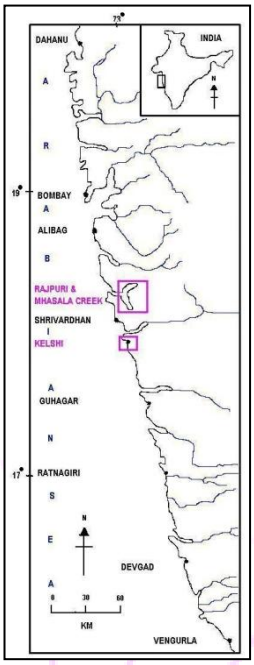

Figure 1 Location Map

III. Database and Methodology

The objective of the present study was to study the technique of coastal fish farming. The study is carried out with the help of both primary as well as secondary data. Primary data is collected through field study and GPS whereas secondary data is collected through toposheet and satellite images. The basic data was collected directly from field from the in charge of that system. The assessment was done on the basis of field observations and interview of the personnel. All the ponds were surveyed one by one and information about prawns, their feed, growth and ideal environment required for them was collected. The study is based on intensive fieldwork, observations and information related to coastal fish farming in the study area has been recorded.

The present study is based on literature searches and analysis of primary and secondary data gathered from satellite images, toposheet and field observations. To identify increasing aquaculture activities in the study area Landsat ETM 2004, 2005 and LISS III 2010, 2011 and 2012 satellite data sets are used. The survey of India (SOI) topographical maps 47 – B/15, 47 – F/3, 47 – F/4 with scale 1:50000 have been used.

The map of that are was prepared from the location of each pond with help of GPS (Global Position System) and a map of the ponds was prepared. The instruments, which are used in the farming process, include clinometers, aerators, and instruments for measuring the

dissolved oxygen and soil and water pH. In all three sites, namely Rowala, Majgaon and Vadawali, were studied from Mhasala creek area and one site was selected form Adhe creek near Kelshi.

The assessment was done on the basis of field observations and an interview of personnel. A questionnaire was prepared to know the exact process of aquaculture. Water and soil samples were collected from the farm and recorded in the field. Each pond was studied with the incharge of the each site and got detailed information about the culture process of prawn farming. Field location was marked by using GPS and map was prepared. Geomorphic map of the area was prepared in the field. Reactions and views of local people were noted.

IV. Aquaculture Pond system of study area

Anand Udyog Aquaculture project is developed along the Rajpuri Creek at Rowla, Vadawali and Majgaon along the Mhasala creek in Raigad district. The owner of the site is Mr. Sunil Bhikaji Kanade. He has owned total 4 sites i.e. at Malvan (13 Aquaculture Ponds), Vadawali (20 Aquaculture Ponds –Fig.7), Rowala (21 Aquaculture Ponds – Fig.6) and Majgaon (10 Aquaculture Ponds – Fig - 5). These all sites are financed by Union bank of India. Incharge of Rowala and Majgaon sites are Mr. Mahadev Kanade and Vadawali and Malvan sites are under the supervision of Mr. Sandeep Patil. Trident aqua (Fig. 2 & 3) was developed at Adhe, Kelshi (Tl. Dapoli, Dist. Ratnagiri) in 1999 by Tata Company, Mumbai. There are in all 8 ponds of which one is a trial pond. Of remaining 7 ponds one is 0.9 hectare, two are of 1.1 hectare and four are 1 hectare in area.

Table 1 Aquaculture farm details

SR.NO	AREA	NO.OF POND	AREA OF EACH	AREA (SQ.M)	DEPTH OF	WATER LEVEL(CM	WATER PH
1	Adhe	7	1	10117.14	1.5	20	7.5
2	Rowala	21	1.1	10128.86	2	25	8.5
3	Vadawali	20	1	10117.14	2	25	8.5
4	Majgaon	18	1	10117.14	2	20	8

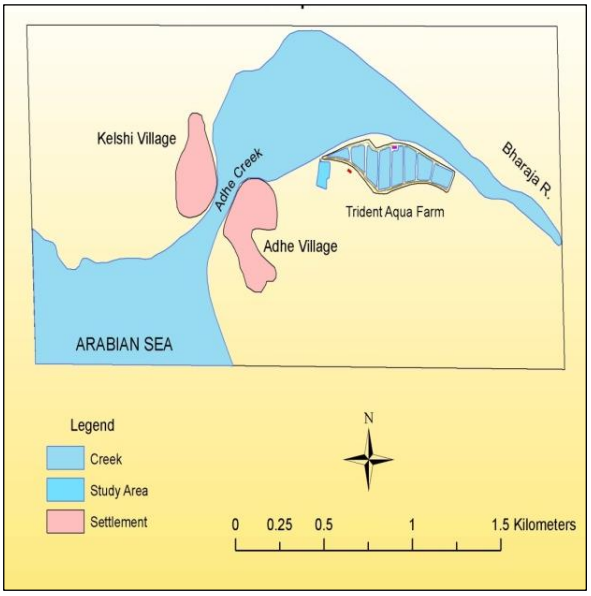

Figure 2 Location Map of Adhe

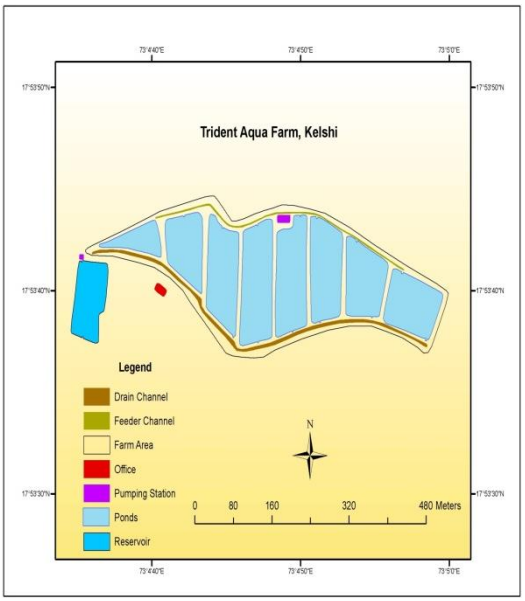

Figure 3 Trident Aqua Farm, Kelshi

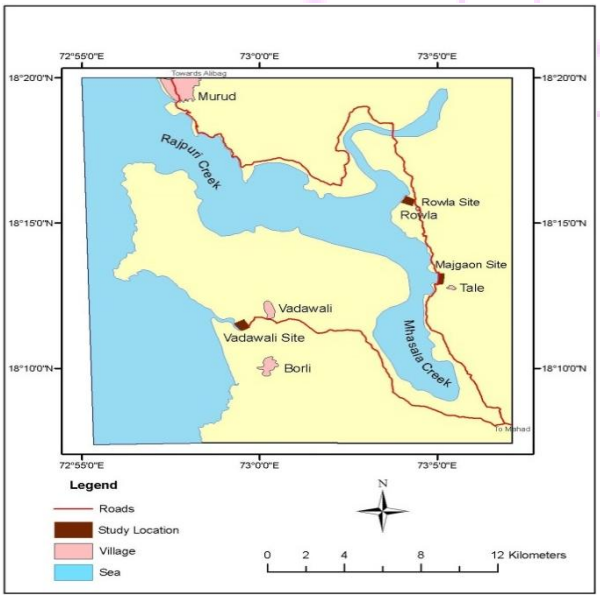

Figure 4 Location map of Mhasla Creek

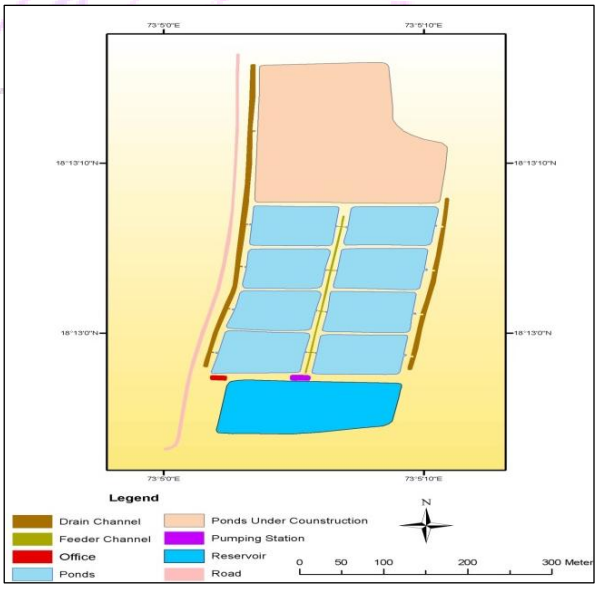

Figure 5 Kanade Aqua Farm, Majgaon

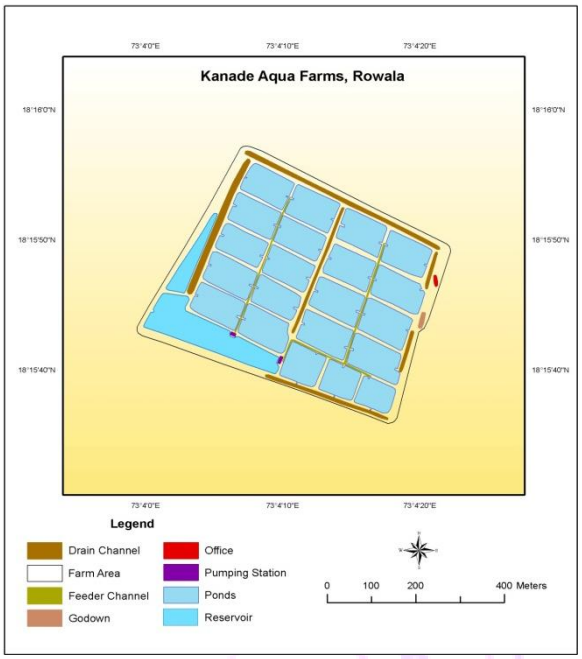

Figure 4 Kanade Aqua Farm, Rowla

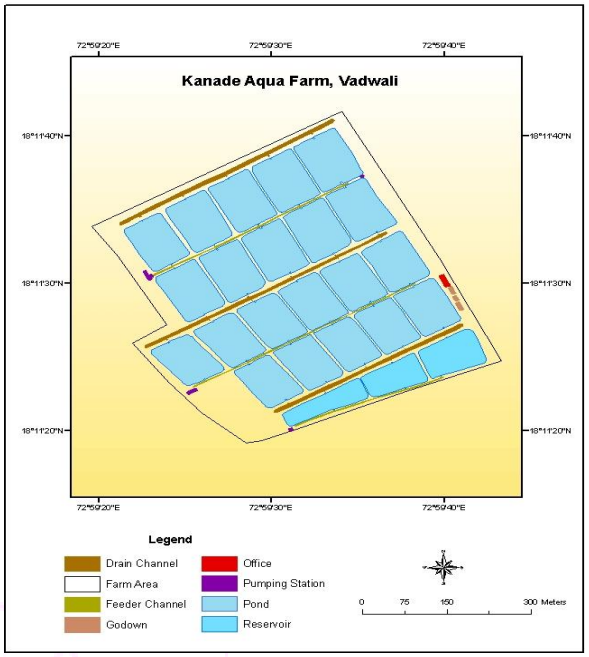

Figure 5 Kanade Aqua Farm, Vadwali

Table 2 Cost Estimate of Aquaculture
For the construction of a 1 hectare pond

SR.NO	PARTICULARS	QUANTITY	UNIT RATE(RS)	AMOUNT (RS)
1	Earth work excavation and laying in embankments for dykes and baffle walls as per design with compaction depressing etc.	9400 Cu.m	120/-	11,28,000
2	Sluice gate – Main Secondary	1 3	60,000 30,000	60,000 90,000
3	Sump pit		70,000	70,000
4	Supplying and	1	1,20,000	1,20,000

	installing pump – 10 Hp with accessories complete			
5	Supplying and installing paddle wheel aerators including cables etc	2	60,000	1,20,000
6	Pump shed and electrical works		1,00,000	1,00,000
7	Miscellaneous		80,000	80,000
	TOTAL			**17,68,000**

Ponds are rectangular because they are easy to build and little space is wasted between ponds. Ponds are at least 1 m in depth and slope towards the side of sluice gate or daring channel. This type of the bottom makes it easier to drain. Water collected in the pond is mainly high tidal water and it is provided by pumping. The water level pond is 20 cm of the water. There are two gates to each pond i.e. feeder gate and sluice gate. Feeder gates are covered with the net to prevent the entrance of other fish and sluice gate is also covered with the net to prevent the daring of the production. While harvesting bag nets are used and the water is drained. The feeder and drain channel are 1.1 m wide and 1m depth. At the pumping station there are pumps and two generators. One has 62 KB capacity and other has 82 KB Capacity. At the time of high tide they pump the water from Ultramar creek and Mhasala Creek respectively.

The construction of one such pond and harvesting from it needed more than 10 lack rupees. The checks trays are used in the system have a size of 70 sq.m. pH of water collected in the ponds is 7.54,1.5 kg of nutrient are used per 1 kg of prawn seeds. Growth period of the culture is around 120 days. By traditional methods of culture seed density of 5 per sq. m. is obtained. Here by professional methods it is increased to 25 per sq.m. The water in the pond system is exchanged every month. In 3rd and 4th month 20% is exchanged in 15 days and20% in 10 days respectively. The details of the aquaculture system are given in the table.

Table 3 Details of Pumps

SR.NO	**AREA**	**AREA UNDER CULTURE (HEC)**	**NO. OF PUMPS**	**POWER (KB)**
1	Adhe	10	1	62

2	Rowala	15	2	82
3	Vadavali	15	2	82
4	Majgaon	12	2	82

Table 4 Growth period, Density and Nutrients

GROWTH PERIOD (DAYS)	DENSITY		NUTRIENTS (FOR 1 KG SEEDS)
	Traditional	Professional	
120 to 140	5	25	1.5 to 1.8

Table 5 Water exchange schedule

MONTH	WATER EXCHANGE SCHEDULE
1	Nil
2	Nil
3	20 % in 15 days
4	20 % in 10 days

V. Discussion and Conclusion

Trident aqua at Adhe, Kelshi (Tal. Dapoli, Dist. Ratnagiri) by Tata Company, Mumbai and Anand Udyog are some of the best examples of the coastal fish farming. They are used mainly for prawns or shrimp farming. 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. There are some regions where coastal fish farming is profitable such as Mud flats, Mangroves, and Shoreline terrace etc. Kharland region is one of the ideal regions for the farming. The work shows that the aquaculture sites have been converted fertile land into aqua ponds. The farms have been proven successful in shrimp farming in this area. The farms have good accessibility for easy and fast transportation of prawns to the market. Human resources also play an important role in aquaculture and local people should get employment opportunities through this activity.

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