Farming Silver Pompano (*Trachynotus blochii*) in Brackishwater Ponds

1. Introduction

India with an annual production of about 11.41 million tonne stands second among the leading fishing nations of the world. Quite significantly, nearly 50% of this production is from Aquaculture. However, our production or the number of species we farm or export, as compared to many other countries in the region is very low for various reasons. While we have done comparatively well in the case of freshwater fish farming and brackishwater shrimp farming, we have still a long way to go in the development of marine fish farming.

Development of seed production and culture technologies for a large number of commercially important and high value marine fish species is needed. In the case of species for which seed production technologies have been developed, such as Sea Bass (*Lates calcarifer*), Milk Fish (*Chanos chanos*), Cobia (*Rachycentron canadum*), Pompano (*Trachynotus blochii*), Grouper (*Epinepheles* sp.) etc., there is need to upscale the seed production technology and raising fingerlings to promote their farming on a large-scale.

2. Resources

In India an estimated 3.9 million ha open brackishwaters, comprising of estuaries, creeks, backwaters and lagoons exist, but vast estuarine areas remain unutilized for fish production. An estimated 1.2 million hectares of coastal saline lands have been identified to be potentially suitable for brackishwater farming. Also, about 9 million hectares of salt-affected inland soils in the hot semi-arid and arid eco-region of northern plains and central highlands in the States of Haryana, Rajasthan, Punjab, Uttar Pradesh, Maharashtra and Gujarat are found suitable. Estimates show that only 11% of the potential coastal area available is utilized for fish farming. Therefore, development of suitable technologies for the utilisation of coastal saline soil/ saline ground water has become a national priority in the past few years. In addition to food production, coastal aquaculture can generate substantial employment opportunities in diversified fields in maritime States of the country.

3. Status and Potential

Understanding the importance of available resources, seed production technologies for high value marine finfish have been developed in the country and their culture possibilities have been studied in different culture systems.

Aquaculture of Silver Pompano (*Trachynotus blochii*) is being successfully undertaken in many Asia Pacific countries like Taiwan and Indonesia. It can be farmed in coastal earthen ponds, low-cost cages installed in brackishwater canals/backwaters and in sea cages. The species can be acclimatized and grown even in low saline water of 10 ppt.

Among the many high-value marine tropical finfish that could be farmed in India, the Silver Pompano is one of the most promising species as its growth rate is high, meat quality is good and it fetches high price in the market. Body shape, colouration and meat quality of this fish is similar to that of highly priced Silver Pomfret (*Pampus argenteus*). In the international market, the dockside price of Florida Pompano averaged $ 8 per kg; in India the price of Silver Pompano is about Rs. 300/- per kg. It has since been proven that Silver Pompano can be cultured in the brackishwater shrimp ponds as an alternative species achieving high survival rate, appreciable FCR and desired meat quality.

4. Project Location and Implementation

A. Site Selection: A committee comprising of representatives from State Fisheries Department/ Fisheries Development Corporation, ICAR-CMFRI and NFDB would identify and select suitable sites for project location and development in the estuarine/ backwater areas of coastal States and saline inland areas.

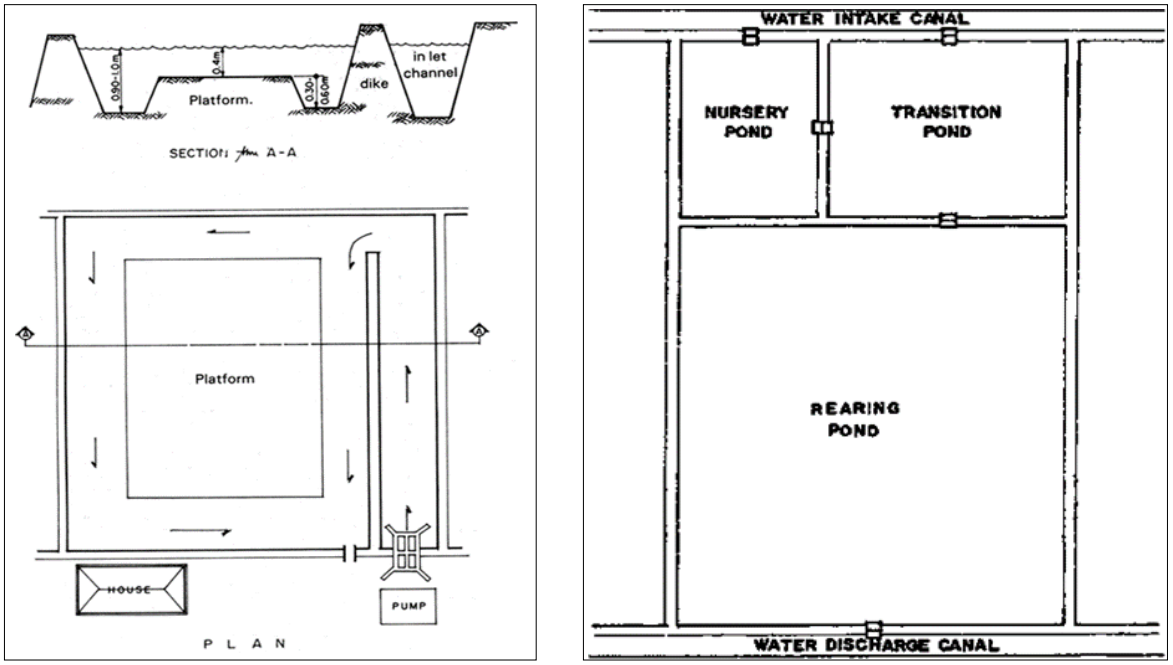
B. Beneficiaries: Beneficiaries include SHGs/ fishers/ fisherman societies/ farmers/ entrepreneurs; selection would be based on their interest and awareness. Fishers living in hamlets along the backwater areas, farmers involved in aquaculture and owning homestead near backwater resources, fisherman societies or entrepreneurs of coastal region could directly benefit from this project. Fisherwomen would be encouraged to earn their income and become independent by doing fish farming activities as it requires less capital investment but gives more financial returns.

C. Project Implementation:

- Management of Silver Pompano farming will be under the technical guidance of the ICAR-Central Marine Fisheries Research Institute, Kochi, Kerala.
- NFDB would provide financial assistance to beneficiaries through State Govt. for farming Silver Pompano in brackishwater ponds as a sustainable aquaculture project.

5. Project Components

A. Pond Preparation: The pond bed has to be dried until cracks appear on the soil surface. Top layer of the soil containing accumulated waste matter from previous crop of fish or shrimp has to be removed. Ploughing is done to overturn the soil to a depth of 30 cm. Feeding areas, corners and side ditches in the pond have to be properly tilled, leveled and dried to avoid formation of black soil. Water pH of 7.5-8.5 would be ideal for farming Silver Pompano. Quantity of lime applied during pond preparation depends on pH of the soil; dose has to be calculated accordingly. Filling the pond with water has to be done only after firmly tying the inlet pipe opening with two layers of fine (100 microns) mesh to prevent entry of unwanted fishes and predators. A week before stocking, the pond must be fertilized with either organic manure or inorganic fertilizers to stimulate plankton production.



Different layouts of Brackishwater Ponds for farming Silver Pompano

B. Salinity: Silver Pompano can tolerate vide range of salinities from 5–40 ppt. However, ideal salinity for farming would be between 15–25 ppt. The pond has to be filled to a minimum depth of 100 cm prior to stocking of fish seed. During the entire culture period, a minimum of 1.5 m water depth has to be maintained.

C. Nursery, Rearing and Seed Stocking: Hatchery produced Silver Pompano fry/fingerlings of 1–2-inch size are released into fine-mesh *hapas*/ cages/ pens of 2 m length, 2.0 m width and 1.5 m depth, installed in the pond. While stocking, care should be taken not to disturb the pond bottom by the persons getting into the pond as it may increase the suspended solid load in the water and choke the gill of fingerlings leading to mortality. Initially, 4 mm mesh *hapas*/ enclosures are used and after 30 days the fish seed are shifted into 8 mm mesh *hapas*/ enclosures. The stocking density during rearing phase could be up to 200 nos./ *hapa*. The fish seed have to be reared in *hapas*/ enclosures for 60 days or until they grow to at least 10 - 15 gram fingerlings, after which they can be released into the pond. Ideally, 5,000 nos. of 30 gram fingerlings can be stocked in a one acre (4,000 sq m) pond.

Nursery & Rearing Hapas in Culture Pond

D. Nutritional Requirement and Feeding: Silver Pompano is a fast swimming marine fish with darting movements and it requires highly nutritive feed to meet its energy requirements. During nursery rearing Pompano can be weaned to any type of feed, *viz*.,

extruded floating pellet, sinking pellet feed and chopped trash fish. Ideally, Pompano can be weaned to extruded floating pellet feed to avoid feed wastage and spoilage of pond bottom.

During rearing phase, in the *hapas*/enclosures, feeding has to be done 4 times a day and during grow-out phase in culture ponds it could be 3 times a day. Feeding zones demarcated by 3-inch diameter PVC-pipe floating frames of 2 x 2 m square have to be installed in the ponds. Feed has to be dispensed inside the feeding zone to avoid dispersal of floating feeds by wind/waves. At least 4 - 6 nos. of feeding zones have to be demarcated in one acre (4,000 sq m) pond. The feed pellet size should be less than the mouth size of the fish and hence, suitable size feed has to be selected for feeding the fish.

Details of feed and feeding schedule for Silver Pompano are as follows:

Fish Weight	Feed Pellet Size	Crude Protein (%)	Crude Fat (%)	Feed Ration as (%) Biomass	Feedings per Day
> 1 gram	800 -1000 µ	50	10	30	4
1-10 gram	1.0 -1.5 mm	40	8	20	4
10-100 gram	1.8 mm	35	8	8	3
100-250 gram	3.5 mm	30	6	5	3
250-500 gram	4.5 mm	30	6	3	3

A mix of two sizes of extruded feed pellet can be used if any size variation is found among fish during regular sampling. If sinking pellet feed is used, at least 4 – 8 feed trays (80 x 80 cm) per pond could be placed. Regular sampling of fish once in 15 days has to be carried out to determine growth rate and to calculate the FCR. In the demonstration of Silver Pompano farming, an FCR of 1:1.8 was obtained using feed having the above given formulation.

E. Water Quality Management: Plankton bloom is essential during early stages (up to 100 gram) of Silver Pompano culture. If the pond water is clear without any colour, a mixture of organic manure (10-30 kg/ha) and inorganic fertilizers (1-3 kg/ha) can be applied to obtain the algal bloom. Sufficient water depth must be maintained in the ponds to prevent growth of algae/vegetation on the pond bottom. Water depth in the shallowest part of the pond should be at least 100 cm. Water quality can be maintained by exchanging 10% of the water once in a week, 20% per week after 3 months and 30% per week after 6 months. If water colour is too dark, the quantum of water exchange can be proportionately increased. To maintain water pH within an optimum range of 7.5 - 8.5, agriculture-lime has to be applied regularly. Dissolved oxygen (D.O.) level should be maintained above 5 ppm at all times. Paddle wheel aerators can be placed in the pond to circulate the water and maintain the DO level. Aeration is a must during late evening to early morning period once the fish attain 200-gram size, and above.

F. Health Management: Silver Pompano is a hardy species and disease problems are not much. When reared in high salinities infestation with parasitic copepods may occur. Periodical application of commercially available pond water sanitizers/chemicals like Iodine solution would help to keep the fish healthy. Feed supplements such as LIV-52 syrup can be given by mixing with the feed to improve the immunity levels.

G. Growth Pattern: During the entire culture period, growth pattern of Silver Pompano is monitored by sampling the fish at fortnightly intervals. Estimated length and weight measurements against days of culture (DOC) are as follows:

DOC	Length (mm)	Weight (g)
1	30.59 ± 0.24	2.00 ± 0.04
30	73.42 ± 0.53	15.08 ± 0.16
60	102.88 ± 1.91	34.60 ± 0.41
90	158.39 ± 2.42	72.54 ± 1.95
120	182.30 ± 2.03	101.82 ± 3.11
150	203.71 ± 3.73	172.39 ± 4.55
180	226.51 ± 2.90	258.31 ± 5.76
210	273.07 ± 3.62	375.32 ± 8.07
240	296.88 ± 6.27	464.65 ± 10.25

H. Harvesting: Harvesting of Silver Pompano could be carried out by using drag net as in the case of freshwater fish ponds. To maintain the freshness and quality of harvested fish, washing in clean water and chill-killing can be done. Harvested fishes can be stocked in plastic crates by adding layers of ice in equal quantities at the bottom and top of the fish. It is suggested that harvesting of fish can be carried out during the off season period of April to June to get a better price.

Harvested Silver Pompano, *Trachynotus blochii*

6. Probable Unit Costs

The Probable unit cost for farming Silver Pompano in brackishwater ponds is given below:

Sl. No.	Particulars	Units	Quantum	Rate (Rs.)	Total Amount (Rs.)
A	**Capital Cost**				
1	Construction of Pond	1 ha	40 hrs	2000	80,000
3	Water inlet structures for pond	LS	1	10000	10,000
4	Water outlet structure for pond	LS	1	10000	10,000
5	Main outlet sluices	LS	1	20000	20,000
6	Pump-house	sq ft	100	200	20,000
7	Watchman shed	sq ft	100	200	20,000
8	Pumps	5 HP	1	40000	40,000
				Total A	**2,00,000**
B	**Operational Cost for One Crop (8 months)**				
1	Manures for pond preparation	kg/ha	1	10000	10,000
2	Cost of fingerling incl. transport	Rs.	12500	8	1,10,000
3	Feed including transport	Kg	7000	70	5,00,000
4	Harvesting charges	LS	-	10000	10,000
5	Miscellaneous expenses	LS	-	20000	20,000
				Total B	6,50,000
				Total A+B	**8,50,000**

7. Estimated Project Costs & Returns

Sl.No.	Particulars	Amount/ Quantity
1	Culture Period	1 year
2	Fingerlings Stocked (nos./ha)	12,500 per ha
3	Expected Survival (%)	75%
4	Total Fish Survived (nos.)	9,375 nos.
5	Average Harvest Size (g)	450 g
6	Total Production (kg/ha/year)	4218.75 kg
7	Sale Price (Rs/kg)	Rs. 250/-
8	Gross Income per year (Rs)	Rs.10,54,687/-
9	Net Benefit	Rs.2,04,687/-

8. Socio-Economics

To achieving sustainable aquaculture production, species diversification is vital. High- value marine fishes are in good demand in the domestic market and often are in short supply. Silver Pompano is in demand from 250-gram size onwards and therefore its farming could be quite lucrative and emerge as a major aquaculture enterprise in the coming years financially benefiting a large number of coastal fishers and fish farmers.

9. Further Reading

Jayakumar, R., Nazar, A K A., Tamilmani, G., Sakthivel, M., Kalidas, C., Ramesh Kumar, P., Rao, G Hanumanta, Gopakumar, G., 2014. Evaluation of growth and production performance of hatchery produced silver pompano *Trachinotus blochii* (Lacépède, 1801) fingerlings under brackishwater pond farming in India. *Indian Journal of Fisheries*, 61(3), pages 58-62