

# MARINE ORNAMENTAL FISH PRODUCTION – AN ALTERNATIVE LIVELIHOOD FOR COASTAL PEOPLE

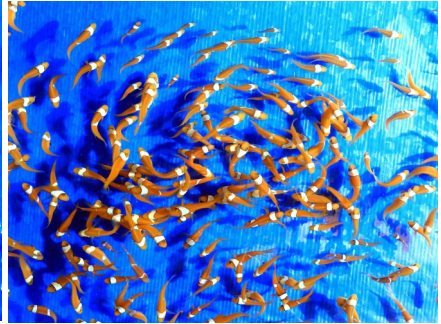
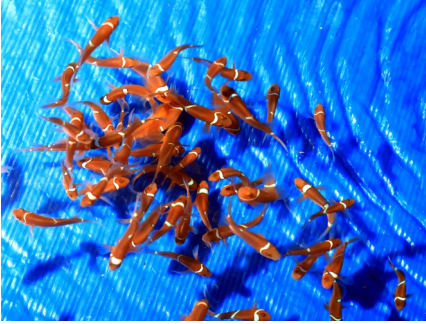


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**Ramanathapuram District**  
**Tamil Nadu – 623 520**



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## PREFACE

The ICAR - Central Marine Fisheries Research Institute (CMFRI), Mandapam has successfully disseminated the marine ornamental fish production technologies to fishers group in Palk Bay and Gulf of Mannar region through different training programmes. As an alternate livelihood option few fisher groups are presently involved in marine ornamental fish production. The expenditure for setting up of small scale hatchery, operational expenditure and gross revenue per year at field level will give an idea about the profitability of an enterprise. In this context the present booklet will give a clear picture on the economic performance of seed production of marine ornamental fishes by fishers.

**Dr. A. Gopalakrishnan**  
Director, ICAR-CMFRI

## **CONTENTS**

S.No	Particulars	Page
1.	Small-scale hatchery	01
2.	Economics for breeding and seed production of marine ornamental fishes	03
3.	Economics for only grow-out of marine ornamental fishes	06

## **Marine ornamental fish production – An alternative livelihood for coastal people**

The ICAR - Central Marine Fisheries Research Institute (CMFRI) has been pioneering in development of seed production technologies and commercial level production for more than a dozen species of clownfishes and damselfishes, which are in good demand in marine ornamental fish trade. Marine ornamental fish production is a low volume, high value enterprise and hence very much lucrative. The marine ornamental fish production technologies were disseminated to fishers group in Palk Bay and Gulf of Mannar region through different training programmes by ICAR-CMFRI, Mandapam. The fish catch or harvest from marine capture fisheries in these regions is stagnating over the last few years, which has led to reduced income generation to the fishers. In such scenario, the fishers group have well understood that the marine ornamental fish seed production will serve as one of the best alternate livelihood option to them. Nearly 30 fishers in five groups are presently involved in marine ornamental fish production in this region.

- **Small-scale hatchery**

Small-scale hatcheries for marine ornamental fish with less capital intensive technologies are available for broodstock development, larviculture, nursery rearing and grow-out to marketable size. The small-scale hatcheries can be easily adapted to culture a range of species.

A typical small-scale hatchery for marine ornamental fish consists of the following units.

1. Broodstock tanks
2. Larviculture tanks
3. Nursery rearing and grow-out tanks
4. One sand filter

5. Outdoor live feed (Phyto and zooplankton) production tanks
6. Seawater and freshwater supply systems.

➤ **Advantages of small-scale hatcheries**

1. Low capital inputs
2. Simple construction
3. Ease of operation and management
4. Flexibility
5. Quick economic returns.

• **Site Selection**

A site suitable for a small-scale marine ornamental fish hatchery should have the following characteristics:

- (i) Good water source – both seawater and access to freshwater
- (ii) Good infrastructure such as road, electricity, etc.
- (iii) Free from industrial and other pollution

• **Economic Assessment**

The candidate species selected for economic analysis is the clownfishes

➤ **Capital Investment**

This component involves all the expenditure on infrastructure and establishment of the hatchery. Items included in this component generally have a life span larger than one year and they are used to generate the future income from the hatchery.

➤ **Operating expenses**

This component is for the expenses that are spent during each production cycle and are essential for the routine operation of the hatchery.

➤ **Non-operational expenses**

These are related to the capital cost and investments write off. There are two items under this component for small-scale hatcheries.

- i) Depreciation
- ii) Interest on capital investment

• **Economics for breeding and seed production of marine ornamental fishes**

➤ **Fixed cost**

<b>Capital Investment items</b>	<b>Quantum</b>	<b>Cost in Rs.</b>
Temporary Shed	144m <sup>2</sup> (12 x 12m)	1,10,000
Broodstock (Glass tank – 200 litres)	6 nos	15,000
Larval rearing (Glass tank – 300 litres)	8 nos	36,000
Nursery and grow out (Glass tank – 300 litres)	10 nos	45,000
FRP tank (250 liters tank) Larval Stock	5 nos	17,500
FRP tank (1000 liters tank) Larval Stock	3 nos	39,000
Microalgae (outdoor) FRP tank (500 liters tank)	4 nos	26,000
Rotifer (outdoor) FRP tank (500 liters tank)	3 nos	19,500
Sand filter/ Over head tank	1 nos	6,000
Water storage tank (1000 liters)	2 nos	15,000
<i>Artemia</i> hatching tank	2 nos	6,000
4 hp diesel pump	1 nos	19,000
Ozonizer	1 nos	16,000
80w submersible pump	5 nos	15,000
Invertor (1200w)	1 nos	25,000
Air pumps (240 w)	2 nos	15,000
Power installation		10,000
PVC piping, plastic wares (water supply/aeration/drainage)		45,000
Netting, miscellaneous etc.		20,000
<b>TOTAL COST</b>		<b>5,00,000</b>

➤ **Operating cost**

<b>Items</b>	<b>1<sup>st</sup> Year(Rs.)</b>	<b>2<sup>nd</sup> Year(Rs.)</b>	<b>3<sup>rd</sup> Year (Rs.)</b>
1. Broodstock fishes and Anemone	12,000	3,000	3,000
2. Feeds	6,000	6,000	6,000
3. <i>Artemia</i>	4,000	8,000	8,000
4. Chemicals for micro algal culture	7,500	7,500	7,500
5. Electricity	25,000	25,000	25,000
6. Diesel	25,000	25,000	25,000
7. Maintenance	12,000	18,000	20,000
8. Workers' salaries	96,000	1,20,000	1,20,000
9. Miscellaneous expenditure	12,000	12,000	12,000
<b>10. Total</b>	<b>1,99,500</b>	<b>2,24,500</b>	<b>2,26,500</b>

There are six broodstock pairs can be maintained in the hatchery and at any time there are four active spawning pairs to produce eggs for the hatchery operations. Each pair will spawn 2 times per month. An average of 400 larvae is produced during each spawn. The survival rate of the larvae to juvenile phase is 50%. The grow out period from larvae to juvenile is 30 days.

There will be 80% survival rate from juveniles to market size, which is saleable. The period from nursery to market size is 90 days. In a month, 320 saleable size fishes can be produced from one pair of clown fish. Each fish can be sold at a rate of Rs.100.

The first six months of operation will be construction and set up of the building, procurement of equipment and collection and maintenance of brooders. The first spawning is expected in seventh month of first year. The sale of the fishes will start from tenth month onwards.

➤ **Economic performance through marine ornamental fish production**

	1 <sup>st</sup> Year(Rs.)	2 <sup>nd</sup> Year(Rs.)	3 <sup>rd</sup> Year (Rs.)
<b>Revenue</b>			
Sale of clownfish fingerlings			
@ Rs.100/ fingerlings(320 juveniles x			
4 pair x2 month=2,560 numbers	2,56,000	-	-
2,560x Rs 100 = Rs. 2,56,000)			
Sale of clownfish fingerlings @			
Rs. 100 / fingerlings (320 juveniles x			
4 pair x12 month=15,360 numbers	-	15,36,000	15,36,000
15,360 x Rs 100 = Rs. 15,36,000)			
Subsidy (50% on capital investment)	2,50,000	-	-
<b>TOTAL (Rs.)</b>	<b>5,06,000</b>	<b>15,36,000</b>	<b>15,36,000</b>
<b>Non-operational cost (Rs.)</b>			
a. Depreciation (20%)	1,00,000	50,000	50,000
b. Interest rate on capital investment			
@12%	60,000	30,000	30,000
<b>Operating cost (Rs.)</b>	<b>1,99,500</b>	<b>2,24,500</b>	<b>2,26,500</b>
<b>TOTAL EXPENSES (Rs.)</b>	<b>3,59,500</b>	<b>3,04,500</b>	<b>3,06,500</b>
<b>PROFIT (Rs.)</b>	<b>1,46,500</b>	<b>12,31,500</b>	<b>12,29,500</b>

• **Economics for only grow-out of marine ornamental fishes**

Few fishermen groups are carrying out only grow-out of marine ornamental fishes. They buy half-inch size clown fishes and grow them up to 1 ½ inch size in 45 days and market them. The income and expenditure for such activity is mentioned below :

➤ **Fixed cost**

<b>Capital Investment items</b>	<b>Quantum</b>	<b>Cost in Rs.</b>
Temporary Shed	42m <sup>2</sup> (6 x 7m)	27,000
Nursery and grow out (Glass tank)	6	10,500
Water storage tank (500 liters)	1	07,000
Sand filter/ Over head tank	1	03,000
80w submersible pump	1	15,000
Ozonizer	1	03,000
Air pumps (55 w)	1	03,500
Motor pump	1	05,000
Power installation		10,000
PVC piping, plastic wares (water supply/aeration/drainage)		07,000
Netting, miscellaneous etc.		05,000
<b>TOTAL COST</b>		<b>96,000</b>

➤ **Operating cost**

<b>Items</b>	<b>1<sup>st</sup> Year(Rs.)</b>	<b>2<sup>nd</sup> Year(Rs.)</b>	<b>3<sup>rd</sup> Year (Rs.)</b>
1. Seed	80,000	80,000	80,000
2. Feeds	03,000	03,000	03,000
3. Electricity	12,000	12,000	12,000
4. Maintenance	05,000	05,000	05,000
5. Miscellaneous expenditures	02,000	02,000	02,000
<b>6. Total</b>	<b>1,02,000</b>	<b>1,02,000</b>	<b>1,02,000</b>

➤ **Economic performance through marine ornamental fish production**

	<b>Amount in Rs.</b>		
	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b>	<b>3<sup>rd</sup> Year</b>
<b>Revenue</b>			
Sale of clownfish fingerlings @ Rs.120/fingerlings (1900 juveniles x 120 = 2,28,000)	2,28,000	2,28,000	2,28,000
<b>Non-operating expenses</b>			
a. Depreciation (20%)	19,200	19,200	19,200
<b>b. Interest rate on capital investment @12%</b>	11,520	11,520	11,520
<b>Operating cost</b>	1,02,000	1,02,000	1,02,000
<b>TOTAL EXPENSES</b>	1,32,720	1,32,720	1,32,720
<b>Profit</b>	<b>95,280</b>	<b>95,280</b>	<b>95,280</b>



