

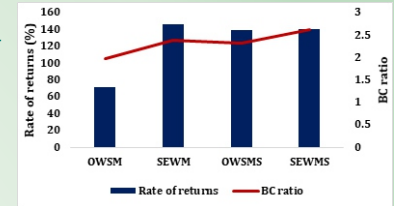
## DEVELOPMENT OF LOW-COST CAPTURE BASED MULTISPECIES CAGE CULTURE SYSTEM FOR COASTAL REGION OF GOA

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### PROBLEM AND RESEARCH GAP

The state of Goa has huge potential for development of cage culture of fish in the underutilized water bodies such as semi-enclosed brackishwater systems (SEWMS) (locally known as “Manas”). These systems maintain a regular connection with main estuarine channel through a sluice gate. The total surface area of SEWMS in Goa is estimates at 8,000 ha and about 30% of area can be utilized for establishment of

SEWMS. There are several types of cage culture systems established along the coastal region of India. The novelty of the SEWMS is the use of multi-species including fish (red snapper, pearlspot) and shellfish (green mussel). The standardization of the system included size of fish/shellfish seed, material used and dimensions for the cage, stocking density, feeding, specifications for mussel ropes (rope size and length, spacing between the ropes, seeding rate) and culture period.



### PARTICULARS AND SALIENT FINDINGS

A standardized methodology was developed for multi-species cage culture of fish in combination with shellfish culture for the SEWMS of Goa in order to improve the fish productivity and income for the fishermen/women. The finfishes such as red snapper (*Lutjanus argentimaculatus*) and pearlspot (*Etroplus suratensis*) were cultured in combination with a shellfish species- Green mussel, *Perna viridis* for a period of eight months. The seeds were procured from wild, which were caught as a by-catch during the bag net fishing near sluice gates. The seeds of red snapper (100-200 mm) and pearlspot (40-50 mm) were separately stocked in nylon cages (specifications; thickness: 1.2 mm, mesh size: 20 mm, size: 2 m × 1.5 m × 2 m) positioned using bamboo poles (numbers: 10, size: 3 m, thickness: 22.5 cm in diameter). Mussel seeds (size: 30-32 mm) were stocked in stitched cotton bags (thickness: 2 mm, size: 1m x 0.3m) with nylon rope (thickness: 2.5 cm in diameter; length: 1 m) @ stocking rate of 1 kg per bag and bags were hung from the bamboo poles kept at a distance of 45 cm between rope. The feeding protocol was followed for red snapper only and the by-catch from the bag nets and gillnets such as ghost crabs, forage fish, and molluscs was chopped and fed@ 5-8% of fish biomass. The pearlspot utilised the periphyton developed on the split bamboo pieces (60 pieces per cage) kept inside the cages. Mussels utilised the phytoplankton available in the water column through filter-feeding. The detailed information on the stocking and returns are provided in the following table (for an area of 500 m<sup>2</sup>). The annual fixed cost, operating cost and total returns from the SEWMS were Rs. 10730, Rs. 9595 and Rs. 53425 respectively. The net profit (0.33 lakhs), benefit cost ratio (2.63), and rate of return (140.6) for the system was significantly higher when compared to open water system with monoculture (OWSM), semi-enclosed system with monoculture (SEWM) and open water system with multi-species culture (OWSMS).

Particulars	Species 1 (Red snapper)	Species 2 (Pearlspot)	Species 3 (Green mussel)
Number/kg of seeds	100	400	15 kg
Number of cages/ropes	1	2	15 ropes
Survival rate (%)	70	72	70
Average weight (kg)	1.0	0.2	0.03
Total harvest (kg)	70	57.6	73.5
Returns (Rs.)	28000	14400	11025



Low cost capture-based aquaculture system experimented in Goa

### IMPACT

The demonstration of the technology of generated an income of Rs 0.53 lakhs with a production cost of 0.20 lakhs yielding a net profit of 0.33 lakhs. The benefit cost ratio was 2.63 from a single unit of SEWMS in 500 m<sup>2</sup> area. The net income from the farmer's practice (single species cage culture/monoculture with the same input materials) and the SEWMS method was Rs. 16,000 and Rs. 33,000/- respectively from 500 m<sup>2</sup> area. Therefore, the technology has yielded 106.3% higher income when compared to the existing methodology followed by the farmers. The technology has a potential to generate an additional net income of Rs. 79.2 crores from the estuarine waters of the Goa. waters of Goa.

### REFERENCES

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