



Research Article

Socio-economic elevation through open sea cage farming-Evidence from Mandapam region of Tamil Nadu, India

R. Dinesh, S. Boobalan, C. Anand, J. Stephen Sampath Kumar

Abstract

Cage culture guarantees the multiplication of seafood output and revenue generation from a small unit area when compared to significant capital investment oriented onshore farming technologies. The Mandapam Centre for Sustainable Aquaculture (MCESA) of Tamil Nadu Dr. J. Jayalalithaa Fisheries University (TNJFU) through the cage culture demonstration as part of the NFDB-funded project 'Open Sea Cage Culture of Marine Finfishes along the Coast of Ramanathapuram District in Tamil Nadu' is continuously involved in disseminating this valuable technology which provides higher yield and income to meet the alternative livelihood needs and to uplift the socio-economic conditions of the coastal fisherfolk in Ramanathapuram District, Tamil Nadu. Case studies were undertaken in the region to assess the impact of MCESA and a success story of Mr. V. Nagadas, one of the NFDB scheme beneficiaries is shared here who has implemented the cage culture of lobster and earned a total profit of 280000 INR. The farmer's success and the MCESA's technical guidance and support are now inspiring other fishermen to adopt the farming.

Keywords adoption, cage culture, demonstration, lobster, success story

Introduction

On the global market, as well as in our country's local market, there is an unabated need for spiny lobsters, and their extraction from our country's natural resources is increasing all the time. Spiny lobsters in live state sell for 5 to 7 times more than spiny lobsters in frozen condition on the international market. The price of live lobster in the domestic market ranged from a minimum of Rs.500 per kilogram to a maximum of Rs.2000 per kilogram [1]. They are tolerant of varying environmental conditions, adaptable to captive circumstances, and readily available in close shore waters. Owing to the declining seafood resource status, increasing demand, and high prices in both the domestic and international markets, cage aquaculture of spiny lobsters in India is a relatively new development that began in 2007 [2]. As a result, cage farming of lobster is a comparably better alternative source of income for marine fishermen families to supplement their income.

On a worldwide scale, the amount of food produced by the sea has been steadily declining in recent years. The fish catch or harvest from marine capture fisheries in Tamil Nadu's Palk Bay and Gulf of Mannar regions has been stagnant over the past few years, according to Johnson et al. [3]. The implementation of fishing holidays is a major management approach that is being implemented all over the world in order to solve the issue of dwindling

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Figure 1. Successful harvest of Spiny Lobster

capture fishing stocks [4]. Taking advantage of this circumstance, the Mandapam Centre for Sustainable Aquaculture (MCeSA) has been promoting open sea cage culture as a feasible livelihood choice for local fishermen. In response to the efforts of the Centre, cage farming is being implemented in the Ramanathapuram District with the assistance of National Fisheries Development Board (NFDB) funded project 'Open Sea Cage Culture of Marine Finfishes along the Coast of Ramanathapuram District in Tamil Nadu'. Therefore, an evaluation of sea cage farming of lobster was done to examine the economic viability of the operation in impacting the lives of fishermen.

Methodology

The case study was conducted with a fisherman, one of the beneficiaries of the NFDB-funded cage culture project involved in open sea cage farming at Seeniappa Dargha coast, Ramanathapuram, Tamil Nadu in 2021. This case study was purposefully chosen for the study due to its exceptional success. Data collection and validation were done through personal interviews and field observation methods [5].

Results and Discussion

Mr. V. Nagadas is one of the fishermen involved in cage farming under MCeSA's guidance. The 53 year old fisherman lives with his wife, 30 year old daughter, and 20 year old son in Vedhalai Panchayat, Ramanathapuram District, Tamil Nadu. His educational level is primary and he is from the Most Backward Class (MBC) category. He has a single FRP boat but is interested in mariculture methods such as culture of high value marine finfishes and lobsters. In 2017, he participated enthusiastically in a training programme organised by MCeSA as part of the NFDB cage culture project. Following his participation, he opted to pursue cage culture of lobster which then became a source of income for his family and helped him improve his economic status.

The Centre provided him a HDPE cage, inner and outer nets, anchor, rope and light. The spiny lobster, *Panulirus homarus* (Linnaeus, 1758) juveniles (body weight ≤ 100 g @ Rs.800/kg) were procured from the traders of Pamban and Rameshwaram coast by the fisherman. A total of 920 lobster juveniles (average weight of 63.2 ± 7.2 g per individual) were stocked in the cage in two phases. In the 1st phase, 750 animals were stocked between July to September 2020 while 170 animals were stocked between October to November 2020 in the 2nd phase. The Assistant professors and technical employees of the centre supplied all technical services from the day of stocking until the day of harvest (net exchange, feeding, growth sampling, and lobster health monitoring).

Lobster cage culture was conducted in a circular floating sea cage with a diameter of 6 m and a depth of 4 m and a circular frame built of HDPE pipes for floatation. A catwalk railing was installed on the cage. The entire cage was balanced and secured to the mooring chain using ballast and ropes to withstand



and absorb underwater pressure, particularly from winds and currents. The cage's overall effective volume was 113 m³. The inner and outer predator nets had mesh sizes of 20 mm and 80 mm, respectively. After four months, the inner net was replaced to prevent net fouling. Seeds were stocked at a density of 8 nos / m³. The lobsters were fed chopped sardines (Family: Clupeidae) daily at a rate of 8% of body weight for the first month of rearing and then dropped to 5% of body weight for the remaining culture period. The period of culture lasted eight months. The water from the cage site had an average temperature of 28° C to 30° C and a salinity of 28 to 32 ppt. After eight months of culture, the lobsters achieved an average weight of 185.7 ± 21.2 g per individual, with an 81.5% survival rate. Mr. V. Nagadas benefited Rs.280000 from a total harvest of 140 kg of Spiny lobster from the cages. He found a number of difficulties associated with marine cage farming operations, including the presence of cyclones and storms, a scarcity of quality trash fish and an insufficient fish storage facility. Successful harvest of Spiny Lobster is shown in figure 1.

Conclusion

Spiny lobster cage farming successfully conducted by Mr. V. Nagadas at Seeniappa Dargha, Mandapam, Ramanathapuram shown that marine cage farming, namely lobster farming, can significantly improve the livelihood and socio-economic position of the coastal people. The region's organisations preferred lobster farming over other marine finfish farming due to the lucrative income and benefits it delivers. Unfortunately, captive lobster breeding and seed production are still in their infancy in India, increasing pressure and reliance on capture fisheries and wild collection.

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