

Extended Abstract

Cage Farming Headed For Equal Opportunity In Aquaculture Development In Kerala, India

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Introduction and Rationale

Kerala, on the southwest coast of peninsular India, has a long coastline, interconnected to backwaters and brackishwater resources with extensive areas available for farming but only moderate current use for cultivation. Pizhala is an island near Kochi, the largest city of Kerala, surrounded by the Periyar River. Pizhalais is in the central part of the Kadamakkudy Grama Panchayat (village council) of Ernakulam District. Here, pokkali (salt-tolerant) rice cultivation in water-logged fields and shrimp farming are the major activities. Kudumba Three self-help groups of women actively participate in these economic activities. Of the 20,000 total population of the Panchayat, women constitute 51 % and have a literacy rate of 81 %. Women's involvement in the fisheries value chain is minimal and mostly concentrated in fresh and dried fish trading.

With the objectives of ensuring equal opportunity in aquaculture and providing supplementary income to families, the present activity of cage culture of finfishes was established by the Indian Council of Agricultural Research (ICAR)-Central Marine Fisheries Research Institute (CMFRI) at Pizhala. The activity was conducted in a participatory mode and involved only women.

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Materials and Methods

The study was conducted in the Pizhala area of Kadamakudy Panchayat in Ernakulam district, Kerala, India. ICAR-CMFRI, KrishiVigyan Kendra (Ernakulam) and the Kerala State Fisheries Department disseminated several technologies in the village, which is predominantly an area where the activities of capture fishermen dominate. Before any farming intervention in the village, the women were trained in cage farming, along with men and youth of the village, through an awareness-raising programme carried out in the village itself.

For the present study, women were selected based on their proximity to the farming site, and the fishery related activities in which they were involved. Women fish traders, Anitha and Latha, were chosen for cage farming demonstrations in a participatory mode, wherein, inputs like net or cages were provided by CMFRI and other inputs like seed, feed etc were met by the farmers. Though the women were chosen at random, both were very receptive and ready to adopt cage farming by following the strict technical advice of the research team. This also was a reason in choosing them for the study. Both women were older than fifty, belonged to the fishing community and had been trading dry fish for the past decade with financial assistance from local government organizations/societies. Both of them had two college-going children. Even though both were married, the income of their husbands, who were daily wage earners, could not meet the entire family expenses. However, the women's income from fish trading, when added to the men's income, was only just sufficient to meet the daily needs of the family. The education of children and additional expenses were met by procuring loans from local agents. The two women were provided with cage nets to start cage farming. They met all other expenditures. All technical inputs were provided by CMFRI in the course of regular visits and sample collections from the farms.

The farming was carried out during 2015-16 for a period of 6 months. Two galvanized iron (GI) cages were used, each measuring 4 x 4 m and net depth of 2.5 m with 19 mm mesh HDPE net. Each cage had two nets, an inner and an outer. Each cage was suspended 50 cm off the bottom of the river. The cages were provided with a 60 mm cover net to prevent bird predation. Within the cages, a 30cm high fine mesh polyethylene net was fixed to retain floating

pellets while feeding. A wooden walkway that connected the cage to the shore made feeding and monitoring simple. Each cage was stocked with 2,000 pearl spot (*Etroplus suratensis*) at 50 fish.m³. The fish were fed using commercial floating pellets (32 % crude protein, Godrej Co., Ltd.).

Since women from two families were only involved in the farming, a structured questionnaire was not used, but phased information was collected by interviews. The measures of women's empowerment used for the study were: the women's decision making ability within the family, spending ability, social participation, access to assets, and access to resources. For measuring the women's decision-making ability within a family and spending ability, the women were asked about the education of children, family health issues, giving loans to others, homestead repairs, purchase of new electronic gadgets, mobile phones, furniture, daily family household expenditure and festival and entertainment expenditure. Social participation included social and community activities, participation in social functions such as marriage, helping neighbors in need, working with people in any situation, participation in panchayat programs pertaining to the village, attitude towards societal activities, and casting votes in local and national elections. Access to assets and resources included access to a bank (own bank account), access to institutional credit, ability to contact public services (health, nutrition, farming etc.), access to national and state fisheries departments and access to farm management and budgeting etc.

Results

Gross yield of pearl spot was 280 kg cage⁻¹, which was very encouraging. The economics was also feasible for social acceptance. The farm gate price received was Rs.500 kg⁻¹. The total revenue obtained was about Rs.1,80,000/-.

As well as production and income, this study has shown that women gained knowledge in the management of cage farms, e.g., for seed procurement, nursery rearing of fish seed, feed scheduling, feeding, cage maintenance, and marketing. Women became directly involved in the fabrication of cages and their maintenance, procuring good quality fish seed, and stocking. They also sold the fish on their own, achieving a profit in terms of money, and due to the

quality of the product. The women sold their produce directly at the farm-gate and in local markets to eliminate the middlemen. All these factors were attributed to the women, although having little education, being empowered in a rural society typically dominated by men. The women with their long years of experience in fish trading were able to sell their produce at a premium price in local markets due to the high quality of the product. Anitha went directly to the market to sell her produce, while Latha was supported by her husband in selling her fish. However, both women received physical and moral support from their family members, especially their husbands. The present results are based on a single crop only, but the women are continuing cage farming with more financial investments in the next cycle. New cages were also installed by both women.

The five empowerment variables had significant positive relationships with the women's sense of empowerment through participation in the cage culture program of CMFRI. Furthermore, apparently important variables such as education, family size, previous experience in aquaculture and family annual income did not show any significant relationship with these women's empowerment.

Discussion and Conclusions

With the involvement of women in cage farming activities, the village may have opened up a better avenue for the development of aquaculture as well as social upliftment and equal opportunity. In nearby areas to this activity, empowerment of women through cage culture with pearl spot, GIFT tilapia (*Oreochromis niloticus* (Linnaeus, 1758)) and red snapper (*Lutjanus argentimaculatus* (Forsskål 1775)) was earlier reported by Joseph et al. (2016), and for pearl spot cage culture by Kappen et al. (2016).

Other activities involving women in cage culture in Kerala (Kappen et al. 2016; Joseph et al. 2016) showed that, once involved in cage farming, women were ready to expand cage farming further with their own efforts and expenditure (personal experience). In addition, it has been observed in this study that the decision making power of the women was remarkably improved because of the enhanced income the families could achieve through cage farming. In this study it was observed that, the education of the children of the

women farmers has been aimed at higher levels. The elder son of Anitha was pursuing an engineering degree while living in a hostel near the college, and younger children were sent for extra tuition in difficult subjects. Also, house repairs were taken care, such as repairing leaking walls after years of neglect, and renewing electric wiring.

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