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Crab Fattening: A Livelihood Option for the Coastal Women Self Help Groups

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Aquaculture offers one of the best livelihood options for women especially in coastal areas. Crab fattening has emerged as a brackish water aquaculture alternative which has potential for a possible livelihood for the coastal women, due to the relative ease of culture techniques and reasonably good profit margin. A project sponsored by Dept. of Science and Technology was undertaken by Central Institute of Brackishwater Aquaculture (CIBA), Chennai at selected coastal villages of Tiruvalluvar and Kancheepuram districts of Tamil Nadu to demonstrate the efficiency of 'CIBA crab pellet feed' and the viability of crab fattening as an alternative livelihood for coastal fisherfolk. Two floating cages of 1m x 1m x 30 cm with 6 compartments each were used at the above project sites for crab fattening demonstration. Each cage was stocked with six water crabs. The crabs were fed with trash fish and 'CIBA crab pellet feed'. The pelleted feed was accepted very well by the crabs. There was an increase in the weight of the crabs by 9 to 10%. The community-based crab fattening project implemented for alternative livelihood purpose especially for coastal women Self Help Groups, has proved to be a great success not only in terms of generating extra income but also in creating an awareness among fisher folk about the value of brackishwater resources and the need for conservation and its sustainable utilization.

Key words: Crab fattening, crab feed, women self help groups, diversified livelihood options

The mud crabs **Scylla tranquebarica** and **Scylla serrata** are the most popular brackish water crab species available in India. At present, mud crabs are cultured in traditional shrimp culture fields in the states of West Bengal, Kerala, Karnataka and Tamil Nadu with a reported production of 10 – 35 kg/ha/yr. Since hatchery technology has been developed, it is possible to culture them on commercial scale, like shrimp farming. About 2 00 000 estuarine fishermen could be gainfully rehabilitated by the successful adoption of mud crab culture (Bensam, 1986). With the available potential area of 1.2 million ha of brackish water in India, the grow-out process of mud crabs would be enormous and it is possible for India to emerge as a major exporter of mud crabs in the world.

In India, crab juveniles or baby crabs are collected from natural resources and cultured on a small scale in earthen ponds with fencing. They are stocked @ 1-2 numbers /m^2 and fed with natural feed materials. Mud crabs are also cultured along with milkfish and grey mullets in some coastal regions of Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal. Besides culture, fattening of post-molted mud crabs called soft crabs are also practiced in earthen ponds and cages (Kathirvel **et al**., 2004).

In India, mud crabs are utilized for local consumption and also exported in the form of frozen and canned meat. Recently, the export of live mud crab has gained importance. To meet the ever increasing demand for live mud crabs, those collected from wild are being cultured or fattened on a small scale in the maritime states of India. Crab fattening has become very popular throughout the Asian countries due to increasing demand for gravid females and large sized hard - shell crabs in seafood restaurants. The relative ease of culture techniques, reasonably good profit margin and familiarity of coastal communities with this species, have

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made crab fattening a possible livelihood for the coastal women (Kathirvel **et al**., 2004). Crabs were considered as a menace in prawn farms and are now found to be alternative species due to set backs in shrimp farming (Kathirvel **et al**., 2001).

Crab fattening is essentially a holding operation during which, soft crabs are kept for a short period of 3 to 4 weeks until they 'flesh out' or immature female crabs are held until their gonads develop and fill the mantle cavity. The fattening just make the molted crab shell harden. During this period, the soft crabs are fed with natural feeds like trash fish, clam meat, and animal waste from butcher's shop in fresh condition. Once the shell becomes hard, they are harvested and sold in live condition for export and also for domestic market (Kathirvel **et al**., 2001).

In Vellapatti near Tuticorin, the southern part of India, a community based crab fattening project of Self Help Groups (SHGs) has been implemented as an alternative livelihood especially for women fisher folk. It was proved to be a great success not only in terms of generating extra income to the SHGs but also in creating awareness among fisher folk about the value of the resources and sustainable utilization (Patterson & Samuel, 2005).

This communication presents the results of a study carried out with the objectives of mobilizing women through group formation for effective utilization of crab fattening techniques with hands-on training, to evaluate the impact of training/ demonstrations using various socio metric tools and to evaluate the feasibility of the crab fattening programme.

Materials and Methods

One hundred women from the Women Self Help Groups (WSHG) of Tiruvallur district and Kancheepuram district were identified for the programme. Of these hundred beneficiaries, fifty were selected from Allambarai Kuppam (village), Kadapakkam of Kancheepuram district. Ten beneficiaries belonged to Kattur village and forty were from Thonirevu village, Tiruvallur district of Tamilnadu state, India.

Three demonstration programmes on 'Crab fattening' were organized among the WSHG beneficiaries during the month of March 2008 at the three selected villages, Allambarai Kuppam, Kattur and Thonirevu. The programme was demonstrated to the beneficiaries as a livelihood occupation for income generation.

Floating cages of 1m x 1m x 30 cm depth with 6 compartments each were used at the above project sites for crab fattening demonstration. At each project site, two floating cages were installed. Water crabs purchased from the local markets were stocked in the cages. Each cage with six compartments was stocked with six soft crabs, one in each compartment weighing 567 to 950g. One cage was kept as control and crabs were fed with trash fish feed @ 10% of body weight while in the other cage, the crabs were fed with formulated pellet feed developed by CIBA, (hereafter referred to as 'CIBA crab pellet feed) @ 3% of body weight. CIBA crab pellet feed, used in the present study had 38.8% protein and 6.1% of extract consisting of trash fish, mantis shrimp, shrimp meal, soybean meal, fish oil and other additives (Ali **et al.,** 2008). Total quantity of feed was given in two equally divided doses in the morning at 8 am and evening at 4 pm. The feed intake was monitored daily and the left over feed if any was removed before the next feeding. The cages were cleaned and monitored daily. The weight gained by the crabs was monitored in all the cages. The duration of fattening period was 20 to 24 days.

To assess the acceptance of the technology of crab fattening as a livelihood option among the beneficiaries of the project, the responses of the beneficiaries were elicited by way of standard ranked responses. Seven major factors were listed in respect of the management strategies for coastal resource management to which the beneficiaries responded, ranking each of the factors as very good, good and average.

Results and Discussion

Comparative analysis of crab fattening using trash fish feed and CIBA crab pellet

feed is presented in Table 1. The initial total weight of six crabs stocked in the trash fish feed trial cage at Thonirevu village was 4120 g and when harvested it was 4495 g. The initial weight of six crabs stocked in the CIBA crab feed trial was 4415g and when harvested it was 4835 g. At Kattur, Tiruvallur District the initial weight of six crabs stocked in the trash fish feed trial cage, was 3400 g and while harvested it was 3705 g. The total weight of six crabs stocked in 'CIBA crab feed trial' cage was 4630 g and the harvested weight was 5075 g. On an average there was an increase of 9.1 to 9.7 % in the crab weight stocked for fattening with fresh feed and CIBA Crab feed. The comparative analysis of crab fattening using trash fish feed and CIBA crab feed shows that the weight gain was as per standard expectation of 10% of the body weight of each crab (Ali **et al.,** 2008). Crabs in floating cages both under the Trash fish feed trial and CIBA crab feed trial were hardened in about 20 to 24 days. The pellet feed was accepted very well and the crabs consumed upto 3% of the bodyweight in the CIBA crab feed trial cages.

Among the 100 women beneficiaries, 51% belonged to the age group of 25 to 60 years. Sixty five percentage of the beneficiaries had primary school education. Eighty percentage of the beneficiaries belonged to nuclear families. It was found that, 28% of the beneficiaries was engaged in fish marketing, which was taken up as their primary occupation. Eighty three percent of the respondents were married women. The data show that 97% of the beneficiaries resided in terraced houses (constructed under the Tsunami rehabilitation programme) and the remaining 3% resided in thatched houses. Ninety percent of the respondents belonged to Hindu religion. Fifty respondents belonged to the most backward classes and 47 belonged to schedule caste and 3 belonged to schedule tribes. Forty two percentage of the women had a monthly income between Rs.2000/- and Rs.3000/-, 39 % had monthly income between Rs.1000/- and Rs.2000/-, 10% of the respondents had income between Rs.3000/- and Rs.4000/- per month and 9% had monthly income above Rs.4000/-. The costs and returns of the livelihood demonstration of crab fattening conducted in the three sites **viz.,** at Kadapakkam of Kancheepuram District and Thonirevu and Kattur of Thiruvallur District are given in Table 2. Soft shelled crabs used for the demonstration was purchased @ Rs.150/kg. The WSHGs sold the hardened crabs at Rs.330/kg, enabling them to earn a total amount of Rs. 822/-, 934 and 979 at Kattur, Thonirevu and Kadapakkam villages respectively in a period of 21-24 days.

During the crab fattening demonstration, assessment of resource management among the WSHGs in all the three sites was carried out and the results are depicted in Table 2. This exercise gives the extent of evolution of coastal resource management strategies during the transfer of this livelihood option of crab fattening. The levels of community based participation of the stakeholders were good across all the sites. While power sharing in terms of delegation of

Table 1. Comparative analysis of crab fattening using Trashfish feed and CIBA crab pellet feed (Unit Analysis)

Factors	Thonirevu Village		Kattur Village		Kadapakkam Village	
	Trash fish feed trial	CIBA crab pellet feed trial	Trash fish feed trial	CIBA crab pellet feed trial	Trash fish feed trial	CIBA crab pellet feed trial
Average initial weight of soft crabs (g)	687	736	567	647	633	772
Average final weight of hardened crab (g)	749	806	618	709	691	846
Average weight gain/crab (g)	62	70	51	62	58	74

Table 2. Coastal resource management in north Tamilnadu through crab fattening as a livelihood option

Factors	Thonirevu Village	Kadapakkam Village	Kattur Village
Coastal Resource Management Strategy	☻	☻	☻
Community based participation of shareholders	☻	☻	☻
Co-management			
Power sharing among participants	☻	♣	♣
Technology and Institutional support	☻	♣	♣
Community empowerment			
Community organization (leadership, values, skills)	☻	☻	☻
Training and education (ecology, indigenous knowledge)	▼	☻	☻
Resource control and equity	▼	♣	▼
Alternative livelihood	▼	♣	▼
External funding / Development Project catalyst	▼	♣	▼
Role of science in policy making	☻	☻	☻

♣ Very Good - ☻ Good - ▼ - Average

responsibilities and co-management for seeking technology support was very good in Kadapakkam and Kattur, it was good in Thonirevu. Most of the beneficiaries of the project at Kadapakkam having alternative sources of income were conscious of external funding agencies and were aware of livelihood project as a catalyst to development. This phenomenon was less in the other two sites. There was good understanding that science had a major role to play in the enhancement of their employment and income generating activities.

The community-based crab fattening project of the coastal women SHGs has proved to generate extra income to the family through the SHGs. The Thonirevu, Kattur and Allambari Kuppam fishing villages have become a role model for the establishment of similar projects in other fishing villages along the east coast of India.

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