

Socio-economic profile and problems of mud-crab farmers of South 24-Parganas, West Bengal: an explorative study

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ABSTRACT

Aquaculture of the mud crab has been practised for the past 100 years in China and for the past 30 years throughout Asia. Almost all crab aquaculture production relies on wild-caught stock, as larval rearing has not yet reached a commercially viable level for stocking into aquaculture farms. Crab meat is virtually cent per cent fat-free, rich in protein and offers no carbohydrates. According to dieticians, crab meat fits in perfectly with the new dietary guidelines, which suggest high-protein foods that are lean and either low-fat or fat free. In India aquaculture has emerged as an important farming activity transforming aquaculture from a traditional livelihood-support rural activity to a profit oriented production system. It could be able to improve the livelihood of the fishers as well as ensuring nutritional security. Keeping in view the facts the present study was designed with the following specific objectives, i.e., to study the socio-economic profile of the crab farmers, to study the present status of the crab farmers and to study the constraints encountered in crab farming. The present study was conducted in randomly selected three villages of Gosaba block in South 24-Parganas district of West Bengal as it has the highest crab farmer concentration. Three villages from the Lahiripur Gram Panchayat area of Gosaba block were selected by simple random sampling technique. A total of 120 crab farmers were listed out from the said locale and out of them, 60 crab farmer, those who are presently involved in crab farming were selected for this study. The findings of the study showed that 84% of respondents belonged to rural areas and their age varied from 17-60 years, in which majority (46.67 %) were in middle aged (26-50 years) category. Out of the total number of respondents, 70% were male and rest 30% female. Majority of the respondents were having the educational qualification up to high school level. 68.33 % respondents belonged to Scheduled Caste followed by General category and Scheduled Tribe. Majority (81.67%) of the respondents were having land access to less than 10 cottah and owned medium sized (4-8 Katha) water bodies. About 58.33 % of respondents belonged to Above Poverty Level (APL) category followed by 41.67 % Below Poverty Level (BPL) category. Most of the respondents (93.33%) preferred their fellow friends as a reliable source of information, followed by Radio (88.33%), Relatives (78.33%) and Fishery Extension Officers (FEOs) (35%). Majority of the respondents (61.67%) practised intensive crab culture technique and 83.33 % preferred the November-February duration as an ideal time for crab farming with seeds collected from the wild (68.33%) i.e. from swamps and derelict water bodies. It was conspicuous from the present study that majority of the respondents used trash *Puntias sp.* as supplementary feed. As far as the disease outbreak in crab farming was concerned, 35% of respondents reported that crabs suffered from ulcer on carapace and necrosis of appendages and they used lime and $KMnO_4$ to get rid of these diseases. Lack of crab seeds emerged as prime constraint followed by marketing problem, transport problem, credit problem and problems related to diseases.

Keywords : Fishery, mud crab, nutrition, sustainability

Crab is being associated with mankind from the ancient time. It is believed that a group of stars which forms a figure of crab called 'cancer' effects man's fortune. According to Greek mythology, the crab crushed by Hercules when it pinched his toes in during a contest with Hydra. He became angry and threw the crab on the sky. That makes the star sign of 'cancer'. Aquaculture of the mud crab has been practised for the past 100 years in China (Yalin and Qingsheng, 1994) and for the past 30 years throughout Asia. In Japan, sea-ranching of hatchery reared mud crab seed has been employed but seed production has not been proved reliable (Shokita *et al.*, 1991). Almost all crab aquaculture production relies on wild-caught stock, as larval rearing has not yet been reached a commercially viable level for stocking into aquaculture farms. Due to

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its great taste, it also gets access to the kitchen of restaurant to households. Now-a-days restaurants attract its clients with giant crabs. It has also a good export potentiality. Crab meat is virtually cent percent fat-free, rich in protein and offers no carbohydrates and perfect complement to any healthy lifestyle. According to dieticians crab meat fits in perfectly with the new dietary guidelines, which suggest high-protein foods that are lean and either low-fat or fat free. Straight from the refrigerator to the table, crab meat can be part of a healthy diet in many ways because of its mildly sweet, delicate flavour and smooth texture. crab meat is a creative "topping" for proteins such as steak, chicken breast or fish, or it can be served as a centre of the late items. In addition to its versatility, processed crab meat is produced at the height of freshness and has a shelf life of one year.

Fishery turns itself to a profitable business due to increasing innovations and modern technology. In spite of that crab farming in West Bengal has always been kept in the dark. In the recent years, there is a rapid growth of crab markets in West Bengal. The coastal and estuarine waters of West Bengal give a large amount of crabs which can be exported. But the crab fishery in West Bengal moving towards the intensive farming from the traditional practices. The crab farmers face the problems of the entire world as well as the some specific problems of that area. Crabs are generally cultured in three districts of West Bengal namely, North 24 Parganas, South 24 Parganas, Purba Medinipur as these three districts have brackish water resources. Brackish water is essential for culture of mud crab (*Scylla serrata*). Based on the outcomes of pilot study, It was found that among the three districts, South 24 Parganas has the highest concentration of crab farmers. Keeping in view the facts, the present study was designed with the following specific objectives, *i.e.*, to study the socio-economic profile of the crab farmers, to study the present status of the crab farmers and to study the constraints encountered in crab farming.

MATERIALS AND METHODS

The present study was conducted in South 24 Parganas district of West Bengal. It is one of the largest districts having a population of 69, 06,689, of which 58, 20,469 (84%) belongs to rural areas. Being a coastal district, majority of its rural population earn their livelihood from fisheries. Below Poverty Level (BPL) families constitute 37.21% of the total population of the district. To conduct the study scientifically, a suitable research design was evolved in order to arrive at an authentic conclusion. Out of 29 blocks of South 24 Parganas district, Gosaba block was purposively selected as the maximum number of crab farmers were living in this block as well as a good number of traders and exporters were engaged in successful running of crab fishery in this block.

Out of 14 Gram Panchayats in the Gosaba block, Lahiripur Gram Panchayat was selected purposively as this Gram Panchayat has the highest concentration of crab farmers. Out of 10 villages in the Lahiripur Gram Panchayat, three villages namely, Lahiripur, Chargheri and Parasmoni were selected by systematic random sampling without replacement technique. Thus the total of 60 crab farmers were selected from these three villages for the present study. Socio-economic and marketing methods were measured with the help of

standard extension tools and techniques. Appropriate statistical measures like parametric, non-parametric and descriptive statistical tests were done to interpret the data (Ghosh *et al.*, 2013).

RESULTS AND DISCUSSION

Socio-economic condition of crab farmers

Results of this study indicated that the majority of crab farmers (84%) belonged to rural areas having the age group of 26-50 years. Out of the total number of respondents, 70% were male and rest 30% were female. Males were dominating the crab fishery but a large numbers of female also engaged in this vocation. In a study, Mukherjee *et al.* (2015) stated that women's participation in income generation activities are of the greatest impact. Females generally helped in feeding of crabs as the male went for agricultural work. So, it is clear that the other members of the family actively participated in crab fishery. The majority of the crab farmers belonged to a family having family size of 5-8 members. Similar findings have been reported by Nandi and Paramanik (1993). The majority crab farmers were having middle level of education. Only one respondent (1.67%) reported illiterate. The present study also revealed that only 3.33 per cent respondents had higher secondary level of education which is in contrary with the findings of Nandi and Paramanik (1993). The findings of the research study showed that the maximum respondents (68.33 %) belonged to scheduled castes. Nandi and Paramanik (1993) also reported the similar findings. According to the results of this study, all the crab farmers belonged to the Hindu religion which differs from the findings of Nandi and Paramanik (1993), but agrees with the findings of Khan and Alain (1991). The results of the present study revealed that 58.33 % respondents belonged to Above Poverty Level (APL) category followed by 41.67 % BPL category. Majority (81.67%) of the respondents were having land access to less than 10 Katha and owned medium sized (4-8 Katha) water bodies and the findings are in disagreement with the findings of Khan and Alam (1991). The findings of the study indicated that friends, radio and relatives were the most credible sources of information to the crab farmers. The majority of crab farmers practised intensive culture (67.67%) during the peak season of November to February (83.33%). The crab farmers collected their seeds from seed collectors and middleman. The findings are in consonance with the findings of Bhattachariya (2002), Nandi and Paramanik (1993) and Khan and Alam (1991).

The information about marketing system of crabs

Demand

The study revealed that female crabs had more demand than male in both domestic and overseas market. Male crabs sold in local market in very less price than female. Crabs with broken or lost appendages fetched less price. The price of crab depends on demand and the weight and good shell condition of crabs. Generally, the grading of weight starts from 180 g in case of female and 150 g in case of male.

Marketing channels

Table 1: Distribution of Respondents according to the selling pattern crabs into marketing channels

Category	Frequency	Percentage
Directly selling to the consumer	9	15
Selling to the middleman	48	80
Selling to the exporter	3	5
Total	60	100

Table 1 shows that majority of the crab farmers (80%) sold crabs to middlemen, followed by 15% sold their product to the consumer directly at Gosaba market or Canning market. Whereas, only 5% respondents sold crabs to the exporters. It may be due to the fact that the majority of crab farmers belong to low socio-economic status, so, they can't sell crabs directly to the exporters.

Market value

It was found that the female crabs fetched at Rs. 30-160/- (150 g.) as per their grading or weight. Male crabs fetched at Rs. 20-140/- (180 g.) and all respondents sold both male and female mixed crabs as a part of their business strategy.

It was also conspicuous from the study that due to involvement of middlemen, the crab farmers did not get profit what they deserve, which are in consonance with the research findings of Bhattachariya (2002), Fortes (2003), Nandi and Paramanik (1993), Angel (1991), Khan and Alam (1991) and Cowan (1984). The findings of this study revealed that female crabs fetch more export value than the males (Mazumder, 2006). The price depended on the demand and the weight of crabs irrespective of seasonality. Similar findings are reported by Bhattachariya (2002), Fortes (2003), Nandi and Paramanik (1993), Angel (1991), Khan and Alam (1991) and Cowan (1984).

Problems encountered in crab farming

General problems

As table 2 depicts, lack of crab seeds due to degradation of natural breeding ground of crabs was found to be the greatest problem among all of the crab farmers for undertaking crab farming. Lack of transport system due to less road connectivity was found to be second major constraints to the crab farmers followed by credit problem. Generally, credits are needed for fattening of crabs and as the crab farmers do not have any collateral securities, bank officials are not intended to disburse the loans.

Table 2: Distribution of respondents according to the problems faced in crab farming

Category	Frequency	Percentage	Rank
Lack of crab seeds	60	100	1
Marketing problem	56	93.33	2
Transport problem	45	70	4
Credit problem	52	86.67	3

Disease problems

Table 3: Distribution of Respondents according to the intensity of disease problems faced in crab farming

Category	Frequency	Percentage
Ulcer on carapace	15	25
Necrosis on appendages	9	15
Both Ulcer and necrosis	21	35
No disease outbreaks	15	25

It is evident from the table 3, that as far as the disease outbreak in crab farming was concerned, 35% of respondents reported that crabs suffered from ulcer on carapace and necrosis of appendages and they used lime and $KMnO_4$ to get rid of these diseases (Mazumder, 2006).

The Bay of Bengal Programme (1987) in collaboration with the Department of Fisheries, Thailand initiated a programme on transfer of technology of mud crab fattening and culture to small scale fisher folk in Ranong Province in Southern Thailand. The project was beset with high investment costs, low availability of seed and the reluctance of financial institution to provide funds. Most operations failed due to heavy mortalities resulting from cannibalism and salinity fluctuations.

The crab farmers of Sunderbans are also facing similar problems. But very few research studies were conducted in this direction. However, the results of the present investigation will help fisher extension personnel to know the different activities performed by crab farmers and different problems faced by them. The study will also help in planning, development and fishery extension activities carried out by the different Government and Non-Government agencies in a more meaningful and scientific way.

Implications

1. Upliftment of socio-economic condition of crab farmers and to give them social status in the village are the important aspects for their development. It is urgently needed to give social recognition of crab farmers.
2. Greater emphasis is needed to provide the raw materials like crab seeds and proper marketing channels. For the effective and meaningful economic development of crab farmers, the malpractices of middle men should be minimized.
3. Training should be given to the crab farmers regarding cultural practices and marketing techniques, so that it may help them to take good decision and to improve their knowledge and skills. For proper economic development, need-based training programme should be conducted for the crab farmers where necessary information should be provided on demand on quality of crabs in overseas market.

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