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IMPACTS OF TRAINING AND AQUACULTURE EXTENSION ON LIVELIHOODS OF RURAL FISH FARMERS IN DIFFERENT REGIONS OF BANGLADESH

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Abstract

This study was carried out to assess the impacts of aquaculture technologies training and extension adoption on the fish production and improvement of livelihoods of fish farmers. The research was conducted at five different areas of Bangladesh with 240 farmers. Of them half of the farmers were trained and the rest were non-trained farmers. Among the trained farmers 86 were men and 34 were women. The mean fish production of the trained farmers (7.8 ± 2.2 kg/dec) was significantly higher ($p < 0.01$) fish production than that of the non-trained farmers in the monitoring year (4.9 ± 1.7 kg/dec). There were differences in the fish production between the men and women trained farmers. For trained men farmers the fish production increased from 4.3 ± 1.3 to 8.2 ± 2.1 kg/dec and for women it increased from 3.8 ± 1.2 to 6.8 ± 2.1 kg/dec, respectively. The percentage increment in fish production of trained men farmers were 89 and women were 78 than their baseline year fish production. The outcomes showed that the training and extension support could increase fish production and livelihood significantly than that of the non-trained farmers.

Introduction

In Bangladesh, the total number of ponds are 2.7 millions with an area of 0.37 million ha. About 52.92% of total fish production comes from inland aquaculture[1,2]. Average fish production from pond is 3615 kg/ha[2,3]. Low productivity of fish is related to farmer's lack of awareness, fish culture knowledge, access to finance and less involvement of women participation in the aquaculture activities. Thus support of extension and training to the fish farmers is essential to increase fish production from aquaculture. Aquaculture sector can play a major role in poverty alleviation, employment generation, earning foreign currency and supply of animal protein. The contribution of the sector accounts for 4.92% to the GDP, 5.71% of the total export earning and indirectly employment of approximately 12 million people[4]. Proper development of aquaculture sector can help

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rural development by appreciable increase in the income of rural people. It is estimated that 65% of people are poor and own less than 0.2 ha of land[5]. Thus they need of additional resource base could increase income from limited land. In 2011-2012 the total inland fisheries production was 3.061 million tons and the contribution of the inland fisheries production was 82.26% from the total national fish production[2]. The increasing production trends of inland aquaculture undoubtedly a positive impact for aquaculture development in the country. However, these developments can be ensured by increasing fish production by supporting extension and training to the rural fish farmers in Bangladesh. The objective of the present study was to determine the impact of extension and training on aquaculture extension and livelihood of fisherman in different areas of Bangladesh.

Materials and Methods

A total of 240 farmers were randomly selected from five Upazilas located at Dhaka, Rajshahi, Chittagong, Khulna and Barisal divisions. Fifty per cent of the farmers received training and extension support on aquaculture technologies from Fourth Fisheries Project of the Department of Fisheries (DoF) during 1999 to 2006 and the rest received no training and extension support. Of the 120 trained farmers 86 were male and 34 were female. Number of men and women in non-trained farmers were 80 and 40, respectively. A questionnaire format was prepared to collect the information regarding socio-economic profile, fish production and livelihood in baseline and monitoring year of the selected farmers. The trained farmer's baseline data was collected from the Upazila Fisheries Offices of Rupganj, Shibganj, Muradnagar, Sarsa and Babuganj and the non-trained farmer's baseline data were collected from the selected farmers by the research personnel for the same locations. Baseline data were collected between November, 2004 to February, 2005.

The DFID'S livelihood vulnerability framework used to study the livelihoods of farmers in the context of fish production. The framework consists of five livelihood capital or assets such as human, social, physical, financial and natural[6]. If these livelihood assets increased for a period of time by a single farmer or group of farmers through a vulnerable context than that single or group of farmers livelihood may comments their livelihood as a sustainable livelihood. The livelihood impact studies data were collected through single interview technique by using prepared monitoring questionnaire for one-year fish production cycle from March, 2005 to February, 2006. Both the baseline and monitoring data were then checked for accuracy. Selected trained farmers were given one-day awareness training and a three-day training on small-scale aquaculture management of selected Upazilla during 2000 to 2006 under the Fourth Fisheries Project of DoF.

The raw data were analysed by using one-way analysis of variance (ANOVA) and paired t-test where F values indicated statistical significance ($p < 0.05$). The analyses were performed by using Microsoft Excel and SPSS Version 11.5 softwares[7-9].

Results and Discussion

The average fish production of non-trained farmers from pond in the baseline year was 4.2 ± 1.4 kg/dec and in the monitoring year it was 4.9 ± 1.7 kg/dec (Table 1).. Fish production of non-trained farmer's ponds increase was only 17%. This little increase was due to lack of training and extension support. The average fish production from ponds of trained farmers during monitoring year was 7.8 ± 2.2 kg/dec and non-trained farmers was 4.9 ± 1.7 kg/dec, which is highly significant (Table 1). Ahmed *et al.* showed that by adopting new aquaculture practices in small water bodies, the farmers were able to produce more fish (9.89 kg/dec) than the baseline production (2.2 kg/dec)[10].

Table 1. Annual fish production of trained and non-trained fish farmers in the study areas.

Study year	Fish production (kg/dec)		Difference (kg/dec)	Average (kg/dec)
	Trained	Non-trained		
Baseline year	4.2 (±1.3)	4.2 (±1.4)	0.0	4.2
Monitoring year	7.8 (±2.2)	4.9 (±1.7)	2.9	6.4
Increment	87%	17%	-	-

The fish production of trained farmers in baseline year was 4.2 ± 1.3 kg/dec and in the monitoring year it was 7.8 ± 2.2 kg/dec .(Table 1). The fish production was increased to 87%. Thomson stated that the fish production increased from 0.5 tons/ha to 2 tons/ha in two years after receiving training and extension support[3]. Islam and Mardall reported that the fish production increased from 812 kg/ha in 1994 to 1700 kg/ha in 1998 in the Model Fisheries Village (Group) approach to aquaculture extension project in the North-west Bangladesh after getting extension and training support[11].

The average fish production of trained farmers' ponds in the baseline year was 4.2 ± 1.3, 4.5 ± 1.4, 4.3 ± 1.3, 4.0 ± 1.1 and 3.7 ±1.1 kg/dec, for study areas located at Dhaka, Rajshahi, Chittagong, Khulna and Barisal divisions, respectively (Fig. 1). The average fish production of trained farmers' ponds in the monitoring year was 8.0 ± 2.1, 8.6 ± 1.9 and 7.8 ± 2.0, 8.2 ± 2.4 and 6.4 ± 1.7 kg/dec, for study areas as located in Dhaka, Rajshahi, Chittagong, Khulna and Barisal divisions, respectively (Fig. 1). The mean fish production of Rajshahi division was significantly higher ($p < 0.001$) in comparison with Barisal division for both baseline and monitoring year. On the other hand, the mean fish production among Dhaka, Rajshahi, Chittagong and Khulna division did not differ significantly. The soil and water condition, size of the pond and environment was

favorable for fish culture in the ponds of Rajshahi division. Fish culture inputs like fish seed, fertilizers, medicine and other inputs were easy available to the farmers of this division. Private and public hatcheries were also available. All these factors ascertained a good positive impact for highest fish production in the Rajshahi division. The pond size, physicochemical condition of pond, shortage of fish farm, less availability of quality fish seed and hatcheries, non-availability of fertilizers; salinity, flood, erosion and fish seed transport problem etc. were responsible for lowest production in Barisal division during monitoring years. DoF[1] reported that annual fish production of pond culture fisheries in Rajshahi division (3.5 tons/ha) was higher than that of Barisal division (3.0 tons/ha).

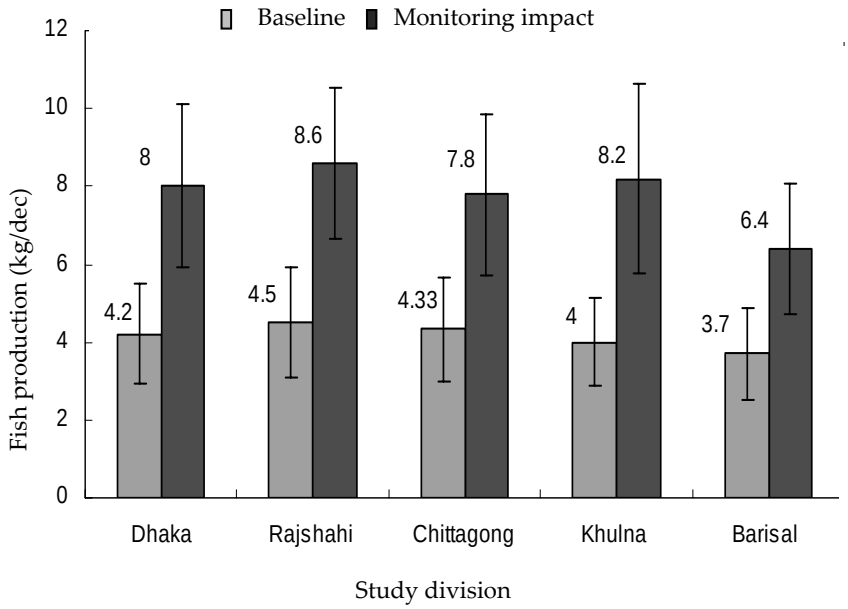

Fig. 1. Fish production (kg/dec) on trained farmer ponds.

In the baseline year the average fish production rate of trained men were 4.3 ± 1.3 kg/dec, while women were 3.8 ± 1.2 kg/dec. After training and extension support from FFP, the average fish production for trained men was 8.2 ± 2.1 kg/dec and for women it was 6.8 ± 2.1 kg/dec (Table 2). For trained men fish production increase was 89% and trained women farmers its increase was 78% as compared to the baseline year fish production. The differences in fish production of trained men in baseline year with trained men farmers in the monitoring year was significantly different ($p < 0.01$). Again for trained women, their baseline year fish production with trained women monitoring year was significantly different ($p < 0.01$). Ahmed[10] reported that after training the fish farmers produced 9.89 kg/dec fish than the base line year production 2.2 kg/dec. He concluded that targeting farmers who have ponds through extension services can push up aquaculture production and benefits them significantly. Barman[12] reported that

women farmers also participated in the production of fingerlings from their rice-fish plots in North-west Bangladesh.

Table 2. Fish production of trained men and women from their ponds.

Study year	Fish production (kg/dec)		Difference (kg/dec)	Average (kg/dec)
	Men	Women		
Baseline year	4.3 (±1.3)	3.8 (±1.2)	0.5	4.0
Monitoring year	8.2 (±2.1)	6.8 (±2.1)	1.4	7.5
Increment	89%	78%	-	-

Table 3. Changes in livelihood assets of trained farmers.

Livelihood assets	Baseline year value	Monitoring year value	Increment (%)	Remarks
1. Social				
a. Linkage and networking (%)	18%	66%	48	Linkage and networking increase (GO & NGO, Bank, UP etc.)
b. NGO membership (%)	29%	60%	31	Membership increase
c. Food scarce month (average)	1.8 month	1.5 month	16	% of food scarcity decrease
2. Physical assets	5	6	17	1. Cart, 2. Van/rickshaw, 3. Shallow machine, 4. Plough, 5. Seine net, 6. Tube-well, 7. Television, 8. Cycle, 9. Mobile phone and 10. radio
3. Financial				
a. Income from fish (Tk/dec)	166	322	94	Increment nearly double from baseline
b. Income from other (Tk)	29776	35731	20	Positive increment
c. Total income (Tk)	39716	55023	39	Positive increment
d. Fish production (kg/dec)	4.2	7.8	87	Increment nearly double from baseline
e. Source of capital	22%	42%	20	Decrease self investment and increase others sources (Bank, NGO etc.)
4. Human				
a. Pond water condition	43%	75%	33	Light green and green positive indicators increase
b. Natural food assessment	5%	90%	85	Practice increase
c. Weed cover at the time of visit	2 %	55%	53	Practice increase

* 1$ = 65 TK; 1 decimal = 40.47 m^2.

Table 3 revealed that most of the trained farmer's livelihood assets covered the DFID'S sustainable livelihood framework and most of the trained farmers assets increased substantially compared to their baseline period. There were overall increase in the livelihood assets like social, physical, financial and human of the trained farmer from the baseline year to the monitoring year. The percentage of livelihood assets has been increased in monitoring year. The highest increment has been found from fish (94%) and lowest in food scarce month (16%).

From the results it was observed that training and extension activities brought positive impact to the trained fish farmers in increasing fish production, assets and livelihood. All these issue ensured them for their healthy and sustainable living and for future existence. Therefore, it was concluded that these increasing trends of livelihood capitals/assets showed positive sign of livelihood sustainability of the selected trained farmers in Bangladesh.

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