Indian Journal of Extension Education
Vol. 49, No. 1 & 2, 2013 (78-82)

Grow out Carp Polyculture by Women : A Case Study from Odisha

H. K. De[1], D. N. Chattopadhyay[2], Radheyshyam[3], G. S. Saha[4], A. K. Dash[5], T. S. Satpati[6] and S. Pal[7]

ABSTRACT

Women are reported to be involved in aquaculture in variety of ways and contribute substantially in aquaculture development. Aquaculture as a weapon to fight malnutrition and poverty has been recognized in many parts of the world. In India too, both government and non-government organizations are giving adequate emphasis to promote aquaculture among resource poor women. Jay Hanuman women self help group (SHG) in Boudh district of Odisha, India is one such successful case of empowering women through aquaculture. The group has taken lease of a community tank 'Kaliabundh' measuring 1 ha and started practicing grow out carp polyculture. In 2010-11, the group has harvested 1232 kg/ha fish (Catla catla, Labeo rohita, Cirrhinus mrigala, Cyprinus carpio and Ctenopharyngodon idella) from that pond which used to yield 700 kg/ha fish earlier. Central Institute of Freshwater Aquaculture (CIFA) located at Bhubaneswar, India imparted hands on training and also demonstrated various aspects of freshwater aquaculture. The women took active interest in practicing scientific fish farming. Smt. Narayani Panigrahi (40), a member of that SHG, informed that each of the 11 members got 3 kg fish every time harvesting was done during the year and the rest of the fish were sold to the trader at ₹ 90/kg. Each household got 12 kg fish for consumption and earned ₹ 5,566 from sales proceeds. By stocking good quality fish seed and taking proper care, the productivity level has gone up by 60 per cent as compared to pre-adoption level. Now the SHG has developed confidence in carp polyculture and interested to undertake fish culture in this pond with gradual improvement of management practices. Active involvement of poor women in carp polyculture has proven to be economically beneficial and it is hoped that this would go a long way in strengthening their livelihood.

Key words : Aquaculture, malnutrition, poverty, polyculture

INTRODUCTION

Involvement of rural women in aquaculture production activities including composite carp culture, seed rearing and integrated fish farming has been advocated for their socio-economic upliftment (Bhanot *et al.* 1999) and generation of self-employment (Sharma *et al.*1988, Thakur *et al.* 1988). Although the involvement of women in the fisheries sector have been recognized globally (Williams, 2008), more remains to be done to recognize and understand women's work in the sector (Weeratunge *et al*., 2010). However, lack of focus coupled with cultural and social constraints limit the participation of women in training and empowerment. Appropriate methods in aquaculture extension with adoption of scientific technology can motivate rural women towards aquaculture practice in a sustainable way. In order to strengthen the livelihood of tribal people, several projects with both farm based and non-farm interventions are being implemented. However, aquaculture interventions are very limited. Role of women has always been supplementary to that of bread winners, although their contribution yet their activities are confined within household. Women are in subsistence in aquaculture, taking care of fish after stocking (Nandeesha, 2007). Therefore dissemination of carp poly culture technology among SC/ST women in Boudh district of Odisha was undertaken by the Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar during 2009-12 with the financial support of Department of Science and Technology (DST), Government of India (GOI).

METHODOLOGY

Boudh, an erstwhile sub-division of Boudh-Kondhamal, lies in the central part of Odisha, India. It is endowed with 2,225 ha aquaculture resources (0.65% of total geographic area). However, only 49 per cent of total aquaculture resources are suitable for pisciculture (NIC, 2011). Private owned tanks constitute only 13 per cent and village community tanks constitute 70.26 per cent of the total aquaculture resources in the district. Both seasonal and perennial ponds are available. However, most of the ponds are seasonal in nature and hold water for 6-7 months. Ponds are having high percentage of rocks and gravels in the bottom. Total freshwater fish production during 2006-07 was 3133.65 tonnes which falls short of the total requirement of this district. Fish are being imported from various adjacent districts. Base line reconnaissance survey was conducted to take stock of the existing carp culture scenario in the study area. Participatory Rural Appraisal (PRA) tools were employed

Central Institute of Freshwater Aquaculture (Indian Council of Agricultural Research) Kausalyaganga, Bhubaneswar, Odisha 751 002

to identify and prioritize the field problems. During the survey, detailed information pertaining to the status of aquaculture, package of practices followed by the farmers and mean production level of last three years prior to adoption was collected from the beneficiaries of the adopted pond. A group of eleven beneficiaries belonging to Jay Hanuman self-help group (SHG), which was formed in 2006 in Palsaguda village from Kantamal block of Boudh district were selected. The group was engaged in rice cultivation and later they started pisciculture in Kaliabandh pond (1 ha) since 2008. The group members belong to socio-economically weaker sections of society. All members were housewives and their average age was 38 years. The group had primary level education and primary occupation was agriculture. The SHG faced many social and cultural problems *e.g.*, traditional beliefs, priorities for household chores, social stigma hindering women to go to pond *etc*. in the process of adopting the technology. Jayhanuman SHG leased in a seasonal pond (water retention period 6-7 months) from village panchayat by paying lease value of ₹ 23,200. During monsoon, water level rose up to 2-2.5 m but in post winter it declined to 1-1.5 m. Initially they followed traditional practice of aquaculture, but after CIFA's intervention, the new horizon had opened in carp culture. They had started with culture of Indian major carps and later adopted carp poly culture with the incorporation of exotic carps.

Technology dissemination and demonstration of carp polyculture

Hands on training was provided in different aspects of freshwater aquaculture *viz.,* pond preparation, liming, stocking, manure application, feeding, health care and harvesting. The principle of 'learning by doing' was employed to reinforce the new skills of carp polyculture. Training was imparted to the group both at on-farm and on-campus at CIFA, Bhubaneswar. Critical inputs like fish seed, lime, feed and fertilizers were provided to the groups in order to encourage them to adopt scientific practices. Efforts were initiated to foster linkage with the bankers for extending institutional credit to women self-help groups and also with market for sale of the produce. Taking into consideration, the inherent water quality and soil conditions management schedule was prepared accordingly. Fingerlings (8-10 cm) of *L. rohita, C. catla, C. mrigala, C. carpio and C. idella* were stocked @ 6,500 fingerlings/ha. As post-stocking care of fishes, the beneficiaries were taught about the procedure of using organic manure like cattle dung, poultry litter and farm yard manure in the pond. Besides organic manure, inorganic fertilizers *viz.,* urea and DAP (Di ammonium phosphate) were used for augmenting phytoplankton production. Emphasis was given to need based and low cost technology in the demonstration process. A mixture of mustard oil cake and rice bran in a ratio of 1:1 by weight was given as supplementary feed @ 2-3 per cent of the estimated fish biomass. Dispensing of feed in dough form preferably in feed trays or gunny bag hung at uniform distance inside the pond was demonstrated. Lime was applied as per requirement. Periodic sampling was done to monitor fish growth and health status. Fish production level was recorded after harvest from the pond.

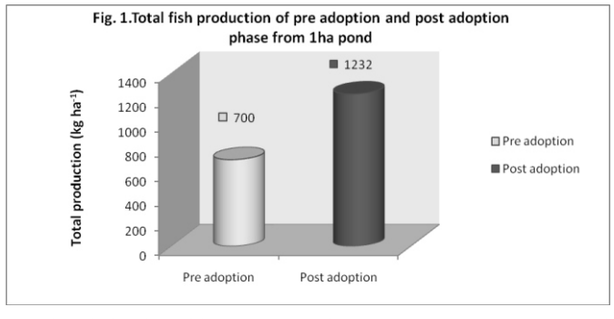
Harvesting and marketing

Single stocking and multiple harvesting system of carp farming was adopted by the farmers. They used to hire professional fishermen for the purpose of harvesting. Local villagers and traders were informed about partial harvesting one day in advance. Partially harvested fish were distributed among the fishermen at the pond site itself. Farmers sell their surplus produce in the main market @ ₹ 90/kg. Partial harvesting was done 4 times during the culture period. Partially harvested fish were generally used for household consumption by the women beneficiaries during various social festivals in the village. Besides, the villagers also got an opportunity to buy fresh fish at the village level market.

RESULTS AND DISCUSSION

Prior to adoption, the beneficiaries used to stock fish seeds (*L. rohita, C. catla and C. mrigala*) of 2-2.5 cm size of species at a density of 12,000/ha. As evident from Table 1, mean production from the adopted pond increased to 1,232kg/ha in 6 months culture period as against pre-adoption production level of 700 kg/ha during same culture period (Fig.1.).

Fig. 1.Total fish production of pre adoption and post adoption phase from 1ha pond



Productivity level has gone up by 60 per cent as compared to pre adoption level. The variable cost was worked out to be ₹ 37,773/ha (Table 2). The production system practiced by the women enabled them to earn a net income of ₹ 61,227/ha. This has resulted in a net return of 162 per cent of the variable cost. The women took active interest in practising scientific fish farming. Each of the 11 members got 3 kg fish every time whenever there was

partial harvesting during the year and the rest of the fish were sold to the trader at ₹ 90/kg. Each household got 12 kg fish for consumption and earned ₹ 5,566 from sale proceeds. The B:C ratio of carp polyculture in Kaliabundh pond was worked out to be 1.62.

Table 1: Total fish production in pre-adoption and post adoption phase from 1 ha pond in 6 months culture period

Adoption details	Species stocked	Stocking density (no./ha)	stocking size (cm)	Total production (kg/ha in 6months)
Pre adoption details	*L.rohita*, *C.catla* and *C.mrigala*,	12,000	2-2.5	700
Post adoption details	*L.rohita, C.catla, C.mrigala, C.carpio* and *C. idella*	6,500	8-10	1232

Table 2. Economics of grow out carp culture in Kaliabundh pond in 6 months culture period

Item	Rate (₹)	Quantity	Cost (₹)
I. Expenditure			
Pond lease value (actual)	-	-	5000.00
Lime	10/kg	110 kg	1100.00
Urea	7/kg	100 kg	700.00
DAP	14/kg	50 kg	700.00
Fish seed	125 per1000 seed	6500 no.	812.50
Mustard oil cake	16/kg	1200 kg	19200.00
Rice bran	2.5/kg	1000 kg	2500.00
Transport charge	-	-	1000.00
Netting charge	500/net	4 times	2000.00
Labour charge	150/man-day	5men	750.00
Miscellaneous expenditure			1375.25
Sub total expenditure			35137.75
Interest on sub total expenditure (15% for 6 months)			2635.33
Total expenditure			37773.08
II. Sale proceeds			
Total production (kg)		1232	
Total fish for consumption(kg)		132	
III. Income			
Gross income (fish sale) (₹ 90/kg)			99000.00
Net Income (16-14)			61226.92
Net return on expenditure (%)			162.09
B:C ratio			1.62

Women beneficiaries were actively involved in all the steps in carp polyculture. It was also observed that increase in fish yield resulted in increased household consumption of quality fish. Enhanced consumption of fish by the participating women improved nutritional status of their families. Jena *et al.* (1998) reported that small seasonal backyard kitchen ponds (0.05-0.2 ha) used for carp seed raising by tribal women in Orissa could enhance the economic status of women when managed properly. Goswami (2009) reported that rural women in coastal areas of south 24-parganas performed many fishery activities including fish seed collection, net weaving, fish marketing and fish harvesting. They took part in decision making related to fishery activities which is fairly a good indicator of their status. Roy (2003) observed that women in aquaculture have contributed significantly for improving the income of their families. According to Ponnusamy and Gupta (2009), aquaculture in combination with other farm enterprises in the coastal regions of the country significantly contributed to the livelihood security of farm families in a system's perspective. Rural women, in particular, who live in poverty, with no purchasing power, and who suffer from malnutrition due to low protein intake has taken the lead in small scale aquaculture for improvement of their social status and economic power (Nwabueze, 2010). Panda *et al.* (2012) observed that with the help of micro finance under Sarnajayanti Gram Swarojgar Yojona (SGSY), women SHGs in India involved in aquaculture could achieve high level of socio economic development.

CONCLUSION

The Jay Hanuman SHG has developed competency in carp polyculture and is interested to undertake fish culture in this pond with gradual improvement of management practices. Active involvement of poor women in carp polyculture has proven to be economically beneficial and in strengthening their livelihood. This success story would inspire many other women SHGs to adopt carp culture in village community ponds as a means of improving their livelihood. Carp culture by women belonging to socio-economically poor strata should be promoted towards ensuring food and nutrition security. This would also bring vast areas of unutilized water resources under fish farming. Success of Jay Hanuman group has not only empowered its members but also influenced other women in neighbouring villages for adopting aquaculture technologies.

ACKNOWLEDGMENTS

Financial support received from SEED (Science for Equity, Empowerment and Development) division of DST (Department of Science and Technology), Government of India (GOI) under the project “Transfer of Technology of Carp polyculture through Demonstration among SC/ST Women in Boudh and Purulia” is duly acknowledged. Encouragement and guidance received from Director CIFA, Bhubaneswar for implementing the above project is also thankfully acknowledged.

REFERENCES

Bhanot,K. K., L. Safui, J. K. Jena, S. N. Monhanty and S. Ayyappan. 1999. Fisheries technologies for women. *Indian Farming* 48(7):46-48.

De, H. K., Saha, G. S., Mahapatra, A. S. and Panda, N. 2012. Involving women in aquaculture- 25 years of CIFA's contribution. Central Institute of Freshwater Aquaculture, Bhubaneswar.

Goswami, B. 2009. Involvement of rural women in coastal fishery sector of West Bengal India. *Journal of Inland Fisheries Society of India* 42(2):44 47.

Jena, J. K., S. N. Mohanty,S. D. Tripathi,A. N.Mohanty, H. K. Muduli and S. Sahoo.1998. Carp seed raising in small backyard and kitchen ponds: a profitable technologypackage for tribal women. *In:*Current and EmergingTrends in Aquaculture (ed.P.C.Thomas), pp. 89-94. Daya Publishing House, Delhi.

Nandeesha, M.C. 2007. Asian experience on farmer's innovation in freshwater fish seed production and nursing and the role of women.In: Assessment of freshwater fish seed resources for sustainable aquaculture (ed. M.G. Bondad-Reantaso), pp. 581602. *FAO Fisheries Technical Paper.*No.501. Rome.

National Informatics Centre (NIC). 2011. http:// www.boudh.nic.in.Accessed February, 21, 2012.

Nwabueze, A. A. 2010. The role of women in sustainable aquacultural development in DeltaState. *Journal of Sustainable Development in Africa* 12(5):284-293.

Panda, N., A. S. Mahapatra and R. Samal. 2012. Impact evaluation of SGSY on socio-economic development of women in aquaculture in Eastern Hills of Orissa. *Aquaculture International* 20:233247.

Ponnusamy, K. and J.Gupta. 2009. Livelihood contribution problems and prospects of aquaculture in integrated coastal farming systems. *Indian Journal of Fisheries* 56(4):317-322.

Roy, N. C., M. A. Wahaband S. H. Thilsted. 2003. Appropriate carp polyculture technology with small indigenous Mola *(Amblypharyngodon mola)* for rural Bangladesh. *Journal of Aquaculture in the Tropics* 18(1):97-109.

Sharma, B. K., N. K. Thakur, S. K. Sarkar, L. Safui, Radheshyam, B. R. Dutta and N. Sarengi. 1988. Involvement of rural womenfolk in aquaculture under S &T programme at KVK/TTC, Kausalyaganga. Proceedings All India workshop on gainful employment for women in the Fisheries Field. CIFT, Cochin. pp.54-71.

Thakur, N.K., S.K. Sarkar, N. Sarengi and B.K. Sharma. 1988. Self employment of rural womenfolk through "successional" aquaculture in backyard ponds. Proceedings All India workshop on gainful employment for women in the Fisheries Field. CIFT, Cochin. pp. 72-81

Weeratunge, N., K.A. Snyder and P.S. Choo. 2010. Gleaner, fisher, trader, processor: understanding gendered employment in fisheries and aquaculture. *Fish and Fisheries* 1:405420.

Williams, M. 2008. Why Look at Fisheries through a Gender Lens? *Development* 5:180-185.