

Indigenous Technological Knowledge in fish farming

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The indigenous technological knowledge (ITK) innovated by the farmers is stored in people's memories and activities, and supposed to be the thumb rule in combating different situations and constraints faced during the culture practices. A study was conducted for documentation of indigenous technological knowledge in fish farming in district 24 Parganas (South), West Bengal. The innovations are socially and ecologically acceptable, economically viable and involve little risk. The indigenous technological knowledge can be promoted through scientific approach as a mean of higher and sustainable fish production, which will be ecofriendly, too.

Keywords: Fish farming, Traditional fish farming, Indigenous Technological Knowledge

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The origin of fish culture in India probably dates back to 2000 years. Perhaps, fishery activity started when the human settlement moved away from the riverbanks to the hinterland. During monsoon season, the inundated paddy fields and low-lying areas gave birth to today's aquaculture. The natural seed of fish got trapped after water receded which eventually led to the idea of "trapping and holding" of fish seed and raising them to the table size. Probably this is the milestone of the first innovation in aquaculture.

As the days went by, the Indian fish farmers practice their own indigenous technology as a common practice through natural resource management¹. The close and intimate observation of farmers through their age-old practices has developed the expertise of acquiring knowledge in aquatic ecosystem in particular. Admittedly, the multifarious knowledge and skill possessed by local people can substantially contribute to productive efforts and endeavors². Scientific attitude to this indigenous technologies of the farmers are yet to be exposed. The viability of indigenous technologies failed to approach short and long-term perspective. Under this context the present study was undertaken to document indigenous technology common among the fish farming communities.

Indigenous knowledge is traditional type of innovation by the farmers that is stored in peoples' memories and activities and it is expressed in the form

of stories, songs, folklore, proverbs, dances, myths, cultural values, beliefs, rituals, community laws, local language and taxonomy, agricultural practices, equipment materials, plant species and animal breeds³.

Farmers' innovation is based on their indigenous knowledge. The indigenous knowledge is the accumulated knowledge, skills and technology of the local farmer derived from the interaction of ecosystem⁴. Since the evolution of mankind, man has been entrusted with resources and location specific avenues like agriculture, fishery, dairy, animal husbandry, indigenous, medicine and weather study, etc.

In rural areas, traditionally associated technical knowledge of fish farmers followed from generation to generation to cope up with different situational constraints⁵. The tested and proven innovations of our ancestors needs to be valued, validated and blended with new technological support^{6,7}.

Understanding of the dimension of technologies of the fish farming helps in asserting the degree and directional change through formal research^{7,8}. Thus, recording of indigenous innovation becomes important which would otherwise be obsolete and lost soon without recognition in future.

Farmers' innovation has little or no cost, readily available, socially acceptable, economically viable, and sustainable, involve minimum risk to rural farmers and producers, and are widely believed to conserve resources.

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Fig.1 Use of banana logs in pond



Fig.2 Use of banana logs in pond



Fig.3 Bamboo logs are placed on the pond



Fig. 4 'Pala' are placed on the pond for resting place



Fig.5 Mixture of Garlic, Salt, CuSO_4 , KMnO_4 as a prophylactic measure for fish diseases



Fig.6 Application of Herbal and inorganic ingredients for prophylaxis of EUS

The use of farmers' innovation, skills and wisdom promotes active community involvement because people depend more on each other⁹. The farmers' innovations encourage transparency and accountability.

Methodology

The study was conducted in South 24 Parganas district of West Bengal. Within the district, two blocks namely, Namkhana and Kakdwip were selected. A

total 20 hatchery owner and 70 traditional farmers were selected from both the blocks. The population of the study was selected by using simple random sampling technique without replacement. Data were collected from the respondents through personal interview using semi-structured schedule (Table 1). The conclusions were drawn from the overall response of the respondents belonging to tribal and other backward communities.

Table 1—Farmers' Innovations in aquaculture in Namkhana and Kakdwip blocks, West Bengal

Items	Methods	Rationality	Purpose	Users
Algae (<i>Jahanesbaptistia</i> sp.) control for proper growth and development of <i>Bagda</i> (<i>Penaeus monodon</i> Fab.) fish.	The growth of algae (<i>Jahanesbaptistia</i> sp.) is fast and covers the vast water body. It creates two separate layers in the pond and <i>Bagda</i> bound to stay in lower layer of in the pond. In the restricted portion, they are grown. Due to increase in population of <i>Bagda</i> , the space becomes limited and insect and disease infestation is occurred. The algae (<i>Jahanesbaptistia</i> sp.) are controlled, manually by uprooting the weed with the help of bamboo poles with toothed prongs or coir rope.	For creating greater space and minimize nutrient loss	To eradicate aquatic weed from the water bodies for higher production	Medium farmers
Use of banana logs in pond (Figs. 1,2)	Banana logs are cut into pieces and immersed into pond water.	Banana plant cell helps in increasing <i>pH</i> of the pond water through their alkaline secretion	To minimize protozoan disease and worm of fish	Small farmers
<i>Pala</i> and bamboo logs (Figs. 3,4)	<i>Pala</i> and bamboo logs are placed in the pond for resting of fish and controlling lice of fish	Rubbing of body with <i>Pala</i> and bamboo log, lice are removed from the body	To manage lice	Marginal farmers
Broken catechu nut extract	In the hatching pool, the extract of water-immersed catechu nut is used in proper dose to make the eggshell hard	It helps in shell hardening and prevents immature release of hatchlings	To obtain higher hatching rate	Hatchery owners
Indigenous fishing instrument <i>Polo</i>	The instrument, made up of bamboo and thread is cylindrical in shape. Both top and bottom sides are open. Top circle is smaller than bottom. Bottom portion is inserted into the soil. Fishing is completed inside the <i>Polo</i>	Due to insertion of the lower portion into soil, fish are bound by the cylindrical structure from the top portion. Trapped fishes are taken out from the top portion	Both bamboo and thread are easily available. Using it, fishes are captured in low water raising area	Small and medium size farmers
Garlic (2kg)+ Salt (2kg) +CuSO ₄ (20gms)+KMnO ₄ (20gms) (Figs. 5,6)	Ingredients made into paste, is mixed in 30-50l liter of water and sprayed over pond water of 0.133ha pond	It contains antimicrobial compound	Control of EUS disease	Hatchery owners
Eggs ingredients	Eggs are applied into brood stock pond	It contains protein	It advances maturation of brooders	Hatchery owners

Results

In order to understand the hatchery owner and traditional fish farmer clearly and comprehensively for this study, some of the personal, socio-economic, communicational characteristics were undertaken. The majority of the fish farmers and hatchery owners were poorly educated, having nuclear family and medium sized family, low family educational status, poor land holding, and poor economic status. The socio-economic condition of hatchery owner was found to be comparatively better than the traditional fish farmers.

Conclusion

The above mentioned indigenous technology was found to be viable in combating the problems of the aquatic systems. Farmers knowingly or unknowingly employed such techniques in effective management of such systems. The scientific approach of these technologies can usher a new era in modern fish farming system employing these indigenous knowledge.

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