

Original Research Article

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## Indigenous Technical Knowledge in Fisheries of South 24 Parganas District of West Bengal, India

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### ABSTRACT

#### Keywords

Indigenous techniques, Indigenous knowledge, West Bengal

#### Article Info

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The study compiled and documented various indigenous techniques of controlling water pH, white faeces problem in shrimp, mortality, fish-lice and use of natural fish attractant along with the socio-economic background of the involved farmers and fishers in selected blocks of 24 Parganas (South) district, West Bengal. The survey was conducted through stratified multiple random sampling procedure in which 66 farmers from 19 potential fish farming villages of two blocks were investigated. This indigenous knowledge being eco-friendly, locally available and cost effective can be successfully used as a part of modern scientific techniques after scientific refinements.

### Introduction

Aquaculture remained as the fastest-growing food production sector in the last decade. Asia is the largest centre of aquaculture production, and currently, more than 90 percent of the global aquaculture production comes from Asian countries in which our nation is in the second rank followed by China (FAO, 2016). West Bengal is the sixth largest economy of India and recorded a gross state domestic

product of US\$ 140.56 billion in 2015-16. It is also the largest fish producing state in India. During 2015-16 West Bengal produced a total of 1.63 million tonnes of fish (Govt. of W.B., 2017). Out of the total aquaculture production, more than 70 percent comes from small-scale farmers (Edwards, 2009), who are also the major contributors of adaptations and small-scale innovations of different aquaculture technologies. Fish farmers of this state have a remarkable interest towards the different fish

culture practices as experienced from last few decades. Farmers are skilful and innovative to use the unique technique in fish culture and management. They experience the problems arising during the culture and identify their solutions in their own environment from generation after generation and invent an indigenous undocumented knowledge to solve that problem (Das *et al.*, 2013). Indigenous technical knowledge (ITK) is farmer oriented knowledge and which is evolved by the farmers.

Indigenous knowledge is a traditional type of innovation by the farmers which is stored in their activities and memories and is expressed in the form of stories, songs, myths, cultural values, beliefs, rituals, community laws, agricultural practices etc. (Dohare, 1996).

In current time various ITKs are at risk of extinction because of rapid socio-economic and cultural changes accompanied by environmental changes in global scale (Das *et al.*, 2013). ITKs are generally follow a slow adaptation and hence vulnerable to be extinct due to inability to address new challenges and less competitiveness towards new technologies. It is crucial to document such ITKs of substantial scientific basic and practical usefulness into written, drawing or other forms of recordings to protect such knowledge.

Meagre works are reported to bring different ITKs into practical use in aquaculture like pond management, disease management, seed production etc. Although several documentation of ITKs is available in various aspect of Indian fisheries and aquaculture, still systematic recording of ITKs from West Bengal has to be addressed to reveal several unreported ITKs as well as their scientific rationale (Bhagawati & Kalita, 1987; Gurumayum & Choudhury, 2009; Sharma, 2001; Yadava & Choudhury, 1986).

## **Materials and Methods**

The present study was conducted in South 24 Parganas district of West Bengal. Within the district 2 blocks were purposively selected namely Mathurapur-II (22.03° N, 88.42° E), and Kakdwip (21.87° N, 88.18° E). Using stratified multiple random sampling procedures 19 potential fish farming villages were chosen from two blocks.

A total 21 hatchery owners and 45 fish farmers including fishers who essentially practices traditional technique for their pond maintenance, fish health management etc. were communicated from the selected blocks. A semi-structured personal interview schedule (Table 1) was taken to collect the data on ITKs. The socio-economic data from the responders are also collected.

## **Results and Discussion**

In the fisheries sector, socio-economic status of fisher plays an essential role in productive activities. Socio-economic parameters such as family size, age structure, education, cast, experience of farming, income etc. determine the approach of farmers towards traditional systems or interest towards various new technologies. To understand the traditional fish farmer and hatchery owner clearly and comprehensively for this study, some of the socio-economic parameters (Table 2) were undertaken.

It was observed that majority of the fish farmers (66.66%) were in the middle age group (30 to 50 yrs) belonging to socio-economically backward section (51.52%), with 8<sup>th</sup> pass education level (36.36%) and had minimum fisheries related experience of 10 yrs (37.88%). Respondents had mainly nuclear type families (62%). But the majority of the farmers (59.09%) had 0.2 to 0.5 ha of the area under farming.

**Table.1** Indigenous techniques used by the farmers of Mathurapur-II and Kakdwip block of South 24 Parganas, West Bengal

Items	Methods	Purpose	Users
<b>Moringa (<i>Moringa oleifera</i>) and Tamarind (<i>Tamarindus indica</i>) stem and branches.</b>	8-10 numbers of 1.5-3 m branches are immersed per bigha (33 decimal) of pond depending on water pH.	To reduce the water pH.	Small and marginal farmers.
<b>Banana stem</b>	Banana stems are cut into small pieces and immersed in the water.	To control some protozoan diseases and increase the water pH.	Small, medium and marginal farmer.
<b>Thankuni (<i>Centella asiatica</i>) leaf</b>	Fresh thankuni leaf is mixed with the shrimp feed @30-40 leaves per kg feed.	To control White Feces Syndrome in shrimp.	Small and medium shrimp farm owner.
<b>Mahua (<i>Madhuca longifolia</i>) oil cake</b>	Mahua oil cake is packed in gunny bags @ 10-15kg and immersed in two corners of a stocking pond (per bigha/ 33 decimal).	To make the fishes hardy (disease resistant) and reduce the mortality rate.	Medium and marginal farmer.
<b>Ekangi (<i>Kaempferia galanga</i> L.) rhizome and Jayatri (<i>Myristica fragrans</i>) flower.</b>	Ekangi rhizomes and Jayatri flowers are sun-dried followed by moderate heating in the hot plate and ground into powders for incorporation through the feed.	To attract fish during angling.	Small fishers and game fishers.
<b>Bamboo (<i>Bambusa vulgaris</i>) branches.</b>	Different size of bamboo branches are placed in the separate location of a pond.	To manage fish-lice by providing a rough surface for rubbing of the fish body. It also helps in minimising the poaching problems.	Small, medium and marginal farmer.
<b>Garlic (<i>Allium sativum</i>) and Fenugreek (<i>Trigonella foenum-graecum</i>) seeds.</b>	1kg of semi-dried garlic is mixed with 250 g of roasted and ground fenugreek seeds. This mixture is then applied before one hour of fishing.	To attract fish schools due to its aroma and to make the fishing effective.	Small fishers and game fishers and mainly for fishing in open water.

**Table.2** Profile of the selected fish farmers and fishers (N=66)

Parameter	Attributes	No.	Percentage (%)
Education	a. Read only	3	4.55
	b. Primary school	13	19.70
	c. 8 <sup>th</sup> Pass	24	36.36
	d. 10 <sup>th</sup> Pass	13	19.70
	e. 10 <sup>th</sup> +2 Pass	7	10.61
	f. Graduation or more	6	9.09
Age (Year)	a. 20-30	8	12.12
	b. 30-40	24	36.36
	c. 40-50	20	30.30
	d. 50-60	5	7.58
	e. 60-70	6	9.09
	f. >70	3	4.55
Cast	a. General	32	48.48
	b. OBC	12	18.18
	c. SC	16	24.24
	d. ST	6	9.09
Experience in farming (Year)	a. <3	5	7.58
	b. 3-5	8	12.12
	c. 5-10	22	33.33
	d. >10	25	37.88
Family type	a. Joint	54	81.82
	b. Nuclear	12	18.18
Area of farming area (ha)	a. 0.2-0.5	39	59.09
	b.0.5-1	11	16.67
	c. >1	16	24.24

The present study reveals that the fish farmers in the selected area discern ITKs as more widely accepted among the rural farmers because of its cost-effectiveness, local availability of materials, less complexity in preparation, compatibility to social and cultural habitats and economic viability. The result indicates that probably low education level fortified with several other factors like poor transportation facilities, socio-economic conditions etc. influenced the farmers to continue traditional fisheries activities rather than adopting modern scientific technologies.

The traditional farmers are continuing the use of ITKs as a part of their culture, generation after generation. In most of the cases, the

ITKs have a good scientific basis with an eco-friendly approach which is an urgent need of current era. The scientific background of such ITKs can be integrated with modern technologies for better efficiency and as well as this authentic knowledge base has to be documented for the future upliftment of hidden scientific rationales of different ITKs. West Bengal, where three types of water resources viz. freshwater, marine water and cold water are available, and similarly, for different water, there may have various ITKs which yet to be reported. So research focus in this area is an emergence need to bridge the gap between modern technologies, its cost-effectiveness and environmental sustainability.

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