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Full Length Research Paper

Adoption behaviour of the farmers of Goalpara district of India towards aquaculture technology

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A study was conducted during 2009 to 2010 to investigate the adoption behaviour of the fish growers towards the innovations in aquaculture technology in Goalpara district of Assam. The district produces 5,347 tonnes of fish per annum against its biophysical potential of 40,969.25 tonnes. Seven critical recommended practices of pond management were selected to study the extent of adoption and correlated with thirteen socio-economic and psychological variables of the growers. Statistical techniques and tools like frequency and percentage analysis, mean score, standard deviation (SD), Co-efficient of variance (CV) and simple correlation were used. The results revealed that the farmers of the district have not yet adopted the recommended package of practices and they lack entrepreneurial spirit in aquaculture operation. The study suggested the need of paradigm shift from the current perception on aquaculture as a poverty alleviation programme to a prestigious income generating enterprise.

Key words: Aquaculture, adoption behaviour, pond management, scaling up.

INTRODUCTION

The Indian Council of Agricultural Research (ICAR), Krishi Anusandhan Bhawan, New Delhi, India has established a Krishi Vigyan Kendra (farm science centre) in Goalpara district (250 5°/ N to 60°10/ N Latitude and 90° 00/ to 91° 15/ E Longitudes) of India in 2006 with the mandates of (i) conducting on farm testing for newly generated technologies, (ii) organising training for extension personnel, (iii) organising short and long term training for the farmers and rural youths with emphasis on 'learning by doing, and (iv) organizing frontline demonstrations proven technologies (www.icarzcu3.gov.in). The district has a population of 8, 22,306 with a density of 451 per sq. km (Anon, 2009). Almost all the people consume fish in their daily diet. The district produces 5,347 tonnes of fish from all resources against the biophysical potential of 40,969.25 tonnes per annum (Anon, 2009). The present demand for fish in the district is 9,045.37 tonnes per annum, considering the per capita requirement of fish at 11 kg/person/year recommended by the World Health Organisation (WHO) for the country. There are number of tested package of practices for fish farming (Assam Agricultural University, 1997), which are also suitable for the agro-ecological situations (Mandal et al., 1981) of the district. Basic information of the district and its agro-ecological characteristics are summarized in Tables 1 and 2, respectively. When there is substantial amount of research generated knowledge it becomes difficult to communicate more widely to the end users and scaling up becomes major concern. Therefore, strategies should primarily involve horizontal scaling up of suitable production technology. Success of scaling up shall invariably depend on adoption behaviour of the farmers. The district has 0.039 million ha water spread area, comprising 0.038 million ha (97.44%) of lentic and 0.001 million ha (2.56%) of lotic waters (Table 3). This amounts to 10.43% of state's fisheries resources and 0.53% of the Inland fisheries resources of the country ARDB (2011).

Most farm families have water bodies in their homesteads in the form of seasonal ponds, sumps,

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Table 1. District profile.

1	Geographical area (ha)	184262
2	Population	822306
	a) Male (No)	420707
	b) Female (No)	401599
3	Density (No/sq. km)	451
	Literacy (%)	58.56
4	Farm families (No)	106862
5	Caste wise family (No)	
	a) Schedule tribe	23219
	b) Schedule caste	5626
	c) Other backward classes	6971
	d) General	71046
6	Land holding wise family (No)	
	a) Large (> 2.00 ha) (No)	6987
	b) Small (1 - 2 ha) (No)	50479
	c) Marginal (<1.00 ha) (No)	35143
	d) Land less (<0.50 ha) (No)	10255
7	Net cultivated area (ha)	79560
8	Gross cropped Area (ha)	106089
9	Area shown more than once (ha)	27529
10	Cropping intensity	133.3 %
11	Forest coverage (ha)	38344
12	Land put on non agricultural use (ha)	21776
13	Barren and uncultivable land (ha)	32819
14	Grazing land (ha)	3576
15	Land under Misc. trees (ha)	5424
16	Cultivable waste land (ha)	1002
17	Fellow land other than current fellow (ha)	910
18	Chronically flood affected area (ha)	12136
19	Current fellow land (ha)	861
20	Sub-division (No)	2
21	Rural development block (No)	8
22	Gram Panchayat (No)	83
23	Revenue village (No)	861
24	Irrigation coverage (ha)	17142

Table 2. Agro-ecological conditions of Goalpara District, Assam.

1	Agro ecological zone	LBVZ
2	Soil type	A
3	Nitrogen content	M-H
4	Phosphate (P_2O_5)	L
5	Potash (K_2O)	M-L
6	Organic carbon (%)	1.5
7	pH	5.0-6.8
8	Texture	S-Sl
9	Rainfall (mm)	
	December-January	50
	March-May	500-600
	June-September	1000
	October-November	150
10	Sunshine (Av.daily hrs)	
	December -January	6-7
	March-May	6-7
	June-September	4-6
	October-November	6-7
11	Temp (Av. Max/min °C)	
	December.-January	29/10
	March-May	31/19
	June-September	31/25
	October-November	29/20

LBVZ= Lower Brahmaputra Valley Zone, A= alluvial, M = Medium, H = High, L = Low, S = Sandy, Sl = Sandy loam, Rl = Red loam, Lt = Lateritic, l = loam. (Source: NARP Document 39, 1981).

Table 3. Type and area of freshwater resources.

Type	Area (ha)
Ponds and tanks	973.30
Beel	1615.90
Low lying area	286.80
Paddy fish	34,973.50
River	1256.00
Integrated farming	15.30
Others	255.50
Total	39,377.30

roadside ditches, etc. (N RCP (Annual Report, 2006 to 2007).

The KVK during village survey observed apathy and pilferage (Talukdar et al., 1999) amongst the fish farmers. Individual farmers seem to exhibit unique adoption behaviour. The decision making process involve various decision stimuli *viz.,*level of physical capital, human capital, access to productive resources, risk attributes (Feder et al., 1985); agro-ecosystem and types of technology (Pingali et al., 2001), farming season (Moser and Barrett, 2003), as well as chance factors such as neighbours and village colleagues (Case, 1992; Munshi, 2004; Pomp and Burger, 1995; Zhang et al., 2002). Involvement of these factors in shaping the farmers' adoption-decision seems to vary. The present need for development of aquaculture in the district is the shift of paradigm from the current perception on aquaculture as a poverty alleviation programme to a prestigious income generating enterprise. The challenge faced by the KVK is: what approach should be appropriate to stimulate the

Table 4. Independent variables for the study on managerial problems.

S/n	Variable	Empirical measure	Methods
1	Age (X_1)	Chronological age rounded off to nearest year	Pareek and Trivedi (1964)
2	Education (X_2)	Socio-economic status scale-Rural	Pareek and Trivedi (1964)
3	Main occupation (X_3)	Socio-economic status scale-Rural	Pareek and Trivedi (1964)
4	Annual income (X_4)	Structured schedule	
5	Operational holding (X_5),	Structured schedule	
6	Localiteness-cosmopoliteness (X_6)	Localiteness-cosmopoliteness scale	Singh (1964)
7	Economic motivation (X_7)	Economic motivation scale	Singha (1991)
8	Decision making ability (X_8)	Decision making ability scale	Singha (1991)
9	Scientific orientation (X_9)	Scientific orientation scale	Singha (1991)
10	Interest (X_{10})	Structured schedule	
11	Information seeking behaviour (X_{11})	Structured schedule	
12	Knowledge on fish production technology (X_{12})	Structured schedule	
13	Attitude towards fish farming (X_{13})	Attitude scale developed for the study	

rural households of the district for judicious use of the existing water resources through aquaculture for sustainability of their livelihood and nutritional security. Therefore, the Krishi Vigyan Kendra (KVK) goalpara investigated the adoption behaviour of the fish farmers during 2009-2010 for preparing its work plan for the next five years.

MATERIALS AND METHODS

Both primary and secondary data were used in this study. Secondary data were collected from the published literature such as project reports, official documents etc. Primary data were collected through structured and validated questionnaire to elicit information from the respondents. The sampling procedure consisted of purposive selection of fifty (50) fish farmers from the fish growing areas of the district for investigating the extent of adoption of recommended package of practices for composite culture of carps (Assam Agricultural University, 1997). Seven critical recommended practices for pond aquaculture *viz.,* (i) desilting of pond bottom, (ii) preventing wild water from entering the pond, (iii) erosion control, (iv) pond liming (v) pond fertilization, (vi) stocking practice and (vii) feeding practice were selected. Test schedules were developed to study the extent of adoption. Weight age of the practices was decided by the judge's rating. Extent of adoption was measured as done most often (MO), often (O), seldom (S) and never (N) with assigned scores of 3, 2, 1 and 0, respectively. Final adoption scores were attained by multiplying the weight age of a practice with the corresponding extent of adoption scores.

A total of 13 socio-economic and psychological variables were selected to study the adoption behaviour of the farmers. These were - (i) age (X_1), (ii) education (X_2), (iii) main occupation (X_3), (iv) annual income (X_4), (v) operational holding (X_5), (vi) localiteness-cosmopoliteness (X_6), (vii) economic motivation (X_7), (viii) decision making ability (X_8), (ix) scientific orientation (X_9), (x) interest (X_{10}), (xi) information seeking behaviour (X_{11}), (xii) knowledge on fish production technology (X_{12}), and (xiii) attitude towards fish farming (X_{13}). Measurement scale used for independent variables are summarized in Table 4. Various descriptive and inferential statistical methods were employed to analyze the data following Panse and Sukhatme (1985). The main statistical techniques and tools used were – (1) Frequency and percentage analysis, (2) Mean score, (3) Standard deviation (SD), (4) Co-efficient of variance (CV) and (5) Simple correlation.

RESULTS

The study reveals that the farmers in the district operate aquaculture in an easy going manner and they lack the entrepreneurship spirit. Extent of adoption of the recommended practices is summarized in Table 5. The farmers of the district normally operate aquaculture in old ponds, where production is limited by anaerobic conditions. It is concluded from the study that 88% farmers do not remove silts from the pond bottom, which attribute to poor productivity. Ponds (80%) are generally well impounded and do not allow entry of wild water. However, 80% farmers are not cautious about erosion control measures. They do not take any measures to control erosion of the embankments. Only 5% farmers use sod cover to prevent erosion. Erosion caused by heavy rain and undermining of dykes is a major problem in the district and repairing becomes costly affair.

Fishes reared under composite culture of carps in Assam are *Catla catla* (Catla), *Cirrhinus mrigala* (Mrigal), *Labeo rohita* (Rohu), *Hypopthalmichthys molitrix* (Silver carp), *Ctenopharyngodon idella* (Grass carp) and *Cyprinus carpio* (Common carp). All these species need slightly alkaline water and pH ranging between 6.5 and 8.0. The soil and water of the district is acidic in reaction, which is the major limiting factor. The package of practices recommends application of agricultural lime at 2,100 kg per ha per annum in split doses. But the farmers have not adopted this practice. Majority of the fish farmers (74%) normally do not apply lime. Only 2% farmers regularly apply at recommended dose.

Growth of phytoplankton is essential for sustaining the primary productivity of the pond as the fish yield is the function of primary productivity (Sugunan and Sinha,

Table 5. Frequency and percentage distribution of respondents in different response categories against water quality management.
N = 50.

Recommended practices	Distribution of respondents				Mean	SD
	MO (3)	O (2)	S (1)	N (0)		
Regular desilting of pond	0 (0.00)	2 (4.00)	4 (8.00)	44(88.00)	0.160	0.46773
Prevent wild water	40 (80.00)	4 (8.00)	3 (6.00)	3(6.00)	2.620	0.85452
Erosion control	5 (10.00)	3 (6.00)	2 (4.00)	40(80.00)	0.460	0.99406
Liming at recommended dose	2 (4.00)	6 (12.00)	5 (10.00)	37(74.00)	0.460	0.86213
Fertilization at recommended	8 (16.00)	12 (24.00)	10 (20.00)	20(40.00)	1.160	1.13137
Stocking at recommended time with recommended species composition	0 (0.00)	0 (0.00)	0 (0.00)	50(100.00)	0.000	0.00000
Feeding with formulated feed	0 (0.00)	0 (0.00)	0 (0.00)	50(100.00)	0.000	0.00000

(Data in parentheses are percentage of frequencies).

2001). Application of raw cow dung (2000 kg/ha initially and 1000 kg/ha/month), urea (25 kg/ha/month) and single super phosphate (20 kg/ha/month) is recommended for maintaining the nitrate and phosphate content at optimum level. Pond fertilization is often done by 28 % and seldom by 72 %. None of the respondents fertilized their ponds regularly. Farmers stock their ponds arbitrarily and do not follow any norms in terms of species, size and even stocking period and time. Since, carps require water temperature above 28°C and optimum temperature prevails during the period from mid April to mid September, it is recommended that ponds should be stocked during April to May with stunted yearlings at the rate of 5000 numbers per ha. Recommended species composition includes silver carp 20%, catla 15%, rohu 15%, grass carp 10%, mrigal 20% and common carp 20%. None of the respondents follow this practice. Fish requires complete feed at 1% of body weight per day for maintenance (Paulraj, 1997). For maximum growth at a declining rate they need to be fed at 3 to 4% of body weight per day and for highest gross conversion efficiency they should be fed at 6 to 7% of body weight per day. The recommended practice for feeding is 3 to 5% of body weight per day with 1:1 mixture of rice bran and mustard oil cake or with formulated feed as per manufacturer's recommendation. No respondent follow this practice.

Majority (76%) of the respondents belonged to middle age category (29t o 58 years) followed by old (above 58 years) 22% and young (below 29 years) 2%. The majority (92%) of the respondents belonged to high category of educational status, that is above high school standard with technical training. Only 8% of the respondents belonged to medium education level that is between primary standard and high school standard. Only 18% of the respondents were fully engaged in fish farming. Others have taken fish farming as subsidiary occupation. While, 48% respondents had agriculture as major occupation, 30% had other business. Negligible section of respondents (4%) had government service as major occupation in addition to fish farming. Data on annual income reveals that 56% of the respondents had middle level of annual income (1326.29 GBP – 2652.45 GBP) followed by high category (24%) and low (20%) with annual income more than 2652.45 GBP and less than 1326.29 GBP, respectively. Amongst the respondents, 54% had medium operational holding (2.0 to 3.33 ha) followed by 38% low operational holdings (up to 2 ha) and 4% high (above 3.33 ha). All the respondents belong to medium level (52%) and low level (48%) of localiteness-cosmopoliteness. Economic motivation of the respondents showed that 90% were in medium level and 10% were in low level category. None of the respondents had high level decision-making ability. While majority (84%) respondents were in medium level, 16% were in low level.

Analysis of data on scientific orientation reveals mean score ($\overline{X}_9$) of 22.420, standard deviation (SD) of 1.907 and co-efficient of variation (CV) of 8.51%. The co-efficient of variation (8.51%) indicates that the respondents were quite homogeneous in respect of their scientific orientation. While 68% of the respondents exhibited a medium level of interest, 32% respondents exhibited high level of interest. None of the respondents exhibited high level of information seeking behaviour. The study reveals that 66% of respondents exhibited high level of

Table 6. Correlations amongst the independent variables.

	Pearson correlation				
Variable	**Age (X_1)**	**Education (X_2)**	**Main occupation (X_3)**	**Income (X_4)**	**Operational holding (X_5)**
Age (X_1)	1.0000	- 0.5275**	- 0.0577	0.3782**	0.3676**
Education (X_2)	- 0.5275**	1.0000	0.0761	- 0.0935	- 0.1454
Main occupation (X_3)	- 0.0577	0.0761	1.0000	0.3354*	- 0.1273
Annual income (X_4)	0.3782**	- 0.0935	0.3354*	1.0000	0.2284
Operational holding (X_5)	0.3676**	- 0.1454	- 0.1273	0.2284	1.0000
Localiteness-cosmopoliteness (X_6)	0.1051	- 0.0275	- 0.1695	- 0.0984	0.2105
Economic motivation (X_7)	0.3990**	- 0.0837	0.0838	0.6909**	0.2000
Decision-making ability (X_8)	0.3479*	- 0.1881	0.0058	0.6048**	0.1316
Scientific orientation (X_9)	- 0.0284	- 0.0125	- 0.0711	0.0506	0.0749
Interest (X_{10})	0.1718	- 0.1304	- 0.2314	0.1498	0.0976
Information seeking behaviour (X_{11})	0.0232	0.0994	0.1740	0.4573**	0.1193
Knowledge (X_{12})	0.0570	- 0.0888	0.1675	0.2107	0.1467
Attitude (X_{13})	- 0.1523	0.2829*	0.1598	- 0.0299	0.0204

** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed).

level of knowledge followed by 34% in the medium category. As many as 94% respondents had favourable attitude followed by 6% more favourable. Analysis of simple correlations amongst the independent variables were done and results are presented in Tables 6 and 7. Tables 6 reveals positively significant correlation between operational holding and age (r = 0.3676, significant at 1%), income and age (r = 0.3782, significant at 1%), economic motivation and age (r = 0.3990, significant at 1%), decision-making ability and age (r = 0.3479, significant at 5%), attitude and education (r = 0.2829, significant at 5%), income and main occupation (r = 0.3354, significant at 5%). Table 7 reveals positively significant correlations between economic motivation and income (r = 0.6909, significant at 1%), decision-making ability and income (r = 0.6018, significant at 1%), information seeking behaviour and income (r = 0.4573, significant at 1%), economic motivation and decision-making ability (r = 0.5769, significant at 1%), knowledge and information seeking behaviour (r = 0.3268, significant at 5%).

Negatively significant correlations were observed between interest and attitude towards fish farming {r = (-) 0.3393, significant at 5%}, age and education {r = (-) 0.5275, significant at 1%}. Individual independent characteristic and management practices and pond management practices adopted by the farmers had negative correlations with education (X_2) at 1% level {r = (-) 0.4247} and attitude (X_{13}) at 5% level {r = (-) 0.2863}. Table 8 reveals the details of correlation amongst the independent variables and pond management practices.

DISCUSSION

The farmers of the district in general live under uncertain, harsh social and environmental conditions. People are basically small holders (80.12%) and 75.25% people live below the poverty line (Anon, 2009). GINI co-efficient of the district is 0.488 (AHDR, 2003). They operate their farms with little access to land, water, extension service and credit. Farming in the district itself is fraught with the uncertainties of floods, drought and anthropo-political conflicts. The fish farmers are normally repelled to high input farming technologies owing to (i) adoption does not sustain due to high cost involved; (ii) low access of the household to technology extension and credit; and (iii) vulnerability of the households to risk involved such as floods, drought and societal problems (Lightfoot et al., 1992).

Scientific and technological revolution (STR) is characterized by deep interconnection and interaction of processes and fundamental changes in all the areas of science, technology and

Table 7. Correlations amongst the independent variables.

Variable	Pearson correlation							
	Localiteness-cosmopoliteness (X_6)	Economic motivation (X_7)	Decision-making ability (X_8)	Scientific orientation (X_9)	Interest (X_{10})	Information seeking behaviour (X_{11})	Knowledge (X_{12})	Attitude (X_{13})
Age (X_1)	0.1051	0.3990**	0.3479*	-0.0284	0.1718	0.0232	0.0570	-0.1523
Education (X_2)	-0.0275	-0.0837	-0.1881	-0.0125	-0.1304	0.0994	-0.0888	0.2829*
Main occupation (X_3)	-0.1695	0.0838	0.0058	-0.0711	-0.2314	0.1740	0.1675	0.1598
Annual income (X_4)	-0.0984	0.6909**	0.6048**	0.0506	0.1498	0.4573*	0.2107	-0.0299
Operational holding (X_5)	0.2105	0.2000	0.1316	0.0749	0.0976	0.1193	0.1467	0.0204
Localiteness-cosmopoliteness (X_6)	1.0000	-0.0947	-0.1853	0.2279	0.0130	-0.2706	-0.1290	-0.1043
Economic motivation (X_7)	-0.0947	1.0000	0.5769**	-0.0894	0.1907	0.1977	0.1212	-0.2159
Decision-making ability (X_8)	-0.1853	0.5769**	1.0000	-0.1175	0.2699	0.4341**	0.1174	-0.2401
Scientific orientation (X_9)	0.2279	-0.0894	-0.1175	1.0000	-0.0835	-0.1945	-0.0956	0.1653
Interest (X_{10})	0.0130	0.1907	0.2699	-0.0835	1.0000	0.0072	0.0589	-0.3393*
Information seeking behaviour (X_{11})	-0.2706	0.1977	0.4341**	-0.1945	0.0072	1.0000	0.3268*	0.0321
Knowledge (X_{12})	-0.1290	0.1212	0.1174	-0.0956	0.0589	0.3268*	1.0000	0.1743
Attitude (X_{13})	-0.1043	-0.2159	-0.2401	0.1653	-0.3393*	0.0321	0.1743	1.0000

** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed).

production, with science playing the leading role as the productive force(Marinko, 1989). Science embodies Francis Bacon's postulate 'Knowledge is power'. The present study established the Bacon's postulate exhibiting positive correlation of farmers' knowledge with farmers' attitude, information seeking behaviour, decision making ability, economic motivation and income. Science and technology constitute the means of enhancing men's strength and the potentiality of his hands and brain. Production as such is unthinkable without economics and the science of management. Drawing on the actor oriented perspectives in rural sociology (Long and Long, 1992), it was advocated that success of adoption of a technology at higher level are not merely a function of the technology, nor of the research and extension methodology, but result from a complex conjunction of people and events with outcomes. According to Wilkening (1953) adoption of a specific practice is not the result of a single decision to act but series of action and meaningful decisions. Rogers (2003) explains that the adoption decision and its timing depend on decision maker's perception and inherent characteristics, with innovators at one extreme and laggards at the others. Farmers in the same environment have different objectives and livelihood strategies and therefore respond differently to a given technology. Only 18% of the respondents have adopted fish farming as major occupation, rest 82% were engaged in agriculture, other business and government jobs. Biot et al., (1995) suggested that 'different behaviour is as much a function of different opportunities and constraints as of different perception'. Even within the farm households, the ability to make decision on resource use and technology adoption varies according to age, gender and other category and actual decision can depend on a complex bargaining process amongst the members (Ellis, 1993; Jackson, 1995 and Biot et al., 1995). Beyond the household group processes and ability to harness them can play a crucial role in adoption decision (Chamala and Mortiss, 1990; Frank and Chamala, 1992; Pretty and Shah, 1994). While Wozniak (1984) opined that education increases ones' ability to receive decode and understand information relevant to making innovative decisions; Clay et al. (1998) found that education is an insignificant

Table 8. Correlations amongst independent variables and pond management practices.

Pearson correlation	Variable	Pond management
	Age (X_1)	0.2781
	Education (X_2)	-0.4247**
	Main occupation (X_3)	-0.0930
	Income (X_4)	0.0540
	Operational holding (X_5)	0.0879
	Localiteness-cosmopoliteness (X_6)	0.1885
	Economic motivation (X_7)	0.0381
	Decision-making ability (X_8)	0.2215
	Scientific orientation (X_9)	0.1095
	Interest (X_{10})	-0.0306
	Information seeking behaviour (X_{11})	-0.1369
	Knowledge (X_{12})	-0.0325
	Attitude (X_{13})	-0.2863*

** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed).

determinant of adoption decision. In this study it was hypothesized that high level of institutional education increases the probability of adopting new technology. The present study revealed negative correlation of educational qualification with decision making ability. Au and Enderwick (2000) explained that six beliefs *viz*., compatibility, enhanced value, perceived benefits, adaptive experiences, perceived difficulties and suppliers' commitments; affect the cognitive process that determines the farmers' attitude towards technology adoption. The present study revealed positive correlation with main occupation, education, scientific orientation, information seeking behaviour, knowledge and operational holdings. The present study suggests a change in farmers' attitude for development of aquaculture in the district.

Conclusion

Fisheries have been a caste based activity in Assam. Flood plain lakes, which were once unmanaged natural water bodies, were the main source of fish. Baruah et.al. (2000) opined that historically there have been three distinct groups of people involved in fisheries activity: (i) those who catch fish for their own daily consumption; (ii) those belonging to the fisher community and (iii) the rural fisher entrepreneurs (leaseholders). Ordinary people usually catch fish daily for food, while fishers are full-time operators.

Aquaculture is comparatively new sector of food production and it is undergoing continuous change in Assam. During last the 20 years it has been mastering a driving force that has propelled aquaculture to the forefront. However, pond productivity is limited to 2800 kg/ha in Goalpara, Assam although much higher yields (5000 kg/ha) have been recorded by Luu et al. (2003) in China and Vietnam. Biophysical potential of aquaculture in Assam reveals that same production could be achieved if recommended pond management practices are adopted by the farmers. This study on farmer's adoption behaviour suggests that they should be substantially trained on the latest technological innovations in aquaculture for a paradigm shift from the current perception on aquaculture as a poverty alleviation programme to a prestigious income generating enterprise.

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