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INTER DISCIPLINARY APPROACH TO AQUACULTURE - WITH SPECIAL REFERENCE TO DAMDAMA, HARYANA

SONDIP K. MATHUR, ATUL K. JAIN & P. V. SUBBARAO
Central Institute of Fisheries Education, Versova, Bombay-400 061.

ABSTRACT

Successful aquaculture development depends not only on the economic evaluation of the cost parameters involved, but also a careful consideration of various biosocio-econmic factors is required. Financial viability has to be iinked with location specific technology packaging within the framework of integrated rural development.

INTRODUCTION

The aquaculture industry, in India, is developing from collections of small enterpreneurial establishments to a stage where much larger investments are being considered by more cost conscious individuals and institutions. Increasingly it is being recognised that aquaculture can be integrated with agriculture and is a strong tool to bring about socio-economic uplift in rural areas.

In India traditional agricultural practices predominate and fish farming is basically a new concept. The agricultural sector is the major component of the national economy, diversification and implementation of new practices have to be viewed from the macro aspects of biosocio-economics, that is, transfer or technology, updating of rural manpywer, rural integrated development, institutional finance, etc.

The CIFE, Bombay, has undertaken a research-cum-pilot project in fish seed production at Damdama (Gurgaon Distt.) in Haryana. It has successfully established an aquaculture enterprise and profitably institutionalized its technology. The technology adopted is constituted in the demonstration of fish hatchery model, CIFE-D-81, implemented at a capital cost of about 1.49 lakhs.

The problems associated with fish seed production in a semiarid zone have been overcome by undertaking fish breeding in controlled hatchery. Factors influencing efficiency in production are the hatchery units, spawn tank and the

nursery. The returns to technology have been high, spawn production was 57 lakhs in 1982, 66 lakhs in 1983, and there was a phenomenal increase to 1883 lakhs in 1984.

ECONOMICS

Rational investment decisions require basic cost information. Economic evaluation of existing operations must be made available to potential investors. The reliability of the basic input and output figures in a profitability analysis depends on technical, economic and managerial factors. The species to be farmed determine the accuracy of technical information on biological and design requirements, changes in economic factors such as capital costs, variable input costs, or sales revenues, have significant effeets on the apparent profitability of a project. However, unfortunately most of the risk and uncertainty in fish farming is associated with the quality of husbandry and management, and such human factors are generally unqantifiable.

Costs of any particular operation may differ considerably as they tend to be location-specific. The figures presented in Table I and II are intended only as examples of particular parameters and variables involved.

Table I : Capital costs

Item	Rate (Rs.)	Amount (Rs.)
Equipment of 24 Jar Hatchery Complex		
Cost of pool, 6x3 ft. (6 nos.)	2,000	12,000
Hatchery Bucket, 24 nos.	600	14,400
Hapa (nylon), 6 nos.	6,00	36,000
Pipes, etc.		8,673.7
Air Compressor with trolley		10,000
Aeration accessories, etc.		6,875
Hatchery jars with stand		10,000
Tullu pump, Diesel pump		17,000
Water storage tank		16,000
Breeding tanks		12,000
Others		5,620.3
Subtotal		1,48,569
Land and Building Costs		
Building		1,05,000
Cost of wasteland (2.5 ha.)	17,000/acre	1,06,250
Contruction/development costs (total operational area is 1.2 ha)	14.5/100 sq. ft.	16,119.36
Subtotal		2,27,369.36
Grand Total (capital costs)		3,75,938.36

Table II : Establishment expenses, operational costs, depreciation interest total Expenditure, gross and net incomes (imputed)

Item	Rate (Rs.)	Amount
Establishment expenses		
Salary (imputed) of manager (annual)	1,00/month	12,000
Skilled workers (4 nos.)	360/month	17,280
Miscellaneous		5,000
Subtotal		34,280
Operational Costs		
Brooders (300 kg.)	15/kg	4,500
Pituitary glands (4 gms.)		4,000
Manuring (40 quintals)	15/qn.	600
Feeding Costs for 1.2 ha.		
oil cake, 6 quintals (1 ha.)	200/qn.	
rice bran, 6 quintals (1 ha.)	100/qn.	2,160
Glassware. nets, etc.		10,000
Miscellaneous		538
Subtotal		21,798
Depreciation		
Buildings. Construction costs, Hatchery	10%/annum	26,968.8
Glassware, nets, etc.	30%/annum	3.000
Subtotal		29,968.8
Interest on total capital costs (3,75,938.36	12%/annum	45,112.6
Total Expenditure (Grand Total		1,31,159.4
Gross Income (imputed) for 1984, Total spewn production was 18.8 million		
13.8 millon spawn	400/lakh	55,200
2.5 million fish fry	50/1000	1,25,000
(5 million stocked, 50% survival rate)		1,80,200
Subtotal		
Net Income (Gross income less total Expenditure for 1.2 ha.)		49,040.6
∴ Net income/hactare is Rs. 40,867.16		

It should be noted that this project was a research project, intended for demonstration in an existing situation. In a recommended project, the need to transport fish to another farm for fish seed production may be easily circumvented The fish seed will be produced at the farm, though at an additional cost, but duplication of resources will be avoided and considerable reduction in expenditure on equipment and glassware will accrue.

State Fisheries Department

At present Haryana is importing fish from Calcutta. The State Fisheries Department (SFD) has over 10 fish farms and aims at achieving self-sufficiency in fish seed production. The SFD undertakes the provision of farms, hatchery building, etc. All physical requirements are provided, the main requirements being brooders, diesel engine, water supply, tubewell, etc Besides, the deptt. is responsible for the maintenance of farm, building and the finance of manpower.

The fish spawn produced at Damdama is distributed by the SFD to their farms at Rohtak, Rewari, Sonepat, Narnaul, Karnal, Ambala, Sohna, etc. The State Govt. has established a Fish Farmers Development Agency (FFDA) for encouraging and guiding production of fish by local farmers.

Rural Development and Institutional Finance

The FFDA sponsors a training programme in culture practices. The participating farmers are given a stipend of Rs. 15/day. The training, which, extends for a fortnight, familiarizes the participants with the basics of fish culture.

The loans and finance granted by the SFD, by way of installation, construction and development costs, is based on two categories. Firstly, a loan of Rs. 10.000/ha. for old ponds (community ponds and ponds on lease) and secondly, Rs. 30,000/ha. finance for the construction of new ponds. In both the cases an additional Rs. 5,000/ha. is provided for the cost of imputs, i. e., fish seed and feed For bigger projects, finance of Rs. 25,000 is provided for the installation of a tubewell. The respective loan amounts are granted alongwith a 25% subsidy.

Furthermore, the SFD compiles a project report and forwards the case to the respective financial institutions. The State Fisheries Department co-operates with local farmers in solving their problems regarding decision making and management. Besides, in collaboration with Gram Panchayats it facilitates the auction of old village ponds and encourages diversification into fish culture. The Central Govt. and the SFDA have distributed kits enabling the farmers to produce fish seed, themselves thus encouraging the transfer of technology.

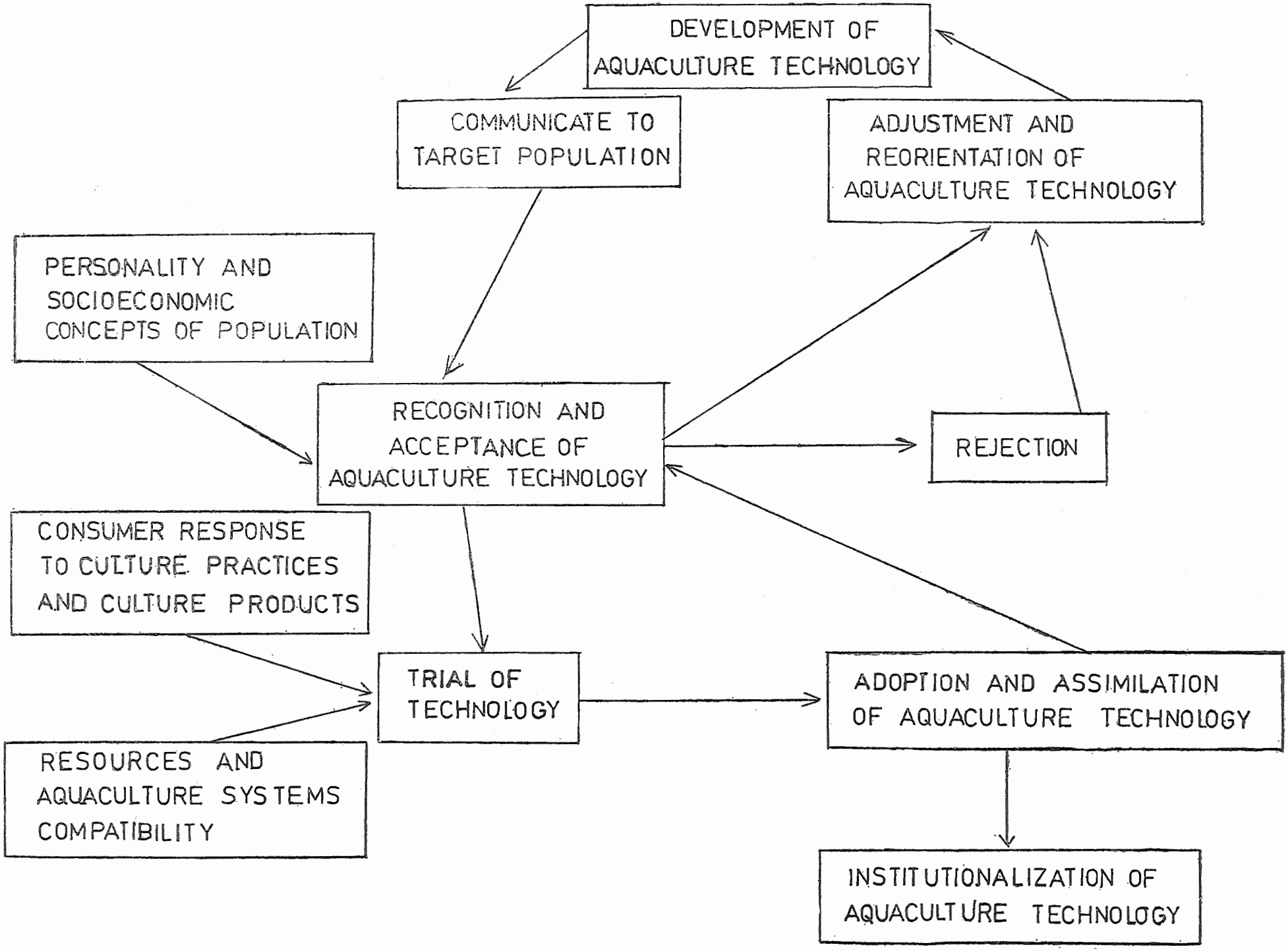
Scope for the generation of employment is created with finance being granted under a new self-employment scheme. Haryana being traditionally an agricultural state, the response of local manpower can be said to be enthusiastic and the impact of induced breeding technology favourable.

DISCUSSION

The analysis regarding the factors involved in establishing an aquaculture enterprise has been presented in the Table III and the flow diagram.

Table III : Decision points in implementing Aquaculture Technology

Decision points involved	Assessment of specific factor leading to favourable implementation of Aquaculture Technology	Comments
Need to increase animal protein	Positive	If negative, then need to implement technology may not be justified
Assessment of consumer demand for fish	Positive	If negative, project may prove to be unprofitable
Availability of fresh fish in market	Negative	If positive, then fresh fish supply will overcome demand gap
Potential to increase availability from capture fish	Negative	If positive, then further exploitation of resources will remove supply constraint
Evaluation of natural resource inputs in aquaculture	Positive	If negative; unfavourable conditions for establishing enterprise
Cost/benefit analysis of Aquaculture versus other animal proteins	Positive	If negative, then there will be a lack of incentive to local farmers to diversify into aquaculture
Assessment of infrastructure	Positive	If negative, then explore possibility of developing infrastructure
Biosocioecioeconomic analysis of alternative aquaculture techno-logies including species choice	Select appropriate technology, assess availability of skilled labor, assess distribution of capital	Adjust technology, stimulate attitude towards proposed changes, Establish training programme, develop credit channel
Make technology available		
Establish aquaculture enterprise		


DEVELOPMENT OF AQUACULTURE TECHNOLOGY
COMMUNICATE TO TARGET POPULATION
ADJUSTMENT AND REORIENTATION OF AQUACULTURE TECHNOLOGY
PERSONALITY AND SOCIOECONOMIC CONCEPTS OF POPULATION
RECOGNITION AND ACCEPTANCE OF AQUACULTURE TECHNOLOGY
REJECTION
CONSUMER RESPONSE TO CULTURE PRACTICES AND CULTURE PRODUCTS
TRIAL OF TECHNOLOGY
ADOPTION AND ASSIMILATION OF AQUACULTURE TECHNOLOGY
RESOURCES AND AQUACULTURE SYSTEMS COMPATIBILITY
INSTITUTIONALIZATION OF AQUACULTURE TECHNOLOGY

CONCLUSION

The project has demonstrated that fish seed production is commercially viable in Haryana and if this enterprise is taken up by entrepreneurs. the state will become self sufficient in fish seed production.

Successful aquaculture development depends upon careful consideration and the harmonizing of economic. socio-cultural, scientific, and technological factors. If any are overlooked, projects may faill. It is the location-specific differe-rences that make technology packaging difficult and adaptation to locally preva-iling conditions. The need is for an interdisciplinary approach to aquaculture development.

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