

**ECONOMIC FEASIBILITY OF COMPOSITE FISH CULTURE IN  
LEASED-IN VILLAGE TANKS OF KANYAKUMARI DISTRICT -  
AN INVESTMENT ANALYSIS**

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**ABSTRACT**

Kanyakumari district belonging to the high rainfall zone has resource advantages for composite fish culture in the leased-in village tanks. There are more than 400 fish farmers operating in leased-in tanks following composite fish culture under the FFDA programme. To estimate the economic feasibility and financial viability of the enterprise, the present study was taken up. 38 fish farmers selected from the district provided the necessary information like capital investment, costs and return and constraints. The data collected were analysed and a farm nearest to the average farm situation was taken as the representative farm. Investment criteria like PayBack Period (PBP), Simple Rate of Returns (SRR), Net Present Value (NPV) and Benefit Cost Ratio (BCR) were estimated taking into account a period of 10 years, the period for which the village tanks are leased-out to fish farmers under the FFDA programme. The analysis indicated the profitability of composite fish culture in village tanks in the district and the results are discussed with recommendations.

Freshwater fish culture in India had developed rapidly after the introduction of Fish Farmers Development Agencies (FFDAs) during the 5th Five Year Plan. The average national productivity has gone up from a mere 582 kg/ha/year in 1979-80 to 1865 kg/ha/year in 1989-90 (Chauhan, 1991). In the state of Tamil Nadu, the FFDA introduced in the seventies has provided an impetus to inland fisheries development and now there are 13 FFDA's covering 4500 ha of waterspread area (Subbaiah, 1991).

Kanyakumari district belonging to the high rainfall zone has resource advantages for composite fish culture in the village tanks. There are more than 400 fish farmers operating in leased-in culture tanks following composite fish culture technology. The ownership of the tanks may be with village Panchayat or Public Works Department or Revenue Department. The need for the estimation of the economic feasibility and financial viability of the enterprise is well understood.

There are many methods that could be used to evaluate investment projects and the measures most widely used are Pay Back Period (PBP), Simple Rate of Returns (SRR) and the discounted criteria like Net Present Value (NPV), Internal Rate of Return (IRR) and Benefit-Cost Ratio (BCR) (Shang, 1981; Gittinger, 1982). Hence the present study was taken up to appraise aquaculture projects in the district using the above criteria except IRR.

Four villages were purposely selected from two talukas where fish culture is practiced by a large number of farmers. Thirty eight fish farmers were selected randomly and information on capital investment, operating costs and returns of the enterprise for the culture period 1990-91 collected using a structured and pretested interview schedule. The collected data were tabulated and analysed to estimate the average farm. The farm which was closest to the average farm situation was finally selected for project analysis. The tank "Sorikulam" located in North Thamarai-kulam village of Agatheeswaram taluka was nearest to the average farm situation and was selected for further analysis. Using the data of this representative farm, investment criteria were estimated.

Investment analysis was carried out for 10 years based on earlier studies (Shang, 1981; Firdausy and Tisdell, 1991). Firdausy and Tisdell (1991) have assumed no change in annual operating cost and price of output, whereas Shang (1981) assumed a 2% increase in cost

and price. Shang's (1981) procedure was followed in the study.

For selecting the rate of discount, there are different views on what rate should be used (Tisdell, 1972; Pearce and Nash, 1981; Gittinger, 1982; Mishan, 1982). In the present study, a discount rate of 13% was assumed as the opportunity cost of capital which is the interest rate paid by the State Bank of India for term deposits of over 5 years period.

*Freshwater fish culture in Kanakumari district* : Composite fish culture of Indian major carps and Chinese carps with a 5 species combination of catla (*Catla catla*), rohu (*Labeo rohita*), mrigal (*Cirrhinus mrigala*), silver carp (*Hypophthalmichthys molitrix*) and grass carp (*Ctenopharyngodon idella*) is followed. The fingerlings are stocked during June-July at the density of 5000 nos/ha and harvested during April-May. The average production per ha is 1500 kg/yr. There is much scope for the development of freshwater fish culture in the district, if the recommended package of practices is followed by the fish farmers.

*Characteristics of the representative farm selected for investment analysis* : The size of the tank was 2 ha under the individual operatorship of Mr. P. Shanmugam, a progressive farmer. Composite fish culture by stocking 5 species combination of catla, rohu, mrigal, silver carp and grass carp at a stocking density of 4825 no/ha was taken up. The value of the tank was estimated at Rs.50,000 with inlet and outlet

structures having weldmesh shutters worth Rs. 800. The annual lease amount was Rs. 240. The yield of fish harvested was 750 kg/ha/year.

*Capital investment and operating cost* : Capital investment and operating costs were estimated for the representative farm and presented in

Table 1. The estimated capital investment was Rs. 5426/ha comprising mainly renovation cost followed by values of fishing nets and inlet and outlet structures. The economic life of fishing nets was 5 years. The operating costs include preparation of tank with liming and pumping-in of water, manuring and

Tabel 1 : *Estimated capital investment and operating costs (Rs./ha) for leased-in freshwater fish culture tanks in Kanyakumari district for 1992*

Item	Years										
	1	2	3	4	5	6	7	8	9	10	
<b>Capital Costs</b>											
Tank renovation	4000 <sup>a</sup>										
Fishing nets	1026					1026 <sup>d</sup>					
Inlet and outlet structures	400										
Total	5426										
<b>Operating costs</b>											
Preparation tank	500										
Manuring and fertilisation	560										
Stocking	1436										
Supplementary feeding	110										
Harvesting	300										
Water and ward	225										
Rent	120 <sup>b</sup>										
Service charges	150 <sup>c</sup>										
Total	3416	3484	3554	3625	3697	3772	3847	3924	4002	4082 <sup>e</sup>	
Total returns	6625	6758	6893	7031	7171	7315	7461	7610	7762	7918 <sup>f</sup>	
Net returns	3209	3274	3339	3406	3474	3543	3614	3686	3760	3836	

Data based on 1990 costs and prices.

a Estimated from the maximum ceiling allowed by Govt. of India for the first year (Chauhan, 1991).

b Lease amount

c Service charges paid to FFDA

d Replacement cost

e Assumed 2% increase in cost annually.

f Assumed 2% increase in price annually.

Table 2 : *Estimated investment criteria for leased-in freshwater fish culture tanks in Kanyakumari district for 1992.*

Investment criteria	Estimated values
Pay Back Period (PBP)	1.54 Years
Simple Rate of Returns (SRR)	64.76 %
Net Present Value (NPV)	Rs. 13,274
Benefit Cost Ratio (BCR)	1:3.45

fertilization using cattle manure, urea and super phosphate, stocking, supplementary feeding with rice bran and groundnut oilcake, labour charges for sampling, harvesting and watch and ward and lease amount and service charges paid to FFDA. It could be seen that the cost of stocking was higher (42.04%) than that of any other culture operation.

*Investment analysis* : The results of the investment analysis using investment criteria like PBP, SRR, NPV and BCR are presented in Table 2. The PBP which estimates the time required to recover the initial investment was estimated to be 1.54 years whereas for milkfish production Agbayani *et al.* (1989) estimated PBP ranging from 1.15 years to 1.58 years. The SRR estimated was 64.76% whereas Agbayani *et al.* (1989) observed a rate of return of 57% to 82% without loan and 49% to 74% with loan while comparing the profitability of modular pond system of milkfish production in the Philippines. The discounted criteria, NPV and BCR estimated for leased-in tanks were Rs. 13,274 and 1:3.45, respectively.

The investment analysis carried out showed that composite fish culture in leased-in village tanks were economically

feasible and financially viable as shown by shorter PBP, higher SRR and wider BCR. There is possibility for increasing freshwater fish production in the district, if farmers follow the full package of scientific fish farming with liberal credit support, research and extension services.

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