

# **Economic Assessment of Shrimp Farming (*Litopenaeus vannamei*) in Gujarat - A Profitable Venture**

Brijesh Kumar<sup>1\*</sup>, Rama Sharma<sup>2</sup>, W.S. Lakra<sup>3</sup>, Arpita Sharma<sup>4</sup>, Swadesh Prakesh<sup>5</sup>, Manoj M. Sharma<sup>6</sup>

ICAR- Central institute of Fisheries Education, Mumbai, Maharashtra, India<sup>1, 2, 3, 4, 5</sup>

Mayank Aquaculture Private Limited, Surat, Gujarat, India<sup>6</sup>

**ABSTRACT:** The present paper exhibits the progress made by shrimp farmers of Gujarat by adopting *Litopenaeus vannamei* farming which has become a profitable venture for them. Shrimp farming in India has recorded remarkable growth during the last three decades especially in coastal states. Optimum use of potential areas and diversified farming practices has not only provided tremendous opportunity to farmers residing along coastal areas but also brought them prosperity. Gujarat has the highest productivity of 13.59 MT/ha/year in *L.vannamei* farming. In Gujarat, four districts viz; Valsad, Navsari, Surat and Bharuch are the major contributors for shrimp production having 95% of state shrimp farmer's population with the potential area of 69,583.91ha. Primary data was collected from 30 shrimp farmers of Valsad district by using structured interview schedule. An attempt has been made to assess an economic viability of *L. Vannamei* farming and extent of contribution towards the uplift of their socio-economic status. This study will be of immense help to encourage the farmers of other areas to get involved in shrimp farming to earn better livelihood.

**KEYWORDS:** Economic assessment, Shrimp farming, *Litopenaeus vannamei*, Gujarat

## **I. INTRODUCTION**

In the recent years, shrimp aquaculture has played a vital role by providing alternative source of income for shrimp farmers along the coastal districts of Gujarat and is considered as a sunrise sector for supporting economic development. Farm practices of shrimp culture have attracted considerable attention for its food supply and became a major contributor towards foreign exchange earner. Because of this fact other countries have also given shrimp farming industry, a high priority in their fisheries programs.

Ministry of Agriculture under Government of India has granted the permission in 2008 for importing the brood stock of *L. vannamei*, which has benefited shrimp production in India. Coastal Aquaculture Authority, had approved *L.vannamei* culture in the States of Andhra Pradesh, Tamil Nadu, Maharashtra, Gujarat, Orissa, Goa and Union Territories of Diu and Pondicherry. The *L.vannamei* farming was started with 107 farms in total, 745 ha area (water spread area of 1,117 ha) in 2009 which had progressively grown to 1,037 farms in total, 951.12 ha area (water spread area of 6,728.20 ha) in 2014. SPF *L.vannamei* production of these farms had also increased considerably with the production ranging from 10 to 12 MT/ha/yr. Rise in productivity of *L.vannamei* farms not only had resulted the overall productivity of shrimp sector but also the volume of shrimp export from India (DAHD&F, 2012)[1]. Till (2011-12), the total area developed for brackish water aquaculture was about 1.53 lakh ha and out of that around 1.23 lakh ha was utilized for shrimp farming (CIBA, 2012)[2]. During this period, farm shrimp production was about 2, 16,494 MT which include 80,716 MT of *L.vannamei* (CIBA, 2012). Since then shrimp market demand started increasing with positive signs and its price trend in various international markets had in turns gave significant revenue to the country.

Increasing demand of shrimp and shrimp products in international markets and its over exploitation from coastal waters had resulted a wide gap between the demand and supply. This has enhanced the possibility to explore other avenues for increasing shrimp production. In India, estimated brackish water area suitable for shrimp culture is approx. 11.91 lakh ha. which has spread over 10 states and a union territory viz. West Bengal, Orissa, Andhra Pradesh, Tamil Nadu,

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Pondicherry, Kerala, Karnataka, Maharashtra, Gujarat and Goa. Out of this, around 1.356 lakh ha area is currently under shrimp farming and signifies that lot of scope exists for entrepreneurs to venture into this field of activity. (NABARD, 2016)[3]

Gujarat contributes approx. 1.80% of national shrimp production and stands second in brackish water area after West Bengal. Among top shrimp producing state, Gujarat has vast potential in inland, marine and brackish water fisheries resources with highest productivity. State has suitable land also for brackish water aquaculture for taking up shrimp farming. Thus, fisheries department of the state is regularly emphasizing the need for continuous development of modern techniques and innovation in *L.vannamei* culture. Adoption of such measures can not only boost the shrimp industry but also enhance the livelihood of shrimp farmers and becomes the major contributor towards the commercial shrimp culture.

State has 12 coastal districts and a union territory of Diu but only four of the districts viz; Valsad, Navsari, Surat and Bharuch are the major contributors for state shrimp production. These districts are having 95% of state fisher's population with potential area of 69,583.91 ha for shrimp production. With this background, an attempt has been made to assess an economic viability of *L.vannamei* culture done between the study periods 2012 to 2015.

## II .MATERIALS AND METHODS

Among the four coastal districts, Valsad district exist in the extreme part of south Gujarat. Total registered shrimp farms are 105 only and belongs to two blocks; Valsad and Pardi. Valsad district comprises of 11 villages, viz; Kakwadi, Bhadel, Jagalala, Malvan, Bhagal, Untadi, Kosamba, Danti, Hingraj, Navapura including one Palsana village in Pardi. To assess the socioeconomic status of *L.vannamei* shrimp farmers there, and primary data was collected through interviewing 30 shrimp farmers by using pretested structural questionnaire. Secondary data was also collected from DoF, Valsad and MPEDA etc. Collected data was then analyzed by using statistical software SPSS version 20.0. To estimate the various cost and income (Salim and Biradar, 2011)[4] and to obtain profitability measures (Dhondyal 1998, Lekhi and Singh, 1999) [5][6] such as gross profit, net profit, pure profit, return to capital, output input ratio, rate of return and benefit cost ratio (Raju and Rao 1993), [7] farm business analysis is used.

### 1. Total Fixed Cost (TFC):

A cost that doesn't change with an increase or decrease in the level of production is known as total fixed cost and has to be borne by shrimp farmer in long run. This is also considered as Initial Cost (IC) of the farm.

### 2. Total Variable Cost (TVC):

Variable cost is the part of the total cost and changes with a change in output level. This is also considered as Operational Cost (OC) of the farm.

### 3. Total Cost (TC) = Total Fixed Cost + Total Variable Cost

### 4. Yield or Production:

It is defined as the production of shrimp per hectare per year and expressed in kg/ ha/yr.

a. Feed Conversion Ratio = Feed Intake / Weight Gain

b. Feed Conversion Efficiency = Feed Intake / Weight Gain \* 100

### 5. Gross Income (GI) = Quantity of Produce \* Selling price

### 6. Net Income (NI) = Gross Income - Total cost

### 7. Gross Profit (GP) = Total Return - Total Operational Cost

### 8. Net Profit (NP) = Total Return - Total Cost

### 9. Pure Profit (PP) = Net Profit - Opportunity Cost of Family Labour

### 10. Return to Capital = Net Profit - Unpaid family labour / Total Cost \* 100

### 11. Output-Input ratio = Total Returns / Total Cost

### 12. Benefit Cost Ratio = Gross Income / Total Cost

### 13. Net Benefit Cost Ratio = Benefit Cost Ratio - 1

### 14. Pay-Back- Period = Number of years required to recover the investment

### 15. Rate of Return on Investment = Gross Farm Income / Total Investment \* 100

### 16. Rate of Return on Variable Cost = Gross Farm Income / Variable cost \* 100

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### III.RESULTS AND DISCUSSION

In Valsad district, overall 65-75% farmers are practicing *L.vannamei* farming and 35-25 % are practicing *P.monodon* as their primary occupation. All these farmers are well equipped with techno-feasibility of shrimp culture and are progressive in nature. Government Institutions such as MPEDA, SAU, Navsari and DOF, Valsad are regularly organizing short term training programmes and had helped them to increase their level of awareness. Operational feedbacks are also provided time to time by input supplier of seed, feed and equipment companies. About 20% of these farmers have constructed their farms in their own land and other 80% have constructed either in leased land or in their relative's land. Their demographic statistics are given in the table 1.

**Table 1: Social profile of *L.vannamei* farmers of Valsad district (n=30)**

Sl.No.	Particulars	Category	Frequency
1.	Sex	Male	26 (86.67)
		Female	4(13.33)
2.	Age	<25	1(3.33)
		25-35	10(33.33)
		35-45	14(33.33)
		>45	5(16.67)
3.	Religion	Hindu	28(93.33)
		Muslim	2(6.67)
4.	Category	GEN	9(30.00)
		OBC	17(56.67)
		SC	3(10.00)
		ST	1(3.33)
5.	Education	Primary	1(3.33)
		Secondary	12(40.00)
		Sr. Secondary	7(23.33)
		UG	8(26.67)
		PG or PhD	2(6.67)
6.	Family type	Nuclear	18(60.00)
		Joint	12(40.00)
7.	Family size	≤ 4	9(30.00)
		5 and 6	13(43.33)
		≥7	8(26.67)
8.	Home equipment	Mobile	30(100.00)
		TV	30(100.00)
		Freeze	30(100.00)
		AC	6(20.00)
		Two Wheeler	30(100.00)
		Four Wheeler	11(36.67)

Note: Figure in the parenthesis shows percentage with respect to total sample size.

Data summarized in the Table1 shows that majority of the males 26 (86.68 %) and 4female (13.33%) are involved in shrimp farming but still it is considered as family activity. Now days, female participation is increasing as leasing is more essay to woman's due to lack of competition in the venture. Majority of the farmers (46.67 %) are middle aged between 35-45 years, followed by younger generation (33.33 %), who are aged between 25-35 years. As far as their literacy is concerned, 40.00% of the respondents are having education up to secondary school followed by undergraduate degree (26.67 %), and senior secondary (23.33%) respectively. Majority of the farmers (93.33 %) involved in shrimp aquaculture are found to be Hindu while only 6.67%are Muslim. Nearly, (56.67 %) of them belongs

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to OBC and are from Tendel Gotra followed by General (30.00 %) respectively. The entire sample of *L.vannamei* shrimp farmers comes under above poverty line and owned pakka houses with necessary facilities. Almost all are the occupant of Mobile, Televisions, and Freeze while some of them (36.67%) have four wheelers and 20% of them even have air-conditioner in their houses. This makes it quite evident that *L.vannamei* farming in Valsad district have been playing vital role for up-lift of their socio-economic status.

**Table 2. Farm information *L.vannamei* farmers of Valsad district (n=30)**

Sl.No.	Particulars	Category	Frequency
1.	Farm ownership	Sole Proprietorship	20(66.67)
		Joint family	6(66.67)
		Partnership	3(10.00)
		Company	1(3.33)
2.	Farm Type	Semi-intensive	16(100.00)
		Intensive	12(40.00)
		P-line	2(6.67)
3.	Land holdings (ha)	≤ 3	8(26.67)
		>3 to <5	4(13.33)
		≥5	18(60.00)
4.	Training	DOF	15(50.00)
		NAU	5(16.67)
		MPEDA	10(33.33)
5.	Farming Experience	≤5	12(40.00)
		6 to 10	9(30.00)
		10 to 15	6(20.00)
		≥15	3(10.00)
6.	<i>L.vannamei</i> adoption	2014	8(26.67)
		2010	9(30.00)
		2008	9(30.00)
		2007	4(13.33)

Note: Figure in the parenthesis shows percentage with respect to total sample size.

The economic and social progress of farm household largely depends on the size of the operational house holding as observed from table 2. The majority of farmers have more than and equal to 5 ha (60.00%) land followed by only 26.67%, who are holding less than and equal to 3ha and 13.33% are holding between 3 to 5 ha. Number of ponds on the land holding in a farm ranged from 3 to 8 in number. Size of the pond varies from 0.5 to 2 ha but most of them are of 1 ha only because of easy operation and input and output calculation by the farmer. It was found that in 2014, 26.67 % of the farmers adopted *L.vannamei* whereas in both the years 2010 and 2008, 30.00% of them adopted *L.vannamei* and rest of them (13.33%) had adopted in 2007. As far as experience in aquaculture and shrimp farming is concerned, majority of them (40%) have less than equal to 5 year experience, 30% of them reported to have 6-10 years, 20% of them reported to have 10-15 years, while only 10% of them are having more than 15 years of experience

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Based on primary data collected, total fixed cost (TFC) has been estimated and following observations are found from table 3.

**Table 3: Total Fixed Cost (TFC) incurred for *L.vannamei* farming in Valsad**

Sl.No.	Parameters	Avg. Unit Cost in (Rs)	Avg. Cost in (Rs/ha/yr)	Contribution in (Rs)
1	Lease rent	816.66	816.67	0.01(0.73)
2	Pond construction	55,066.67	15,238.24	0.14(13.63)
3	Reservoir	61,633.33	4,533.89	0.04(4.06)
4	Inlet and Outlet	32,166.67	10,302.19	0.09(9.22)
5	Bio-security measures	3,433.33	2,132.28	0.02(1.91)
6	Farm hut	27,700.00	2,811.65	0.03(2.52)
7	Nets and Craft	4,466.66	2,110.36	0.02(1.89)
8	Lab Kit and Equipment	1,338.33	786.30	0.01(0.70)
9	Pump set	32,966.67	9,401.85	0.08(8.41)
10	Aerators	30,000.00	21,122.73	0.19(18.90)
11	Generator	20,9166.70	15,883.33	0.14(14.21)
12	Vehicle	53,433.33	4,965.31	0.04(4.44)
13	Mobile	3,466.66	1,321.67	0.01(1.18)
14	Miscellaneous	37,433.33	8,378.33	0.07(7.50)
15	Interest on TFC	@ 12%	11,976.58	0.11(10.71)
Total Fixed Cost (TFC)			1,11,781.38	1.00(100.00)

Note: Figure in the parenthesis shows percentage with respect to total sample size.

The first step to develop a farm is to take the land on lease. Lease period of the shrimp farm in Valsad is normally 20 years and average lease amount was found to be Rs.816.67 /ha/yr (0.73%) of TFC. After getting farm on lease, earth work and construction is normally done to develop pond, reservoirs and its inlet-outlet. These ponds and reservoirs are generally constructed by out-sourcing tractors and average cost of pond construction comes out as Rs.15,238.24/ha/yr (13.63%) of TFC and for reservoir Rs.4, 533.89 ha/yr (4.06 %) of TFC. Each reservoir and pond has one inlet made of PVC pipe and one outlet made of bricks and cement along with sluice gate to control the water level. Average cost for the same comes out as Rs.10, 302.19 /ha/yr (9.22%) of TFC.

Bio-security measures at shrimp farm include fencing for bird, crab, dog and facilities of disinfection and hygiene control for workers. The average cost for bio-security measures accounts nearly Rs. 2,132.28/ha/yr/ (1.91%) of TFC. Each of the shrimp farm has a farm hut as a store room for keeping feed or other equipment other than stay purpose. Average cost of the same come out as Rs. 2,811.65 /ha/yr (2.52%) of TFC. In shrimp farming, cast net is used for sampling purpose where partial harvesting is carried out through drag net. Average cost for net and craft comes out as Rs. 2,110.36/ ha/yr (1.89%) of TFC. Lab kit and digital equipment used at shrimp farm include different pH papers, DO and salinity meter. Average cost of these kits and equipment comes out nearly Rs. 786.30/ha/yr (0.70%) of TFC.

Use of pumps in coastal aquaculture is considered as an alternative solution for water to be forced from creek to reservoirs and ponds. Normally, 2-3 pumps are sufficient for 5 hectare farm if its slope and design are as per the requirement. Average cost of pump set comes out nearly Rs.9,401.85/ha/yr (8.41 %) of TFC. Aerators increases oxygen level in *L.vannamei* farming as higher stockings are used in grow-out system. They are required to improve water quality for increasing productivity, growth and survival rates. Paddlewheels are the most efficient aerator to increase

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dissolved oxygen levels in ponds. Recently, long shaft engine-run paddlewheel aerators have also been developed, which can be operated in remote areas far from power supplies. Average cost of aerators used by shrimp farmers is normally Rs.21,122.73/ha/yr (18.90 %) of TFC. Generators are normally used as backup appliances to supply electrical power during emergency and help to run all electrical equipment to avoid discontinuity so that daily farm activities can take place without disruption. Most of the farmer (85-90%) has a generator while (10-15%) uses diesel engine with long arm for running aerator. The average cost of generator borne by the shrimp farmer comes out as Rs. 15,883.33/ha/yr (14.21 %) of TFC.

Most of the farmers visit daily or twice their shrimp farms and use two wheelers for transportation purpose. The average cost of these vehicles to be borne by them is Rs.4,965.31/ha/yr (4.44 %) of TFC. The entire sample of Valsad shrimp farmers are well connected with their fellow farmers and get them updated with the latest information via mobile. The average cost of mobile comes out as Rs.1,321.67 ha/yr (1.18 %) of TFC. Miscellaneous cost for these shrimp farmers includes any emergency expenses, maintenance cost and annual depreciation of fixed cost. Normally, average miscellaneous cost comes out as Rs. 8,378.33 /ha/yr (7.50%) of TFC. They also have to bear 12 % per annum interest on fixed capital as per bank rate, average of which comes out as Rs.11,976.58 /ha/yr (10.71%) of TFC. In this way, total average fixed cost for a shrimp farmer is Rs. 1,11,781.38/ha/yr.

Shrimp farmers of *L.vannamei* farming in Valsad district also have to bear total variable cost (TVC) depends on 15 variables in all which comes as Rs.11,68,011.07/ha/yr. Details of these costs for each variable are given below in Table 4. From the table it is clear that the farmer has to bear the major cost of feed and seed used for the farming. Nearly, 70-80% *L.vannamei* farmers purchased seed from CAA approved SPF hatchery from Andhra Pradesh and Tamil Nadu, while the rest of them 30-20 % purchase from state hatcheries. Average seed cost comes out as Rs.25,9716.70 /ha/crop (22.24%) of TVC. Field study revealed that most of the farmers used formulated commercial feed with their preferences in the order of Avanti followed by C.P. Aqua, Godrej Agrovet, and from Growel, however they also use local feeds to fertilize their ponds initially before stocking to develop phyto-plankton and zoo-plankton. All the farmers follow feeding rates in different sizes and grades suggested by the feed supply company. The average cost of feed comes out as Rs. 44,6071.70/ha/crop (38.19%) of TVC.

**Table.4. Total Variable Cost (TVC) incurred for *L.vannamei* Farming in Valsad**

Sl.No.	Variables	Avg. Unit Cost in (Rs)	Avg. Cost in (Rs/ha/crop)	Contribution in (Rs)
1	Seed	0.76	25,9716.70	0.22(22.24)
2	Feed	83.33	44,6071.70	0.38(38.19)
3	Probiotic and Medicine	-	39,133.33	0.03(3.35)
4	Bleaching Powder	14.80	2,834.13	<.01(0.24)
5	Salt and Minerals	LS	19,366.67	0.02(1.66)
6	Electricity	6.50	62,213.33	0.05(5.33)
7	Fuel	53.16	54,470.50	0.05(4.66)
8	Agri-lime	8.46	9,178.33	0.01(0.79)
9	Labour Hired	225.00	34,643.33	0.03(2.97)
10	Labour family	500.00	38,291.67	0.03(3.28)
11	Transport	-	9,800.00	0.01(0.84)
12	Communication	-	3,148.66	<.01(0.27)
13	Maintenance	-	34,300.00	0.03(2.94)
14	Harvesting	-	12,602.32	0.01(1.08)
15	Miscellaneous	-	32,500.00	0.30(29.62)
16	Interest on TVC	@ 10%	1,09,740.40	0.09(9.40)
Total Variable Cost (TVC)			11,68,011.07	1.00(100.00)

Note: Figure in the parenthesis shows percentage with respect to total sample size.

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Gomez-Gil et. al., 2000[8] mentioned that probiotics plays an important role to provide a healthy environment to shrimp. Wang et al. (2005)[9] investigated the effect of commercial probiotics on water quality in shrimp, *L.vannamei*, ponds and revealed that probiotics can significantly reduce the concentrations of nitrogen and phosphorus in pond water compared with the control. Thus, the average cost for probiotics and medicine accounted for Rs.39, 133.33 /ha/crop (3.35%) of TVC. Some of the shrimp farmers in Valsad district apply bleaching powder for treatment of intake water as well as for disinfection of implements during pond preparation. Application rate of bleaching powder varies depending upon the application purpose and its quantity ranges between 100-1000 kg/ha/crop (D. Deboral Vimala. et. al., 2015) [10]. In Valsad district, shrimp farmers uses 100-300 kg/ha/yr and its average cost Rs. 2,834.13/ha/crop (0.24%) of TVC. In shrimp farms, salt and minerals are very important to control salinity and to trace nutrient in culture system and its average cost was Rs.19, 366.67 /ha/ crop (1.66%) of TVC. To disinfect the farm and to maintain the pH level, agriculture lime is used and average cost of this comes out nearly Rs.9,178.33ha/yr (0.79%) of TVC.

Farmer also has to bear electricity charges which can be used to operate pumps and agitators and on an average the cost for this was Rs. 62,213.33/ha/crop (5.33%) of TVC. Fuel, especially diesel was found to be used for running generator and electric equipment. As in Gujarat, diesel cost Rs 53.16/litre therefore, average fuel charge was Rs.54, 470.50 ha/yr (4.66%) of TVC. Labour is very important in variable cost which can be classified as hired labour and family labour. These hired labours generally comes from Bihar, Jharkhand and Orissa during culture period and average cost of this comes out as Rs.34643.33 ha/yr (2.97%) of TVC. Family labours mainly look after the farm but also works in absence of hired labour and on an average they are paid Rs. 34,643.33 ha/yr (2.97%) of TVC.

Shrimp farmers spend an average amount of Rs.9,800.00/ha/crop (0.84%) of TVC on transport to perform various activities such as bringing seed, feed and medicine etc. and uses for harvest marketing. They paid an average amount of Rs.3, 148.66 /ha/crop (0.27 %) of TVC for communication connection so that each farm can have communication facility to get the instant feedback. And the average maintenance charges comes out as Rs.34,300.00 /ha/crop (2.94%) of TVC. Harvesting is very crucial activity as it adds value to shrimp quality and also makes easier to determine the export price based on count/kg. *L.vannamei* farmers do harvesting with proper planning and use ice to maintain the freshness of shrimp while transportation. The average expenses for this were Rs.12, 602.32 /ha/ yr (1.08%) of TVC. On an average farmer bears Rs.32,500.00/ha/yr (29.62%) of TFC for miscellaneous expenses which include emergency cost, maintenance cost and annual depreciation on variable cost. Interest on variable cost was calculated on 10 % per annum as per bank and average amount of interest on variable cost comes out approximately Rs.1,09,740.40/ha/yr (9.40%) of TVC.

Below mentioned table 5 shows the disposal pattern of harvest of one crop grown in 123 days by *L.vannamei* farmers in Valsad district.

**Table 5. Production of *L.vannamei* farming for harvesting one crop in Valsad**

Sl.No.	Produced	Average Quantity in (kg)	Average unit cost in Rs.	Average Revenue (Rs./ha/crop)	Contribution in (Rs.)
1.	Exported	3974.24	402	15, 88,445	0.97 (97.44)
2.	Local Disposal	208.66	200	41732	0.02 (2.56)

Note: Figure in the parenthesis shows percentage with respect to total sample size.

Their crop had received record Average export revenue of Rs.15, 88,445 with an average production 3974.24 kg/ha(94.89%) which had average count 33/kg, with farm gate price Rs. 402/kg. Other than export, they also use the balance average shrimp harvest of 208.66 kg for local disposal which include home consumption 29.50 kg, gift to friend and relatives 34.50 kg, and sale for nearby markets 144.66 kg after excluding some wastage during harvesting. With this local disposal pattern, they also had been able to profit average revenue of Rs.41, 732/- @ Rs.200/ kg.

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Now to explore that to what extent *L.vannamei* farming is profitable venture for them, quantification of economic indicators has been done and is listed below in the table 6

**Table 6. Economic indicators and their quantification per hectare in one crop**

Sl.No.	Economic Indicators	Quantification of Indicators
1	Total Fixed Cost	Rs.1, 11,781.38
2	Total Variable Cost	Rs.11, 68,011.07
3	Total Cost	Rs.12, 79,792.45
4	Total Production	4182.9 kg
4.1	Production exported	3974.24 kg
4.2	Production for local disposal	208.66 kg
a)	Feed Conversion Ratio	1.27
b)	Feed Conversion Efficiency	127 %
5	Gross Income	Rs.16, 30,177
6	Net Income	Rs.3, 50,384.55
7	Gross Profit	Rs.4, 62,165.93
8	Net Profit	Rs.3, 50,384.55
9	Pure Profit	Rs.3, 12,092.88
10	Return to Capital	24.38
11	Output-Input	1.27
12	Benefit Cost Ratio	1.27
13	Net Benefit Cost Ratio	0.27
14	Pay-Back- Period	156 days
15	Rate of Return on Investment	12.73%
16	Rate of Return on Variable cost	13.95%

Table 6 indicates that total production of *L. vannamai* in Valsad district is on an average ( for n=30) 4182.9 kg /ha/crop which is 1.70 times more productive than reported by(S. Sahu et.al., 2012)[11]as 2450.5/ kg/ha/crop of *P.monodon*culture in Medinipur district of West Bengal .*L. Vannamai* farming had given an average grossprofitofRs.4,62,165.93/ha/crop to Valsad district farmers who could earn 1.74 times more profit than reported by (Nguyen Thi Hoai An 2012) [12], who had reported to receive the profit of 3,944.16 USD (Rs2,64,712.10@67Rs/UDS) by *L.vannamai* farming in Song Cau district of the Yenprovince of Phu, Vietnam. Feed conversion ratio mentioned in table 5 revealed that1.27 kg of feed can produce 1 kg of *L.vannamei*. Benefit cost ratio of 1.27 means that *L.vannamei* farming gives net benefit of Rs. 0.27 and payback periods is of 156 culture days. Study revealed that while one crop in a year gives 12.73% rate of return on investment and 13.95% rate of return on variable cost, but if farmers can produce two or three crops in a year than they their profit can be enhanced manifolds.

#### IV.CONCLUSION

This study concludes that even though *L.vannamei* shrimp farmers come just above poverty line but all of them could ownpakka houses with necessary facilities even including four wheelers. This venture brought a greater up-lift to their socio-economic status. Majority of the shrimp farmer prefer to move from semi intensive to intensive farming system to enhance productivity and profitability. Production disposal pattern reveals that *L.vannamei* farmers get maximum earning from exports. Quantification of economic indicator showsthat this venture could earn them more profit which can further be increased to manifolds by increasing cropping intensity in a year.



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## BIOGRAPHY



Mr. Brijesh Kumar is a PhD (Fisheries Economics) research scholar at ICAR-Central Institute of Fisheries Education Mumbai. He had completed M.F.Sc. in Fish Business Management from CIFE in the year 2010 and B.F.Sc. from College of Fisheries, Central Agriculture University, Imphal in the year 2007. He aims to contribute mainly towards farmer based research components so that they can earn better livelihood and bring sustainability in blue revolution.