International Journal of Zoology Studies
www.zoologyjournals.com
E-ISSN: 2455-7269
Received: 15-09-2026, Accepted: 15-10-2026, Published: 30-10-2026
Volume 11, Issue 4, 2026, Page No. 17-22

Socio-economic condition of *Penaeus vannamei* farmers with implementation of better management practices in Nellore district, Andhra Pradesh

Danya Babu Ravuru*, Jagadish Naik Mude
Department of Zoology and Aquaculture, Acharya Nagarjuna University, Andhrapradesh, India
Correspondence Author: Danya Babu Ravuru
DOI: https://doi.org/10.66856/ijzs.2026.11.4.11083

Abstract
The goal of the current study was to assess the socioeconomic standing of the Nellore district's *P. vannamei* shrimp producers. This study was carried out in several mandals within the reformed Nellore district in 2024–2025. Age, education, occupation, caste, kind of dwelling, farming experience, land holding, and income were all examined in relation to the socioeconomic standing of *P. vannamei* prawn farmers. Five mandals and twenty-two villages from Nellore district's twelve mandals were purposefully chosen for the current study using the proportionate and easy random selection technique. With the help of a well-structured questionnaire, a sample size of 356 respondents was chosen from the district's designated mandals for the particular purpose. The majority of *P. vannamei* shrimp farmers in the Nellore district were between the ages of 31 and 40 (36.0%), had only one occupation (61.0%), belonged to the forward cast (40.0%), owned 1-2 acres of land (50.0%), had RCC-style homes (73.0%), and earned an annual income of Rs. 3.5 lakh (38.0%). The study came to the conclusion that socioeconomic benefits had been demonstrated by the application of BMPs in the *P. vannamei* culture of the study area.

Keywords: *P. vannamei*, Better management practices, socio-economic status and Nellore district

Introduction
One of the fastest-growing food production industries in the world, aquaculture is essential to maintaining food security, improving nutrition, creating jobs, and boosting rural economies. Over the past few decades, aquaculture production has grown significantly worldwide, with Asia producing almost 90% of the world's farmed aquatic food (Food and Agriculture Organization of the United Nations [FAO], 2026). Due mainly to the growth of freshwater aquaculture, which produces about three-fourths of the nation's fish,

India has become the world's second-largest aquaculture producer. Although the cultivation of catfish, exotic carps, tilapia, and pacu has grown significantly due to their increased market demand and profitability, Indian Major Carps (IMCs) continue to be the mainstay of inland aquaculture (Department of Fisheries [DoF], 2026). The predominant species of shrimp, *Penaeus vannamei* (Boone), is cultivated in clay ponds. Production levels ranged from 2973 tons in 2016 to 2200 tons in 2020 and 1509 tons in 2023, making up 10.5% of all aquaculture production (FAO, 2025) [3].

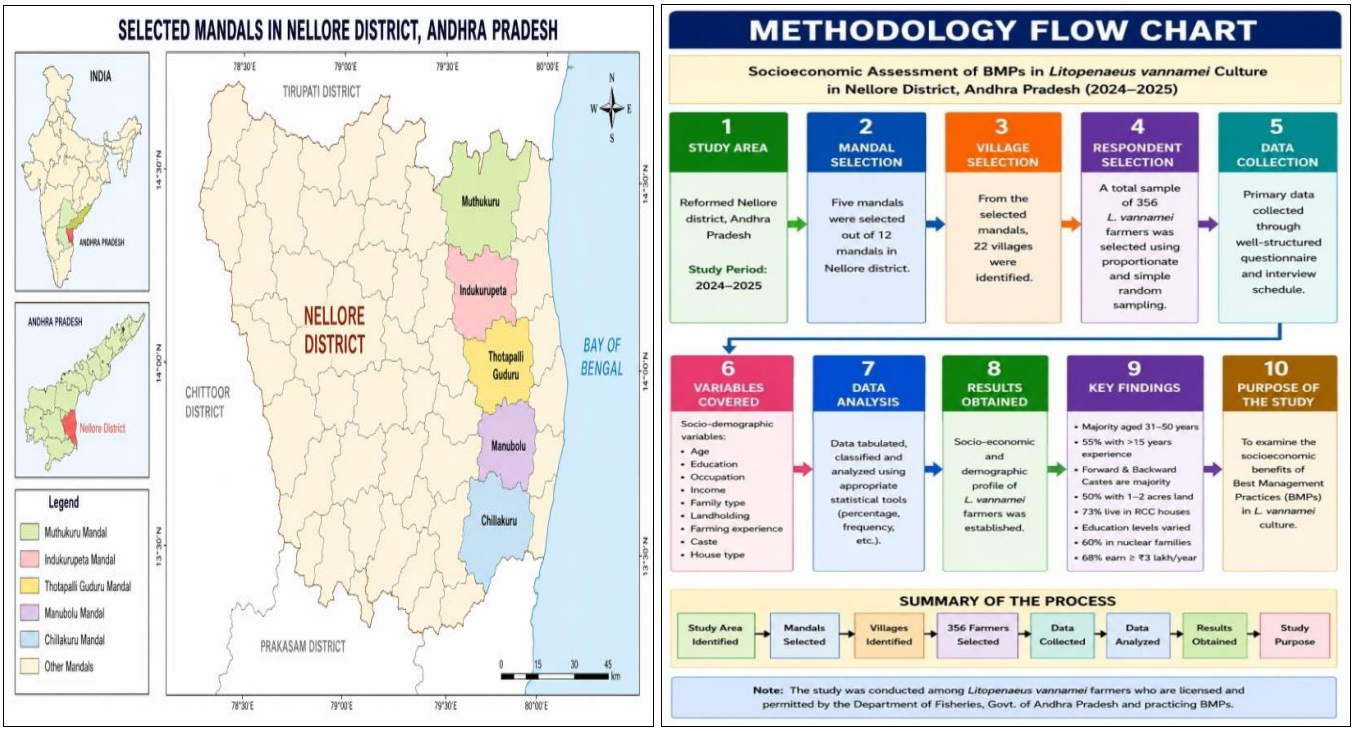


Fig 2: Shows methodology frame work

Material and Methods

The goal of the current study was to evaluate the socioeconomic standing of the Nellore district's *P. vannamei* shrimp producers. The purpose of this study, which was carried out in several mandals of the reformed Nellore district in 2024–2025, was to examine the socioeconomic advantages of BMPs in *P. vannamei* culture. To choose the final responders, a three-stage selection process was used. Five of the Nellore district's twelve mandals were specifically chosen for the current investigation. From the 22 villages of the five mandals that were identified, a sample size of 356 respondents was chosen. A well-structured questionnaire and an interview schedule were used to collect primary data from 356 respondents who were specifically chosen for the study. The study was carried out in *P. vannamei* farmers (licensed and permitted by the Department of Fisheries, Govt. of Andhra Pradesh) who were putting BMPs into practice. All the variables listed were empirically measured using different schedules created for the study; the final questionnaire included questions on the socio-demographic condition, age, education, occupation, income, family type, experience, etc.

Statistical analysis: The technique of simple random sampling was used

Results

The study examines the socio-economic and demographic features of 356 *P. vannamei* farmers scattered across 22 villages in five mandals. Below is a summary of the main findings.

Farmers' Age: The age distribution reveals that 128 (36%) of the *P. vannamei* farmers were in the 31–40 age range. Farmers in the 41–50 age bracket, comprising 121 farmers (34%), came next. 53 farmers (15%) were between the ages of 51 and 60, and 36 farmers (10%) were between the ages of 21 and 30. Merely 18 farmers (5%) were older than 60. The findings show that farmers in the economically active age range of 31 to 50 years old were primarily involved in shrimp farming.

1. **Employment status:** 7,004 acres were listed as the total water spread/culture area. At 4,232 acres (61%), *P. vannamei* culture took up the most space, followed by P. monodon culture at 2,371 acres (34%), fish culture at 281 acres (4%), and polyculture at 120 acres (1%). Chillakuru was the mandal with the most farmers (123) and the largest overall cultivation area (2,381 acres). Manubolu, with 92 farmers and 1,822 acres, and Indukurupeta, with 60 farmers and 1,405 acres, came next. T.P. Guduru had the fewest number of farmers 36 while Muthukuru had 45.

2. **Distribution by age:** According to the age distribution, the biggest percentage of farmers were in the 31–40 age group (128 farmers, or 36%), followed by the 41–50 age group (121 farmers, or 34%). 53 farmers (15%) were between the ages of 51 and 60, and 36 farmers (10%) were between the ages of 21 and 30. Just 18 farmers, or 5%, were older than 60.

3. **Farming Experience:** According to the data, 88 farmers (25%) had 16–20 years of experience, while 104 farmers (30%) had more than 20 years. Fifty-two farmers (15%) had six to ten years of experience, and over seventy farmers (20%) had eleven to fifteen years. 42 farmers, or 10% of the total, had been farmers for 0–5 years. These findings show that a sizable percentage of the farmers had a great deal of shrimp farming expertise.

4. **Caste Distribution:** With 145 farmers (40%), the Forward Castes made up the largest group, followed by the Backward Castes with 133 farmers (37%). There were 51 farmers (15%) who belonged to Scheduled Castes and 27 farmers (8%) who belonged to Scheduled Tribes. Therefore, shrimp farming in the research area involved farmers from different social classes, but Forward and Backward Castes combined comprised the majority.

5. **Land Holding**: According to the landholding pattern, 177 farmers (or 50%) owned one to two acres, making this the most common landholding group. 49 farmers (14%) had 6–10 acres, and another 104 farmers (30%) owned 3–5 acres. Only 26 farmers (6%) held holdings above 10 acres. The results thus demonstrate that farmers with comparatively limited landholdings were the main practitioners of shrimp farming.

6. **House Type:** According to the housing pattern, 256 farmers, or 73%, resided in homes made of reinforced concrete. There were 34 farmers (10%) with tiled roofs, 51 farmers (15%) with sheds, and 15 farmers (2%) with huts. The large percentage of reinforced-concrete homes indicates that the shrimp farmers assessed have rather stable housing conditions.

7. **Educational Status:** According to the educational status, 78 farmers (22%) had completed their studies up to the Intermediate level, followed by 72 farmers (20%) who were illiterate and another 72 farmers (20%) who had completed their education up to the first to fifth standard. Approximately 61 farmers (17%) were graduates, and 65 farmers (18%) had only completed the sixth or tenth grade. Eight farmers (3%) had more schooling than a bachelor's degree. As a result, the results show that the farmers' levels of schooling varied significantly.

8. **Family Type:** Of the farmers, 212 (60%) were part of nuclear families, while 144 (40%) were part of joint families. This suggests that among the *L vannamei* farming households surveyed, nuclear families were more prevalent.

9. **Annual Income:** 132 farmers (38%) fell into the ₹3–5 lakh income category, which is the largest group, according to the annual income data. 108 farmers (30%) who earned more than ₹5 lakh annually came next. Approximately 26 farmers (7%) earned ₹1 lakh annually, whereas 90 farmers (25%) earned ₹2 lakh. Shrimp farming significantly increased household income in the study area, since the majority of farmers fell into the income categories of ₹3 lakh and above.

Table 1: Occupational status of *P. vannamei* farmers

S. No	Mandals	Villages	Farmers	WSA (ac)	*P. vannamei* culture (ac)	*P. monodon* culture (ac)	Fish culture (ac)	Poly culture (ac)
1	Muthukuru	3	45	658	658	Nil	Nil	Nil
2	Indukurupeta	5	60	1405	1124	Nil	281	Nil
3	Chillakuru	5	123	2381	1101	1280	Nil	Nil
4	Manubolu	4	92	1822	731	1091	Nil	Nil
5	T.P. Guduru	5	36	738	618	Nil	Nil	120
Total culture (%)		22	356	7004	4232 (61%)	2371 (34%)	281 (4%)	120 (1%)

Table 2: Age wise *P. vannamei* farmers

S. No	Mandals	Villages	Farmers	21-30 (years)	31-40 (years)	41-50 (years)	51-60 (years)	Above 60 (years)
1	Muthukuru	3	45	5	13	18	6	3
2	Indukurupeta	5	60	6	18	24	9	3
3	Chillakuru	5	123	12	50	37	19	5
4	Manubolu	4	92	9	37	28	14	4
5	T.P. Guduru	5	36	4	10	14	5	3
Total culture (%)		22	356	36 (10%)	128 (36%)	121(34%)	53 (15%)	18 (5%)

Table 3: Farming of experience of *P. vannamei* farmers

S. No	Mandals	Villages	Farmers	0-5 (years)	6-10 (years)	11-15 (years)	16-20 (years)	Above 20 (years)
1	Muthukuru	3	45	6	6	9	11	13
2	Indukurupeta	5	60	6	9	12	15	18
3	Chillakuru	5	123	15	18	24	30	36
4	Manubolu	4	92	11	13	18	23	27
5	T.P. Guduru	5	36	5	5	7	9	10
Total culture (%)		22	356	42 (10%)	52 (15%)	70 (20%)	88 (25%)	104 (30%)

Table 4: Cast wise *P. vannamei* farmers

S. No	Mandals	Villages	Farmers	Scheduled Tribe	Scheduled Cast	Backward Cast	Forward Cast
1	Muthukuru	3	45	4	6	22	13
2	Indukurupeta	5	60	6	9	30	15
3	Chillakuru	5	123	8	18	36	61
4	Manubolu	4	92	6	13	27	46
5	T.P. Guduru	5	36	3	5	18	10
Total culture (%)		22	356	27 (8%)	51 (15%)	133 (37%)	145 (40%)

Table 5: Land holding of *P. vannamei* farmers

S. No	Mandals	Villages	Farmers	1-2ac	3-5ac	6-10ac	Above 10ac
1	Muthukuru	3	45	22	13	6	4
2	Indukurupeta	5	60	30	18	7	5
3	Chillakuru	5	123	61	36	18	8
4	Manubolu	4	92	46	27	13	6
5	T.P. Guduru	5	36	18	10	5	3
Total culture (%)		22	356	177 (50%)	104 (30%)	49 (14%)	26 (6%)

Table 6: House type of *P. vannamei* farmers

S. No	Mandals	Villages	Farmers	Hut	Shed	Tiled roofed	Reinforced Concrete
1	Muthukuru	3	45	2	6	4	33
2	Indukurupeta	5	60	3	9	6	42
3	Chillakuru	5	123	5	18	12	88
4	Manubolu	4	92	4	13	9	66
5	T.P. Guduru	5	36	1	5	3	27
Total culture (%)		22	356	15 (2%)	51 (15%)	34 (10%)	256 (73%)

Table 7: Education of *P. vannamei* farmers

S. No	Mandals	Farmers	Illiterate	1-5th	6-10th	Inter	UG	PG
1	Muthukuru	45	17	14	7	4	2	1
2	Indukurupeta	60	23	18	9	6	3	1
3	Chillakuru	123	12	18	24	36	30	3
4	Manubolu	92	9	13	18	27	23	2
5	T.P. Guduru	36	11	9	7	5	3	1
Total culture (%)		356	72 (20%)	71 (20%)	66 (18%)	78 (22%)	61 (17%)	8 (3%)

Table 8: Family type of *P. vannamei* farmers

S. No	Mandals	Villages	Farmers	Nuclear	Joint
1	Muthukuru	3	45	27	18
2	Indukurupeta	5	60	36	24
3	Chillakuru	5	123	73	50
4	Manubolu	4	92	55	37
5	T.P. Guduru	5	36	21	15
Total culture (%)		22	356	212 (60%)	144 (40%)

Table 9: Annual Income of *P. vannamei* farmers

S. No	Mandals	Villages	Farmers	1lakh	2lakh	3-5lakh	Above 5lakh
1	Muthukuru	3	45	4	16	20	5
2	Indukurupeta	5	60	6	20	28	6
3	Chillakuru	5	123	6	26	40	51
4	Manubolu	4	92	5	18	30	39
5	T.P. Guduru	5	36	5	10	14	7
Total culture (%)		22	356	26 (7%)	90 (25%)	132 (38%)	108 (30%)

Dscussion

According to the current study, the most common aquaculture activity among the farmers surveyed was *Penaeus vannamei* culture. *P. vannamei* was cultivated on 4,232 acres (61%) of the 7,004 acres of water-spread area, followed by *P. monodon* culture (34%), fish culture (4%), and polyculture (1%). This dominance is a sign of *L. vannamei's* growing economic significance in the research region. The results are in line with those of Shireesha and Prabakar (2024) [10], who stated that stocking density, feed, probiotics, labor, and seasonal factors all have a significant impact on output and profitability in shrimp farming, which is a significant commercial activity in Andhra Pradesh.

1. **Occupational status *P. vannamei* farmers:** Chillakuru had the most farmers (123) and the biggest overall culture area (2,381 acres) among the chosen mandals, with 1,101 acres under *P. vannamei* and 1,280 acres under *P. monodon*. Indukurupeta had 60 farmers and 1,405 acres of total culture area, whereas Manubolu had 92 farmers and 1,822 acres. There were relatively less farmers in Muthukuru and T.P. Guduru. These variations show that the amount of shrimp farming varies significantly between mandals, which may be due to variations in local aquaculture development, farmer investment capability, and the availability of suitable land and water resources. Since coastal Andhra Pradesh is one of the main hubs for *L. vannamei* production in India, the current findings are very pertinent to the state. In their research of *L. vannamei* farmers in southern coastal Andhra Pradesh, Nuthakki and Kunda (2022) [8] noted that farmers were heavily involved in shrimp farming and emphasized the growing significance of scientific and technological methods in raising output. Additionally, they noticed that small-scale farmers might not have as much access to scientific applications and technology advancements as other social groups. The current study's findings about *P. vannamei's* prevalence are in line with the wider evolution of white leg shrimp farming in India. Due to its great market demand, adaptability to intensive farming, and relatively high production capacity, *P. vannamei* has grown in importance in Indian shrimp aquaculture. According to Kumar *et al.* (2017) [6], the introduction of Pacific white shrimp significantly aided in the resurgence and growth of shrimp farming in India, with increased production linked to improvements in technical efficiency.

2. **Age wise *P. vannamei* farmers:** According to the age distribution, 70% of the respondents were between the ages of 31 and 50, with 36% of farmers being between the ages of 31 and 40 and 34% being between the ages of 41 and 50. This implies that economically engaged farmers oversee the majority of shrimp production. According to a recent study by Palwe *et al.* (2024) [9], most shrimp producers in the Raigad district were middle-aged or older. The consistency between the research implies that middle-aged farmers constitute an important human resource in shrimp aquaculture because they combine physical capacity with accumulated farming and business expertise.

3. **Farming of experience of *P. vannamei* farmers:** Experience farming was another crucial factor. According to the current survey, a significant percentage of farmers have long-term experience in aquaculture, with 30% having more than 20 years of expertise and 25% having 16–20 years. This is crucial because real-world experience can help farmers make better judgments about feeding, stocking, managing water quality, and preventing illness. Because timely technical information is necessary for farm management, Yadav *et al.* (2024) [11] highlighted the importance of information access and farmer characteristics for effective shrimp farming.

4. **Land holding of *P. vannamei* farmers:** The majority of farmers were modest landowners, as seen by the landholding pattern, which showed that 50% of farmers owned 1–2 acres and 30% owned 3–5 acres. This result shows that large landowners are not the only ones that engage in shrimp farming. The outcome is similar to that of Shireesha and Prabakar (2024) [10], who found that farmers in Andhra Pradesh's Godavari districts with comparatively small farm holdings participated significantly. Their research also showed that

increasing the profitability of shrimp farming requires effective use of production inputs.

5. **House type of *P. vannamei* farmers:** According to the farmers' housing situation, only 2% of them lived in huts, with 73% residing in reinforced concrete homes. Shrimp-farming households may have better socioeconomic conditions, as evidenced by the predominance of permanent homes. According to Palwe *et al.* (2024) [9], shrimp growers in Maharashtra's Raigad area frequently built pucca dwellings. Although home style by itself shouldn't be seen as a direct indicator of farm profitability, the resemblance implies that income from aquaculture may help to enhance household living standards.

6. **Cast-wise *P. vannamei* farmers:** According to the current study's caste breakdown, Forward Caste farmers made up the largest group (40%), followed by Backward Caste farmers (37%), Scheduled Castes (15%), and Scheduled Tribes (8%). Thus, 77% of the *P. vannamei* farmers surveyed were members of both the Forward and Backward Castes. This pattern suggests that in the chosen study location, these two social groups were somewhat more involved in commercial shrimp farming. Nuthakki and Kunda (2022) [8] revealed similar socioeconomic disparities in *P. vannamei* farming involvement across social categories in southern Andhra Pradesh.

7. **Education of *P. vannamei* farmers:** According to the educational profile, 20% of farmers were illiterate, 22% had intermediate education, 18% had completed their schooling up to the sixth or tenth grade, and 17% had graduated. The need for farmer-oriented extension programs is highlighted by the variation in educational status. It is necessary to disseminate technical information about disease control, biosecurity, water quality, feeding, and appropriate pesticide use through hands-on training and resources that are easily understood locally. According to Yadav *et al.* (2024) [11], information-source use is a crucial element of effective shrimp production, and they explicitly highlighted the need of having access to pertinent information for shrimp farmers.

8. **Family type of *P. vannamei* farmers:** According to the family structure, 40% of the farmers were part of joint families and 60% belonged to nuclear families. Palwe *et al.* (2024) [9] found that the majority of shrimp farmers in their study area belonged to nuclear families, which is in line with the prevalence of nuclear families. The availability of family labor and the distribution of resources and revenue within shrimp-farming households may be impacted by nuclear family arrangements.

9. **Annual income of *P. vannamei* farmers:** According to the annual income distribution, 30% of farmers made more than ₹5 lakh and 38% made between ₹3 and ₹5 lakh. As a result, 68% of the farmers questioned had incomes of ₹3 lakh or more. This demonstrates how crucial shrimp farming is to household livelihoods. *P. vannamei* farming was successful in the Godavari districts, according to Shireesha and Prabakar (2024) [10], albeit greater resource-use efficiency was needed to increase returns.

In a similar vein, Kasukurthi *et al.* (2024) noted that shrimp farming in the Nellore district produced significant farm business income and profit, highlighting the need for increased cost efficiency because farmers have little control over worldwide shrimp pricing. Durai *et al*. (2022) [2], who examined 194 shrimp farms in Tamil Nadu and found that factors like stocking density, culture time, feed utilization, survival, and harvest size affected output and economic performance, provide more evidence of the economic significance of *P. vannamei* farming. Their results show that sustaining the profitability of shrimp farming requires effective management of production inputs. Kumar *et al*. (2021) [7] found that farmers generally preferred *P. vannamei* due to its relatively rapid growth, tolerance to a range of culture conditions, availability of seed, and greater economic returns, which further supports the comparatively larger area under *P. vannamei* compared with *P. monodon*. According to their comparison research, farming *P. vannamei* was more profitable than *P. monodon* in the conditions examined.

According to Gitte *et al*. (2021) [5], *P. vannamei* cultivation enhanced the socioeconomic standing of participating farmers and offered a significant possibility for aqua-entrepreneurship. Additionally, their study highlighted the significance of scientific management and technical training for effective shrimp farming. The significant number of farmers engaged in *P. vannamei* cultivation suggests that improving technical expertise, farm management, and extension services could further enhance sustainable shrimp production, which makes this pertinent to the current study. The sustainability of shrimp aquaculture in Andhra Pradesh is especially affected by the current findings. Profitability can be impacted by production costs, disease, input utilization, and market changes, even if social data indicate that shrimp farming offers significant livelihood and income benefits. Stocking density, feed, probiotics, feed supplements, labor, and season all had a substantial impact on shrimp productivity, according to Shireesha and Prabakar (2024) [10], proving that proper input management is crucial for preserving farm profitability.

Conclusions

The study shows that farmers in the study area have benefited greatly from *P. vannamei* culture in terms of employment, livelihood, and money creation. The potential of shrimp aquaculture for rural economic development is demonstrated by the combination of significant farming experience, growing *P. vannamei* acceptance, and comparatively greater income among many farmers. Long-term productivity and profitability depend on sustained focus on scientific farm management, disease control, water-quality management, effective input use, and sustainable aquaculture practices.

Acknowledgements

In the Nellore district of Andhra Pradesh state, the writers thank the farmers of the cultural ponds and provide answers to all of their inquiries for socio-economic information.

Author contribution

DBR: Conceptualisation, methodology, data analysis, and writing of the original manuscript JNM: Conceptualisation, methodology, data analysis, and supervision
RBB: Conceptualisation, methodology, data analysis

Reference

1. Department of Fisheries. Handbook of fisheries statistics 2025. Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, 2026. https://www.dof.gov.in/
2. Durai V, Lloyd Chrispin C, Bharathi S, Velselvi R, Karthy A. Factors determining the economic performance of *Litopenaeus vannamei* (whiteleg shrimp) aquaculture in Tamil Nadu, India. Aquaculture Research,2022:53:4689–4696. https://onlinelibrary.wiley.com/doi/abs/10.1111/are.15961?utm_source=chatgpt.com
3. FAO Fisheries and Aquaculture Department. Fish stat, a tool for fishery statistic analysis release 4.04.11. FAO, Rome, 2025 [accessed on 25 April 2025]. Available from: https://www.fao.org/fishery/en/topic/166235/en
4. Food and Agriculture Organization of the United Nations. The state of world fisheries and aquaculture 2026, Blue transformation, Turning vision into impact, 2026. https://doi.org/10.4060/cd8357en
5. Gitte MJ, Meshram SJ, Sawant BT, Patil SV, Naik BV, Dhamgaye HB, *et al*. Study on aqua-entrepreneurship in *Litopenaeus vannamei* culture in Raigad district of Maharashtra. Journal of Krishi Vigyan,2021:9(2):221–224. https://indianjournals.com/article/jkv-9-2-043?utm_source=chatgpt.com
6. Kumar JS, *et al*. Is Pacific white shrimp (*Penaeus vannamei*) farming in India technically efficient? A comprehensive study. Aquaculture,2017:468:161–169. https://www.sciencedirect.com/science/article/pii/S0044848616306913?utm_source=chatgpt.com
7. Kumar NR, *et al*. Comparative analysis of profitability and resource use efficiency between *Penaeus monodon* and *Litopenaeus vannamei* in India. Aquaculture Reports, 2021. https://pmc.ncbi.nlm.nih.gov/articles/PMC8096089/?utm_source=chatgpt.com
8. Nuthakki S, Kunda SK. A study on socio-economic profile of *Litopenaeus vannamei* (Boone, 1931) farmers of southern Andhra districts, India. International Journal of Fisheries and Aquatic Studies,2022:10(2):149–153. https://www.fisheriesjournal.com/archives/?ArticleId=2667&issue=2&part=B&vol=10&year=2022&utm_source=chatgpt.com
9. Palwe DR, Yadav BM, Chaudhari KJ, Wasave SM, Patil SV, *et al*. Socio-economic status and constraints faced by shrimp farmers of Raigad district of Maharashtra. International Journal of Agriculture Extension and Social Development,2024:7(Special Issue 7).
10. Shireesha C, Prabakar C. A socio-economic analysis on shrimp culture (*Litopenaeus vannamei*) in Godavari Districts of Andhra Pradesh, India. Archives of Current Research International,2024:24(12):86–94. DOI: 10.9734/acri/2024/v24i12999
11. Yadav PP, Patil SV, Chaudhari KJ, Naik BV, Yadav BM, Wasave SM, *et al*. Profile and information source utilization behaviour of shrimp farmers in north Konkan region, Maharashtra. Journal of Krishi Vigyan,2024:12(1):138–143. DOI: 10.5958/2349-4433.2024.00025.4