Evaluation Of Problems Aquaculture Industry in India - An Analytical Study

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Abstract

Purpose- India is second only to China in the total area dedicated to fish farming, making it the world's third-largest fish producer. In Andhra Pradesh, East & West Godavari districts are known to cultivate fish farming in a large extent through large hectors of land. It is known that many of the farmers are getting loss in the fish farming due to various factors like "food they use for bay fish, marketing problems, transportation problems, government policies" etc. . Therefore, this may helps to identify the major problems which are the part of fish farming. This study will also helps to understand the new rural entrepreneurs who wants to start aqua business.

Design/methodology/approach- After getting the empirical data from the aqua farmers, the analysis identifies the major factors which impacts the problems of aqua through factor analysis. After that, the researcher checked for normality through Kolmogorov and smirnove test. Further analysis is done with parametric tests. It is am empirical study with a sample of 75 respondents. The population is the total number of Aqua-culture farmers in East & West Godavari districts of Andhra Pradesh. The sample is extracted through convenience sampling technique.

Findings- All the problems which affects aqua-culture farming are classified under four factors namely "Government support factors, Legal factors, Competition and Value added factors". Further, the researcher has developed the hypotheses based on the above four factors tested for the significance. significant differences are identified in the perceptions of the aqua-farmers on "legal factors and value added factors". Therefore, it is identified that the major problems of aqua-culture farming are Strict Quality Standards, Low Price Realization, Trade Barrier, Inadequate Infrastructure Facilities, No Information about Foreign Market, Poor Government Support, Legal procedures, High Operational Cost, Tough Competition and Inadequate Value Added Products.

Originality - this study is the first to show the problems of Aqua-culture in East & West Godavari districts of Andhra Pradesh with empirical data.

Keywords- Aqua-culture, Problems in aqua-culture, marketing.
Paper type Research paper

1. Introduction

Millions of people throughout the globe rely on the fish industry for their income and livelihood. The number of people employed in the fishing and aquaculture industries has increased significantly. At least 14.5 million people are expected to be working in fisheries and aquaculture in 2020 and 38.98 million people worldwide are involved in fish farming according to the Food & Agriculture Organization of the United Nations (FAOUN).

A farm is an enterprise. Large sums are required for the purchase of both fixed and working components of production in every kind of company or activity. The quantity of money managed and the amount of capital that is handled are often large. Land, machinery, equipment, seeds, feeds, and pesticides all cost a lot in today's agricultural operations. Aside from hiring

workers, farmers also pay for services like feeding and harvesting. Numerous business-related tasks must be addressed in order for the farm's operations to run well. For fish farming, water body is the most essential fixed factor. Financial management is required for huge financial arrangement. Various individual and financial institutions are involved in fishing finance. Some of the money lenders give money to fish farmers for financing for fixed and working capital. The main components of fishing finance to fish farmers include commercial bank, informal sources like relatives, friends, money lenders, etc. NABARD acts as refinance for financing the fish farmers in the state. FFDA and department of fisheries give financial assistance to fish farmers for farming purpose.

An alternate answer to the rising demand for fish and fish protein is offered by fish farming. Fish farming consists of all the activities from raising of fishes to marketing of fishes through human efforts. In particular, it includes fish seed stocking, rearing, harvesting and marketing of fish raised in freshwater (ponds/tanks) and brackish water. Fish culture in tanks, though in a limited scale, has been practiced in India since as early as 350BC (Nigam, 1997). India rank third among the largest producers of fish in the world. This is growing by leaps and bounds and has considerable employment opportunities. Fish are cultured for several economic values. As a source of human food, the importance of food is as old as human civilization.

The present study throws light on the problems and prospects of fish farming in Andhra Pradesh. The most important problems of fish farmers like problems of finance, marketing and other infrastructural problems are also studied for the purpose of taking necessary steps for improvement of fish production and also the productivity of fish farming in Andhra Pradesh. The present study finds out the various infrastructures and schemes available to the fish farmers by which they can increase the production to a great extent. Proper analysis of the marketing channels and its problems of fish will help in proper flow of fish and fish products to the market and made available of fish on time and will benefit the fish farmers through remunerative price and farm gate will effectively linked to the market and thus increase marketing efficiency. The study also helps to understand the socio-economic conditions of fish farmers. By studying the prospects of fish farming, it can encourage people to take up fish farming as a source of their livelihood and can also encourage farm entrepreneur.

2. Review of Literature

The researchers have collected secondary data from various sources which includes journals, books, articles and news papers. Some of the studies are presented here under.

2.1. N. A. Hasan, Richard D Heal, A. Bashar, Alif Layla Bablee (2021), The COVID-19 pandemic has affected Bangladesh's burgeoning aquaculture sector. Two surveys were held Bangladesh, involving 40 farmers and 120 supply chain intermediaries. A follow-up open-ended survey of 120 consumers clarified the marketing results. It has lowered fish producers' profits and worsened supply chain inequities, our study reveals. However, pangasius and tilapia farming may leave farmers in debt. Farmers were losing money while buyers paid more for pangasius and carp than tilapia and other

catfish. Conversely, intermediaries have raised their selling rates to counter rising costs and retain profitability. Farmers have cut labour expenses by reducing the number of employees and their compensation to offset increased operational and revenue costs. It may frustrate rural working-class people and cause tremendous socio-economic problems. Finally, COVID limits have changed consumer perceptions towards fish as a protein source.

2.2 According to Okomoda V. (2011) , Multiple chemicals and medications are employed in high stocking density aquaculture to prevent sickness, eradicate dangerous biota, disinfect and restrict contaminated and damaged water. Antibiotic usage has increased in recent years, while it is still contentious. Antibiotics are usually added to fish pellets, which then end up in the water and on the bottom. They can also infiltrate water via faeces and urine. In fact, some experts estimate that 70-80% of the medicine is released into the environment. Antibiotics are commonly used in aquaculture to treat skin ulcers, diarrhoea, and blood sepsis (Zheng et al 2012). (Food and Agriculture Organizations, 2005).

2.3 Podemski C.L (2006), Aquaculture's fast development and ongoing demand for natural water, energy, and feed can have varying environmental implications. Aquaculture has both beneficial and bad environmental effects. Aquiculture's environmental implications vary depending on farmed species, management approaches, and location of the production system but also feed quality and management. Other consequences of aquaculture (e.g. fertilisers, pesticides, and medications) on the environment are discussed in this work.

2.4 Mishra, A.M. (2004) Fish marketing in Madhya Pradesh and Chattisgarh has been studied. The fish farmers have highlighted a number of issues, including difficulty in marketing, pond water issues, fish infections, lack of professional advice, and a lack of cold storage and marketing facilities.

2.5 S. Yılmaz, E. B. Şen, A. Ozalp (2013), Marketing fisheries goods affects numerous groups, from producers to consumers. Exporters and importers, local and federal authorities, and industrialists processing fisheries are all involved. Because fisheries goods are readily dissolved, they should be sold as soon as feasible. Thus, marketing fisheries demands a well-oiled marketing infrastructure. Although Turkey's fisheries industry enjoys favourable conditions, it nonetheless has severe issues. One of these issues is scattered marketing, which affects fisheries, aquaculture, processing, quality control, storage, and transportation (lack of suitable cooling chain). In this study, the structure and challenges of fisheries product marketing in Turkey were discussed, as well as the influence of laws on fishery product marketing.

2.6 Shepherd CJ. (1983), Aquaculture is defined and worldwide production figures are supplied, along with a comparison to the total amount of wild fish harvested. This article focuses on the benefits of aquaculture, including the availability of culture-based fisheries, the availability of a diverse range of species, the availability of husbandry techniques, the availability of control over the life cycle, and so on. Improved production methods, a deeper understanding of fish nutrition, and stock

upgrades thanks to studies of fish genetics, health, and the cultivation of novel aquatic species are only some of the current advances in aquaculture.

2.7 Norman RA, Crumlish M (2019), When it comes to global nutrition and food security, aquaculture is often overlooked. Aquatic food includes a wide range of species. There are additional issues to contend with because of the wide variation in supply and demand among countries. Several factors must be taken into account when addressing nutrition and food security. Included in this list are the amount of food produced, the sustainability of that food production, the sustainability of that food production in terms of livelihoods, and the nutritional value as well as safety of that food. Aquaculture's expansion is essential if the world's population is to be fed. Aquafeed raw materials, disease outbreaks, food safety, and environmental constraints to expansion are some of the obstacles to growth in aquaculture. In addition, there are issues with the working conditions of those in the supply chain that must be addressed. In light of the current global problems to nutrition and food security, it is imperative that aquatic foods are brought into the discussion and their substantial benefits are recognised and exploited.

2.8 Chen, S. N. (1991)., Aquaculture has grown quickly across Asia over the last decade. Currently, systems ranging from the extensive to the semi-intense to the extremely intensive are in use. Management of these systems is critical to minimise environmental degradation and the mass extinction of cultivated species. The author uses shrimp farming as an example to illustrate how environmental conditions affect aquatic species' health. There is also discussion of possible solutions to the various issues.

2.9 H., H. (1986)., Fish culture in the Netherlands, which has been practised for more than a century, is gaining renewed attention. The fish and their surroundings can be controlled to varied degrees by the production systems available, with yields ranging from 0.01-250 kg/m3/year. Modern recirculation systems (40-80 kg/m3) enable the commercial production of luxury fish species no matter what the weather conditions are like, while causing the least amount of damage to the ecosystem. There are a few technical issues that need to be addressed in regards to fish reproduction, housing, feeding, growth, health monitoring, and fish marketability. However, the Netherlands' current fish farming development is hampered by a lack of a well-established history. Farmers must practise good fish stock management. Agriculture's success would not have been possible without the backing of the government and the organisation of the industry. Luxury fish species including trout, salmon, tilapia, catfish, seabass, and seabream have the best commercial potential at the time. The remaining technical and logistical risks may be alleviated by working together.

2.10 Flloko, A. (2003)., In this article we will examine the present situation of fish marketing and trade in Albania (2001-2002). In-depth discussions of the national policy and legislative framework, fisheries production, aquaculture production, the fish processing sector and marketing, the fish catch distribution system, and fish pricing are presented. Current problems in the Albanian fish market are explored, and some solutions are offered.

2.12 Flloko, A. (2003)., Nigeria's catch fisheries and the multiple value chains

(especially marketing and distribution) for fisheries and aquaculture products are booming, offering a wide variety of investment and employment opportunities. Fish is the primary source of animal protein in Nigerian diets, accounting for 55 percent of total animal protein consumption. Across the whole value chain, Nigerians start selling fish and fish products right from the beginning, with the harvest. These difficulties include seasonality, after harvest losses, and the inability to supply adequate electricity to the distribution network. Fishery value chains and marketing in Nigeria are hampered by the high cost of fish preservation and storage. Many young people are prevented from working in the business because of the difficulty they have in obtaining loans. In contrast, as part of a government campaign, young people are being encouraged to view agriculture and aquaculture as a viable career option. However, it may be said that contemporary marketing and distribution operators have been able to increase output despite the high marketing expenditures. Marketers' profits will rise more if the infrastructure, power supply, and storage facilities they rely on to run their businesses are improved, as will the marketing environment and processes that support them.

2.13 Dursenev, M. S., & Chirkin, S. A. (2021)., Developing commercial fisheries should be a top priority in areas without easy access to the sea, according to Russia's "Strategy for the Development of the Fisheries Industry of the Russian Federation for the Period up to 2030." The Kirov region, which has been developing aquaculture for nearly a century, is one of these regions. Purpose. The study's goal was to determine the existing situation of commercial aquaculture in the Kirov region, as well as the challenges it faces and the opportunities it holds for growth. Methods and supplies needed to carry out the project. Statistical and monographic methods of analysis were used to compile data from government papers from the last two decades on the development of the Kirov region's fish sector, as well as from magazines. Results. The study's findings suggest that the commercial fish farming business in the Kirov region is in a situation of crisis at now. However, it has immense potential that has yet to be fully realised. Aquaculture growth in the region is hampered by a number of issues. Aquaculture has been recognised for its social relevance in the development of rural regions in the Kirov region. In order to further aquaculture's development, it was determined that innovative approaches and unconventional solutions were required in order to boost production of high-quality commercial fish products over time. Conclusion. In a nutshell, high-tech aquaculture can help the Kirov region grow economically and improve the quality of life for its residents. Only by bolstering private interest in the growth of this industry with supportive governmental policies will this goal be achieved.

2.14. Abbott, R. R. (1990)., Aquaculture produces about 50% of all fresh fishing products, including 152 species of algae, finfish, crabs, and molluscs. Along with the growing number of cultivated species in the US, industrial methods are changing. Some of these approaches are a response to aquaculture's economic hazards, while others resemble poultry industry methods. The expanding aquaculture industry is stratified into numerous small enterprises. Small and start-up producers can reduce risk and boost cash flow. Aquaculture is a non-consumptive user of water; following

fish culture, it can be utilised to water cattle. Contract rearing allows fish farmers to form equity partnerships with fish buyers. Some hatcheries trademark their seedstock due to genetic advancements. Some cultivated species have generated marketing issues. Generic marketing, albeit new to aquaculture, may help promote the industry's products.

2.15. Das, D. S., & Govindasamy, R. (2021)., More and more of the rural people relied on aquaculture and fisheries as a primary source of food, protein, nutrition, livelihood, and employment opportunities. Over the last decade, the fishing industry has seen steady and impressive growth. Jobs, income, and food security are all enhanced by the industry's bright outlook. It is based on secondary data from the Government of India's Handbook on Fisheries Statistics 2020 and other publications in the field of fisheries statistics. Between 2001-02 and 2017-18, researchers gathered data for this study to use in their time series analysis. Global fish consumption has increased by 10.4 kilogrammes per capita between the 1960s (i.e. 9.9 kilogrammes) till 2016. (i.e., 20.30 kg). Using time-series data, it is clear that the overall fish production, including marine and inland, has grown at a compound growth rate of 4.58 percent. Overall fish output (Y) and total fish seed production (X) were used as dependent variables in a regression analysis with an R2 value of 0.9414. (independent variable). Fish seed and fish output are linked in a favourable way in the country. For the country's GDP and food security, aquaculture is a key contributor.

Syaifudin, A., & Carsjens, G. J. (2018)., Urbanization can affect farming in metropolitan areas. To keep farming going, farms and cities must "reconnect." This collaboration emphasises sustainable intensification, exploitation, and diversity. Indonesia has no study on farmer strategies, while the Netherlands, India, and China have. This study examined how Indonesian farmers adapt to and profit from urbanisation. As a major agricultural enterprise in Bogor Regency, Greater Jakarta Area, inland aquaculture was studied (JMA). A research endeavour included in-depth interviews with farmers, government officials, and a consumer group. We used pattern matching to analyse the data. According to the findings, inland aquaculture farmers in JMA generally use intensification. Farmers try to reduce production costs to make enough money. Concerns about animal welfare and financial stability make JMA fish aquaculture unsustainable. Fish pond wastewater discharge may have environmental impacts. Local training programmes look too broad to address these difficulties and improve inland aquaculture's sustainability.

Examining past research suggests that most were performed from an economic standpoint. The studies above analyse the projects' economic feasibility using production function, cost-benefit, and marketing efficiency analyses. For a full picture of aquaculture in Andhra Pradesh, no research have been done. The current study focuses on the key challenges of aquaculture products in Andhra Pradesh.

3. Hypothesis of the study:

1. H_{01}: There are no significant differences in the perceptions of the aqua-culture farmers on the problems of government support factors.
2. H_{02}: There are no significant differences in the perceptions of the aqua-culture farmers on problems of Legal factors.

3. H_{03}: There are no significant differences in the perceptions of the aqua-culture farmers on the problem of Competition.
4. H_{04}: There are no significant differences in the perceptions of the aqua-culture farmers on the problem of Value added factors.

4. Methodology: Much of the information is gathered from respondents by use of a predetermined questionnaire. The information gathered from 75 randomly selected people. The population is drawn from a convenience sampling. In this investigation, an analytical approach is used. Once Cronbach's Alpha is applied to the questionnaire, it is considered complete. The validity and trustworthiness of the survey may be evaluated with the use of this coefficient. For this survey, the Cronbach's Alpha is 0.812, much over the required threshold of 0.70. The survey may be trusted, therefore. SPSS is used for the data analysis.

5. Results & Discussions: The first hand information is collected through a structured questionnaire. The data collected from a sample of seventy five. Convenience sample is used to extract the sample from the population. The data is analysed with SPSS. The demographical profile is written below.

The data shows that 97.3 percent of the respondents are male and only 2.7 percent are female; 44 percent are in the 31-40 age range, followed by 30.7 percent in the 41-50 range, and 25.3 percent in the 21-30 range. It is also clear that most respondents (44%) are between the ages of 31 and 40, indicating that the study includes both middle and older respondents.

There are 36% of respondents who have finished intermediate level education, followed by 25.3% who have achieved bachelor's level education or above. Just 17.3 percent of respondents have an SSC or above, while 21.3% have not completed high school. As a result, it's clear that the vast majority of responders had some college under their belt. There were 82.7% of respondents whose annual income was between 6 and 10 lakhs and 16.7% whose annual income was between 11 and 20 lakhs in this sample. Less than 2% of respondents (just 1,3%) reported annual incomes of less than 5 lakh. This explains why 82.7% of respondents report income between 6 and 10 million rupees. With respect to years of experience, almost half (49.3%) of respondents have between 1 and 5 years, nearly a third (38.7%) have between 6 and 10, and just 12% have 25 or more years of service.

Here, the researcher analysed primary data from a sample of 75 in an effort to better understand the most pressing issues confronting aqua-culture business owners. The KMO Bartlett test was used to determine sample size in the initial phase of the factor analysis, as shown below.

Table-1: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin value		0.797
Bartlett's Test of Sphericity	Chi-Square test value	1871.15
	D.f	74
	p-value	.000 *

Data reduction via factor analysis may be used to look for patterns within a set of variables and to discover the most fundamental reasons for any observed differences. The KMO-Bartlett test, a measure of sample adequacy, was used to ensure the data was legitimate before moving on to factor analysis. With a KMO of 0.79 > 0.5, multivariate normality between variables appears to be present. A p-value of less than 0.05 indicates that the meaning is not significant. In light of this, the researcher moves forward with factor analysis.

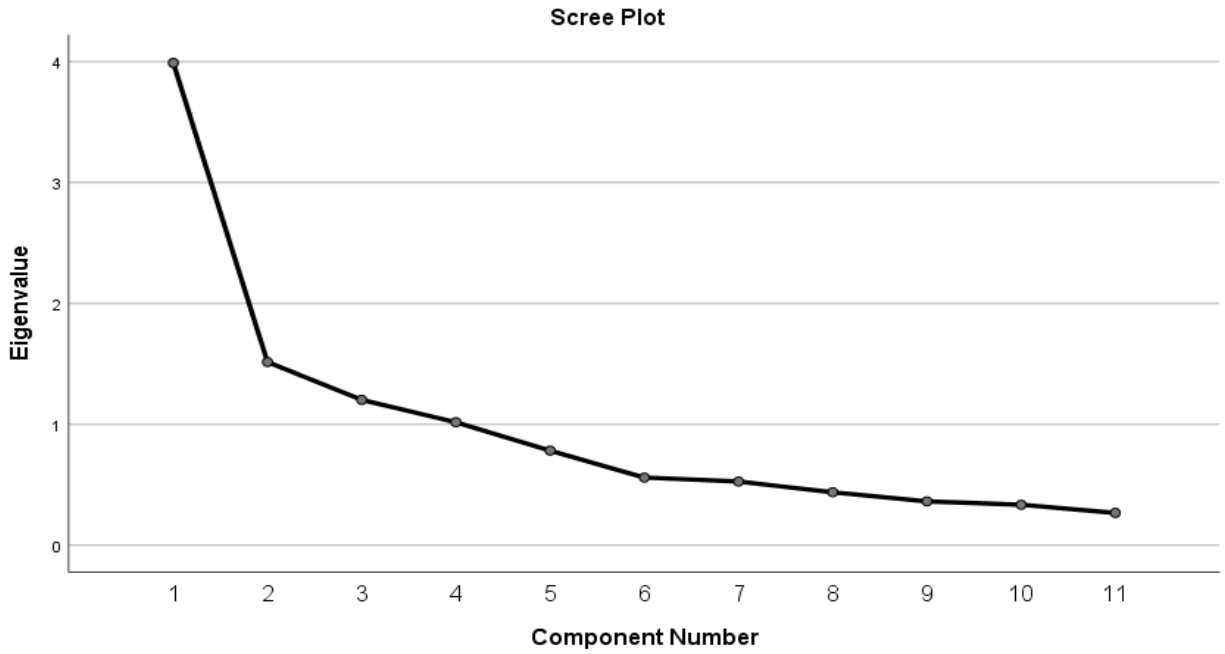
Table-2: Total Variance of the problems in Aqua-culture

	Initial Eigen-values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Co	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	3.989	36.264	36.264	3.989	36.264	36.264	2.689	24.446	24.446
2	1.516	13.777	50.042	1.516	13.777	50.042	2.196	19.967	44.412
3	1.202	10.931	60.973	1.202	10.931	60.973	1.769	16.079	60.491
4	1.017	9.250	70.222	1.017	9.250	70.222	1.070	9.731	70.222
5	.783	7.116	77.338						
6	.560	5.093	82.431						
7	.527	4.794	87.225						
8	.438	3.986	91.211						
9	.363	3.302	94.513						
10	.335	3.049	97.562						
11	.268	2.438	100.000						
12	0.221	2.422							
13	0.212	2.000							
14	0.119	1.980							
15	0.110	1.891							
Extraction Method: Principal Component Analysis. CO means Component									

The number of independent variables at the beginning is the same as the number of independent variables in the population parameter analysis. There are sixteen factors to take into The Eigenvalue of the retained variables is more than 1, hence only four will be used. The total variation describing the variables should be at least 70.22 percent. Through this study, we found that four factors could account for 70.22 percent of the difference in effect between the homogenous variables.

Initial Eigenvalues: Eigenvalues are used to symbolise the diversity of variables. It is guaranteed that the first component will always account for the most variance, and that subsequent factors will always account for less variance, relative to the first factor as seen. As a result, progressively less variance would be explained by each succeeding component.

Graph-3: Screen plot of Eigenvalue and Component Number



The screen plot shown above is a graph of the Eigenvalues plotted against all of the variables. The graph may be used to determine the optimal number of independent variables to track. Once the curves meet, they tend to flatten out. It has been demonstrated that the curve flattens out between the first and fourth components. Keep in mind also that only four variables have been kept since the Eigenvalue of factor 4 downwards is less than 1.

Table-4: Factor Loadings for the problems in Aqua-culture - Rotated Component Matrix

S.No	Variables	Co-1	Co-2	Co-3	Co-4
E1	Inadequate Value Added Products				.916
E2	Strict Quality Standards	.762			
E3	Inadequate Supply of Raw material(Fish)			.673	
E4	Low Price Realization	.628			
E5	Trade Barrier (Tariff & Non-Tariff)	.741			
E6	Inadequate Infrastructure Facilities (Transport, Communication, Electricity, Training Institutes, etc)	.596			
E7	Inadequate Finance & Welfare Measures	.745			
E8	Tough Competition			0.692	
E9	No Information about Foreign Market	.718			
E10	Strict Legal procedures		.787		
E11	High Operational Cost		.758		

E12	Poor Government Support	0.68			
E13	Competition			0.66	
E14	Legal procedures	0.78			
E15	Tariff and non-tariff barriers	0.71			

CO means Component.; Method: Principal Component Analysis.

By employing the Varimax rotation technique, the Principal Component Matrix arrives at the rotated component matrix. Factor rotation can be used to get a deeper comprehension of the variables at play. The table of the function matrix for the four components being extracted displays all 15 variables. To a greater extent, the component contributes to the element, the higher the absolute load value (the approach has extracted four variables, which are split into four factors, from a total of fifteen factors). Several parts (component-1, component-2, component-3, and component-4) make up the whole.

Table-5: Factors for problems of Aqua-culture

S.No	**Factors-1: (Government support factors)**
E2	Strict Quality Standards
E4	Low Price Realization
E5	Trade Barrier (Tariff & Non-Tariff)
E6	Inadequate Infrastructure Facilities (Transport, Communication, Electricity, Training Institutes, etc)
E7	Inadequate Finance & Welfare Measures
E9	No Information about Foreign Market
E12	Poor Government Support
E14	Legal procedures
E15	Tariff and non-tariff barriers
S.No	**Factors-2: (Legal factors)**
E10	Strict Legal procedures
E11	High Operational Cost
S.No	**Factors-3: (Competition)**
E3	Inadequate Supply of Raw material (Fish)
E8	Tough Competition
E13	Competition
S.No	**Factors-4: (Value added factors)**
E1	Inadequate Value Added Products

Test of Normality to apply either parametric / Non-Parametric Tests: If the measurement is irrelevant, the data is normal, hence any number greater than 0.05 implies normalcy. If the result is meaningful (less than .05), the data is not regular. For the variables derived from the factor analysis, the researchers tested normality for the factors removed. Below the results are tabulated.

Table-6: Tests of Normality

Variable	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	p-value	Statistic	df	p-value
Problems	0.196	74	0.300	0.918	74	0.120
a. Lilliefors Significance Correction						

The p-value of 0.30 for the Kolmogorov Smirnov test for this dimension is greater than the threshold of 0.05 indicated by the data shown above. By this metric, the score of 0.12 for the Shapiro-Wilk test is likewise more than the 0.05 threshold for statistical significance. That's a sign that the results are quite normal. Parametric testing should be mentioned as a means of further investigation. In addition, the normal distributions shown below lend credence to this understanding.

Table-7: Descriptive Statistics and Significance Testing

Dimensions	N	Mean	Std. Deviation	F-value	P-value
Government support factors	75	11.15	4.54	.109	.741
Legal factors	75	9.18	2.80	1.231	.000 *
Competition	75	15.29	4.19	.493	.483
Value added factors	75	6.09	1.29	6.818	.009 *

Source: Primary data; * Significance at 0.01

Significance testing problem in aqua-culture is tabulated and shown in the above table. The same is extracted through significant values. The mean of the perceptions of respondents is 11.15 with an S.D 4.54 about " Government support factors"; The F-value is 0.109 with a p-value of 0.741. This means, the entrepreneurs perceived differently support from the government.

The mean of the perceptions of respondents is 9.18 with an S.D 2.80 about "legal factors"; The F-value is 1.23 with a p-value of 0.00. This means, entrepreneurs perceived differently about legal factors.

The mean of the perceptions of respondents is 6.09 with an S.D 1.29 about "value added factors"; The F-value is 6.81 with a p-value of 0.009. This means that the entrepreneurs perceived differently about legal factors. Therefore, it is concluded that, the major problems which are associating with aqua-culture are Quality, Low Price, Trade Barrier, Inadequate Infrastructure Facilities, No Information about Foreign Market, Poor Government Support, Legal procedures, High Operational Cost, Inadequate Supply of Raw material, Competition and Inadequate Value Added Products.

Problems in connection with production of aquaculture products;

Aquaculture production issues are examined in the context of eleven explanatory factors. They are: 1. Inadequate Value Added Products; 2. Strict Quality Standards; 3. Inadequate Supply of Raw material (Fish); 4. Low Price Realization; 5. Trade Barrier (Tariff & Non-Tariff); 6. Inadequate Infrastructure Facilities (Transport,

Communication, Electricity, Training Institutes, etc); 7. Inadequate Finance & Welfare Measures; 8. Tough Competition; 9. No Information about Foreign Market; 10. Strict Legal procedures; 11. High Operational Cost; 12. Poor Government Support; 13. Competition; 14. Legal procedures; 15. Tariff and non-tariff barrier.

The aquapreneurs are given a five-point scale on which to rate how much they agree with the statements made under each challenge. The severity of each incident was elicited by using a mixture of positive and negative comments. The first step in the analysis is to compare the problem's mean scores to the expected score to see if the problem variables are relevant based on their agreement. The expected score of three is reached by multiplying the number of items connected with each issue variable by three; this yields a score of three as the neutral point. If the actual mean score is greater than the expected score, then the issue is real in the aquaculture farms. The results obtained from the study's intended sample are shown below.

Table-8: Descriptive statistics of production problems of Aqua culture

S.NO	PROBLEMS	Expected score (no. of items X 3)	Actual meanscore
1	Inadequate Value Added Products	6	8.1533
2	Strict Quality Standards	9	9.8600
3	Inadequate Supply of Raw material (Fish)	**12**	**10.8300**
4	Low Price Realization	**9**	**7.4600**
5	Trade Barrier (Tariff & Non-Tariff)	33	37.4833
6	Inadequate Infrastructure Facilities (Transport, Communication, Electricity, Training Institutes, etc)	6	9.3067
7	Inadequate Finance & Welfare Measures	6	9.2700
8	Tough Competition	6	6.1900
9	No Information about Foreign Market	**6**	**5.7833**
10	Strict Legal procedures	9	13.0600
11	High Operational Cost	21	28.0900
12	Poor Government Support	8	5.44
13	Competition	**6**	**7.23**
14	Legal procedures	6	4.442
15	Tariff and non-tariff barriers	6	6.065

The difficulties of Inadequate Supply of Raw Material (Fish), Low Price Realization, No Information on Foreign Market, and Competition" have mean scores that are lower than the projected score, as shown in the table above. As a result, these four issues are ruled out of further consideration. As a result, the production challenges are reduced to eleven factors, and subsequent study is

limited to the eleven variables identified as the true production issues.

Analysis of Production Problems

Eight variables are evaluated for the analysis which collected from the respondents in West Godavari district included for the study.

Descriptive statistics on VariousProblems in Production

Factors	West Godavari District	
	Mean	S.D
Inadequate Value Added Products	6.54	1.201
Strict Quality Standards	9.41	1.455
Trade Barrier (Tariff & Non-Tariff)	29.20	6.773
Inadequate Infrastructure Facilities (Transport, Communication, Electricity, Training Institutes, etc)	9.76	0.922
Inadequate Finance & Welfare Measures	9.54	1.378
Tough Competition	5.18	0.686
Strict Legal procedures	13.73	0.755
High Operational Cost	23.24	2.792
Poor Government Support	6.34	0.43
Legal procedures	6.10	0.63
Tariff and non-tariff barriers	5.89	0.22

The table shows that the mean scores for the variable incidence of trade barriers do not differ significantly in west district, however the means for all other variables differ significantly. Trade restrictions appear to be a major issue in West Godavari district. Other important issues in aquaculture include a lack of value-added products, strict quality standards, and high operational costs. It has been identified that the mean scores for the aforementioned issues are higher in West Godavari.

6. Conclusion:

The major problems aqua culture in general and production are analysed through primary data and results are shown in the above. Therefore, it is understood that the major problems of aqua culture industry are Quality, Low Price, Trade Barrier, Inadequate Infrastructure Facilities, No Information about Foreign Market, Poor Government Support, Legal procedures, High Operational Cost, Inadequate Supply of Raw material, Competition and Inadequate Value Added Products. Trade restrictions appear to be a major issue in West Godavari district. Other important issues in aquaculture include a lack of value-added products, strict quality standards, and high operational costs.

References:

[1]. Hasan, Neaz A. et.al. (2021). Impacts of COVID-19 on the finfish aquaculture industry of Bangladesh: A case study. Marine Policy. 130. 104577. 10.1016/j.marpol.2021.104577.

[2]. Cretu, Mirela. (2016). Environmental Impact of Aquaculture. A Literature Review.

[3]. Okomoda Victor (2011), "Aquaculture and the Environment, effects and Best practices`", Department of Fisheries and

Aquaculture, University of Agriculture Makurdi, Nigeria.
[4]. Podemski C.L. and Blanchfield P.J., (2006) `Overview of The Environmental Impacts Of Canadian Freshwater Aquaculture`, in A Scientific Review of the Potential Environmental Effects of Aquaculture, Vol-V, 138.
[5]. Mishra N (2012), "issues of the inland fisheries and the policy framework governing the sector, Indian water Portal. http://www.indiawaterportal.org /articles/study-issuesinland-fisheries-and-policy-framework-governing-sector. 2012;
[6]. S. Yılmaz, E. B. Şen, A. Ozalp (2013), FISHERIES SECTOR IN TURKISH ECONOMY AND MARKETING OF FISHERY PRODUCTS. 21. 265-272.
[7]. Madan, M. S., Radhakrishnan, K., Ranjith, L., Narayanakumar, R., Aswathy, N., & Kanthan, K. P. (2018). Economics and marketing of dry fish production in Thoothukudi District, Tamil Nadu, India. *Indian Journal of Fisheries*, *65*(4). https://doi.org/10.21077/ijf.2018.65.4.53463-16
[8]. Anneboina, L. R., & Kavi Kumar, K. S. (2017). Economic analysis of mangrove and marine fishery linkages in India. *Ecosystem Services*, *24*. https://doi.org/10.1016/j.ecoser.2017.02.004

[9]. Das, D. S., & Govindasamy, R. (2021). Aquaculture Production and Consumption of Fish in India. *Shanlax International Journal of Economics*, *10*(1). https://doi.org/10.34293/economics.v10i1.4443

[10]. Sharma, H., Kalamkar, S. S., & Swain, M. N. (2020). Assessment the Cost and Return in Marine Fish Production in Gujarat, India. *International Journal of Current Microbiology and Applied Sciences*, *9*(2). https://doi.org/10.20546/ijcmas.2020.902.021

[11]. araya, M., Rathod, S., Sinha, K., Shekhawat, R. S., & Chavan, S. (2018). Statistical Modeling and Forecasting of Total Fish Production of India: A Time Series Perspective. *International Journal of Current Microbiology and Applied Sciences*, *7*(03). https://doi.org/10.20546/ijcmas.2018.703.201

[12]. Singh, M., & Singh, J. M. (2017). Trends in Fish Production and Marine Fish Products Export from India. *Indian Journal of Economics and Development*, *13*(2). https://doi.org/10.5958/2322-0430.2017.00188.3

[13]. Goswami, C., & Zade, V. S. (2015). Statistical Analysis of Fish Production in India. *International Journal of Innovative Research in Science, Engineering and Technology*, *4*(2).

[14]. Yadav, A. K., Das, K. K., Das, P., Raman, R. K., Kumar, J., & Das, B. K. (2020). Growth trends and forecasting of fish production in assam, india using arima model. *Journal of Applied and Natural Science*, *12*(3). https://doi.org/10.31018/jans.v12i3.2353

[15]. Bhattarcharyya, B. (2005). The Indian shrimp industry organizes to fight the threat of Anti-Dumping action. In *Managing the Challenges of WTO Participation: 45 Case Studies*. https://doi.org/10.1017/CBO9781139030526.018
[16]. Blümmel, M., Haileslassie, A., Herrero, M., Beveridge, M., Phillips, M.,

& Havlik, P. (2015). Feed resources vis-à-vis livestock and fish productivity in a changing climate. In *Livestock production and climate change*. https://doi.org/10.1079/9781780644325.0008

[17]. Shepherd CJ. Aquaculture worldwide. Vet Rec. 1983 Jan 22;112(4):73-6. doi: 10.1136/vr.112.4.73. PMID: 6829148.

[18]. Norman RA, Crumlish M, Stetkiewicz S. The importance of fisheries and aquaculture production for nutrition and food security. Rev Sci Tech. 2019 Sep;38(2):395-407. doi: 10.20506/rst.38.2.2994. PMID: 31866686.

[19]. Chen, S. N. (1991). Environmental problems of aquaculture in Asia and their solutions. In *Revue scientifique et technique (International Office of Epizootics)* (Vol. 10, Issue 3). https://doi.org/10.20506/rst.10.3.576

[20]. H.,H.(1986)., Aquaculture in the Netherlands: problems and perspectives. *Tijdschrift Voor Diergeneeskunde*, *111*(22).

[21]. Flloko, A. (2003). Fish marketing and trading in Albania. *Aspects of Fish Markets in the Adriatic Sea - Report of the AdriaMed Meeting on Aspects of Fish Markets in the Adriatic Sea*.

[22]. Rahman, M., & Hossain, M. (2013). Production and Export of Shrimp of Bangladesh : Problems and Prospects. *Progressive Agriculture*, *20*(1–2). https://doi.org/10.3329/pa.v20i1-2.16868

[23]. Dursenev, M. S., & Chirkin, S. A. (2021). Aquaculture in the kirov region. Problems and prospects. *Siberian Journal of Life Sciences and Agriculture*, *13*(2). https://doi.org/10.12731/2658-6649-2021-13-2-128-137

[24]. Abbott, R. R. (1990). Aquaculture production stratifying, developing in niches. *Feedstuffs*, *62*(32).

[25]. Das, D. S., & Govindasamy, R. (2021). Aquaculture Production and Consumption of Fish in India. *Shanlax International Journal of Economics*, *10*(1). https://doi.org/10.34293/economics.v10i1.4443

[26]. Syaifudin, A., & Carsjens, G. J. (2018). Exploring farming strategies in a metropolitan area: Case study of inland aquaculture in Bogor Regency. *IOP Conference Series: Earth and Environmental Science*, *202*(1). https://doi.org/10.1088/1755-1315/202/1/012026