Reshaping Management and Economic Thinking through Integrating Eco-Friendly and Ethical Practices
Proceedings of the 3rd International Conference on Management and Economics

26-27 February 2014
Faculty of Management and Finance, University of Ruhuna, Sri Lanka

Marine Fisheries Sector in Kerala, India: An Analysis of the Socio Economic and Feed Marketing Impact on the Farmers

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Abstract

Fish has become an important part of diet for millions of people throughout the world especially in the coastal regions. It is estimated that human population is presently increasing at approximately 2 per cent a year. Kerala has 404 fishing villages and 222 landing centers. There are about 10.85 lakh marine fisher folk in the State of which, 2.2 lakh are active fishermen in the year 2004. The decline in numbers is due to many factors that affect the livelihood of the farmers. Exports of fishes from India have been showing a steadily increasing trend since 1980. The growth in motorisation and mechanisation of the crafts has contributed significantly to an increase in fish catches leading to increased volume of export of these items from our country. The high demand from foreign buyers, especially for prawns has resulted in an increase in exports, both in terms of volume and value. This study hence was conducted keeping in view the socio economic conditions of the marine fisheries farmer, the role played by marketing of feeds sector and it covered the entire state of Kerala. It is found that a distinct market advantage usually generates a greater profit potential for the firm. Studies conducted on marine fish marketing pointed out that transportation of fish is very inefficient in India. Due to inadequate transportation, no fresh fish is available in larger and needy markets located away from the landing centres, but at the same time surplus fish at harbours is being sent to fish meal plants. The secondary data reveals that in most of the poor countries, the physical conditions for fishery expansion was very low and the prevailing social, institutional and economic conditions prevented the better livelihood of farmers.

Keywords: *farmers; India; Kerala; marine fisheries; socio economic conditions*

1. Introduction

The sea covers two-thirds of the world area. The sea is not only the store house of water but also a store of resources like food and valuable commodities such as pearl medicines and raw materials for industries. The sea is a good supplier of food in the form of fish. Fish has become an important part of diet for millions of people throughout the world especially in the coastal regions. Human population is presently increasing at approximately 2 percent a year and 10 to 30 million people die due to starvation or deceased by malnutrition. Fish could be a mitigating force in supplying food to the world. At present more than 90 million tons of fish are harvested from world seas annually. Fishing is one of the most familiar economic activities associated with the sea. 'Fishing' refers to the landing of all types of marine and fresh water 'Faunas'. India is one of the important fishing nations of the world. India is a developing country which stands second in population next to China. People in India mainly depend on agriculture for their livelihood. Next to agriculture fishing plays a prominent role. India has a coastal line of 8,129 km. The 7.5 million hectares of fresh water bodies and 1.4 million brackish water bodies such as estuarine, backwater and mangrove water ways existing in the country meet the fishing requirements of the country.

During 1970-1980, there was a rapid expansion of the fishery in the inshore waters. Purse seine nets were introduced on the south west coast for the exploitation of pelagic fishes. With the introduction of the purse seines, large beach seines and rampan nets (used mostly along the Karnataka coast) started disappearing. It has also led to the increased competition between the traditional and purse seine operators regarding the exploitation of pelagic resource; the mainstay of fisheries of this region. Fishing pattern has also started changing from single day fishing to multi day fishing. The cod and mesh size of the trawl nets became reduced to catch relatively smaller sized prawns. During monsoon season, fishing was done with gears such as gill nets and small purse seines, in addition to trawlers. This increased effort in fishing has resulted in maximum catches of fishes. India is considered as one of the world leaders in shrimp production and exports. Considering the requirement of foreign exchange, the government has identified the marine products as a trust area for developments. The natural resources are either decreasing or remaining almost constant even though human resources are increasing. The fisheries resources are also depleting and hence cannot be expected to keep up with the demands of the multiplying mankind. The output from many of world's fisheries has remained constant over the recent years. The environmental degradation and poor fisheries management are two important reasons which hamper the growth of fisheries' resources. Inefficient management of fisheries' resources and environmental pollution has caused many of the world's fisheries to decline and even collapse. One option to prevent extinction and promote extensive production is stocking of early life stages of fishes. In this context, shrimp feeds are the major growth area and hence it is important that more focus is given for the sustainability of this shrimp feeds and the socio-economic conditions of the farmers.

2. Literature Review

There is very limited literature available on the subject. Day (1979) studied the fishing industry in the Indian Ocean countries in terms of its feasibility. Improvements in handling, distribution and marketing of fish, strengthening and extension services were found to be the urgent needs of fishermen. Kalawar (1985) concluded that the policy in vogue resulted in very low investment in marine fisheries compared to other sectors.

Kurien (1981) analysed the causes for the poverty among the fishermen. According to his report, inequality in the asset holdings among fisherman, exploitation by market intermediaries and the habit of excessive spending during high catch season are the three main reasons for poverty among the fishing households. Ralph et al. (1957) examined the various problems facing the fisherfolk and their development in less developed countries. The major problems identified included the lack of knowledge of potential resources, ignorance, lack of capital, lack of marketing expertise and organisational weakness among the fishermen. The main conclusion of these authors is that in most of the poor countries, the physical conditions for fishery expansion was very low and the prevailing social, institutional and economic conditions prevented the take off.

Marine fisheries play an important role in the economy of the fisher folk of Kerala. Currently, the state's share is over 5 lakh tons per annum and stands first among the maritime states of India in fish production. Kerala has 404 fishing villages and 222 landing centres. There are about 10.85 lakh marine fisher folk in the State of which, 2.2 lakh are active fishermen in the year 2004. According to UNDP (1983) the results of a fish feed survey conducted in twelve developing countries, review of each country's ability to meet future feed demand for aquaculture, and results of the initial efforts of the ADCP fish diet development programme in the areas of fish feed formulation, diet testing and feed manufacture in those countries such as Brazil, Egypt, India, Malaysia, Mexico, Nepal, Nigeria, The Philippines, Sri Lanka, Thailand, Tunisia and Venezuela.

Gandhi (1998) in his paper on the export prospects of marine products has suggested strategies for smooth and steady growth of this industry. His suggestions include intensification of R&D activities to produce quality fish seeds and fish feed for augmenting production and productivity, development of value added products from low value fishes, improvement in packaging techniques with the help of bio technology, upgradation of quality by modernizing the industry and strict adherence to the quality standards, including health regulations laid down by major markets such as the European Union, the USA, etc.

Hakkim (1980) conducted a case study of a few fishery cooperatives in Quilon district, the district

which constituted the major part of mechanized fishing in Kerala. His conclusion was that a substantial chunk of the benefits of mechanized fishing in the state was reaped by persons or groups not actually engaged in the fish production such as officials, traders and industrialists but who has set up fictitious fishery co-operatives.

Panikkar (1998) conducted a study to finding how the Central Government's Liberalisation Policy has affect the fishery stock. He has made a critical analysis of giving licenses to the foreign marine vessels and state that the policy of giving licenses to foreign deep sea vessels under liberalization and globalization is detrimental to the national interest as well as the interests of the coastal fishermen. In his opinion these deep sea vessels, with most modern equipment involved in indiscriminate and intensive fishing in the offshore waters, ultimately may leads to the depletion of the stock of many of the commercially important fishes.

Sehara et al. (1983) had studied the general economic conditions of fishermen in the two states of Maharashtra and Gujart and analyzed the literacy, size of family, number of earning members, number of annual fishing days, household income and expenditure and saving pattern. The conclusions of the study were (i) the literacy was high in all villages (ii) size of the family varied from 7 to 8 (iii) earning members in different categories were 40-59 percent (iv) number of annual fishing days ranged from 200 to 244 and (v) quarterly fishing expenditure and income were highest in post monsoon and lowest in monsoon season (vi) nearly 53-91 percent of total income in Maharashtra and 57-91 percent in Gujarat (vii) one rupee in fishing expenditure was responsible for 0.15 and 0.13 increase in net fishery income in Maharashtra and Gujarat.

The scrutiny of literature reveals that studies related to the marine fisheries sector in particular to the shrimp feeds industry in our country are not many and most of them were conducted at selected centres and at micro levels. They could not help in deriving policy perspectives at the state or at the national level. Hence, this sector has emerged as an important one only during the last decade. This research study hence makes a modest attempt to fill in the research gap pertaining to the shrimp feeds in terms of the responses received from the dealers. The secondary data itself is a guiding factor in the primary data collection.

3. Methodology

Data for the study were collected from 300 farmers in Kerala selected through a two stage random sampling. The districts formed the first stage unit and the farmers in the selected districts are the second stage unit. For the selection of the first stage, the districts were ranked in descending order on the basis of purchase of shrimp feeds from the dealers. The quantity purchased from each dealer was taken as the proxy for the shrimp feeds usage. From the ranked frame, a sample of three districts was selected using systematic sampling. In each selected district a list of farmers was prepared by contacting Marine Products Export Development Authority (MPEDA) and by local enquiry. From the list so prepared a sample of 100 farmers was selected from each of the three districts viz., Kollam, Alppuzha and Ernakulam using systematic random sampling. Total number of primary sampling unit is thus 300 farmers. From the selected sample of dairy farmers, the required data were collected through structured interviews. The data collected include information on the socio-economic condition of the dairy farmers, their livelihood assets, the practices followed in dairy farming, disposal pattern of milk etc. Discussions were also held with groups of farmers to get a deeper understanding of their livelihood strategies. Filled questionnaires were edited to make them ready for coding. Then the collected data were coded and transcribed on transcription cards. With help of the transcription cards, classification tables were prepared for further analysis. Secondary data published by MPEDA and the official documents of Fisheries Association and Fisheries College, Kochi were also used.

4. Results and Findings

In Kerala about 70% of the people live in rural areas. Most of them are engaged in agriculture and allied activities, small business, rural labour, artisans etc. Various studies have shown that the distribution of household income in the rural areas is skewed with a few households having large income and many having medium and low level income. Households in the lower income level are mostly small and tiny farmers, agricultural labourers and other rural labourers. For these households, the income is usually seasonal and the day to day

income is small and often uncertain. Because of this uncertainty, they often engage in multiple activities.

The activities that members of these households engage in depend on the socio economic conditions prevailing in the community. To understand the role of shrimp farming, it is necessary to understand the socio economic background of the households engaged in the activity. The age wise distribution of the farmers was calculated. In Alappuzha, 51 percent of the respondents fall within the age group of 46 years to 65 years. However 28 percent of the respondents within the age group of 36 years to 45 years have also taken up farming. In Ernakulam, the pattern is more or less the same. 52 percent of the farmers fall within the age group of 46 years to 65. Another 24 percent of the respondents are within the age group of 36 years to 45 years.

Younger generation does not seem to be keen in taking up shrimp farming as their occupation. Availability of other attractive occupations may be the cause for low participation of younger persons in shrimp farming. Another possible reason could be that the younger people may be searching for other jobs with higher income. Lack of experience in shrimp farming may also be a reason for not taking shrimp farming as an occupation by the youngsters. Discussion with farmers revealed that they are not interested in directing their children to take shrimp farming as an occupation. The majority of people have education up to SSLC level or below. There are farmers to the extent of 47 percent with education up to upper primary level. 45 percent of the farmers have education up to SSLC. Those with higher education are less in number to the extent of eight percent. This means that majority of the farmers is middle aged and has comparatively low education level. The majority of the respondents in all the three districts are married. A small percentage of the farmers are widows and divorced people. It was seen that shrimp farming is mainly performed by nuclear families.

Almost all the respondents in this study are doing shrimp farming either as their main occupation or as subsidiary occupation. Among them about a third are as their main occupation. Among those doing shrimp farming as a subsidiary occupation, their main occupation is usually either agriculture or fishing. From the tabulated results given below it can be seen that in Kollam, 32 percent of the respondents are doing this as their main occupation. Most of the respondents with main occupation as agriculture or those doing fishing have taken as a subsidiary occupation. Nearly, 48 percent of the people fall in this category. That is to say that other than cultivators and fishing, very few people intends to take up shrimp farming as an occupation. A few persons who have returned from gulf and a few with business like provision stores come under this category. The situation is more or less the same in Alappuzha and Ernakulam districts. In Alappuzha 34 percent of the respondents have taken up shrimp farming as their main occupation and 43 percent have taken up agriculture and fishing as their as their main occupation. In Ernakulam, 31 percent of the respondents are doing shrimp farming as their main occupation and 48 percent have taken up agriculture and fishing as their main occupation. Thus it can be seen that those who are engaged in dairying are either people with dairying as their main occupation or those who have taken agriculture or working as agriculture labourers. The contribution from people in other sectors is negligible except a few business men and gulf returnees.

For chi square test, the null hypothesis is that there is no association between the two classifications; in this case between districts and type of occupation. The result indicate that the three districts follow the same pattern with respect to occupation and the classifications are independent, which means that the pattern is the same for all three districts. From the details about the land holdings of farmers, it was observed that majority have less than 80 cents of land. However, in all three districts there are some farmers with larger holdings and in a few cases having land of 3 to 4 acres. It means that shrimp farming is done mainly by large holders. One way ANOVA results indicate that the difference between the means seen in the land holdings are not statistically significant. The difference in the estimate is due to the existence of a few farmers with large holdings. The Median size of holdings is 74 cents, which means that 50 percent of the dairy farmers have holdings below 74 cents. A typical farmer is a middle aged or elderly person with a small piece of land and some experience in shrimp farming. Both men and women contribute equally in shrimp farming.

The majority of those who purchased from major dealers are those with large land holdings. There are farmers who have tieup with the dealers who in turn reach the feed to them. The farmers purchasing shrimp feeds without involving middlemen is less than 50 percent. The farmer pays a commission to the middlemen

for the purchase of shrimp feeds. The yield depends upon the type and quality of the shrimp feed used for farming purposes. The null hypothesis for the test is that the population means for all districts are the same. The result indicates that there is no sufficient evidence to reject the null hypothesis. This is to say that the differences in the sample estimates are not significant.

Besides taking precautions, the farmers also feed the shrimps at various stages with additional supplements like mineral mixture and calcium powder/liquid along with supplements in smaller quantities depending upon the stage of the shrimps. Adopting such practices is an indication of the awareness of the farmers regarding the preventive health care measures. However, there are many farmers who have incurred losses in terms of mass shrimp diseases issues. Most farmers are not insured. Only those who have availed loans have insured along with major farmers. This is because insuring the farm is one of the conditions mentioned in the loan agreement. The farmers revealed that the formality for settling a claim against the loss incurred by the farmers is laborious and corrupt. This may be the reason that many farmers are reluctant in insuring.

To test whether the sample means of the total retained earnings from dairying are different, one way ANOVA was carried out. The result indicates that the retained earnings from dairying among the three districts are not significantly different. Therefore pooled average (Rs. 19040/- per month) can be taken as an estimate of the retained earnings. From the occupation structure of the household members it was observed that those who are engaged in agriculture activities and those who work in fishing are mostly engaged in shrimp farming activities. Besides this people engaged in various other occupations including retired people and gulf returnees are also maintaining farms. The people engaged in agricultural activities are mainly cultivating rubber. The income from rubber contributes a major portion of their income.

Most of them are following the traditional method of farming and only those with large land holdings are experimenting with the extensive, modified extensive and semi-intensive methods of farming. Most of the large land holding farmers in Ernakulam were resorting to modified extensive and semi-intensive method of shrimp farming. Scampi is the most used species followed by Tiger and White prawn. White prawn is followed by farmers with large land holdings. This is followed more in the case of Ernakulam. Pellet feed is found to be accepted more due to its advantages in the Kerala conditions.

Shrimp feeds are purchased from various sources and various brands are under active consideration. Most of the farmers purchase Grobest shrimp feeds followed by Godrej and the rest from nearby dealers. Only a few people purchase from local market where local brands are being considered. Marketers have to design the appropriate strategy for the relevant market conditions. The acceptance of the brand consists of so many variables in practice. In the present study, the same is confined to fourteen variables. The farmers were asked to rate these 14 variables at five point scale.

The most considered variables in acceptance of the brand among the farmers are brand name, maintaining high quality and maintaining unique image since their respective mean scores are 3.9446, 3.9337 and 3.8664. Among the Kollam farmers, these are 'coverage of range of produces' having lower cost than the competitors and coverage of various segments since the mean scores are 3.9933, 3.9441 and 3.9896. Regarding the importance given to the variables, the significant difference among the three district farmers have been noticed in the case of innovative products, product design, maintaining high quality, brand name, maintaining unique image, advertising message and differentiating products from competitors since their respective *t* statistics are significant at 5% level. The important acceptance strategies have been identified with the help of Exploratory Factor Analysis (EFA). The score of the variables in the brand acceptance strategy has been included for the analysis. Initially, the test of validity of data for factors analysis has been conducted using Kaiser-Meyer-Ohlin measure of sampling adequacy and Bartlett's test of Sphericity. Since the KMO measure is greater than 0.50 and the chi-square is significant at 1% level. The validity of data for factor analysis has been confirmed. All 14 variables have been accepted into EFA. It results in four important strategies namely market standardization, differentiation, export diversification and cost leadership. The most important strategy is 'market standardization' since its mean score and per cent of variation explained is 2.9196 and 32.08 per cent respectively. The next two strategies are differentiation and export diversification since their respec-

tive Eigen values are 2.0864 and 1.9919. These strategies consist of three variables each with the reliability coefficient of 0.8144 and 0.7169 respectively. The last strategy is cost leadership which consists of two variables with the reliability coefficient of 0.7049. The higher correlation is identified between market standardization and differentiation since its correlation coefficient is -0.2917 whereas the lower correlation is noticed in the case of differentiation and cost leadership since the correlation coefficient is 0.1339. The inter-correlation coefficient between the strategies is not statistically significant. It confirms the discriminant validity of the export strategies. It reveals that the four strategies are mutually exclusive to each other.

The shrimp feed manufacturers and marketers may be attached with different brand acceptance strategy which depends upon the nature of products, nature of usage and the different customers segment. It is highly imperative to analyse the importance attached to the strategies by the feed manufacturers. The mean score of each strategy among various respondents has been computed separately. Regarding the importance attached to the marketing, strategies, the significant difference among the three districts has been examined with the help of 't' test. The highly attached strategies among the Kollam respondents is 'differentiation' and 'market standardization' since the mean scores are 3.8816 and 3.6393 respectively. Among the Ernakulam respondents, these two are 'export diversification' and 'cost leadership' since the mean scores are 3.9325 and 3.9551 respectively. Regarding the importance given to these strategies, the significant difference among the three districts has been noticed in the case of importance given to differentiation, product diversification and cost leadership since their respective't' statistics are significant at five per cent level. The Hypothesis was tested using Chi-Square test to study the relationship between socio economic status and the opinion of the respondents on the influence of advertisements on the shrimp feed brand purchase. The Chi- Square value was obtained as 17.39. This is not significant at 5% level of significance (0.004). It was observed that the need is created in majority of the respondents irrespective of their socio economic background. It can be concluded that there is no significant difference among respondents of different levels of socio economic background on the influence of advertisements on the shrimp feed brand purchase. Hence, the Hypothesis is accepted.

The null hypothesis was that pricing opinion on 1kg shrimp feed is independent on the location. According to chi-square analysis the calculated value is lesser than the table value, therefore the null hypothesis is accepted. The location of the farmer is not an indication for deciding on the pricing. While the question was asked in terms of the payment being made by the farmers towards the purchase of shrimp feeds, it was found that majority are buying using the cash mode of payment.

On the same question of whether credit facility is offered to those currently buying using the cash mode was asked. Based on the above, a null hypothesis was formulated with a statement that there is no significant relationship between location of the respondent and their opinion about the statement that credit mode will influence their decisions. The null hypothesis was tested using Chi Square test to determine the relationship between location of the respondent and their opinion about the statement that credit mode will influence their decisions. The Chi Square value obtained was 30.918. This is significant at the 5 % level of significance (P Value 0.014). Hence the Null Hypothesis is rejected. Therefore, it is concluded that there is significant relationship between location of the respondent and their opinion about the statement that credit mode will influence their decisions. Kruskal – Wallis Test was carried out in the five categories grouped according to their location. The mean scores obtained for the five categories were 3.91, 4.1, 4.03, 4.27 and 4.0 respectively. This shows that the Kollam was least with a mean score of 3.91. In case of Ernakulam, the opinion was more in favour of credit mode will influence their decisions. To test the difference between the mean scores of the various age groups, Chi Square test was conducted and the Chi square value obtained was 2.749 (P Value 0.601). This is not significant at 5 % level of significance; and hence we can make an inference that there is no significant difference between the means scores of the different locations.

The majority of the respondents were not consulting experts before purchasing the brand of shrimp feed. Hence the experience and expertise of the respondents play a vital role in choosing the decision on the brand. It may be noted that many of the respondents were not even a graduate still they were able to decide on the brand. The null hypothesis was formulated that there is no significant relationship between location

of the respondent and their opinion about the statement that they consult the experts before buying a brand of shrimp feed. This is significant at the 1 % level of significance (P Value 0.002). Hence, the Null Hypothesis is rejected. Therefore it is concluded that there is significant relationship between location of the respondent and their opinion about the statement that they consult the experts before buying a brand of shrimp feed.

Kruskal – Wallis Test was carried out in the location decisions grouped. The mean scores obtained for the three categories were 4.52, 4.63 and 4.74 respectively. This shows that as location changes, the opinion of farmers on the requirement of expert opinion is becoming stronger. It may be noted that there is no significant relationship among the locations with the statement that they consult the experts before buying a brand of shrimp feed. To test the difference between the mean scores of the various lcoation type, Chi Square test was conducted and the Chi square value obtained was 4.085 (P Value 0.13). This is not significant at 5 % level of significance; and hence we can make an inference that there is no significant difference between the means scores of the different group. It can be inferred that all locations, there is a clear opinion that dealers highly needed to provide the necessary inputs about the shrimp farming techniques, developments etc. The null hypothesis was tested using Chi Square test to determine the relationship between location of the respondent and their opinion about dealers need to provide the necessary inputs about the shrimp farming techniques, developments etc. The Chi Square value obtained was 6.294. This is not significant at the 5 % level of significance (P Value 0.391). Hence the Null Hypothesis is accepted. So it is concluded that there is no significant relationship between location of the respondent and their opinion about dealers need to provide the necessary inputs about the shrimp farming techniques, developments etc. Kruskal – Wallis Test was conducted in the three location categories grouped. The mean scores obtained for the four categories were 1.67, 1.62 and 1.66 respectively. This shows that as the location changes provide the necessary inputs about the shrimp farming techniques, developments etc there is no change in their opinion. To test the difference between the mean scores of the various experience groups, Chi Square test was conducted and the Chi square value obtained was 1.336 (P Value 0.721). This is not significant at 5 % level of significance; and hence we can make an inference that there is no significant difference between the means scores of the different groups.

80 % of the respondents who has educational qualification below SSLC were of the opinion that dealers need to provide the necessary inputs about the shrimp farming techniques, developments etc. 56.5 % of the respondents who has educational qualification as SSLC were of the opinion that dealers mostely need to provide the necessary inputs about the shrimp farming techniques, developments etc. 75 % of the respondents who has educational qualification as degree were of the opinion that dealers highly need to provide the necessary inputs about the shrimp farming techniques, developments etc. 48.1 % of the respondents who has educational qualification as technical were of the opinion that dealers highly need to provide the necessary inputs about the shrimp farming techniques, developments etc. The null hypothesis was tested using Chi Square test to determine the relationship between educational qualification of the respondent and their opinion about dealers need to provide the necessary inputs about the shrimp farming techniques, developments etc. The Chi Square value obtained was 8.84. This is significant at the 5 % level of significance (P Value 0.356). Hence the Null Hypothesis is rejected. Therefore we conclude that there is significant relationship between educational qualification of the respondent and their opinion about dealers need to provide the necessary inputs about the shrimp farming techniques, developments etc. Kruskal – Wallis Test was conducted in the three categories grouped according to their education level. The mean scores obtained for the five categories were 1.85, 1.74, 1.56, 1.65 and 1.40 respectively. To test the difference between the mean scores of the various education level, Chi Square test was conducted and the Chi square value obtained was 4.745 (P Value 0.314). This is significant at 5 % level of significance, and hence we can make an inference that there is significant difference between the means scores of the different groups. There were statements clearly delineate the marketing activities undertaken by the shrimp feeds marketers and the response to these statements were obtained from the farmers. Excepting the two statements on company's dealers being competitive and the loyalty programmes are good, all other statements were given a good rating by the farmers. The pricing part of the products as usual got an average rating and that needs to be addressed by the marketers. To a certain

extent there is clear understanding of the marketing activities undertaken by the shrimp feeds manufacturers.

5. Conclusion

Activities that members of the fishing households engage in depend on the socio economic conditions prevailing in the community. To understand the role of shrimp farming, it is necessary to understand the socio economic background of the households engaged in the activity. The study evaluated farmers, their socio economic backgrounds, the consumption pattern and their involvement with the dealers and the manufacturers. This study has thrown open avenues where there is a government intervention in trying to ameliorate the conditions of the farmers so that shrimp farming can actually fetch them an earning on which the business can thrive. Government/fisheries agencies or feed companies jointly or separately start laboratories having facility to test seeds to avoid deadly decease before stocking. Adopting various preventive measures from diseases and better hygiene practices will prevent the occurrence of diseases and help to reduce the maintenance expenses. To do this, the various testing measures available at CMFRI, MPEDA and CUSAT needs to be used by the farmers for converting the larvae into the shrimps that usually are at first quality.

Create farmers society of around 100 farmers and appoint a technician for them to provide technical support for awareness creation and support. As the farmers are concentrating mainly on quality and timely availability of the shrimp feeds these factors are important. Company should give more attention to keep and develop the quality of their product to be effective in the market especially in Feed Conversion Ratio and water stability. Fresh bags with the latest production date should be supplied to the farmers as they are highly sensitive about the condition of the feed. The marketers may devise a new credit facility for high net worth customers. The consumption pattern, demand analysis will give a clear indication in this direction.

Technical field force are a must in this industry and that will create more visibility, awareness and the possible increase in demand for these feeds in Kerala. Concentration must be given to produce the low price feed to satisfy that particular market segment. Pricing is a major concern for the farmers and was vouched by the experts, pricing strategies attracting the segments may be planned. As most of the farmers responded that they have expansion plan in near future with younger generation involved in the business, it is imperative that professional marketing strategies are followed by the marketers.

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