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Mainstreaming the Gender Perspective of Bivalve Farming Self Help Groups of Women Fisherfolk: Insights from Kerala

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ABSTRACT

A study for assessing the impact of SHGs in gender mainstreaming was undertaken on the bivalve farming Self Help Groups of women fisherfolk in four districts in Kerala such as Kasargod, Malappuram, Ernakulam and Kollam. The analysis included specific aspects such as performance assessment of the SHGs, gender analysis, empowerment analysis and economic feasibility analysis of mussel and edible oyster which were carried out based on socio-economic surveys and personal interviews using pre-tested and structured data gathering protocols with standardized scales and indices involving the members of the SHGs. The male and female counterparts of the families were separately interviewed to assess the gender mainstreaming aspects in terms of equity and equality to access to resources, participation profile, decision making aspects, gender need analysis etc. Though majority of activities are female dominated, the male counterparts of the households also have definite role in decision making, purchase of accessories, sales, marketing etc. The indicative economics worked out for the economic feasibility analysis to find break-even point and pay-back period of the SHGs suggests that, both the mussel and oyster units take one year to break even. A success case study was elucidated and documented as a documentary movie which can be used as a case model for promoting group action for mobilizing SHGs on a sustainable basis.

Key words: Gender mainstreaming, Self Help Groups, Break-even point, Pay Back Period, Empowerment Index, Performance level.

INTRODUCTION

It is an unequivocal fact that, innovations do not emerge in a socio-political vacuum. It is the extent of partnership between the research and the client system that decides the fate of any technology in terms of its adoption or rejection. Being the premier Marine Fisheries

Research Institute in India with seven decades of service to the nation, the Central Marine Fisheries Research Institute (CMFRI) suggests ways and means to sustain the potential source of food in capture and culture fisheries and their optimum utilization.

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Rational utilization of common property resources for sustainable development without endangering the environment is possible through community participation. Bivalve farming (especially mussel and oyster culture) is one such technology that has offered great scope for enhancing food and livelihood security of the stakeholders in our coastal agro climatic zone and community participation is an important element of this technology. Mussel farming has already been proved as one of the profitable enterprises in the coastal belts as a subsidiary income-deriving source of coastal fisherfolk. The experimental trials conducted by CMFRI have proved the techno-economic feasibility of mussel farming^{4,11}. Here an attempt has been made on exploration of a couple of case studies in Kasargod, Malappuram, Ernakulam and Kollam districts of Kerala on mainstreaming the gender perspective and impact of Self Help Groups of women fisherfolk engaged in bivalve farming and an assessment of indicative economics.

An attempt was made for documenting the case study on gender perspective in mussel farming SHGs of women, in a descriptive way, focusing attention on the gender equity and equality, there is ample scope to explore the gender empowerment paradigm along with emphasis on the three pillars such as economic empowerment, well-being and decision making. Looking into the policy and programs for aquaculture development in India, it could be observed that the production from marine sector has almost attended the plateau where as aquaculture has a great potential. Being an important stakeholder of fisheries sector, women shoulder various roles. Traditionally fisher women (women belonging to particular caste, sub-caste, etc.) are important stakeholders in fish processing and marketing. With increase in awareness level among women on economic activities and dissemination of aquaculture techniques, rural women from other caste have joined the fishery sector. Now we find women besides

their reproductive roles, assumed new roles in scientific fish culture, processing and marketing. Women constitute 50 per cent of the total population and comprise one-third of the labour force. So the development of our country cannot be assured leaving behind this large population. Though, it is largely accepted that, the role of women in fisheries sector is limited to processing and marketing, then role in other activity like aquaculture cannot be totally ignored. On the other hand, their participation in this sector is needed to be strengthened for better production. The fisheries activities are broadly categorized into capture and culture and the processing is coming up as a separate industry. The resources under capture and culture include – marine, brackish and fresh water. Whereas capture fisheries dominate the marine sector, culture activity dominates inland waters. During last five decades, the fisheries sector witnessed a continuous rise with a paradigm shift in the production scenario from that of marine to inland fisheries and aquaculture is gaining priority over capture fisheries. Production of fish from capture sector (with marine and fresh water) has been stagnant for nearly a decade. Hence, the demand shifted automatically to the aquaculture, and thereby the relevance of the study concentrates on mussel and edible oyster mariculture undertaken wholeheartedly by women fisherfolk mobilized as SHGs.

A brief profile of the locale of the study

The study was undertaken in four districts in Kerala namely Kasargod, Malappuram, Ernakulam and Kollam where bivalve farming is consciously being undertaken by women's Self Help Groups representing north, central and southern parts of the state. The locale of the study is presented in figure 1. The basic data with regard to the fisheries sector of Kasargod, Malappuram, Ernakulam and Kollam are presented in Table 1.



Figure 1: Map of Kerala showing the locale of the study
Kasargod, Malappuram, Ernakulam & Kollam Districts

Kasargod, the extreme northern district of Kerala is particularly notable for mussel and oyster farming as it has been successfully accomplished by the women's Self Help Groups (SHGs). These groups were given financial assistance in the scheme namely; SGSY (Swarnajayanthi Gramaswa Rozgar Yojana) by the state government which takes care of economic empowerment of weaker sections. Subsidies, bank loans etc are the part and parcel of the scheme which focuses attention on poverty alleviation through organised Self Help Groups. This programme looks into training, credit, marketing, technical knowledge and basic facilities necessary for the upliftment of the poor to bring them above the poverty line within three years in such a way that they should have a monthly earnings of at least Rs 2000/-. This district possesses an area of 1992 km² with a population of 10, 71,508. The district has a population density of 538 km², average growth rate of 22.78 per cent and literacy rate 82.51 per cent. Major means of livelihood of the villagers are agriculture, fishing, coir retting, coconut husk, toddy tapping etc. There is tremendous potential for aquaculture diversification in Kasargod coastal belts. Water bodies in these coastal belts have ample scope for the judicious utilisation of finfish culture, prawn and crab farming^{4, 11}.

Malappuram district is composed of portions of the former Palakkad and

Kozhikode districts: Ernad taluk and portions of Tirur taluk in Kozhikode district, and portions of Perinthalmanna and Ponnani taluks in Palakkad district. Malappuram district contains abundant wildlife and a number of small hills, forests, rivers and streams flowing to the west, back water and paddy, arecanut, cashew, pepper, ginger, pulses, coconut, banana, tapioca and rubber plantations. Malappuram is one of two Muslim-majority districts in south India. Malappuram is the 50th most populous of India's 640 districts, with a population density of 1,158 inhabitants per square kilometer (3,000/sq mi). Its population-growth rate from 2001 to 2011 was 13.39 percent. Area is 3,550 sq.km, population 41, 10,956.

Spanning an area of about 3,068 km², Ernakulam district is home to over 12 per cent of Kerala's population. Its headquarters is located at Kakkanad, a suburb of Kochi city. Ernakulam is known as the commercial capital of Kerala. The district includes the largest metropolitan region of the state, Greater Cochin. Ernakulam district is the highest revenue yielding district in the state. Ernakulam district is the richest district in Kerala in terms of GDP and per capita income. It contributes 41.74 per cent of the total state revenue. Ernakulam district is bestowed with all the geographical factors, which help the development of industry, and it is in the vanguard of all other districts in Kerala in the

field of industry. The availability of all types of transport facilities *viz.*, road, rail, canal, sea, air is a factor which is unique to this district. Ernakulam is the biggest commercial centre in the state of Kerala. The district has a population density of 1,069 inhabitants per square kilometer (2,770/sq mi). Its population growth rate over the decade 2001–2011 was 5.6 per cent. Ernakulam has a sex ratio of 1028 females for every 1000 males and a literacy rate of 95.68 per cent.

Quilon or Kollam, is an old seaport town on the Arabian coast. About thirty per cent of this district is covered by the Ashtamudi Lake, thereby making it the gateway to the backwaters of the state. Kollam District which is a veritable Kerala in miniature is gifted with unique representative features - sea, lakes,

plains, mountains, rivers, streams, backwaters, forest, vast green fields and tropical crop of every variety both food crop and cash crop. Area: 2,491 km² with a population: 25, 84,118 and the Literacy level of 91.49 per cent. The district has a prominent place in the field of agriculture. The total extent of land under cultivation is 2,18,267 hectares. The principal crops are paddy, tapioca, coconut, rubber, pepper, banana, mango and cashew. About 70 per cent of the population is engaged in agriculture. Coconut gardens extend to about 75,454 hectares. The five major crops: paddy, tapioca, coconut, rubber, pepper - are cultivated in an area of 1,73,847 hectares. Small and marginal farmers constitute more than 95 per cent of the farming community and the average per family holding is 0.21 hectare.

Table 1: General profile of fisheries sector in Kasargod, Malappuram, Ernakulam and Kollam districts

Sl. No	Parameter	Kasargod	Malappuram	Ernakulam	Kollam
1	Length of the Coast line	70 km	70 km	46 km	37 km
2	No. of Fishing villages	16	23	21	26
3	Fisherfolk population	30653	98120	42083	63300
4	Active fishermen	7669	22238	8934	16677
5	No. of landing centers	19	11	20	18
6	Traditional fishing family	4500	14747	8898	12273
7	No. of BPL family	3255	6760	4405	8458
8	Sex ratio(female per 1000 male)	1007	967	970	935
9	Membership in fisheries cooperative society	7685	14589	9210	11307

Kollam is an important maritime district of the state with a coast line of 37.3 kms. Fishing has a prominent place in the economy of the district. Neendakara and Sakthikulangara villages thrive in fishing. An estimated number of 22,000 persons are engaged in fishing and allied activities. Cheriazheekkal, Alappad, Pandarathuruthu, Puthenthura, Neendakara, Thangasseri, Eravipuram, Paravoor and Thekkumbhagam are nine among the 26 important fishing villages. There are 24 inland fishing villages also. Considering the unique location and infrastructure available, the Government has initiated steps for establishing a fishing harbour at Neendakara which is expected to augment fish production by 15per cent. Average fish landing is estimated to be 85,275 tonnes per year. One third of the state's fish catch is from Kollam. There are 93 producer co-operatives, two credit

cooperatives and one marketing cooperative in the fisheries sector. There are 38 Fishermen Development Welfare Cooperative Societies in the district. Nearly 3000 mechanised boats are operating from the fishing harbour. About 150 families are engaged in fishing as the main occupation and about 300 families as subsidiary occupation.

In addition to the mussel farming being undertaken intensively in Padanna and Chervuvathur panchayats in Kasargod district, the practical dissemination of mussel culture in the coastal belts of potential maritime locations in Malabar coasts was undertaken in Kadalundy areas of Vallikkunnu grampanchayat in Malappuram district of northern Kerala also by training 62 women fisherfolk with the Community Development Scheme (CDS) of the Kudumbasree District Mission of the panchayat. These women were

mobilised into 12 SHGs comprising 60 members Each SHG had a provision of loan amount worth Rs 1,25,000/- and subsidy of Rs 50,000/- with a reasonable amount of Rs 6,250/- as Beneficiary contribution. These SHGs undertook for mussel culture in estuary with the training assistance imparted by CMFRI. The five members of each SHG possessed the joint responsibility through a strong internal amendment with a firm base of interpersonal trust. These SHGs maintained the registers and documents systematically and performed group meetings in time as per the norms and standards stipulated for the SHGs by the facilitators.

CMFRI also imparted training on edible oyster culture in Moothakunnam areas of Vadakkekara grampanchayat in Ernakulam district with a successful demo which also attracted SHGs mobilised by Kudumbashree District Mission. There were 35 SHGs mobilised by women who successfully undertook oyster farming with 545 beneficiaries.

This study was undertaken in two panchayats namely Cheruvathur and Padanna in Kasargod district and Thekkumbhagam and Needakara in Kollam district, Vadakkekara panchayat in Ernakulam district and Vallikkunnu panchayath in Malappuram district. The study area, Cheruvathur panchayat has an area of 18.37 km² with a population of 24, 504 out of which 18, 631 people are literate. Similarly, in Karunagappally thaluk situated 27 Kms north to Kollam, Thekkumbhagam and Needakara panchayats were selected and of these, Dhalavapuram and Malibagam villages of Thekkumbhagam panchayat and Pannakkal thuruthu and Puthanthuruthu villages of Neendakara panchayaths were selected for data collection. As much as 6 SHGs undertaking bivalve farming from Kasargod, 12 SHGs from Kozhikkode, 35 SHGs from Ernakulam and 4 SHGs from Kollam were selected and male and female counterparts in each household were separately interviewed, comprising a total of 741 respondents. The details of the SHGs identified in selected districts are presented in Table 2.

MATERIAL AND METHODS

Table 2: Details of the SHGs identified in selected districts

Name of the district	Name of the panchayath	Village	Samples selected (Self Help Groups)	No. of members	
Kasargod	Cheruvathur	Kaithakkad	Mahatma Mussel Unit	13	
		Kavunchira	Kairali Mussel Unit	15	
		Kaithakkad	Kaithakkad Mussel Unit	13	
	Padanna	Thekkekkad	Thekkekkad Mussel Unit	12	
		Vadakkekad	Vadakkekad Mussel Unit	15	
		Ori	Ori Mussel Unit :	13	
Malappuram	Vallikkunnu	Hiroseragar	Nila	5	
			Puthuma	5	
			Jalamythri	5	
			Theeram	5	
			Olam	5	
			Soft	5	
			Chippy	5	
			Ganga	5	
			Keerthy	5	
			Kanakam	5	
			Kadalundy nagaram	Muthuchippy	5
				Sagararani	5
Ernakulam	Vadakkekara	Moothakunnam	Kudumbashree SHG units 35 nos	545	
Kollam	Thekkumbhagam	Dhalavapuram	Mahatmaji Kudumbasree Group	19	
		Malibhagam	St.Maries Kudumbasree Group	16	
	Neendakara	Puthan thuruthu	Ashtajalarani Group	18	
		Pannakkal thuruthu	Chavara south Group	15	

The data regarding gender participation in different activities, gender needs, decision making and access and control over the resources in respect to bivalve culture were collected through personal interviews of the respondents with the help of a pre tested well structured interview schedule. In addition to this, Self Help Groups of women engaged in bivalve culture at random from 4 districts were selected for drawing explorative case studies to measure the Empowerment Index and Level of Performance through personal interviews of the respondents.

The study was a judicious blend of practical extension and extension research. The practical extension part focused on awareness and ECB Training programmes with systematically executed farmer interaction meetings in the selected locations with the involvement of scientists from CMFRI and officials of State government. Professional training on mussel and oyster culture were also undertaken systematically with the involvement of fisherfolk members of SHGs. Stage by stage Video documentation in the various phases of activities of SHGs in bivalve farming was also undertaken.

The extension research part focused on socio economic surveys with a pre-tested and structured data gathering protocol consisting of standardized scales and indices to assess the impact of group approach in enhancing their standard of living. The involvement of people in bivalve farming operations such as Aftercare, Arranging bamboo poles, ropes, seeding nets etc, Canoeing to the sites, Disposal of shell, Harvesting, Hiring canoes to estuary/sea, Marketing of live bivalve, Marketing of shucked mussel, Meat shucking, Mussel spat collection, Post-harvest operations, Raft construction, Seeding Rate and Seeding site selection, Transport to shore, Tying the seeded ropes to the raft, arrangement of institutional and non-institutional credit were the major activities quantified using appropriate procedures. For mainstreaming the gender perspective,¹ to assess the equity and equality, the of men and women counterparts of the family were separately interviewed to

evaluate their access to resources, participation profile, decision making aspect and gender need analysis.

The Performance level of SHGs and Empowerment Index, appropriate scales and indices were used. The Level of Performance^{5,7} of SHG was assessed by the NABARD checklist containing 16 dimensions including Group size, type of members, number of meetings, timings of meetings, attendance of members, participation of members, savings collection within the group, amount to be saved, interest on internal loan, utilization of savings amount by SHG, loan recoveries, maintenance of books, accumulated savings, knowledge of the rules of SHG, education level, knowledge of Govt. programmes etc. arranged in a 3 point continuum. Similarly the Empowerment Index was quantified based on 8 dimensions³ such as confidence building, self-esteem, decision making pattern, capacity building, psychological empowerment, social empowerment, economic empowerment and political empowerment. The extent of empowerment was quantified as the difference between the scores obtained as per the perception of the SHG members before and after joining the SHG. For computing the Empowerment Index, the scores obtained for each dimensions were first made uniform and that was multiplied by the weightages assigned by the judges while relevancy rating for ascertaining the content validity of the scale through scale product method. Each dimension of Empowerment Index was computed by the scores of sub-dimensions coming under the categories of these 8 dimensions. All these sub-dimensions were measured by a set of inventories containing appropriate questions arranged in a three-point continuum of always, sometimes and never with scoring pattern 2,1 and 0 for positive and vice versa for negative questions^{12, 13, 14}.

The Economic feasibility analysis of the mussel and oyster units also was done to work out the indicative economics. Benefit-Cost ratio was analysed in each group and cost dynamics were worked out. The problems and

constraints faced by the women were also assessed in each case and listed out. The cost estimates of all the selected Self help Groups were also computed and by taking in to consideration of major expenditure required for bivalve farming is for the materials such as bamboo, nylon rope, coir, cloth, seed, etc. and labour costs essentially cover construction, seeding, harvesting etc. the Net Operating Profit and B:C ratio also were calculated for different SHGs to draw valid inferences reflecting the break-even point and pay-back period.

RESULTS AND DISCUSSION

The Empowerment Index and Level of Performance of all SHGs were quantified and got an average Empowerment Index score 0.765 and Level of performance as 67.78 per cent. Paired sample t test was conducted separately for different SHGs to find out the statistical difference between the mean empowerment index scores: before after joining SHG. The results of the paired sample t test were highly significant ($p < 0.01$) in all the eight empowerment variables considered for the present study, indicating that there was a significant increase in the empowerment scores before and after the formation of SHG^{12,13}.

The study, focused attention on Empowerment Index as a trait of Self Help Groups, cost estimates and gender dynamics. Though the above tables were the speculated computation of economics of mussel culture in a typically ideal set up without constraints, by the micro enterprise consultants of the Community Development Scheme (CDS) of Kudumbashree unit of Vallikkunnu panchayats, the present research study undertaken in the first year of implementation of the mussel culture expeditions of women SHGs brought out commendable significant results. The harvest results in the first year gave a B.C ration of 3.5: 1 on an average.

Development and modification of tools for data collection of molluscan culture technologies in the potential maritime locations in Malabar were systematically undertaken as a part of the study.

Profile of Economic Feasibility Analysis of Bivalve farming:

The major expenditure required for mussel farming is for the materials such as bamboo, nylon rope, coir, cloth, seed, etc. and labour costs essentially cover construction, seeding, harvesting etc. The women's groups constituted in the scheme DW CRA started mussel farming as early as 1996-97 and are assisted in the beginning itself with a loan amount worth Rs 8800/- per member with a subsidy amount worth Rs 4400/-. The duration of the loan was 5 years and the rate of interest is 12.5 % per annum. In addition to this, a revolving fund of Rs 5000/- was also provided without interest. The loan was granted through Farmers' Service Cooperative Banks and North Malabar Gramin Banks in Cheruvathur and Padanna panchayaths of Kasargod district. The SHGs showed considerable progress in repayment of the loans. Now they reached to a commendable situation of economic empowerment with the provision of loan facilities and social mobilization programmes. The BC Ratio in all SHGs was computed and found as substantially good which proves the profitability of bivalve farming in the initial trial itself and since during the subsequent years, material costs such as those of bamboo, rope, cloth and labour cost in construction etc. are negligible. This ensures reasonable profit as a major consequence of adoption of bivalve farming enterprise bringing about economic empowerment of rural women through organised SHGs. The indicative economics^{8, 12} of mussel farming from a 5 X 5 m mussel farm computed by the microenterprise consultants of the mobilized SHGs of the selected panchayaths of the 4 districts on an average are presented in Table 3.

Table 3 : Economic Feasibility analysis of a model mussel farm

Rack and rope culture in estuary, Mussel farm 5m x 5m & Seeded rope 100 nos.

1. Fixed cost (material cost)			
Item	Quantity	Rate (Rs.)	Amount (Rs.)
Bamboo poles (9= poles + 10 horizontal poles)	19 nos	350	6650
Nylon rope (3mm/4mm)	1kg	250	250
Nylon rope (12mm)	13kg	250	3250
PVC pipe (2.5 “3”) for seeding in pre stitched tubes	1m	100	100
Total			6850
2. Recurring cost (Labour charge)			
Stitching charge	100	7	700
Canoe hire charges	5 days	300	1500
Labour charges (farm construction, seeding and harvesting)	8 days	850	6800
Mussel seed (20-25 mm)	150kg	50	7500
Cotton netting materials	25m	40	1000
Marketing (shell on) **	800 kg	25	20000
Miscellaneous			1000
Total			38500
3. Labour charges (Meat shucking)			
Depuration charge *	800kg	6/kg	4800
Shucking charge	200 kg	30	6000
Fuel charges			2000
Marketing	200 kg	50	10000
Total			22800
Total financial expenditure			
Shell on (1+2+3 *) = 6850+38500+4800 = Rs.50,150			
Heat shucked meat (1+2**+3) = 6850+ 18500+22800= 48,150			

**Except the marketing charge

* Depuration charge only

Product	Total yield		Income
	Total quantity	Rate	Amount
Shell on	800kg (8kg/rope)	Rs.120/kg	96,000
Heat shucked meat	200kg (25% meat)	Rs.400/kg	80,000

Net profit

Shell on = 96,000 – 50,150 = Rs. 45, 850/-

Shucked meat = 80,000 – 48,150 = Rs. 31,850/-

It is quite evident from the Table 3 that from a 5x5 m mussel farm, a net profit of approximately Rs. 45,850/- and Rs. 31,850/- are obtained from the sale of shell-on mussels and shucked meat respectively. Break Even point was estimated to be 95.29 kg of mussel and the Pay Back Period was computed as 1 year i.e. the enterprise takes 1 year to break even.

As an innovation, the new steam based meat shucking process helped to save weight loss. Further, the new depuration technology developed helped to increase the consumer safety in live oyster consumption. Because of low salinity during monsoon, mussel was harvested before the raining season and was successfully undertaken in the SHGs and breakthrough harvest results was noticed due the high market demand of the product up to 5 Rs per piece of mussel, and more than 200 Rs per kg of meat. The harvest results and cost & yield dynamics estimated in the SHGs brought out a BC ratios of 3.5: 1 on an average.

Similarly in edible oyster farming, in Moothakunnam areas, recently 13 SHGs developed 13 farms of 5X5 metre dimension and each group got around 1.5 tonnes of oyster and harvested a total of 20 tonnes. Each unit used around 100 coir ropes for planting oyster seeds. The live oyster value chain has developed in the city of Kochi on a small-scale, and has great scope to expand to other metro cities in the country. The live oysters produced and supplied by women SHGs are being sold to the star hotels like Taj, Casino, Brunton etc. in the major cities like Kochi, Mumbai, Delhi and Bangalore. The value of live oysters increased from 1 rupee to 12 rupees and that of depurated steam shucked oyster meat increased from Rs 65 to Rs 400. The indicative economics tables of edible oyster farming from a 5 X 5 m farm computed by the experienced farmers and microenterprise consultants of selected panchayats of the 4 districts on an average are presented in Table 4.

Table 4: Economic Feasibility analysis of a model oyster farm

	Rack and ren method	Oyster farm	5x5 m
		Ren	
Fixed Cost			
1. Fixed cost (Material cost)			
	Item	Quantity	Rate/unit
			Amount
	Bamboo poles (16 poles +14 horizontal poles)	30nos	320
	Rop (Farm construction) 3mm	2 kg	250
	Rope (Ren making)3mm	6kg	250
	Total		11600
2.Recurring Cost			
	Shell	1500 nos	50 paise
	Ren making	300 nos	2
	Farm construction	2 labours	850
	Installation of spat setters	1labour	850
	Harvesting	4 labours	850
	Canoe hire charges	5 days	250
	Depuration charges	1500 kg	7
	Fuel charges **	1 cylinder	2000
	Shucking charges **	105 kg	50
	Single oyster declumping	3000	1
	Total		29300
3. Marketing expense			
	Live oyster	3000	5
	Heat hucked meat **	105	50
	Total		20250
Total financial outlay			
	Shell on	3000	20
	Shucked meat	105 kg	500
	Profit		
	Shell on	60000-11600-21800- 15000 = 121	
	Shucked meat	52500-11600-29300-5250 = 6350	

It is quite obvious from the Table 4, that from a 5x5 m oyster farm a net profit of Rs. 12,100 is obtained from the sale of shell-on oysters and Rs. 6,350 is obtained from the sale of shucked oyster meat. Break Even point was estimated to be 1132 nos. of live oyster and the Pay Back Period was computed as 1 year i.e. the enterprise takes 1 year to break even.

Experiences and observations already indicated that, for a group to be developed as an SHG, it requires a period of at least 36 months and it is a hectic process. It has to pass through various phases such as Formation phase, Stabilisation phase and Self Helping phase. These Self Help Groups promote a cooperative and participative culture among the members, which ensures the empowerment culture of the Self Helping phase. The loan sanctioning, utilisation, accounts maintenance

and timely repayment of loans etc. are all perfectly accomplished with proper maintenance of the documented records by the group members. This ascertains the fulfillment of norms and standards of the SHG leading to economic empowerment of the members. The major expenditure required for bivalve farming is for the materials such as bamboo, nylon rope, coir, cloth, seed, etc. and labour costs essentially cover construction, seeding, harvesting etc.

Quantification of personal and socio-psychological characteristics

An attempt for quantification of personal and socio-psychological characteristics was also undertaken and the schedule covering the appropriate standardized scales were used to measure these dimensions and the results are presented in Table 5.

Table 5: Quantification of Personal & socio psychological characteristics

Variable	Quantified value in Per cent
Credit Orientation	71.5 per cent
Economic Motivation	66.0 per cent
Scientific Orientation	59.5 per cent
Risk Orientation	61.0 per cent
Socio economic status	46.5 per cent
Social Participation	78.0 per cent
Extension Orientation	59.5 per cent
Mass media participation	79.0 per cent
Cosmopolitanism	67.0 per cent

The results indicated the variables like Mass media participation achieved highest level (79 per cent) followed by social participation (78 per cent) and Credit orientation (71.5 per cent). The least value was noticed for socio economic status (46.5 per cent) owing to the poor economic background of the SHG members.

Assessment of Gender Perspectives in Bivalve Farming

An assessment of gender perspectives in terms of gender need and gender role in mussel farming in Kasargod and Kollam districts was also done as a part of the study. 200 households from each district were selected and male and female counterparts in each household were separately interviewed in these 2 districts, comprising a total of 400 households. The gender participation in different activities, gender needs, decision making and access and control over the resources in respect to mussel culture were analyzed. Opinion of men and women in above aspect was found to be similar without

any significant difference. However, differential gender response was observed between the villages in Kasargod and Kollam districts. Significantly, the accounting/money transaction is under the control of women and the most important requirement perceived by both men and women is the timely availability of spat. In case of participation and need, both men and women share almost the same opinion.^{6,10} Socio-economic, technological and export support requirement was analyzed for gender mainstreaming. Male and female respondents in a household were separately interviewed for getting the response of gender needs in terms of access to resources in mussel/oyster culture, participation in various activities of bivalve farming, gender needs and decision making in various stages. The typology access to resources in bivalve farming in gender response such as female alone, male < female, male = female, male > female and male is alone indicated separately for male and female respondents. (Table 6)

Table 6: Access to resources for bivalve farming (n= 500)

Resource Access	Female Alone		M<F		M=F		M>F		Male Alone		No Access	
	F	M	F	M	F	M	F	M	F	M	F	M
Craft	24.5	25.13		0.5	2	2.01	12.5	14.57	61	57.79		
Extension Service	37.69	36.87	4.02	2.02	8.04	8.08	24.12	22.73	18.09	21.72	8.04	8.59
Gear	25	24.12		2.01		1.51	14	15.58	61	56.78		
Institutional Credit	26.5	26.63	1.5	1.01	13	11.06	19.5	19.6	39.5	41.71		
Market	23.62	23.74	4.02	2.02	26.63	20.2	27.14	28.79	17.59	23.74	1.01	1.52
Non-Institutional Credit	0.5	1.01	0.5		6.5	4.52	19.5	14.07	21.5	25.13	51.5	55.28
Other Inputs	0.5	1.52	3.5	3.54	11	14.65	35.5	34.34	40.5	39.39	9	6.57
Site/Water	1.5		1.5	0.5	5	5.53	35.5	41.21	56.5	52.76		
Total	17.46	17.37	1.88	1.45	9.01	8.43	23.47	23.85	39.49	39.9	8.7	9

A perusal of the table 6 clearly shows the response of male and female separately in access to resources concerned with bivalve farming. Among the responses of female and male for the items of access to resources, most of the items are dominated by 'male alone' except for 'extension services' and 'market access' which are dominated by 'female alone'. Access to 'extension services' and 'market' by 'female alone' is a commendable

significance of mussel farming SHGs mobilized by women.

Similarly the participation profile in various activities concerned with bivalve farming is presented in Table 7. The gender response in participation in various activities in mussel farming in such as female alone, male < female, male = female, male > female and male alone indicated separately by male and female are presented in Table 7.

Table 7: Participation profile in gender perspective in bivalve farming

Activity	Man (Independently)		With Man		With Woman		Women (Independently)	
	F	M	F	M	F	M	F	M
Accounting and Record Keeping	6.5	6.03	37	24.12	34.5	46.73	22	23.12
Aftercare	16.5	16.58	74.5	50.25	6	28.14	3	5.03
Arranging Bamboo Poles	43	17.09	51.5	76.38	1	0.5	4.5	6.03
Arranging Ropes	30.65	16.58	65.33	64.82	1.51	14.07	2.51	4.52
Arranging Seeding Nets	25	16.08	65	62.81	8	17.09	2	4.02
Canoeing to the sites	43.72	26.13	53.27	70.35	0.5		2.51	3.52
Disposal of shell	8	2.01	34.5	18.59	35.5	57.79	22	21.61
Harvesting	19	17.09	71	49.75	5	25.13	5	8.04
Hiring Canoes to Estuary / Sea	44.72	28.14	52.76	66.83		1.01	2.51	4.02
Marketing of live Mussel	17.5	1.51	23	27.14	37	48.74	22.5	22.61
Marketing of Shucked Mussel	17	1.51	20	26.13	40.5	49.75	22.5	22.61
Meat Shucking	7.5	1.51	28	27.64	42	47.74	22.5	23.12
Mussel Spat Collection	48	27.64	30	49.75		0.5	22	22.11
Post Harvest Operation	19	5.03	38.5	43.72	19.5	28.64	23	22.61
Raft Construction	33.67	22.61	56.78	61.81	4.52	11.56	5.03	4.02
Seeding Rate and Seeding	23.62	17.59	65.83	57.79	7.54	19.6	3.02	5.03
Site Selection	49	34.17	28	35.68	1	8.04	22	22.11
Transport to shore	36.5	16.58	41.5	58.29	3	6.53	19	18.59
Tying the Seeded Ropes to the raft	28.14	15.58	43.22	54.77	23.12	24.62	5.53	5.03
Total	27.2	15.23	46.28	48.77	14.23	22.96	12.28	13.04

A perusal of the table clearly indicates the participation profile in gender perspective in mussel farming for male and female separately. It can be glanced clearly from the perusal of the table that, the male dominating operations of bivalve farming are after care, arranging bamboo poles and ropes, seeding nets, canoeing to the sites, harvesting, hiring canoes to estuary, mussel spat collection, post harvest operation, raft construction, seeding rate and seeding, site selection, transport to

shore and tying the seeded ropes to the raft which are labor intensive as per the responses of both male and female. But the female dominating activities are record keeping, shell disposal, marketing of live mussel, shucked mussel, meat shucking etc. In the same way, response to the gender needs in various activities concerned with bivalve farming of male and female separately is presented in Table 8.

Table 8: Gender needs in activities of bivalve culture (n=1600)

Need Area	Important		Less Important		Most Important	
	F	M	F	M	F	M
Access to Extension Services	44	46.3	1	2	55	51.7
Availability of Quality Seeds	24	20.4	4.5	4	71.5	75.6
Credit	51.5	58.2	5	6	43.5	35.8
Exposure Visits	54.5	50.3	1.5	4	44	45.8
Farm Management Practices	7	9.45	5	3	88	87.6
Marketing	44	39.8	0	1	56	59.2
Packaging and Transport	15	15.9	11	9	74.5	75.1
Property right	16.5	9.45			83.5	90.6
Safeguard against Unfair Transactions	79.5	81.1	4	6	16.5	12.9
Social Support	33.5	32.8	0.5	1	66	66.2
Support From Counterpart	52.5	50.3	1.5		46	49.8
Timely Availability of Seeds(Quantity)	7	1			93	99
Training in Farm Management	45.5	46.8	0.5	1.5	54	51.7
Training in marketing	2	3.48	0.5	0.5	97.5	96
Training in Mussel Farming Technology	11.5	11	1.5	1	87	88.1
Training in Packaging	10	8.46	20	21	70	70.7
Training in Value Addition	13	11.4	3	2.5	84	86.1
Total	30.1	29.2	3.5	3.7	66.5	67.2

The gender response in need areas in mussel farming as per the importance assigned by male and female counterparts are presented in the table. With regard to the gender needs, the most important need area expressed by both male and female counterparts is training and marketing. As mussel and oyster are highly vulnerable for perishability, marketing of the products is the key for the success of the dynamics of this SHGs. Proper 'training on technical matters' and 'marketing aspects' is inevitable for desirable results. Next important need is 'property right'. Both male and female respondents more or less equally assigned

safeguarding for unfair transactions as 'important' category of need area.

Similarly, the extent of decision making in various activities concerned with mussel farming as per the response of male and female separately is presented in Table 8. Decision making aspect of fishermen is of paramount significance with regard to marine fisheries sector in the Indian context⁹. The gender response in decision making in various activities in bivalve farming is such as female alone, male < female, male = female, male > female and male alone indicated separately by male and female are presented in Table 9.

Table 9: Decision making in various phases of bivalve farming

Decision making in Activity Name	Female Alone		M<F		M=F		M>F		Male Alone	
	F	M	F	M	F	M	F	M	F	M
Accounting and Record Keeping	24.75	24	10.61	2.5	35.86	33	15.15	23.5	13.64	17
After Care /Maintenance	9.55	6.97	16.58	4.48	27.64	26.87	19.1	27.86	27.14	33.83
Arranging Bamboo Poles	1		22.5	3.98	3.5	4.98	21	36.82	52	54.23
Arranging Ropes	2	1.49	21	5.47	12	4.48	25.5	39.8	39.5	48.76
Arranging Seeding Nets	1.51	1	23.12	5.97	8.04	6.47	26.13	38.81	41.21	47.76
Harvesting Time	22.5	23.38	1.5	0.5	27	21.89	20.5	20.9	28.5	33.33
Hiring Canoes To Estuary/Sea	0.5	1.49	22	4.98	0.5	1	20	32.34	57	60.2
Institutional Credit	24	22.89	1.5	2.49	43.5	25.37	17	17.41	14	31.84
Marketing	23.62	25	19.1	12	29.65	18	12.06	25.5	15.58	19.5

Meat Shucking	23.35	23.62	15.23	11.06	38.07	26.13	11.68	21.61	11.68	17.59
Mussel Spat Collection	23	23.38			4.5	4.48	19	11.94	53.5	60.2
Non-Institutional Credit	22.61	22.89	6.03	7.46	32.16	19.4	25.63	17.41	13.57	32.84
Post Harvest Operation	23.62	23.5	2.01	1	28.14	15.5	22.11	25.5	24.12	34.5
Raft Construction	1.51	3	22.11	4	6.53	4.5	25.63	40	44.22	48.5
Seeding Rate and Seeding	1.01	2	24.12	5.5	12.56	11.5	27.14	41.5	35.18	39.5
Site Selection	23	23.38	2		6.5	4.98	15	10.45	53.5	61.19
Tying the Seeded Ropes to the Raft	0.5	3.5	38.69	15.5	10.05	10.5	8.54	27	42.21	43.5
Total	13.4	13.61	14.59	5.1	19.16	14.05	19.49	26.96	33.36	40.28

It is interesting to note that, the decision making aspect on the various phases of bivalve farming being accomplished by ‘male alone’ in most of the activities as per the response of male and female without much difference. But the decision making of the activities like accounting and record keeping, institutional credit and meat shucking etc. are equally shared by male and female. But it is seen that, decision making for marketing is a female dominating activity by majority’s perception as per the response of both male and female. The table indicates the decision making capability of male and female respondents of the selected households independently being performed in various phases of bivalve farming in Kasargod, Malappuram, Ernakulam and Kollam districts.

General constraints of gender in bivalve farming

Mussel farming in Kasargod district met with a serious constraint for the last couple of years as drastic reduction in yield after 2009.⁴ The mortality was pronounced to such an extent that, a yield to the tune of 5 kg per rope got reduced to just 1 kg per rope and in Padanna location in 2015-16, the yield got reduced to just 264 tonnes. Continuous farming beyond the carrying capacity of the supporting ecosystem of Padanna and Cheruvathur area, poor quality seed, poor water flow, higher atmospheric temperature and salt concentration in water, lower growth rate, protozoan infestation etc. were the major reasons looking into the scientific perspective. Steps were taken to draw ample samples from the locations for laboratory tests by the research team of CMFRI and 22 suggestions

for revival of mussel culture in Padanna location have already been submitted to panchayath authorities. Mussel and oyster farming faces a number of impediments like water salinity, seed availability, selection of location/site, climatic vagaries, identification of proper beneficiaries and proper monitoring opportunities. The major problems and constraints faced by the women in mussel cultivation in the rank order are unpredictable seed availability, meat shucking problem, marketing of mussel, mortality of seeds during transportation, reduced growth during certain years, social constraints like caste splits, conflicts etc. to a limited extent. Here also, all the group members are of unanimous opinion that the government agencies should come forward with advanced marketing facilities as marketing of the mussel was perceived as one of the biggest constraints. Provision of loans with reduced interest rates and freezer facility for storage of harvested mussels can bring about a breakthrough in this sector in the near future.

To put in a nutshell, it can be stated that, the consequence of adoption of bivalve farming when accomplished through organised Co-operative Groups of women undertaken in the sampling areas in North Malabar areas (Kasargod and Malappuram districts), Central part (Ernakulam district) and Southern part (Kollam district) of Kerala state is achieving considerable significance because of its substantial profitability.

Though bivalve culture is being fully grown up to possess the potential to be known as exclusive women based independent enterprise in Kerala, it would be vital to look

up on the gender issues in the selection of suitable sites and various operations fulfilling the essential parameters for undertaking bivalve culture trials. An assessment of gender role and gender need is inevitable in this context. It also would be pertinent to have a study on the drudgery in bivalve farming trials as well as effect of coir retting zones on growth and attachment of mussel seeds to the strings, which often found by experiences. It is also an essential requisite that, the laboratory experiments should be broadened to study the effect of coir retting zones on growth of mussel. Similarly, the export potential of mussel can be promoted through value addition experiments on depuration plants in filtered seawater. Organised fishermen's cooperatives can play a pivotal and vital role in various stages of seeding, harvesting, sorting, grading, packing and marketing with an intention of export potential. Irrespective of the location specific problem oriented resource based alternative programmes for income generation, this study emphasizes on the gender need and gender role also ultimately for economic empowerment through bivalve farming as a means of poverty eradication through SHGs.

Here an attempt also has been made to assess the socio economic impact of bivalve farming by mobilizing Self Help Groups in Kasargod, Malappuram, Ernakulam and Kollam areas of Kerala coastal belts. Though bivalve farming is achieving considerable significance because of its profitability, it is inevitable to take care of the selection of suitable sites fulfilling the essential parameters for undertaking culture trials. The consequence of adoption of mussel farming when accomplished through organised Self Help Groups of women in North Malabar areas, Middle Kerala locations and South Kollam areas of Kerala state is achieving considerable significance. As mussel seed availability is a major constraint, efforts should be initiated for widening the mussel seed production technologies developed by CMFRI on a larger scale.

The study also disclosed the deep rooted influence of Group Empowerment Dynamics network among the farmer folk and the economic empowerment of rural women through bivalve farming as a means of poverty eradication through Self Help Groups because, poverty can only be alleviated by mobilising the poor to solve their actual problems in the form of organised SHGs. The economic feasibility assessment also ensures reasonable profit as a major consequence of adoption of bivalve farming enterprise bringing about economic empowerment of fisherfolk through organised Self Help Groups. A thorough assessment of gender perspectives in terms of gender need and gender role in mussel farming in the selected four districts done as a part of the study indicated the gender participation in different activities, gender needs, decision making and access and control over the resources in respect to bivalve farming.

Technology Impact

The harvest results of bivalve farming by the women mobilised SHGs had great expectations of SHG enterprise of mussel farming as a major means of poverty alleviation, as each SHG in turn ensures economic sustainability of 5 families which in turn led to the local availability of green mussel and local self sufficiency of edible mussel products of diversified uses with low cost of production. This has brought out a remarkable linkage with line departments and Kerala State Poverty Eradication Mission. As the Indian middle class and upper middle class grow, there is great scope for tapping this large market by enterprising oyster farmers. As an extremely soft and delicate meat, processed oyster value chain can also be developed both on the domestic and export front. Formal functions for distribution of sales proceeds as well as different awards such as 'Best oyster farmer SHG', 'Best oyster meat production SHG', 'Best oyster meat marketing SHG' and 'Oyster Value Added Product Unit' award were organized by CMFRI. Through gender mainstreaming and socio economic empowerment of these SHGs of mobilised women fisherfolk in bivalve farming, the local

economic development of Padanna and Cheruvathur of Kasargod, Vallikkunnu of Malappuram, Vadakkekara of Ernakulam, Thekkumbhagam and Neendakara of Kollam got improved which in turn led to radical development of fishers of Kerala state in a broader sense in the paradigm of economic empowerment of women, where in CMFRI proudly joined hands for economic development of the state, with extreme commitment and uprightness.

SUMMARY

The bivalve farming women SHGs operating in four conspicuous districts of Kerala were intensively studied in terms of gender mainstreaming and empowerment. The study included specific aspects such as performance assessment of the SHGs, gender analysis, empowerment analysis and economic feasibility analysis which were carried out based on socio-economic surveys and personal interviews using pre-tested and structured data gathering protocols with standardized scales and indices involving the members of the SHGs. The male and female counterparts of the families were separately interviewed to assess the gender mainstreaming aspects in terms of equity and equality to access to resources, participation profile, decision making aspects, gender need analysis etc. Though majority of activities are female dominated, the male counterparts of the households also have definite role in decision making, accounting and record keeping, after care/maintenance, arranging bamboo poles, ropes and seeding nets, hiring canoes to estuary/sea, arranging institutional credit, meat shucking, mussel spat collection, post harvest operation, seeding rate and seeding, raft construction, site selection tying the seeded ropes to the raft and to a certain extent marketing also. The Scales of 'Performance Assessment' and 'Empowerment Index' developed for this study have good potential for future use in other key areas on a sustainable basis. Lacunae identified in Empowerment Index computation give adequate feedback to authorities to proceed in

the right direction. The gender dimension analysis on mainstreaming aspect gives sensitization on crucial issues like women fisherfolk's rights and marketing channels for policies and other interventions on gender. An exhaustive research with larger sample and wider area would be of ample scope. Inter relationships between the variables act as catalytic points for group action and group empowerment on a sustainable basis. The indicative economics worked out for the economic feasibility analysis for break-even point and pay-back period suggests that, the unit takes only one year to break even. The success case studies elucidated were documented as video documentaries entitled 'Awakening Saga of Women SHGs in Bivalve Farming in Kerala' and 'Success Story of Women's Self Help Groups in Mussel farming in Kadalundi' (in 3 languages English, Hindi and Malayalam) which can be used as case models and practical manual for promoting group action for mobilizing SHGs on a sustainable basis reflecting the insights from Kerala.

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