

# Role of Self Help Groups in Technology Transfer and Advancement of Mariculture

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## Introduction

It is an unequivocal proposition that, in the advancement of mariculture, and transfer of technologies, the Self Help Groups of fisherfolk play a pivotal role. Rational utilization of common property resources for sustainable development without endangering the environment is possible through community participation. Bivalve mariculture 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 and oyster farming. (Asokan *et al*, 2001 and Vipinkumar *et al*, 2001).

A Self Help Group (SHG) consists of members linked by a common bond like caste, sub-caste, community, place of origin, activity etc.. The Group Dynamics of these SHG's refer to the interaction of forces between the members. It is the internal nature of the groups as to how they are formed, what their structures and processes are, how they function and affect the individual members and the organization. (Lewin *et al*.1960). In an intensive study of Group Dynamics, Pfeiffer and Jones (1972) identified the Group Dynamics factors as to how the group is organised, the manner in which the group is led, the amount of training in membership and leadership skills, the tasks given to the groups, its prior history of success or failure etc. Like any other sector of agriculture, women participation in aquaculture/mariculture remains largely unnoticed. When the question of adoption of new technology comes the women are rarely considered a target group. But since women constitute 50% of total population, negligence to bring them to the front line action is always a negative approach to the total development process. It is estimated that women carry out almost 70% of agricultural workload, but in aquaculture, their role has not been properly identified. May be it is due to the ignorance of women about the technology, cultural and social barriers, women perception and so on. Women's role in fisheries is very significant and there is gender bias in respect of their works. This discrimination may be noted out from the country's scenario through the economic upliftment of fisherwomen through appropriate policies, programmes and projects.

Mariculture is a developing sector and women participation in this sector needs a meticulous planning for technological empowerment encompassing the social and economic barriers. On-farm trials conducted by DRWA, CIFA, CIBA and CMFRI have brought out, the strong motivation and capability among women for taking up aquaculture (Freshwater, brackish-water and Marine) through SHGs. Empowering women in different



aquaculture/ mariculture practices can provide suitable option for sustained economic and nutritional security of the family and thereby an in-depth observation on these dimensions made through the present study has ample scope to explore the paradigm of gender balance and women empowerment. Here an attempt has been made on exploration of a couple of case studies in Kerala and Karnataka on role of Self Help Groups of fisherfolk in transfer of technology and advancement of aquaculture.

### **Bivalve farming by women SHGs in Kasargod and Kollam districts of Kerala state**

Kasargod, the extreme northern district of Kerala is particularly notable for green 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 (Swarnajayanti Gramaswa Rozgar Yojana) by the state government which takes care of economic empowerment of weaker sections (Vipinkumar *et al* 2001). Subsidies, bank loans etc are the part and parcel of the scheme which focus 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 /-. 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 bivalve farming, finfish culture, prawn and crab farming. (Asokan *et al* 2001).

Quilon or Kollam, is an old seaport town on the Arabian coast very conspicuous for brown mussel and oyster farming. 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 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 15%. 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 38 Fishermen Development Welfare Cooperative Societies in the district. FFDA and VFFDA are promoting fresh water fish culture and prawn farming respectively.

This study was undertaken in two panchayats namely Cheruvathur and Padanna in Kasargod district and Thekkumbhagam and Needakara in Kollam district. The study area, Cheruvathur panchayat has an area of 18.37 km<sup>2</sup> with a population of 24, 504 and about 150 families are engaged in fishing as the main occupation and about 300 families as subsidiary occupation. Similarly, Padanna panchayat has an area of 13.08 km<sup>2</sup> with a population of 17, 961. About 200 families are engaged in fishing as main occupation and about 400 families as part time occupation. The brackish water estuary systems of these panchayats are extremely suitable for bivalve farming. Similarly, in Kaunagappally taluk 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 Puthan thuruthu villages of Neendakara panchayaths were selected for data collection. As much as 200 households undertaking bivalve farming were selected and male and female counterparts in each household were separately interviewed, comprising a total of 400 respondents. 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, 10 Self Help Groups of women engaged in bivalve culture at random from 2 districts were selected for drawing explorative case studies to measure the Group Dynamics through personal interviews of the respondents. The Group Dynamics of members of Self Help Groups was measured by developing an index called Group Dynamics Effectiveness Index (GDEI) which was operationally defined for the study as the sum-total of the forces among the member of SHG based on the sub-dimensions, such as participation, influence & styles of influence, decision making procedures, task functions, maintenance functions, group atmosphere, membership, feelings, norms, empathy, interpersonal trust and achievements of SHG (Vipinkumar and Singh, 1998). The 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.

The study, focused attention on Group Dynamics Effectiveness as a trait of Self Help Groups resulted by the joint influence of individual members of the group generated out of skills and orientations from the past life experiences. It definitely varies from person to person, place to place, time to time, situation to situation and in turn from group to group. This might be the probable reason for the differential degree of GDEI observed among respondents. Six Self Help Groups of women engaged in mussel farming were selected from two panchayaths Cheruvathur and Padanna in Kasargod district and 4 Self Help Groups from Kollam district to draw explorative case studies through personal interviews of the respondents.(Table I).

Table I. Details of the SHGs identified in Kasargod and Kollam districts

Name of the district	Name of the panchayat	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
		Vadakekkad	Vadakekkad Mussel Unit	15
		Ori	Ori Mussel Unit :	13
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

### **Profile of Cost Estimates of Bivalve Farming Self Help Groups**

The women's groups constituted in the scheme DWCR started mussel farming as early as 1996-97 and are assisted by loan amount worth Rs 8800 /- per member with a subsidy amount worth Rs 4400/- which looks quiet fascinating. The duration of the loan is 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. When the SHGs are economically empowered with the provision of loan facilities, the returns from mussel farming help them to repay the loan



slowly. The loan was granted through Farmers' Service Cooperative Banks and North Malabar Gramin Banks in Cheruvathur and Padanna panchayaths of Kasargod district. Majority of the SHGs showed considerable progress in repayment of the loans, which can be concluded as an indication of the profitability of mussel farming. The expenditure details of the selected SHGs in the initial year of mussel cultivation are shown in the Table 2. The BC Ratio in all the ten SHGs was computed and found as substantially good which proves the profitability of Mussel 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 mussel farming enterprise bringing about economic empowerment of rural women through organised Self Help Groups.

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 relationship of yield and GDEI of selected SHGs is also presented in Table 2. The yield in Kg per metre length of the rope recorded in all SHGs as Average Yield showed a positive relationship with GDEI score. The correlation coefficient value was ( $r = 0.863$ ). One of the major dimensions of GDEI is achievements of SHG which is an indirect representation of yield and economic gain from the micro-enterprise of the SHGs. Therefore it is quite natural to observe a positive relationship of yield or BC Ratio with GDEI.

### **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 (Sahoo *et al*, 2009). 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 participation profile in various activities concerned with bivalve farming is presented in Table 3. 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. It 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 labour 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 access to resources, the gender needs and the extent of decision making in various activities concerned with bivalve farming of male and female also were assessed separately.

Table 2. Relationship of Yield and GDEI of selected SHGs

SHG	Cost (Rs)	Returns (Rs)	BC Ratio	GDEI score	Correlation Coefficient (r)	Significance (2-tailed)
SHG 1	32,355 /-	40,000 /-	1.236	52.78	0.863**	0.001
SHG 2	50,415 /-	64,000 /-	1.269	54.33		
SHG 3	37,950 /-	48,000 /-	1.265	53.91		
SHG 4	45,550 /-	60,000 /-	1.317	57.32		
SHG 5	55,590 /-	72,000 /-	1.295	55.68		
SHG 6	43,095 /-	58,000 /-	1.346	60.08		
SHG 7	32,000 /-	42,000 /-	1.312	59.14		
SHG 8	31,750 /-	40,500 /-	1.275	57.78		
SHG 9	32,500 /-	42,000 /-	1.292	59.16		
SHG 10	32,850 /-	44,500 /-	1.354	60.17		

### **Problems and constraints of gender in bivalve mariculture**

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 improved 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. It 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. Laboratory experiments should be broadened to study the effect of coir retting zones on growth of mussel. Similarly, export potential of mussel can be promoted through value addition experiments on depuration plants in filtered seawater. Organised fishermen's cooperatives can play a 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 emphasises on the gender need and gender role also ultimately for economic empowerment through bivalve farming as a means of poverty eradication through Self Help Groups.



Table 3: Participation profile in gender perspective in bivalve farming (n = 400)

Activity	Man (Independently)		With Man		With Woman		Women (Independently)	
	Female	Male	Female	Male	Female	Male	Female	Male
Accounting and Record Keeping	6.5	6.03	37	24.12	34.5	46.73	22	23.12
Aftercare	16.5	16.58	74.50	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	71.00	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

## 2. Case study of mussel farming SHGs in Karwar of Karnataka state

Self Help Groups of fisherfolk were mobilised in Karwar and Bhatkal locations of Karnataka coastal belts. Three SHGs of 15 members each comprising a total of 45 were mobilised in Majali (Open Sea) of Dhandebag and three SHGs of 15 members each comprising a total of 45 were mobilised in Sunkeri of Kali estuary in Karwar coastal belts in Uttar Kannada district of Karnataka state. Training and demonstration on mussel farming was undertaken in these SHGs. Initially, two training and demonstration programmes in these two sites in Karwar were undertaken, one for raft culture in open sea in Majali of Dandebag and one for rack culture in Sunkeri of Kali estuary. The training was imparted to 45 members of three Self Help Groups, each possessing 15 members in 2 sites separately comprising a total of 90 participants. At Majali in open sea, a 5 x 5 metre raft and at Sunkeri of Kali estuary, a 5 x 5 metre rack were constructed for mussel farming. Similarly In Mundalli river of Bhatkal estuary in Karnataka, 4 Self Help Groups of 15 members each exclusively of women fisherfolk mobilised under the NGO, 'Snehakunja' comprising a total of 60 participants were trained on mussel farming. They initiated a trial in 5 x 6 metre rack mussel culture by long line method. The sample design for observation including the number of SHGs' trained, beneficiaries and method of culture is given in Table 4.

Table 4: Mussel culture interventions in Karnataka state

Site	No.Of SHG's Trained	No.of beneficiaries	Method of culture	Size of the rack / raft
Sunkeri of Kali estuary	3	45	Rack culture	5 x 5 m
Majali of Dhandebag	3	45	Raft culture	5 x 5 m
Bhatkal of Mundalli estuary	4	60	Raft culture	5 x 6 m

Data were gathered from these 10 SHGs through personal interviews of the respondents. For the study, the Group Dynamics of Self Help Groups was again measured by Group Dynamics Effectiveness Index (GDEI). The growth parameters were monitored every week in all the sites and the yield particulars of mussel during harvesting in each SHG was also noted. (Vipinkumar and Asokan, 2005, 2008). The relationship of Yield and GDEI of SHGs, correlation coefficients and t value are presented in table 5.

Table 5 : Relationship of Yield and GDEI of SHGs'

SHG	Yield in Kg / m	GDEI score	Correlation Coefficient (r)	't' value
SHG 1	9.2	53.71		
SHG 2	9.1	52.31		
SHG 3	8.9	51.91		
SHG 4	12.6	57.32		
SHG 5	12.7	56.68	0.958139	9.4656248**
SHG 6	12.5	57.14		
SHG 7	13.6	60.01		
SHG 8	13.1	59.98		
SHG 9	13.8	61.29		
SHG 10	13.2	60.02		

The open sea mussel culture in this particular case met with the impediment of unfortunate sabotage of the seeded mussel by some miscreants. It was rectified by reseeded, but the yield was not that much conspicuous compared to the trials undertaken in estuaries. All the SHG members are of unanimous opinion that the government agencies should come forward with improved 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.

### 3. Case study of Mussel Farming Women's Self Help Groups in Malabar Fisheries Sector

It is a matter of great concern that, despite the economic and socio cultural significance of fishing in Kerala state, the women fisherfolk at large are outside the mainstream of the society in the economically disadvantaged category without accruing the benefits from fishing industry (Kurien, 1994). Malabar areas of Kerala always stand backward and less progressive than the rest of Kerala and about half of the coastline of Kerala state is of Malabar. (MCITRA, 2003) But fisherfolk especially women rarely gain the benefits even when there is tremendous consideration for fish production because fisheries development was most often discriminated from the development of fishing community. This case study in Malabar essentially focused on the major objective of assessing the Group Dynamics of the SHGs of women fisherfolk and identifying the important dimensions contributing to their effectiveness and assessing the influence of personal and socio psychological characteristics on Group Dynamics.



The practical dissemination of bivalve farming technologies in the potential maritime locations in Malabar coasts was undertaken in Kadalundy of Vallikkunnu grampanchayat in Malappuram district of northern Kerala by training 62 women fisherfolk under Community Development Scheme (CDS) of Kudumbasree District Mission. These women were mobilised into 11 SHGs comprising 60 members with a provision of a distinct loan amount and 40 % subsidy with a reasonable nominal amount as beneficiary contribution in each SHG. The members possess the joint responsibility through a strong internal amendment with a firm base of interpersonal trust. Assessment of the Group Dynamics Effectiveness of the SHGs was attempted by interviewing the members with standardized protocols developed and the groups with substantial effectiveness score were identified. (Table 6)

Table 6: Selected SHGs and locations

Sl. No	Name of SHG	No. of members	Location	GDEI Score
1.	Nila	5	Vallikkunnu, Hirosnagar	0.65
2.	Puthuma	5	Vallikkunnu, Hirosnagar	0.78
3.	Jalamythri	5	Vallikkunnu, Hirosnagar	0.67
4.	Theeram	5	Vallikkunnu, Hirosnagar	0.77
5.	Olam	5	Vallikkunnu, Hirosnagar	0.78
6.	Soft	5	Vallikkunnu, Hirosnagar	0.68
7.	Chippy	5	Vallikkunnu, Hirosnagar	0.79
8.	Ganga	5	Vallikkunnu, Hirosnagar	0.70
9.	Keerthy	5	Vallikkunnu, Hirosnagar	0.71
10.	Kanakam	5	Vallikkunnu, Hirosnagar	0.69
11.	Muthuchippy	5	Kadalundy Nagaram	0.81
12.	Sagararani	5	Kadalundy Nagaram	0.81

A breakthrough harvest results were noticed in the SHGs due to the high market demand of mussel up to 5 Rs per piece and Rs 250 per kg of meat. The computation of harvest particulars, economic analysis, estimation of socio-psychological characteristics and yield dynamics were undertaken in the SHGs and brought out a BC ratio of 3.5:1 on an average. The influence of personal and socio-psychological characteristics of SHG members on Group Effectiveness also was assessed along with gender perspectives on decision making aspects and gender need analysis in mussel culture. The harvest results of mussel farming by the women SHGs had great expectations on SHG enterprise as a major means of poverty alleviation as each SHG in turn ensures economic sustainability of 5 families. The local availability of green mussel and local self sufficiency of edible mussel products of diversified uses with low cost of production and moderate selling rate make satisfied customers in turn attracting consumers of other states to the enterprise. Ultimately through gender mainstreaming and women empowerment and socio-economic upliftment through the mobilised women SHG, the local economic development of Vallikkunnu gets improved which in turn leads to radical development of fishers of Kerala state in a broader sense. Success cases of SHG mobilization were elucidated and documented which could be used as case models for promoting group action of SHGs on a sustainable basis. The Simple Correlation analysis of the sub-dimensions is presented in Table 7 and it was noticed that Achievement of SHGs was the most important dimension followed by Participation and Group Atmosphere. (Vipinkumar *et al*, 2015)



Table 7: Simple Correlation analysis of sub-dimensions with GDEI

Sl. No	Variable	Quantified value in Per cent
1	Participation	0.947**
2	Influence and Styles of influence	0.938**
3	Decision making procedures	0.919**
4	Task functions	0.907**
5	Maintenance functions	0.913**
6	Group atmosphere	0.945**
7	Membership	0.874**
8	Feelings	0.879**
9	Norms	0.884**
10	Empathy	0.869**
11	Interpersonal trust	0.918**
12	Achievements of SHG	0.949**

\*\* Significant at 1 % level of significance

#### 4. Gender mainstreaming and impact of self help groups in cage farming in Vembanadu lake

Vembanadu lake is conspicuous for the brackish water cage culture undertaken by the mobilized Self Help Groups of fisherfolk. As much as 27 fishermen mobilized under *Vembanadu Kayal Samraskhana Samithy, Srayithodu Unit* as Self Help Groups accomplished the farming of commercially important fishes in 20 cages in Vembanadu lake under the financial assistance of Agency for Development of Aquaculture- Kerala (ADAK) as a part of *Kuttanadu* package. The technical assistance was provided by the experts from CMFRI under the project gender mainstreaming and impact of Self Help Groups in Fisheries Sector. Massive awareness programmes and farmer interaction meets were organized in Vembanadu site and training programmes including cage fabrication and cage installation along with seeding and feeding with video documentation were successfully carried out in the SHGs. The fishes chosen for culture are pearl spot and tilapia, as they are highly adaptable to salinity fluctuations in Vembanadu lake during monsoon season. The gender analysis, performance level of SHG, Empowerment Index and economic feasibility analysis were assessed with socio economic surveys undertaken in the locality with a pre-tested and structured data gathering protocol with standardized scales and indices developed. 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 male dominating, the female counterparts of the households also have definite role in decision making, feed preparation, management, harvesting, sales and marketing etc. The social and economic empowerment dimensions and capacity building aspects achieved highest score in Empowerment Index. The economic feasibility analysis gave a BC ratio of tilapia cages as 2.5:1 and pearl spot cages as 3.5:1 on an average in the first year. The success case study elucidated can be used as a case model and practical manual for promoting group action for mobilising SHGs on a sustainable basis.

#### 5. Seaweed Culture by Self Help Groups in Tamil Nadu

Around 60 species of commercially important seaweeds with a standing crop of 1,00,000 tons occur along the Indian coast from which, nearly 880 tonnes dry agarophytes and 3,600 tons dry alginophytes are exploited annually from the wild. Seaweed products like agar, algin, carragenan and liquid fertilizer are in demand in



global markets and some economically viable seaweed cultivation technologies have been developed in India by CMFRI and Central Salt and Marine Chemical Research Institute (CSMCRI). CMFRI has developed technology to culture seaweeds by either vegetative propagation using fragments of seaweeds collected from natural beds or spores (tetraspores/ carpospores). It has the potential to develop in large productive coastal belts and also in onshore culture tanks, ponds and raceways. Recently the culture of the carageenan yielding sea weed *Kappaphycus alvarezii* has become very popular and is being cultivated extensively by SHGs along the Mandapam coast. To make the seaweed industry more economically viable, research aimed at improvement of strains of commercially important species by isolating viable protoplasts and somatic hybridization techniques is being carried out. The rate of production of *Gelidiella cerosa* from culture amounts to 5 tonnes dry weight per hectare, while *Gracilaria edulis* and *Hypnea* production is about 15 tonnes dry weight per hectare. Pilot scale field cultivation of *Kappaphycus alvarezii* carried out in the near shore area of Palk Bay and Gulf of Mannar showed maximum increase in yield of 4.3 fold after 30-32 days in Palk Bay and 5.7 fold after 22-34 days in Gulf of Mannar. This is a promising venture being undertaken by the women's Self Help Groups in Mandapam. So far as much as 1200 families were engaged in seaweed farming of which 60% of the farmers are women.

### Conclusion

The article emphatically disclosed the deep rooted influence of Group Dynamics network among the Self Help groups of fisherfolk in five different narrative cases concerned with mariculture like mussel and oyster farming, cage culture, seaweed culture etc., Irrespective of the location specific problem oriented resource based alternative programmes for income generation, this study emphasises on the economic empowerment of coastal fisherfolk, especially women through mariculture technologies 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. It is a truth that, to bring in social change and economic prosperity, no nation can ignore fifty per cent of its population. Removal of gender imbalances should be established as a priority for ensuring rapid economic development. This would mobilize the remaining fifty percent of the country's human resources and would result in the smooth movement of the economic wheel. National policies should be resolute in tackling this issue and local bodies should ensure the implementation of these policies at the community level. (Shyam *et al*, 2011). It is an essential requisite that, there is immense need to create better opportunities for women in coastal fishing communities to enhance their social and economic role and enable them to participate in development efforts, rehabilitation and conservation of the coastal and aquatic environment. The special features of fisheries and aquaculture make it necessary to link microfinance to appropriate technology development and transfer to women clients. Both capture fisheries and mariculture require upgraded vocational training programmes and technical advice crucial for the success of appropriate micro enterprises. CMFRI has developed a technology for the farming of mussels in the open sea and protected bays. The technology is simple and cost effective and has been widely adopted by the fisherfolk of Kerala and Karnataka through mobilized SHGs. (Pillai, 2000). Several women SHGs in the Malappuram district of Northern Kerala have successfully tailored the venture and proved profitable. Women could significantly contribute to this sector, if trained and oriented in the right direction. Freshwater pearl culture is fast picking up as commercial venture and there are moves to integrate it with the carp culture to generate additional revenue to the farmer. Women could take up pearl culture as a productive income-earning venture on account of the vast unutilized potential. Efforts taken by government and non-governmental agencies to organise fisherfolk into Self Help Groups and involving them in appropriate mariculture technologies has brought out encouraging results. The

success cases of Self Help Groups Dynamics highlighted in the article can be used as a case model and practical manual for mobilizing SHGs for effective technology transfer in advanced mariculture or any key areas on a sustainable basis.

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