

WOMEN INVOLVEMENT IN DRY FISH VALUE CHAIN APPROACHES TOWARDS SUSTAINABLE LIVELIHOOD

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ABSTRACT

Coastal fisherwomen of Bangladesh are marginalized yet they play a significant role in different levels of dry fish marketing chain. This study covers seven different villages of Cox's bazaar districts. A total of 280 women fishers among - 140 fisherwomen and 140 women workers, were selected for the study. The paper applies different aspects of DFID Sustainable livelihood model in the study areas to learn the livelihood pattern of sample respondents and explores to what extent the respondents have access to these basic livelihood assets like physical, natural, financial, social and human capital. It points out that the sample women are involved in different income generating activities like drying, sorting and grading, cleaning and salting. It focuses on respondents opinion regarding the factors that affect their ability to adopt different livelihood strategies like natural resource based strategy, non-natural resource based strategy and migration strategy. Finally it suggests some innovative marketing strategies to overcome the vulnerable situation faced by the fisherwomen and adopt better livelihood strategies and thus attain sustainable livelihood through better livelihood outcome.

Keywords: *Women Involvement, Value chain approach, sustainable Livelihood and Dry Fish*

1.0 BACKGROUND

Women are the invisible and unrecognized backbone of South Asian agriculture (Human Development in South Asia 2002). This is evident from not only by high female participation rates in farm and non-farm activities in rural areas but also by their intimate connection to rural customs, tradition and values. In Bangladesh, women are important productive workers in the economy, making up about one-third of the labor force. Women fishers play an important role in fish production all over the world. Their role encompasses social and economic responsibilities, both within and outside the family. It was found that women's participation in aquaculture was recognized by many researchers and practitioners, but largely from an instrumental perspective. In rural Asia, women are excluded from participation in community-level management of natural and other resources, from relations with external agencies and from political representation.

Bangladesh has rich fisheries biodiversity with about 280 fresh water and 490 marine species (Hossain, S. et al 2004). In addition 12 exotic fishes have been also introduced at different time. Such large biodiversity of fisheries is rarely available anywhere in the world (Mazid 2002). But due to population growth, there is growing gap between supply and demand of fish and dried fish product in Bangladesh. Narrowing the gap not only requires increasing production but also addition of the value in the different stages of distribution chain. Fishery sector is already contributing 80% to the nation's animal protein intake, nearly 6% to the GDP 14% of gross agricultural product and more than 12% of the export earnings of the country. The fisheries sector provides fulltime employment to an estimated two million fishermen, small fish traders, fish transporters and packers. It is also significant that there are 11 million part time fishermen and women in the country and 73% of the households are involved in subsistence fisheries in the flood lands (GOB 1997). Some of the poorest people live in coastal fishing communities, which are culturally and economically marginalized and have often little or no voice in local government bodies such as thanas. Further these fisheries provide the country with around 60%-80% of its animal based protein and livelihood for over 10.8million house holds in 1400 coastal villages along

the 710 km coast line. About 8% of the total population in Bangladesh depends on fisheries for their livelihood (Alam 1996, BBS 1998, FAO/BFDC 1972, Hossain 1991). Again marine dry fishes are important source of protein. Its edible parts provide protein 70-80%, fat 2.5%, minerals 10% (Calcium, phosphorus, iodine etc.). It is tasty, cheaper, and available. So it is a favorite food item of middle class families (Jabbar, 2001, 111).

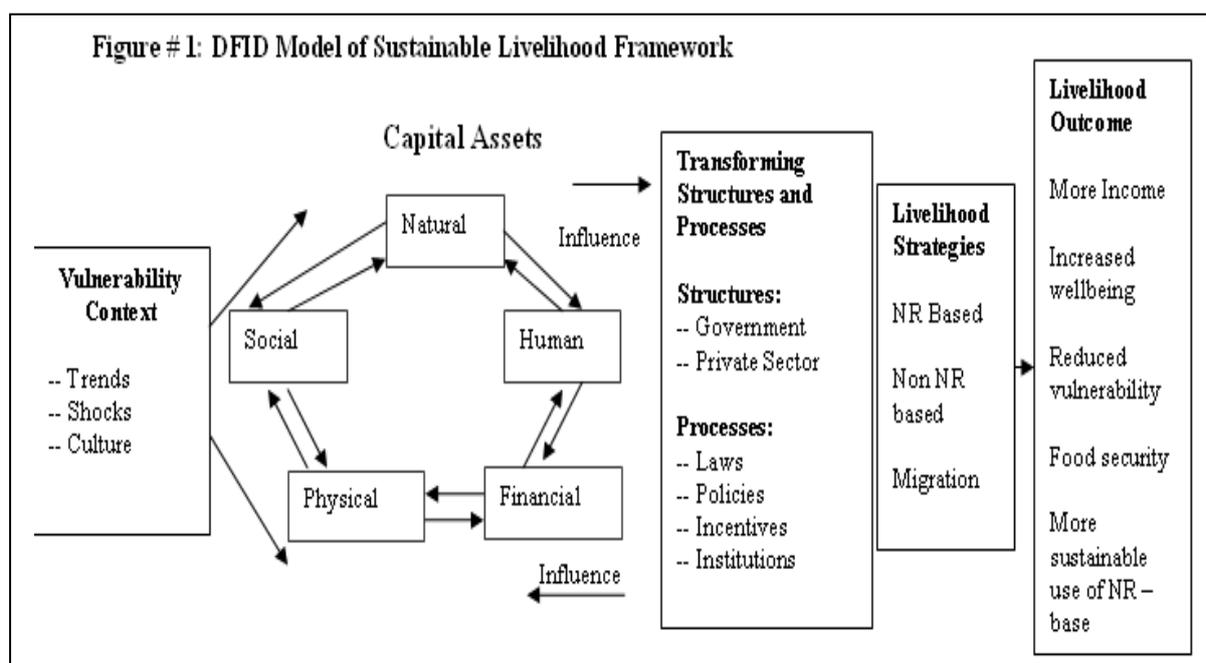
Again livelihood means way of living but it is not just the net result in terms of income received or consumption attained (Ellis, 2000). It is linked with social and human factors and comprises the capabilities and assets and activities required for means of living (Chambers and Conway 1992). On the other hand a livelihood is sustainable when can cope with and recover from stresses and maintain or enhance its capabilities and assets both now and in the future, while undermining the natural resource base (Chambers and Conway 1992). The coastal women of Bangladesh usually have lack of access to livelihood assets and empowerment opportunities. Also the Fifth Five Year Plan of Government of Bangladesh (1997-2002) indicate that the need for study of production and marketing of small scale marine fisheries. Thus it seems important to identify key constraints hindering poor fishing community particularly fisherwomen participation in relation to relevant institution and its impact on their livelihood and how the livelihood can be developed and sustained with improved and innovative policy decision making processes in the marine fish distribution and marketing system.

2.0 SUSTAINABLE LIVELIHOOD

Sustainable livelihood means ability of men and women to utilize assets portfolios on both short and long term basis. According to UNDP (2000)¹, sustainable livelihood enables –

- i) **Adaptive and Coping strategies:** Ability to cope with and recover from shocks and stresses such as drought, civil war, policy failure, through adaptive and coping strategies.
- ii) **Economic Effectiveness:** Ensuring economic effectiveness or ability to use minimal inputs to generate a given amount of outputs.
- iii) **Ecologically sound:** Ensuring livelihood activities that are ecologically sound and do not irreversibly degrade natural resources within a given ecosystem.
- iv) **Socially Equitable:** Promotion of livelihood opportunities or one group should not foreclose options for other groups, either now or in the future.

Again, DFID (2000)² focuses that though the center point of the sustainable livelihood framework is ‘asset base’, these assets base are interconnected and influenced by two factors i.e. vulnerability context and structure and process, which are the determinant factors of the people’s livelihood options. This DFID model of sustainable livelihood (Figure # 1) has been used in this paper to analyze the livelihood condition of the fisherwomen involved in the dry fish sector.



¹ UNDP (2000), Sustainable Livelihood Overview.

² DFID (2000), Sustainable Rural Livelihood Guidance Sheet, DFID, UK.

3.0 PURPOSE

The purpose of this research is to understand the functioning of the dry fish marketing system and its impact on the livelihood of the coastal women involved in dry fish sector. In the light of this main purpose, the specific purposes of the study are as follows:

- Investigate into the dry fish value chain from coastal Bangladesh.
- Explore involvement of women in dry fish production, processing and distributing the dry fishes.
- Unearth livelihood pattern of the women involved in dry fish activities.
- Put forward strategy recommendations to ensure sustainable livelihood of the women fisher folk through innovative marketing strategies.

4.0 MATERIALS & METHODS

The study is the product of the combination of two methods, i.e. empirical survey and desk study. Both quantitative and qualitative methods were used to collect data for the exploratory study.

4.1 Study Areas & Sample Size

The study was confined to seven coastal fishermen villages of greater Chittagong, Bangladesh. The reason behind for selecting these villages is based on the consideration that it will fully represent the picture of coastal fishing community of Chittagong, Bangladesh. They are of homogeneous in terms of social, economical, political and other external environment. The villages belong to three thanas of southern Chittagong which are – Gotivanga, Ghorakghata, and Thakurtala under Maheskhal, West Kutubdiapara and Chafuldandi under Cox's Bazar and Sairakhali under Chakaria.

The sample respondents are 280 among which 140 are women workers where as 140 are fisher women. 20 women workers and 20 fisherwomen are interviewed separately from each of the above mentioned seven villages.

4.2 Primary Data

Primary data have been collected through both quantitative and qualitative methods. Under quantitative research methods, Direct Interview through structured questionnaire, check list and interview schedule were used to collect primary data. Observation and PRA (Participatory Rural Appraisal) technique were used to collect the qualitative information. The questionnaire is finalized after necessary correction based on a pilot survey conducted on a limited basis. The questionnaire was designed with two main characteristics viz., open ended and close ended according to the nature of information. For instance, questions regarding procedures and method of different aspects of credit issues were close ended based on literature survey and pilot survey. This was done to facilitate data analysis work. Some other questions were kept open ended where opinion was sought and the respondents have something to tell from his experience. This was done to give scope to the respondents to express themselves freely.

5.0 RESULTS AND DISCUSSIONS

5.1 Respondents' Demography

Demographic characteristics of the customers includes age, family size, family life cycle, gender, income, occupation, education, religion, race, nationality, social class, etc (Kotler and Keller 2005). These characteristics help shape preferences, determine attitudes and mold values (Robey, 1984). Such characteristics are often observed to be an inheritance process where some benefits, resources and privileges are passed on from the father and other family members to the next generations. Further, these variables are of major interest to marketers because it involves people and people make up markets (Kotler 1992). In such a context, demographic characteristics, i.e. age, education, gender combination, marital status, monthly income, asset, land, have been considered more relevant for the purpose of sample respondents of present study. Data, thus, collected have been shown in the table-1.

In such a context, socio economic characteristics, i.e. age, education, gender combination, marital status, monthly income, asset, land, have been considered more relevant for the purpose of sample respondents of present study.

Table – 1: Socio-Economic Profile of the Sample Respondents

Variables	Items	Frequency in Number	Frequency %	Average
Age group	< 10	42	15.00%	36 years
	10 – 20	31	11.07%	
	20 – 30	45	16.07%	
	30 – 40	104	37.14%	
	40 – 50	39	13.93%	
	50 +	19	6.78%	
Education	Illiterate	129	46.07%	
	Can write name only	106	37.86%	
	Up to Primary	36	12.86%	
	Up to Secondary	7	2.50%	
	Above Secondary	2	0.71%	
Family Size	<=4	48	17.14%	6.47
	5 – 6	92	32.86%	
	7 – 8	89	31.79%	
	9 +	51	18.21%	
Marital Status	Married	108	38.57%	
	Widow	74	26.43%	
	Divorced	38	13.57%	
	Unmarried	36	12.86%	
	Old	24	8.57%	

Source: Field Survey

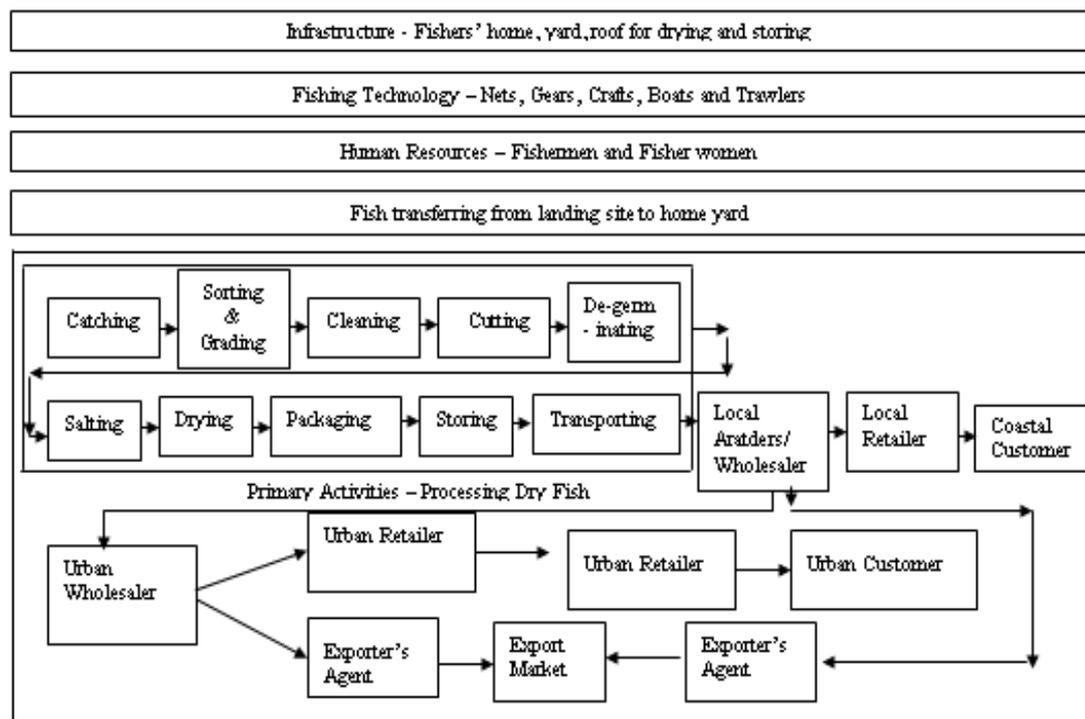
It is evident from table-1 that the average age of the women respondents is 36 years. Most of them (37%) fall in the age group of 30-40 years followed by 20-30 years (16%), less than 10 years (15%), 40-50 years (14%) and 10-20 years (11%). It shows that this is the age when one can exert his skill, talent, on one hand, and seems to be motivated to face any challenges building her career, on the other. Again, the survey data reveals that significant number of women respondents (11+15 = 26%) are children and they are involved in fishing or fishing related activities instead of spending time in school which shows a key socio-economic perspective of the fishing community. It appears that there is potentiality of development of family based enterprise which will open up job opportunities for all family members. 46% of the respondents of the study are illiterate. The education level of the women fishers ranges from 38% in the “can write name only” section which is followed by 13% - up to class V, 2.50% - up to SSC and only 0.71% - above SSC. The survey data reveals that 280 total respondents have 1811 total family members with average family size of 6.47, which is higher than national Average – 5.26. This shows that the respondents have fairly large family which also proves that family planning campaign of the government is not that successful in the study areas. Again, such large family size, in turn, causes lower rate of earning, low rate of saving and ultimately they lead a poor livelihood. As far as the marital status of the respondents goes, table 1 shows that 38.57% of the respondents are married, 26.43% of them are widow, 13.57% are divorced, 12.86% are unmarried and 8.57% are old. Reportedly, married women live more secured life than widow and divorced women of the coastal fishing communities. Thus, social network through marital linkages may help one to choose alternative income generating activities from their socio-economic environment.

5.2 Women Involvement in Dry Fish Value Chain

The value chain can be described as the range of activities required to bring a product or service from conception, through the intermediary phases of production to delivery to final consumers (Kaplinsky, 2000)¹. Porter (1980)² defined value-chain as “sequential set of primary and support activities that a firm performs to turn inputs into value added outputs for its external customers”. The activities include – primary activities and supporting activities where primary activities consist of inbound logistics, operations, outbound logistics, marketing and sales, and support services. Support activities include procurement, technology, human resources, and firm infrastructure. The dry fish value chain also includes both primary and support activities. Figure # 2 shows the primary and support activities of dry fish value chain.

¹ Kaplinsky, R. 2000. Spreading the Gains from Globalization: What Can Be Learned from Value Chain Analysis? Institute of Development Studies, Working Paper 110, Sussex.

² Porter, M.E. 1980. Value Chain Analysis. Oxford Press Ltd, London.



5.2.1 Primary Activities

The primary activities refer to processing of dry fish. Fisherwomen usually get engaged in the value chain once their counter part catches fish and brings them in the landing site. They are mainly engaged with processing of dry fish which includes a number of activities like Sorting, Grading, Cleaning, Cutting, De-Germinating, Salting, Drying, Packaging, Storing, Transporting, and finally selling. They usually sell their produces to dadondars (local money lenders), aratders, and wholesalers. It has been observed that the sample respondents dry the fishes caught by their male counterparts in the roof (mostly made by hay; few of them are made by tin) and / or in the yard of their house. They spread the caught fishes on a mat and then dry them. The respondents opined that they do not follow any modern mechanism for drying the fishes. They usually dry their produces manually and even they seldom use cover to protect the fishes from dust and other dirt. This definitely has negative impact on the quality of the dry fish. Dry fish usually are graded based on size and freshness. It has also been reported by the respondents that sometimes the fishes which are about to be rotten, are separated and dried and then sold as dry fish. But it has been observed that the fishers suffer from lack of scientific techniques in sorting and grading which hinders the efficiency of the dry fish marketing system. Fishes are usually cleaned by the women workers and female family members of the male fishers. Once the fishes are cleaned, sorted and graded then they are mixed with salt before drying. The women fishers and other family members usually conduct this function. They buy generic salt from the local market and mix with fishes so that the fishes do not get rotten over night because it takes few days to dry the fishes properly. Again women fishers usually de-germinate the fishes with some specific chemicals. Thus the caught fishes are usually sorted and graded and cleaned in the yard of fishers in a manually and non-scientific way. Again the fishes are dried in a traditional manner. As a result the fishes need to be de-germinated to get dry fish of improved quality.

As far as packaging goes, the respondents generally use bamboo made basket, plastic bags and jute bags for packaging of fishes to transport them the processing or drying yard. Once the fishes are dried then they are packaged in different plastic and jute bags to transport to the market. Women fishers store the dried fishes in pots of different sizes and also in a wooden boxes and plastic bags before they are transported and sold to the market or before the middlemen buy them from the fishers. Sometimes they tend to dry fish when they catch huge amount of fishes and all of the fishes can not be sold within a day. Some of the excess fishes are also stored with ice by the fishers and then sold or dried later on. Again in dry fish industry, the fish catching places are away from the drying places. Again the primary markets where the dried fishes are sold first are also away from the drying places. The dried fishes are transported to the primary market to sell to the local middlemen like Faria, Mohajon, etc. But unfortunately, lack of adequate and good means of transportation between the areas of fish catching and the centers of their marketing hinders the movement of fish produce and makes primary

marketing costly (Rahamn 1973). It has been reported that the various modes of transport used in this regard among which van, rickshaw, boats, etc. are worth to mention.

5.2.2 Support Activities

The support activities include Fish Procurement from landing site to fishers home or yard for drying purpose, Fishing Technology – Nets, Gears, Crafts, boats, trawlers, etc thorough which the fishers catch fish . Human Resources – Fishermen, Fisher women, and their family members involved in fish drying; and Infrastructure – Fishers’ home yard, backyard, roof, store room of the home, etc. which are used for fish drying and preserving. Among all these activities, the researchers were interested to know about which activities were mostly done by the women fishers. The survey data were processed in this regard to find out the rank average of different roles played by the women fishers in drying fish, which is shown in table # 3.

Table 3: Role of women in Dry Fish Value Chain

Activities/Role	Respondents' Ranking or Factors			Weighted Score	Rating Percent	Rank
	No.1	No.2	No.3			
Sorting & Grading	177	141	33	846	18.87	2
Drying	178	144	35	857	19.11	1
Cleaning	162	109	87	791	17.64	3
Packaging	22	98	188	450	10.04	5
Transportation	18	41	140	276	6.16	7
Storing	20	76	176	388	8.65	6
De-germinating	14	36	77	191	4.26	8
Cutting	15	33	61	172	3.84	9
Salting	41	96	198	513	11.44	4
Total				4484	100.00	

Source: Field Survey

N.B. The respondents mentioned more than one activity as the key role of women in drying fish and in some cases they didn't mark all the three role according to preference. The ranking factors indicate 3,2, and 1 respectively. The overall ranking has been made on the basis of the percentage of the weighted scores for each activity.

Table # 2 above evidence that women workers are engaged with nine different types of activities in drying fish. Based on the rank average of these eleven activities, the sequence is - Drying (rank 1), Sorting and Grading (rank 2), Cleaning (rank 3), Salting (rank 4), Packaging (rank 5), Storing (rank 6), Transportation (rank 7), De-germinating (rank 8), and Cutting (rank 9). Therefore, most of the women workers in the study areas are involved in drying the fish followed by sorting and grading, cleaning, salting, and the likes. It is reported that some times all the family members are doing these activities together i.e. husband catch the fish and wife sort, clean, add salt and dry the fish along with their children. Often the marginal women workers, widow and old workers depend on their children or engage themselves with their neighbors and do the same.

5.3 IGA of the Respondents and Income Derived from the Activities

Income generating activities are the prime determinants of level of income. Income is the important ingredient of purchasing ability and thereby fundamentally affects livelihood of the target people. It is generally observed that increase in income is followed by subsequent rise in demand for and search for quality, which pave the way towards better livelihood. Again, the income generating activities varies based on gender and season. In this connection, we were interested to know about different IGA in peak season and lean season for male and female and also income derived from such IGAs, which is shown below

5.3.1 Peak Season

Peak season in fishing industry basically refers to the dry season which lasts from October to March. During peak season the fishers are able to dry fish at their highest level. During this season male principal activity is Fish catching and their average income is 2985.72 tk. On the other hand, female principal activity is Fish processing & drying and their average income is 1611.90 tk.

5.3.2 Lean Season

Lean season refers to the rainy season when the fishers really struggle to dry fish due to heavy rainfall. It lasts from April to September and this period of the year is also prone to natural calamity like cyclone, flood, etc. During lean season usually the income is low compare to peak season and both male and female pursue different activities for their livelihood. The information in this regard is shown in the following table.

Table 5: Activities of women respondents during lean season

Activities	Frequency in %
Poultry	52.38
Weaving	38.09
Bamboo works & Handicrafts	33.33
Gardening & Plantation	28.57
Dairy	23.67
Fish Culture	8.52

Source: Field Survey

From the above table and figures, it is evident that the principal income generating activity of the female in lean season is poultry (52%) followed by weaving 38% and Bamboo works 33%, etc. The average male income during lean is 1645.23 tk. where as average female income is 1061.90 tk.

5.4 Working Hours & Wage Structure of Women in Fish Processing

Wage is the monetary value of labor. In the coastal fishing community, wage is calculated based on both per day and overtime hours. The following table 6 shows the working hours and wage rate for the sample women dry fish workers.

Table 6: Working hours and wage rate of the respondents

Time	Total Hours	Total Wage
1. 7 am – 6 pm	12 hrs	50 tk.
2. 6 pm – 12 midnight	6 hrs.	50 tk.
3. 12 midnight – 3 am	3 hrs.	50 tk.

Source: Field Survey

From the table, it is confirm that the regular wage of the women dry fish workers is tk. 50 per day only, which very poor and frustrating as well. The overtime rate is also very poor as for the first 6 hours, it is tk 50 only and even during the midnight, the rate is also only tk 50. However, the usual trend of working hours of the respondents is shown in the following table 7.

Table:7 Distribution of the Respondents by working hours

Category	Frequency	Frequency in %
7 am - 6 pm	220	78.49%
6 pm - 12 midnight	105	37.53%
12 midnight - 3 am	68	24.18%

N.B. Total frequency in percentage is more than 100 as the respondents answered more than one option.

Source: Field Survey

Table 7 proves that 78.49% of the respondents work in the usually working hours i.e. from 7am to 6 pm. 38% of them work from 6 pm to 12 midnight where as 24% work after midnight from 12 am to 3 am.

6.0 ASSETS: Types and Valuation

6.1 Physical Assets

Physical assets of coastal dry fish workers include basic infrastructure such as housing for shelter, indigenous transport, communication, etc. Further, radio, bicycle, and TV play a significant role in communication network especially in cyclone, flood, and other natural disasters. Data collected in this connection is depicted below:

Table 8 Assets of the Sample Respondents

Category	Frequency	Frequency in %	Average Value in tk.
House	236	84.29%	8200.00
Plants	112	40.00%	1947.36
Television	58	20.71%	3800.00
Radio	146	52.14%	326.66
Jewelry	133	47.50%	2375.00
Others	74	26.43%	1856.89

N.B. Total frequency in percentage is more than 100 as the respondents answered more than one option.

Source: Field Survey

Both the Table 9 and figure 8 above depict 84% of them have house to live with average value of tk. 8200. 40% of the respondents have some plants with average value of tk. 1947 and 21% of them have small black & white TV valued at tk. 3800 and 52% have radio valued at tk. 326. Jewelry owned by 47% worth tk. 2375. Boat is the basic production equipment, which enables the fishermen to pursue their livelihoods.

6.1.1 Fishing Assets

Fishing assets refers to production equipments boats, nets, gears and the likes. Boats and nets are essential for continuous flow of catching of fishes. Other fishing assets like fishing gears, fish processing equipment such as drying racks/ slabs are essential to support livelihood strategies. We were interested to know from the sample respondents about the status of boats, nets, fishing gears and other equipments. The data collected in this regard has been shown in table 9 and 9 (a).

Table 9 Fishing assets of the respondents

Category	Frequency	Frequency in %
Boat	26	9.29%
Net	43	15.36%
Fishing gears	21	7.50%

Source: Field Survey

Table 9 (a): Boat Types of Respondents

Boat Type	Number of Sample Respondents	Frequency in Percentage
With engine	7	26.92%
Without engine	19	73.08%
Total	26	100%

Table 10 and 10 (a) depicts that 9.29% of the respondents own boat, 15.36% own fishing net and 7.50% of the respondents owns fishing gears. It also shows that among the boat owners, 26.92% of the respondents have boat with engine, 45% have without engine 45%; 19% have both.

6.1.2 Household Type

Household type is another element of livelihood. It is an outcome of the respondent’s income level and social condition. Better household provides better safety, mental relaxation and therefore acts as an inducement for higher earning and thus paved the way for better livelihood. Data collected in this regard is shown in table 11.

Table 10: Household type of the respondents

Type	Frequency	Frequency in %
Tin and Brick	18	6.43%
Hay and Bamboo	116	41.43%
Soil & Hay	78	27.86%
Others (soil, whole tin)	74	24.29%
Total	280	100.00%

Source: Field Survey

From the above table, we find that most of the respondents have houses made of Hay & Bamboo (41.443%) followed by soil & hay (28%), others (whole tin, etc) – 24% and tin & brick (6.43%). It is reported that most of the respondent’s house is vulnerable to cyclone, tide and other natural disaster as they have to build their house beside the embankment or seashore.

6.1.3 Size of Land

Size of land holding is an important socio-economic indicator of the rural people. The land size is also important for various types of occupational activities. Bertocci (Bertocci, 1970), who designed 2.0 acre as the subsistence size of land in his study of two Comilla Villages. Table 12 below shows the data collected in this connection from the sample respondents.

Table 11: Size of land owned by the sample respondents

Size of Land	Frequency	Frequency in %
1-4 decimals (decs)	86	58.90%
5-8 decs	34	23.29%
9-12 decs	17	11.64%
13 + decs	9	6.16%
Total	146	100.00%

Source: Field survey

Table 12 shows that among the 146 land owners, 59% have only 1-4 decimals, 23% have 5-8 decimals, 12% have 9-12 decimals, and 6% of the respondents have 13+ decimal land. Therefore, it is evident that the in terms land ownership, socio-economic condition of the sample respondents is very poor.

6.2 Natural Capital

Natural capital includes land, water, bio- diversity and the likes. People of coastal fishing communities depend on a various types of natural resources for pursuing their livelihood. Land is an important socio-economic indicator or the rural and coastal people. Fish production and growth depend on availability of this natural resource. Again water ways are also used for transport of persons and produces. Fresh water is used for human consumption and for preserving fish. In this regard, we were interested to know whether our sample respondents have access to land, tube well water and sanitary latrine. Though sanitary latrine is a physical assets, despite we are considering it as natural capital as it is one of the fundamental need of human being and use of fresh and pure water is also involved with sanitary latrine. Data collected in this connection is shown below -

Table12 Access to natural capital by the sample resplendent

Response	Access to Land		Access to Tube well Water		Access to Sanitary Latrine	
	Frequency	in %	Frequency	in %	Frequency	in %
Yes	88	31.43%	158	56.43%	108	38.57%
No	192	68.57%	122	43.57%	172	61.43%
Total	280	100.00 %	280	100.00%	280	100 %

Source: Field Survey

From table 13, it is evident that about half of the sample respondents (68.57%) do not have their own land other than their own household area. 43.57% of the sample people do not have access to tube well water and 61.43% of them do not use sanitary latrine. These show a poor and distressed livelihood of the sample fisher folk. It is reported that often the respondents occupy some *khash* land (government owned land for future social development) and use that for farming. But such efforts are also vulnerable to natural disaster like cyclone and tidal bore as usually these lands are nearby to sea shore. Again, the respondents are not financially capable enough to establish sanitary latrine and tube well by their own. Though the local Government and different NGOs are helping the people in the study areas in building sanitary latrine and tube well but they are not enough in number and still there are a lot to do.

6.2.1 Degradation of Bio-Diversity

Biological diversity is an important element of our ecology and the ecological balance should be ensured. But bio-diversity is the outcome of conservation efforts of different natural resources and conservative livelihood. From our observation, it has been found that the bio-diversity is degrading day by day due to non-conservative consumption of natural resources. It has been observed that fishing is a seasonal activity and for the livelihood of sample respondents during lean season, an alternative source of income is required. Combination of different types of natural resources like forestry, water, land are used for better livelihood in the fishermen community. Water is used as drinking water as well as the medium of income for the fishers. Again land (own land as well as *khash* land) are used by the respondents for farming. Moreover, forest provides materials for housing and

boats making. It also provides different types of fruits which can meet nutritional requirements of sample respondents. It is also used as fuel for cooking of food of coastal people. But the matter of concern is that during lean season, males are farming by destructing forests as well as by destroying the hills at an alarming trend.

Again, coastal people in general and the fisher folk in particular often use different types of insecticides like DDT, Basudin, while cultivation and these causes a serious adverse effect on natural bio-diversity. Because, these chemical insecticides destroy useful creatures of the land along with the harmful insects. Moreover, these insecticides often wash a way due to rainfall and mix with the river or sea water and cause the fishes die. Besides, it has been observed that the study areas are prone to excessive air pollution due to acerbic smell of dry fish. The dry fish workers neither use any scientific methods of drying fish nor take any steps to protect such bad smell. Thus all these events affect adversely the bio-diversity of ecology and destroy the environment for growth and development of natural renewable resources.

In this backdrop, we asked the respondents about their tendency towards different activities causing degradation of bio-diversity. The survey results are shown in the following table 14.

Table 13 Distribution of respondents based on activities related with bio-diversity

Activities	Yes		No	
	Frequency	Frequency in %	Frequency	Frequency in %
Cutting forest for fuel	268	95%	12	0.04%
Using DDT, Basudin in Land	189	67%	91	32%
Steps to protect bad smell of dry fish	24	0.08%	256	91%
Use of cow-dung	204	72%	76	27%

Source: Field survey

Table 14 evidents that the respondents of the study areas are frequently involved with different activities which are creating problem for bio-diversity. Among those, 95% of the respondents cut forest for fuel which is a tremendous threat for biodiversity. 67% of the respondents use of DDT, Basudin or other type of insecticides in the land, which is also a great threat for bio-diversity. Besides, 91% of the respondents do not take any steps for protecting bad smell which creates air pollution in the study areas. Therefore, more conservative use of natural resources should be ensured for the better livelihood of the respondents in the study areas.

6.3 Human Capital

Human capital includes education, skills, knowledge, ability to labor and good health, etc, which enables the individuals or groups’ ability to pursue different livelihood strategy. The level of education of the sample fisherwomen above where we find that most of the respondents (46%) are illiterate and 38% can write their name only.

6.3.1 Technical Skill of the respondents in drying fish

Skill is one’s capability of carrying out a specific task. Skills are learned and developed with experience, training, and practice. Technical skills are those involved in making a product or providing a service (Skinner & Ivancevich 1992). Likewise, in fish drying, skill of the workers is an important determinant of the quality of the dried fish. Data collected in this regard is shown in the table 14.

Table 14: Table showing technical skill of the respondents

Skill Level	Frequency in %
Skilled	21.79%
Semi – Skilled	47.14%
Unskilled	31.07%

Field Survey

Table 15 shows that most of the respondents (47%) are semiskilled. 31% of them are unskilled where as only 22% are skilled in drying fish.

6.3.2 Training of the Workers

Training is a continual process of helping workers perform at a high level (Skinner and Ivancevich 1992). It is used to be thought that ‘training was like measles’ – a dose in one’s youth was sufficient for life (Jewel 1998). It may occur in workplace or at special training facility. It may be conducted on the job or off the job. In this connection, we were interested whether the sample respondents got any on off the job training from any institutions. Data collected in this regard is shown in table 15.

Table 15: Distribution of the sample respondents based on formal training attained.

Training	Training	
	Frequency	Frequency in %
Yes	34	12.14%
No	246	87.86%

Source: Field Survey

From table 15, we see that only 12.14% of the respondents got training on their profession i.e. in drying fish. It is reported that basically the NGOs arrange different types of off the job training program for the fisher folk in general and dry fish workers in particular.

As the NGOs offer off the job training, we were interested to know about the nature of off the job the job training they offer, from the 34 respondents who got the off the job training of the NGOs, which have been shown in the following table 16.

Table 16 : Distribution of sample respondents based on nature of training attained from NGOs

Off the Job Training	Frequency (out of 34)	Frequency in %
Lecture Session	22	64%
Group Discussion	14	41%
Counseling	17	50%
Simulation Technique	8	23%

N.B. Total frequency in percentage is more than 100 as the Respondents answered more than one option.

Source: Field Survey

Table 16 shows that among the 34 respondents who got off the job training from the NGOs, 64% of them attended in lecture session, followed by counseling 50%, group discussion 41% and simulation technique 23%. Reportedly, the dry fish workers also attain some on the job training by their predecessors or supervisors and these are naturally informal. In this connection, we were interested to know about the nature of the training attained by the respondents, which is shown in table 17 below.

Table 17 Distribution of respondents by the nature of informal on the job training attained

On the Job Training	Frequency	Frequency in %
Apprenticeship Training	129	46%
Assistantship	98	35%
Job Rotation	64	22%
Part Time Assistance	106	37%

Source: Field Survey

Table 18 evidence that the women dry fish workers often attain informal on the job training among which the most popular method is apprenticeship training weighted to 46% followed by part time assistance 37%, assistantship 35% and job rotation 22%.

6.4 Financial Capital

6.4.1 Financial Assistance

The coastal fishing communities, in general, are very poor. In most cases, more than 50% of the fishermen have no such valuable assets including land (Jeusen 1985). Besides, previous discussion also evidence that the financial condition of the coastal dry fish workers have a very limited source of income, low wages and their occupation is highly dependent on seasonality. It has been reported that after the death of a poor man or the only bread-winner of a family, it becomes difficult for his people to finance the burial of the deceased, not to speak of the food and shelter for his dependents (Ahmed 1987). This is even truer in case of coastal women dry fish workers because they need to depend on dry season to a greater extent to be in the peak of their occupation. But lives of these women fish workers is not static and do not keep stopped during the dull season. Therefore, they need to depend on loan and other financial assistance of different formal and informal sources for their day to day livelihood as well as for optimum production of dry fish in the peak season.

6.4.2 Purpose of Taking Loan by the Respondents

The dry fish women workers need financial assistance both in peak season as well as dull season. During peak season, they need loan to buy different ingredients like salt, chemicals, etc. for drying fish. They also need financial help during peak season to own fish catching elements like net, boat, fishing gears, etc. They also need help for support services such as packaging, transportation, storage facilities and the likes for continuity of fish catching and fish drying. Again during dull season, as the usual income generating activities are under threatened, the respondents need financial help for the fulfillment of basic needs i.e. food, housing, health care, sanitation, education for maintaining their livelihood. Moreover, the coastal areas are prone to natural disaster like cyclone, tidal bore, flood, etc. and the livelihood of the sample respondents are highly threatened by such kind of natural calamity. Once affected, they need financial assistance immediately for mere survival. In such context, we were interested to know from the sample respondents about the reasons for taking credit. The survey data in this regard is shown in the following table 19.

Table 18: Purpose of Taking Loan by the Respondents

Purpose	Frequency	Frequency in %
Social Function (Marriage) Funeral	204	72.86%
Small Business	112	40.00%
Purchasing fishing instruments	176	62.86%
Medication	138	49.29%
Recovery from natural disaster	114	40.71%
	128	45.71%

Source: Field Survey; N.B. Total frequency in percentage is more than 100 as the respondents answered more than one option.

The survey data of table 18 evidence that majority of the respondents (73%) took loan for social function like marriage of daughter followed by starting a tiny business like tea stall (63%), purchase of fishing instrument (49%), recovery from natural disaster (46%), medication (41%) and funeral – 40%.

6.4.3 Loan Sources of the Respondents

In the background of the rural financial market mentioned above, we were interested about the loan sources of the sample respondents. The information is shown in table 19.

Table 19: Loan Sources of the Respondents

Sources	Frequency	Frequency in %
Informal Source:		
Relatives	62	22.14%
Friends	14	5.00%
Jaladash samity (Fishers cooperatives)	16	5.71%
Dadondar	21	24.78%
Paikar	22	7.86%
Goldsmith	16	5.71%
Total Informal Sources	198	70.71%
Formal Source:		
Bank	7	2.50%
NGO	37	13.21%
Samity	19	6.79%
Total Formal Sources	63	22.50%
Not Enjoyed Loan	19	6.79%
Total	280	100.00%

Source: Field survey

Above table and figure clearly shows that the components of non-institutional financial market is dominating as a source of loan in the coastal areas among the women dry fish workers. 70.71% of the respondents took loan from informal sources where as 22.50 persons took from formal sources. Among the non-institutional components, 'dadondar' play a significant role in providing financial assistance to the sample respondents as 25% of the respondents depend on Dadondars for loan. The is followed by relatives - 22.14%, paiker – 7.86%, jaladash samity – 5.71%. Among the formal sources, NGO is the most dependable source as 13.21% of the

respondents NGOs – 13.21%, Samity (Cooperatives) – 6.79%. From the table, it is evident that formal banks is the least preferred source of loan.

6.4.4 Interest Rate

Usually the rural fishing community pays a high interest rate as they get loan from non-institutional sources. This is even truer for coastal women dry fish workers as the women workers neither have financial strength to keep as collateral nor they have bargaining power. From table 19 above, it is evident that 71% of the sample respondents get loan from non-institutional sources among which Dadondar is the key party. Often, dadondar, local lender, paiker is the same person and the respondents are kept confined by that individual. It is reported that the respondents usually pay interest per say basis which is in turn, if converted into yearly terms, varies from 120% – 280% per annum. But the rate of interest of loan of institutional sources was found to vary from 12% - 18% depending on the nature of credit. In most cases the fishermen have to handover all of their catches to the ‘dadandar’ up to 50% of the market price of their produces. In this regard, we were interested to know about the rate of interest they usually pay, which is shown in table 20.

Table 20 - Rate of interest paid

Rate of interest paid per month	Frequency	Percent
<5	33	11.78
5.1-10.0	45	16.07
10.1-15.0	68	24.28
15.1-20	79	28.21
20+	55	19.64

Source: Field Survey

The survey reveals that the range of rate of interest paid per month by the respondents varied from taka <5 at the lowest to 20 + at the highest. Again, among the respondents the highest number of loanee paid rate of interest per month is at Tk. ‘15.1 – 20.0’ whereas the lowest percentage paid in Tk. <5. As to query, they opined that dadandar rate of interest is the highest among the various sources of loan.

7.0 RESPONDENTS’ OPINION REGARDING THE FACTORS INFLUENCING THEIR LIVELIHOOD STRATEGIES

From the above discussion, it is evident that the coastal fisher women are passing their days through a vulnerable situation. They are neither socially empowered (dominate by their male counterpart) nor they have optimum access to basic elements of livelihood – physical capital, human capital, natural capital, and financial capital, yet they are contributing to the dry fish value chain significantly. From the DFID model of Sustainable Livelihood, we find that the livelihood strategies include Natural Resource based strategies, Non-Natural Resource based strategies and Migration. Natural Resource based strategies ensure conservation and effective use of natural and fishery resources in the coastal area. Factors inhibiting these strategies include those issues that cause depletion of natural resources in the study areas. For example deforestation, declining trend of fishery resources, unplanned fish catching system through current net, non-conservative consumption of fishery resources, etc. Non Natural Resources based strategies ensure social and livelihood security of the inhabitants of the coastal areas. Factors that negatively affect the non-natural based strategies of the coastal women are cultural factors like male domination in the family, lack of empowerment of the coastal women, illiteracy, early marriage, and other economic factors like lack of adequate income and capital to support livelihood, etc. On the other hand coastal people adopt migration strategies due to soil erosion, uproot from homestead due to man made reason like land struggle, unplanned expansion shrimp culture, etc. Again, different Government agencies as well as different NGOs operate in coastal areas and provide infrastructural facilities, financial support, information and counseling support to safeguard themselves from three issues – Trends, Shocks, and Culture mentioned in the vulnerability portion of DFID Sustainable Livelihood Framework model. In addition to all these factors, coastal fisher folk are tremendously affected by marketing problems and they suffer a lot due to lack of effective marketing system of fishery resources from coastal areas (Solaiman et al. Nurul kareem, Javed Hassan 2003) which also causes insecure livelihood due its impact on income generation of the fishers.

At this stage, we were interested to know about the respondents’ opinion regarding the factors that are mostly affecting the livelihood strategies and marketing strategies of fisherwomen. Participatory Rural Appraisal (PRA) technique has been used in this regard. The respondents gave their opinion regarding the following factors and we rated these factors based on the following criteria –

- Severe Problem (if more than 80% of the respondents opined the factor as a problem)
- Moderate Problem (if 50% - 80% respondents opined the factor as a problem)
- Minimum Problem (if less than 50% respondents opined this factor as a problem)

Data thus collected in this regard are shown in table 21.

Table 21: Table showing the factors affecting the livelihood strategies of the sample respondents

Factors	Remarks
1. Natural Resources Based Strategies:	
-- Unplanned fish catching through destructive fishing technique	Severe
-- Over Fishing	Moderate
-- Mangrove forest destruction	Severe
-- Declining of fishery resources due to environmental pollution	Moderate
2. Non-Natural Resources Based Strategies:	
-- Extortion of Dadondars (Local Money Lenders)	Severe
-- Lack of adequate income	Severe
-- Early Marriage	Moderate
-- Lack of women empowerment	Moderate
-- Illiteracy	Moderate
-- Superstitions of the fishing community	Minimum
3. Migration:	
-- Periodic Natural disaster (cyclone)	Severe
-- Migration due to coastal erosion	Severe
-- Resource use conflict	Moderate
-- Lack of diversified income generation option	Moderate

Source: Field Survey

From the above table, it is evident that fourteen factors affecting the livelihood strategies, six factors are rated as severe, seven factors are rated as moderate and only one factor is rated as minimum. Therefore, the livelihood strategies of the coastal people in general and dry fish women workers in particular are affected by the above mentioned factors. It is reported that they are aware about the destructive fishing technique, over pollution and over fishing but as this is the only income generating activity of the sample respondents, they are keep going on with this practice and creating a vulnerable situation for themselves.

8.0 MARKETING INNOVATIONS FOR SUSTAINABLE LIVELIHOOD OF THE RESPONDENTS

Innovation is associated with change. An innovation in the realm of management refers to an idea or pattern of ideas becoming manifest as a new kind of management tool or technical device, a new procedure, a new material or substance, a new mode of human action or a new concept or belief (Wijeratne K. 1996). An innovation begins with need analysis and ends with customer satisfaction (Cravens 1991) and improves current practices of achieving objectives. On the other hand marketing is a never ending process and is concerned with integrated efforts at desired exchange outcome with target customers. It includes chain of activities backed by creative thinking that spreads from the concept development of the product to when it is consumed or used. Due to lack of innovative and creative thinking in the marketing processes of fishery resources, the coastal fishers do not get fair price of their produces and face problems due lack of bargaining capacity. Different innovative marketing strategies can be the resort to overcome such undesired situation. Following are few relevant innovative marketing strategies in this regard -

8.1 Marketing Potential through Innovative Packaging & Grading

Dry fish is one of the favorite items for the day to day meal of the Bangladeshi people in general and Chittagong people in particular. People prefer dry fish both as a paste (locally called vorta) as well as with vegetables irrespective of their income status. Different types of dry fish like Ribbon, Bombay duck (Laitta), etc. are usually listed at the top of the preference. The producer can take this advantage by augmenting the dry fish in innovative packaging. The low income groups usually buy the generic one available at the general fish market. But for the high income group, the producer can sell high graded dry fish in innovative and attractive packaging under a specific brand name. The considering factors for such packaging is obviously the status, perception and individual need of high income group. For example, in case of dry shrimp, the producer can grade the fish based on size three size – big, medium and small. Then all the three sizes can be included in three cubes of one package. Such package then can be sold at different one stop large scale shopping mall like “Well Mart, Khulshi Mart, Agora, etc.

8.2 Export Earnings

There is immense potential of Dry fish in the export market. This is because, there are lots of Bangladeshi people live in foreign country who usually possess Bangladeshi food habit. They also prefer to have dry fish as an item for their lunch or dinner. The dry fish producers can export the packaged dry fish in foreign countries and thus can contribute in the national economy by earning foreign currency. For this, the producers need to be careful about the grading as the dry fishes selected for export should be of high quality to be edible after long period.

8.3 Creating Job Opportunities through Value Addition in Marketing Chain

Dry fish industry is one of the key protein suppliers for the people of Bangladesh. It has immense potential from Bangladesh economy point of view as it is labor intensive industry and indigenous technology is used here. There is enormous prospect of value addition in different stages of dry fish processing as the final product (which is ready to consume) requires a number of processing steps and different parties are involved in such processing. The following discussion focuses on the potential dry fish sector highlighting the scope for job creation through value addition in different processing steps and in the marketing chain.

8.4 Vertical Integration of Dry Fish Value Chain

Dry fish value chain is too long and there are numerous parties involved in the chain who share his/her profit and thus lead to increase of ultimate price for the customers. Among the parties involved in the chain, the harvesters or the coastal fishers are the most marginalized group and get the least profit. If the fish harvesters and dry fish processors can be able to sell their produces directly to the urban wholesalers instead of selling to the local aratders (local wholesalers; sometimes they also finance the fishers and buy their produces at cheap price) then they will be able to get fair price of their products and thus will earn more. For this purpose, they need to be trained about the scientific way of dry fish processing, financed at low interest so that they can process and store more dry fish and own their own vehicle to transport the dry fish to the urban wholesalers. As a result the proposed value chain will be like following –

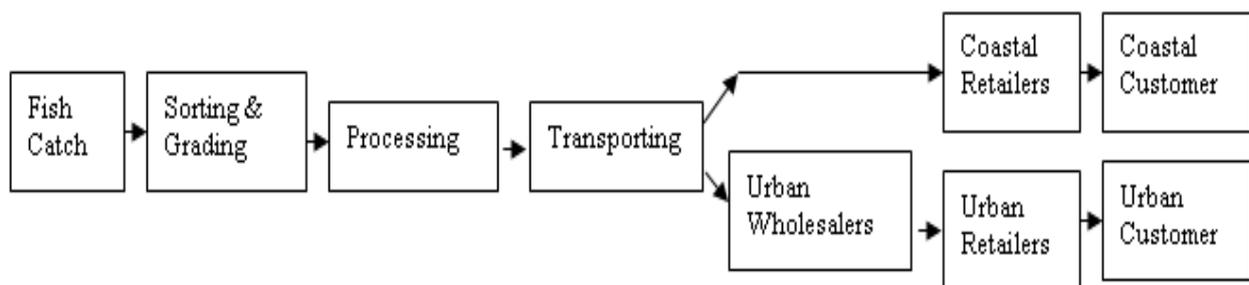


Figure: 3 Innovation in dry fish value chain

8.5 Innovative Grading and Labeling – ‘Ready to Cook’ and ‘Ready to Eat’

As dry fish sector has immense demand in the urban areas and foreign countries, the fisherwomen can grade the high quality, desired species of fishes and process them separately based on the requirement of the ultimate customers’. Thus proper utilization of the conventional and potential fishery resources both in domestic and global markets in the form of “ready to cook” and “ready to eat” may enhance employment opportunity through value addition. Practices of processing and value addition of fishery items and identify its market outlets can uplift socio-economic condition of fisher folk. Enhancement of fish drying can be another option of preservation as well as income generation.

8.6 Entrepreneurial Marketing and Development of Family Based Enterprises

As dry fish industry requires labor intensive indigenous technology and there is huge scope for value addition in different steps of processing and marketing chain of dry fish, establishment of family based enterprise will be an attractive proposition to cater these needs of value addition. To say elaborately, a family consists of husband, wife, and children. The fishermen family members can be engaged in different activities of producing and processing dry fish; like if the husband and male child catch fish in the sea then his wife and female child can sort, clean, and grade the fishes. Then the female family members can add salt and de-germinating elements at home before drying them. The male members then take a way the dry fish to sell in the market. Again, all of them can help each other to prepare some innovative package (as mentioned above).

8.7 Proper Branding and Traceability

Traceability enables identification of the credibility regarding sourcing of raw materials, ingredients used, processing systems, etc. in various steps of food value chain from the farmers or harvesters to retailers. Often the retail outlets are locally owned and traded on their personal credibility for safety, quality and honesty. Again large scale retail chain in the world care about their reputation and want to ensure quality food with hygienic processing of the best ingredients while they procure food item like frozen foods, shrimps, meat etc. so that they can use these credible information to attract customers and attain their loyalty. If we can process our dry fish scientifically and brand them, manifest all the information regarding ingredients and processing and promote them with appealing advertisement then no doubt, we would be able to attain immense customer response. Even the producer can go for contract with Agora, or Arong or other renowned retail chain of the kind to sell the packaged dry fish in their store under their brand name.

8.8 Environmental Marketing Strategy

Environmental marketing forces the marketer to discover environmentally sound products and manufacturing processes to protect environmental pollution and conserve the depleted natural resources like fisheries, forests, etc. As it emphasizes on conservative and planned consumption of natural resources, adopting the principles of environmental marketing properly in the fishery sector will not only enable environmental protection but also will reduce the migration of the marginalized fishermen and women and will assist them to adopt livelihood strategy smoothly and to face the vulnerability issues in a better manner.

To implement these innovative marketing strategies, it requires a coordinated effort from both Government and Non-government organizations to increase the awareness level of the fishing community and to make them literate. Fishermen cooperative association need to be developed to increase their bargaining capacity, to shorten the value chain and thus get the fair / better price for their produces. NGOs should take necessary programs to assist them in by imparting customized training regarding the aforementioned marketing strategies, and to create linkage with urban wholesalers, exporter's agents, and large scale retail chain directly.

9.0 CONCLUSION

Women play a crucial role in aquaculture production of Asian region in general and dry fish sector of Bangladesh in particular. For example, in Cambodia, higher yields are obtained from fish ponds managed mainly by women. In Thailand and China, they often bear the sole responsibility of farm and aquaculture production because of male migration to cities. However, women's contribution to aquaculture is often unrecognized and the real benefits from their involvement in the activity are not objectively assessed. Small-scale aquaculture development is increasingly considered as a means by which the livelihoods of the poor, including women, could be improved. The understanding of the marginalized coastal women's assets, in terms of human, natural, physical, financial and social capitals, and strategies to cope with external factors such as shocks, trends and seasonality (i.e., vulnerability context) and institutional, commercial and cultural structures and processes, can provide avenues to target development strategies more adequately to the poor and support them to achieve new livelihood outcomes.

On the other hand adoption of aforementioned innovative marketing strategies will enable the coastal women to undertake livelihood strategies (NR based, Non-NR based and Migration) in a more efficient manner which will lead them to obtain better livelihood outcome like obtain better price for their produces and thus increased income, conservation of natural resources, reduce vulnerability and face the trends and shocks with an equipped manner and consequently better access to the basic capital assets – natural, social, physical, financial and human capital. As a consequence the population that are presently considered as a burden for the country will be turned into effective human resources for the country.

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