

## FISHERIES EDUCATION AND RESEARCH IN BANGLADESH

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### ABSTRACT

With the increase of population and depletion of fisheries resources due to loss of fish growing land to agriculture, siltation, etc it became necessary to develop an institutional set-up for fisheries education and research. A number of educational institutes have been established in Bangladesh and every year a number of graduates are coming out from these institutes. In addition, various research and development institutes have also conducted fruitful research for the upliftment of fisheries sector to meet the increasing demand for fish in Bangladesh. The present study is conducted to explore how these institutes play a role in fisheries education and research. This paper highlights training requirements and future plan of the government of Bangladesh for fisheries education and research. The researchers also tried to identify the constraints in fisheries research and education and suggested few probable suggestions for the government and other relevant parties for the ultimate benefit of the fisheries sector.

**Keywords:** Fisheries resources, institutional set-up, education and research, training, future plan, constraints

### INTRODUCTION

Bangladesh is being an agricultural country crisscrossed with numerous rivers, canals, creeks, etc. The country has potential fishery resources both within land boundaries and also within its territorial and economic zones of the Bay of Bengal. More than eighty percent animal protein in the diet of Bangladesh population comes from fisheries products alone (Rubbi, 1978). A large of number of the population has been engaged directly or indirectly in fisheries sector. It is estimated that there is about 1.5 million full-time professional fishermen and 11 million part-time fishermen in Bangladesh (Cemara, 2000). Fisheries sector contributes 4.91% to GDP and 5.10% to foreign exchange earnings through export. Fish provides 63% of national animal protein consumption (Hasan, 2004).

Though Bangladesh is a small country, its population stress is very high. As a result dependency on fisheries is essential and therefore optimum utilization of fishery resources should be developed. Majority of these fishermen lives below the poverty line. Inland fisheries of Bangladesh cover an area of 4.3 million ha., of which 94% comprises open water capture fisheries and remaining 6% comprises closed water culture system (World Bank, 1990).

Fisheries sector provides a valuable contribution to livelihood development and nutrition to the rural people of Bangladesh, constituting about 80% of the total population. Nevertheless, the immense potential of this sector has remained largely unutilized due to ignorance of such potential and lack of technical knowledge in this respect. Dearth of trained human resource is a major problem towards realization of the potential. Presently more and more people are getting involved in fisheries business due to technological advancement and its demonstrated benefits. But, before they embark upon fishery business, they should gain knowledge on the technical know-how through training, and the demand for training has been increasing day by day. In order to render effective general and specialized training, there is necessity to develop more fisheries education and research institutes in Bangladesh.

With the increase of population and at the same time depletion of fisheries resources due to the conversion of fish growing land to agriculture and other purposes, it becomes necessary to develop an institutional set-up for fisheries education and research ensuring technological upliftment in fisheries sector. By this time a number of educational institutes have been established in Bangladesh and every year a certain number of graduates are coming out from these institutes. Though the academic institutes contribute positively through research and development to overcome the problem, this is not adequate. Therefore it is utmost requisite to establish similar types of institutes for challenging with the coming worse situation in the fisheries sector of Bangladesh.

### **OBJECTIVES OF THE STUDY**

1. To have an idea regarding the existing fisheries education and research institutions in Bangladesh.
2. To explore how these existing institutions play a role in fisheries education and research.
3. To improve and update the knowledge of the resources on various educational and research issues.
4. To develop capacity of the researchers and educationists in identification, analysis, and prioritization of problems and undertaking appropriate studies.
5. To produce skill fisheries graduates through modern research and education relating to fisheries resources.

### **METHODOLOGY OF THE STUDY**

Only secondary data have been used in this paper. In secondary data, the supporting and relevant materials such as Government publications, research articles and textbooks regarding fisheries research and education have been consulted in order to present the fact in a logical format. In addition, direct interview has been taken from some renowned researchers and educationists both in public and private sectors regarding the current status and future programs of different educational and research institutes of Bangladesh.

## **FISHERIES EDUCATION AND RESEARCH INSTITUTIONS**

In order to congregate the demand for fisheries education and to convert the huge potential of fisheries in Bangladesh into real wealth the following institutions play a significant role in fisheries education and research in Bangladesh:

### **Department of Fisheries (DOF)**

The Department of Fisheries (DOF) was created in Bengal in 1908. It was revived and restored to its original position on March 01, 1955 with Head Quarters in Dhaka. DOF laid the foundation of adaptive fisheries research by establishing the Freshwater Fisheries Research Station at Chandpur in 1964 under its control. DOF is still continuing some exploratory survey for the assessment of resources in the Bay of Bengal. In the backdrop of declining production trend from inland capture fisheries against ever-increasing demand for fish, DOF established the Aquaculture Experiment Station (AES) at the Bangladesh Agriculture University (BAU) Campus in Mymensingh and the Fish Hatchery and Training Center in Raipur at 1977 for doing aquaculture research in the country. This was an important development in the arena of aquaculture research in the country. Some adaptive research was also conducted under the Ox-bow Lake Fishery Project at Kotchandpur. However, these project-based activities have not been able to take permanent shape due to lack of programme-based approach.

### **Bangladesh Fisheries Development Corporation (BFDC)**

The Bangladesh Fisheries Development Corporation was established in 1964 played an important role during 1970s in carrying out initial investigations for the exploration and exploitation of marine fisheries resources from the Bay of Bengal by itself and by the private entrepreneurs. It has established fish harbours, landing and distribution centers, processing plants, ice plants, net manufacturing plants, etc. for the development of processing, utilization, and marketing of fish. BFDC is a commercial agency in the public sector for production, distribution, and marketing of fish.

### **Bangladesh Agricultural University (BAU)**

A significant advancement was made in formal fisheries education and research in the country by Bangladesh Agriculture University through the creation of the Faculty of Fisheries in 1967 as its sixth Faculty. The introduction of specialized and higher education by BAU is marked as a milestone for fisheries research and development in Bangladesh. In fact, the technical manpower produced by the Faculty of Fisheries was a turning point for introduction of modern fisheries in the country. The rationale for setting up the faculty was to produce high quality fisheries graduates equipped with up-to-date knowledge in different fields of fisheries science and to develop the country's fisheries sector by conducting research and applying advanced modern technology. The Faculty offers BSc (Hons) in fisheries and Master's and PhD in different specialized areas of aquaculture, fisheries resource management, genetics, socio-economics, and

fisheries technology. The Faculty has a moderate to excellent facilities for advanced studies in a wide range of discipline. At present the Faculty has four Departments with 29 courses for undergraduate studies in various aspects of fisheries management and development along with a fish farm, and a field laboratory. The Departments are Fisheries Biology and Genetics, Aquaculture, Fisheries Management, and Fisheries Technology. The Department of Fisheries Biology and Genetics focuses on fish fauna, reproductive biology, conservation and management of brood stock, fish breeding, and chromosome and gene manipulation. The Department of Aquaculture deals with fish culture, nutrition and fish pathology. The Department of Fisheries Management offers studies on population dynamics, economics and marketing, biostatistics, and fish health. The Department of Technology deals with processing and preservation, pre- and post-capture technology, fish microbiology and quality of fish products. All the public universities have zoology departments with research programs at MSc, MPhil, and PhD levels in fisheries subjects. Till 1999, a number of 1176 Bachelors, 551 Masters and 8 PhDs passed out from the Faculty.

### **OTHER UNIVERSITIES AND INSTITUTIONS**

Basic and academic research in some aspects of fisheries was also conducted by other Universities such as the University of Dhaka (DU), Chittagong (CU), Khulna (KU), and Rajshahi (RU). Dhaka University started the Department of Aquaculture and Fisheries in 1998, while Chittagong University established the Institute of Marine Sciences and Environmental Sciences in 1973 for research and education especially in marine fisheries development. The University of Khulna established in 1991 has introduced a discipline called Fisheries and Marine Resources Discipline, offering specialized education at the graduate and post-graduate levels. Meanwhile, the University of Rajshahi has also opened a Department of Aquaculture in 2000-01 academic sessions. The Institute of Food Science and Technology of the Bangladesh Council of Scientific and Industrial Research (BCSIR) deals with nutrition and processing technologies of food and fisheries products. Along with education, similar research has also been conducted by the Institute of Nutrition and Food Science of the University of Dhaka.

### **Bangladesh Agricultural Research Council (BARC)**

In 1973, the Bangladesh Agricultural Research Council (BARC) was also created as a national apex body for coordination of agricultural research including fisheries. BARC's accepted responsibility is to plan, coordinate, monitor, and evaluate research across the Agricultural Research Institutes (ARIs) which is now named as National Agricultural Research System (NARS). However, the 1996 Act (amendment) of BARC enhanced its power and widened its responsibilities enabling it to take over some administrative and financial control of crop-based research institutes within the Ministry of Agriculture. When fund is available, BARC offers contract research grants to research and education institutions and individuals to address the emergent issues. Special reviews and studies of national importance are also conducted by BARC to assess the status and suggesting measures and strategies for development. BARC plays only coordinating role for research planning management and strategic plan development for the non-crop institutions like BFRI (Fish), BFRI (Forest), etc.

## **Bangladesh Fisheries Research Institute (BFRI)**

Bangladesh Fisheries Research Institute (BFRI) was established in 1984 under an ordinance (Ordinance No. XLV of 1984) promulgated by the President of the Peoples' Republic of Bangladesh, which was subsequently renamed as Bangladesh Fisheries Research Institute (BFRI) by an Act. The purpose of creation of BFRI is to develop appropriate technologies to harness the vast potentials of the fisheries sector for food, nutrition, and economic development through increasing production from all sub-sectors of fisheries. Thus, its research programme primarily aims to evolve appropriate production and management methods for sustainable growth in fish production from the country's vast available resource base. BFRI is designed to serve as the national resource for technical information on fisheries and to continuously generate and standardize appropriate production technologies for countrywide extension by the Directorate of Fisheries and the concerned government organizations (GO) and non-government organizations (NGO). The success of BFRI in generating aquaculture technologies and improved resource management practices paved the attention for involving NGOs in fisheries extension since 1988. Before That time, the NGOs involvement was mainly limited to social services sectors like primary health care, child education, adult education, family planning, etc. The BFRI has several stations and units such as Freshwater Station on the Bangladesh Agricultural University campus, Riverine Station at Chandpur; Marine Fisheries Technology Station at Cox's Bazar; Brackish-water Station at Khulna; Marine Fisheries Survey and Management Unit at Chittagong; and Marine Fisheries Survey and Management Unit at Cox's Bazar.

Government has created BFRI with a mandate to carry out and coordinate fisheries research in Bangladesh. It functions as an autonomous body with a Board of Governors overseeing the execution of its mandate by providing necessary policy and administrative guidance. The Board in exercise of its power under the Ordinance and Act may make rules and regulations to manage the affairs of the institute effectively. BFRI has precisely the following mandate:

1. To carry out fisheries and aquaculture research in Bangladesh.
2. To coordinate all fisheries research being carried in Bangladesh and elsewhere.
3. To assist in the development of economic and effective methods and technologies for fish production and eco-system management, management of fisheries and all related activities, fish harvesting, handling, processing, and quality control, development of value-added products, fish transport, storage, and marketing.
4. To provide improved training to the extension workers, entrepreneurs, progressive farmers and fishers and research-based technology transfer.
5. To do such other things as may be considered necessary for carrying out the purposes of the ordinance.

## **TRAINING FOR FISHERIES EDUCATION AND RESEARCH**

Training is required at all levels starting from farmers, landless labors, women, unemployed youths, members of community organizations at the primary level to technicians, managers, extension workers of GOs and NGOs, entrepreneurs at the secondary level; and scientists, teachers, and planners at the tertiary level. At the primary level, the range of training should

include improved aquaculture technologies, hatchery, and fish/shrimp farm management, open water fisheries resources management and conservation, fish processing and quality control, transportation and marketing, fish-based industry and trade development, etc. However, more emphasis should be given on aquaculture to facilitate its wide-scale adoption for self-employment of the rural farmers.

**Current Status of Training**

Usually training is not offered on regular basis. However, project-based training is available mainly for farmers, which covers only a limited number. According to the available statistics of DOF, during the last five years training was offered to about 70,000 farmers annually, while the number was only 7,000 or less before that period. As fisheries and aquaculture have already been identified as an important means of poverty alleviation and also declared as industry, it has created a large demand for training on different aspects of fisheries and aquaculture management practices by farmers and entrepreneurs.

**TRAINING PLAN**

Skilled manpower is a prerequisite for fisheries development and it has to be acquired through appropriate training. A five-year plan started from 2002-03 onward that has been suggested by DOF for fisheries and aquaculture development is shown in Table-1.

**Table 1: Five-Year Plan for Short-term Training on Fisheries and Aquaculture Management**

Category of Training	Topics	Duration	Nos. of Trainee					Total
			2002-03	2003-04	2004-05	2005-06	2006-07	
Fish farmers	Improved aquaculture practices	3-5 days	500,000	500,000	500,000	500,000	500,000	2500,000
Hatchery operations and farm managers	Improved quality seed production, hatchery, and farm management	1-2 weeks	50,000	50,000	50,000	50,000	50,000	250,000
Fishing Community	Open water resource management and fish conservation	3-5 weeks	50,000	50,000	50,000	50,000	50,000	250,000
Extension workers	Improved aquaculture practices	5-6 weeks	10,000	10,000	10,000	10,000	10,000	50,000
Entrepreneurs	Engineering design and operational guidelines for fish farms, hatcheries, fish processing plants, feed mills, quality control, disease diagnostic centers and marketing facilities.	2-3 weeks	5,000	5,000	5,000	5,000	5,000	25,000
Total			615,000	615,000	615,000	615,000	615,000	3075,000

(Source: DOF, Ministry of Fisheries and Livestock, Government of The People’s Republic of Bangladesh.)

In this program, a total of 3.07 million fish farmers, hatchery and farm managers, fishing community, extension workers, and entrepreneurs have been proposed to be trained within a period of five years on different aspects of fish production and fish trade development activities. It has been planned to train 2.5 million farmers on fisheries and aquaculture with a yearly target of 1,000 farmers from each Thana; 0.25 million hatchery operators and farm managers on improved seed production, hatchery and farm management; and 0.25 million fishing community members on capture fisheries management and fish conservation guidelines, with a yearly target 100 people from each Thana; 0.05 million extension workers on improved fisheries and aquaculture technologies taking 20 from each Thana; and 0.02 million entrepreneurs on fish trade and industrialization, targeting 10 from every Thana.

The present number of Thana in the country is 507 (Statistical Pocket Book of Bangladesh 2003). However, for the sake of convenience of calculation, training target has been planned on the basis of 500 Thana.

## **RESEARCH PLANNING AND MANAGEMENT PROCESS IN DIFFERENT ORGANIZATIONS**

Although there are some degree of differences and inconsistencies, the ARIs have developed some methodologies for developing and upgrading the research plan. The research planning and management process followed by different organizations are given below:

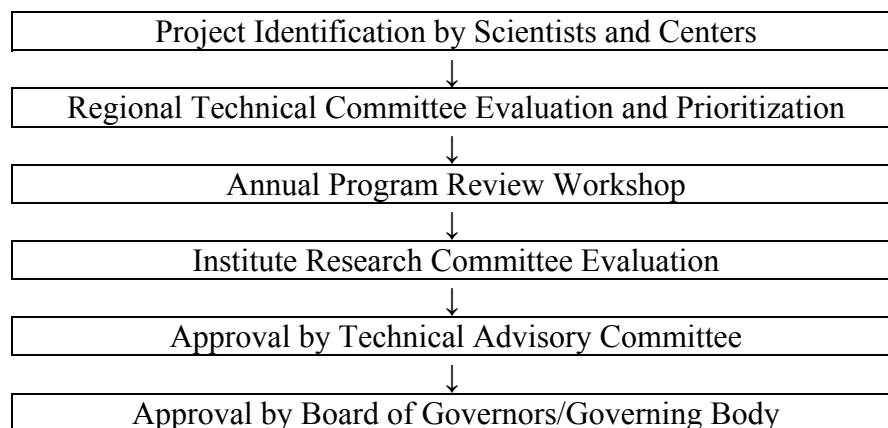
### **Research Planning In The University**

The universities of the country follow almost similar type of planning process where such a set up is present. As is known, the universities generally carry out basic and fundamental research, mostly designed for Master's or PhD. academic degree programs. BAU has an organized set up for processing-based research. It has established a separate institution known as Bangladesh Agricultural University Research System (BAURES) in 1984 for planning, processing, recommending, and approving research projects received from different teachers and scientists. It also coordinates monitors and evaluates the research through organizing seminars and workshops. BAURES takes active part in mobilizing research grants. Additionally, university teachers also receive contract research grants from Ministry of Science and Technology, BARC, University Grants Commission, and such other potential institutions.

### **Research Planning In The Institution**

BFRI has developed a model based on the role of BARC provided by its 1996 Act (Amended) for conducting research planning and review. Research projects as identified by individual scientists, stations, and substations are required to be reviewed at the regional level workshops by Regional Technical Committee and participated by all stakeholders. The ARI Research Committee (ARIRC) at the Head Quarters then reviews these programs. ARIRC approved

projects are again reviewed by the national level by Annual Program Review Workshop and subsequently approved by the Management Board and Governing Body for crop-based ARIs and Technical Committee and Board of Governors for non-crop ARIs. Agricultural Technical Committee (ATC) at the regional level and National Agricultural Technical Committee (NATC) at the central level have been constituted for vetting the regional and national research projects respectively. Present flow chart of research program identification and review is as follows:



## FUTURE PLAN FOR FISHERIES EDUCATION AND RESEARCH

An analysis of the specialization of the BFRI scientists show that the majority of them (75%) process only MSc degree and holding junior (63%) and mid-level (30%) positions. Recently, 10-15 scientists received PhD degree in various fields of fisheries. About 50% of the BFRI researchers received some short-term in-service training in the country and abroad. Further training and exposure to advanced research abroad are required in the important areas of activities. A 20-year Master List of Training requirement of BFRI is shown in Table 2, 3, and 4 respectively.

**Table 2: Proposed Post-doctoral Program Abroad up to the year 2020**

Subject	1st Five-year Plan 2005	2nd Five-year Plan 2010	3rd Five-year Plan 2015	4th Five-year Plan 2020	Total
Genetical Engineering	1	2	2	2	7
Pond Microbiology	1	2	2	2	7
Fish & Shrimp Disease	1	2	2	2	7
Resource Assessment & Management	1	2	2	2	7
Fish Physiology	2	2	2	2	8
Fish Processing Technology	2	1	1	1	5
Fishing Technology	1	1	1	1	4
Fish Nutrition	1	1	1	1	4
Fish Socio-Economics	1	1	1	1	4
Population Genetics	2	1	1	1	5
<b>Grand Total</b>	<b>13</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>58</b>

(Source: DOF, Ministry of Fisheries and Livestock, Government of The People's Republic of Bangladesh.)



**Table 3: Proposed Degree Program (MS/PhD) up to the year 2020**

Subjects	1st Five-year Plan 2005		2nd Five-year Plan 2010		3rd Five-year Plan 2015		4th Five-year Plan 2020		Total	
	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local
Bio-Technology	2	-	2	-	1	-	1	-	6	-
Aquatic Resource Management	2	-	2	-	2	-	2	-	8	-
Aquatic Biodiversity	-	2	-	2	-	2	-	2	-	8
Aquatic Resource Economics	2	-	2	-	-	2	-	2	4	4
Fish Radiation Biology	1	-	1	-	1	-	-	-	3	-
Research Planning Management	2	-	2	-	2	-	-	-	6	-
Fisheries Technology	2	1	2	1	-	2	-	2	4	6
Fish Nutrition	1	1	1	1	-	1	-	-	2	3
Fish Processing	1	1	1	1	-	1	-	-	2	3
Fish Parasitology	2	2	-	2	-	2	-	2	2	8
Fish Ecology	2	2	2	2	2	2	1	1	7	7
Fish Physiology	2	-	2	-	2	-	1	-	7	-
Fish Biochemistry	1	2	2	2	2	2	-	2	5	8
Fish Crafts & Gears	2	2	2	2	2	2	1	2	7	8
Fish Behaviour	2	2	2	2	2	2	-	2	6	8
Bio-Energetics	2	-	2	-	-	-	-	-	4	-
Population Dynamics of Reverine Fish	2	1	2	1	1	2	1	2	6	6
Population Dynamics of Marine Fish (Demersal)	2	1	2	1	1	2	1	2	6	6
Population Dynamics of Marine Fish (Pelagic)	2	1	2	1	1	2	1	2	6	6
Fish Population Genetics	2	-	2	1	2	-	2	-	8	-
Fish Virology	1	-	1	-	1	-	1	-	4	-
Fish Histopathology	2	-	1	-	2	2	-	-	5	2
Fish Bacteriology	1	-	1	-	2	2	1	-	5	2
Fish Endocrinology	2	-	1	-	1	2	-	2	4	4
Fish Pheromones	1	-	1	-	1	-	-	-	3	-
Fish Toxicology	1	-	1	-	1	-	-	-	3	-
Mangroves Ecology	2	-	1	2	-	2	-	-	3	4
Fisheries Statistics	2	1	1	1	-	2	-	2	3	6
Fisheries Extension	2	-	1	2	-	2	-	-	3	4
Fisheries Socio-economics	2	1	2	2	-	2	-	2	4	7
Fisheries Library Science & Data Base Development	2	-	1	1	-	2	-	2	3	5
<b>Grand Total</b>	<b>52</b>	<b>20</b>	<b>45</b>	<b>26</b>	<b>29</b>	<b>40</b>	<b>13</b>	<b>29</b>	<b>139</b>	<b>115</b>

(Source: DOF, Ministry of Fisheries and Livestock, Government of The People's Republic of Bangladesh.)

**Table 4: Proposed Non-degree Training Program up to the year 2020.**

Subjects	1st Five-year Plan 2005		2nd Five-year Plan 2010		3rd Five-year Plan 2015		4th Five-year Plan 2020		Total	
	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local
GIS	2	-	2	2	-	2	-	2	4	6
Remote Sensing (RS) & Application	2	-	2	-	-	-	-	-	4	-
Digital Mapping & RS	2	-	2	-	2	-	-	-	6	-
Research Planning & Mgt.	2	-	2	-	2	-	-	-	6	-
Fisheries Extension	2	-	2	2	-	2	-	2	4	6
Information Technology	2	-	3	-	3	-	-	-	8	-
Population Genetics Research	3	-	3	-	-	-	-	-	6	-
Biochemical Genetic Research	3	-	3	-	-	3	-	3	6	6
Frog Breeding & Culture	2	-	-	-	-	2	-	-	2	2
Economic Bio-modeling	2	-	2	-	-	2	-	-	4	2
Fish Parasitology	2	-	2	-	2	-	-	-	6	-
Fish Histopathology	2	-	2	-	-	-	-	2	4	2
Live Fish Feed Culture	2	-	2	-	2	-	-	-	6	-
Soil Water Chemistry	2	-	2	-	2	2	-	2	6	4
Population Dynamics of Riverine	2	-	2	-	2	2	-	2	6	4
Population Dynamics of Marine Fish (Demersal)	2	-	2	-	1	2	2	1	7	3
Population Dynamics of Marine Fish (Pelagic)	2	-	2	-	1	2	2	1	7	3
Fish Toxicology	2	-	2	-	2	2	-	-	6	2
Fishing Crafts & Gear Technology	2	-	2	-	2	2	-	-	6	2
Shrimp Hatchery Technology	2	-	2	-	2	-	-	-	6	-
Brackish Water Aquaculture	2	-	2	2	2	2	-	-	6	4
Coastal Resources Mgt.	2	-	2	1	-	1	-	1	4	3
Fisheries Engineering	2	-	2	-	2	-	-	-	6	-
Seaweed Culture	2	-	-	-	2	-	-	-	4	-
Molluse Culture	2	-	2	-	-	-	-	-	4	-
Pearl Culture	2	-	-	-	-	-	-	-	2	-
Nursery Technology of Marine Fish	2	-	2	-	-	-	-	-	2	-
Marine Product Quality Control	2	-	2	-	-	-	-	-	2	-
Value Addition	2	-	3	-	2	-	2	-	9	-
Live Food Culture	2	-	1	-	1	-	1	-	5	-
Fisheries Statistics	2	-	2	-	-	2	-	2	4	4
<b>Grand Total</b>	<b>64</b>	<b>-</b>	<b>59</b>	<b>07</b>	<b>32</b>	<b>28</b>	<b>07</b>	<b>18</b>	<b>162</b>	<b>53</b>

(Source: DOF, Ministry of Fisheries and Livestock, Government of The People's Republic of Bangladesh.)

Government shall have to organize donor funding (fellowship) for phase-wise implementation of this training program. Since all research scientists need to acquire advanced knowledge for effective planning and conduct of research, a plan for advanced studies has been proposed for BFRI to make it as a center of excellence. The plan includes 58 post-doctoral, 254 MS and PhD and 210 non-degree programs for specialized advanced training in different subjects up to the year 2020.

## **CONSTRAINTS IN FISHERIES EDUCATION AND RESEARCH**

During the study the researchers have observed significant constrains in the fisheries education and research in Bangladesh. Some of them are given below:

1. Lack of adequate funds to develop the course curriculum and research activities on a continuous basis.
2. There is a significant lag in the availability of crucial data and information to make policy design regarding fisheries education & research and their implementations.
3. Fisheries education and research are also significantly affected by the inconsistent policy making of the government and other regulatory agencies, which are taken by considering the political necessity rather than actual necessity.
4. Nonexistence of structured coordination among the various fisheries education and research institutions.
5. Educational curriculum is dominated by theoretical part rather than practical and as such the stakeholders are deprived of getting practical exposure from the academician.
6. Absence of built-in mechanism in the fisheries data collection and processing.
7. Due to proper administrative management and technical know how, in most of the cases education and research institutions cannot utilize foreign funds and ultimately allotted funds go back to the donor organizations.
8. There are a tremendous development in inland fisheries sector but limited development yet been achieved in the field of marine fisheries though we have vast marine resources.

## **RECOMMENDATIONS**

1. There is an immense coastal resource in Bangladesh but due to the absence of well-managed research plan, the resources of this sector yet been unutilized. One of the main objectives of the government is the poverty alleviation. So in order to ensure proper utilization of the vast coastal resources as well as smooth functioning of this sector, a separate 'Marine Fisheries Directorate' set up is very essential.
2. Establishment of 'Demonstration Farm' especially in the coastal area to disseminate the environment friendly and socially viable technology to the rural coastal farmers to uplift their socio-economic position through government extension programs.
3. Currently available few project-based training is not enough. It has to be institutionalized and offered on a regular basis following technology-based training module.
4. There should be automated data and documentation unit, regular publication of documents regarding resources to reduce the lag in the availability of data and information to make policy design and implementation effectively.
5. The government should take crash programs to implement the policies and programs that have been taken regarding fisheries education and research.

## CONCLUSION

Fisheries sector is making valuable contribution to livelihood development and nutrition of people of Bangladesh, especially rural people. However, the immense potential of this sector has remained largely unutilized due to the ignorance of such potential and lack of technical knowledge in this respect. Insufficient fisheries research and education is a major problem towards realization of the potential. Presently, more and more people are getting involved in fisheries business due to technological advancement and its demonstrated benefits. But, before they embark upon fishery business, they want to gain sufficient and effective knowledge on the technical know-how. Though the stated academic and research institutes contributing positively toward this objective, this is not adequate to overcome the situation. There are also few constraints involved in fisheries education and research. The government and other regulatory agencies can take remedial measures stated above to deal with the challenging situation in the fisheries sector of Bangladesh.

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