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Department of Fisheries, Bangladesh

Ministry of Fisheries and Livestock

Annual Report 2018

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Preface

Bangladesh, the biggest delta in the world has a vast and diversified inland open waters, estuaries, brackish and marine waters with the potential fisheries resources.Fisheries sector has been carrying out its significant role in our economy for few decades. The fisheries sector of Bangladesh has both prospects and challenges. Department of Fisheries (DoF) is playing an important role for supplying animal protein to the huge population of Bangladesh through fisheries management, aquaculture technology expansion, fisheries conservation and planned development of fisheries resources to uplift the socio-economic conditions of the fishers.The sector is also playing its vital role in creating employment for the rural people, earning foreign currency by exporting shrimp as well as ensuring quality and safe fish and fishery products. Department of Fisheries also assists government in formulating policies and acts required for the sustainable fisheries development integrated natural resources management, fisheries conservation.

Fish provides about 60% of animal protein of our daily life. In order to ensure overall development of the sector, DoF is implementing several projects and programs under both development and revenue budget.The annual report 2018 brought together the brief of the activities performed by the DoF. The report also presents the development of fisheries sector to visualize the potential and achievements in the contemporary period.

I strongly believe that this report will go a long way to help the field officers of DoF, planners, researchers, development partners, extension workers, NGOs and all other relevant stakeholders of fisheries sector. I appreciate the initiatives of my colleagues who have given their valuable time, effort and endeavor in preparing this report. I offer my heartfelt thanks, gratitude and acknowledgement to them.

Quazi Shams Afroz

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1. Introduction

Bangladesh is one of the world's leading fish producing countries blessed with many rivers-canals, depressions and oxbow lakes, ponds and floodplains, covering a huge area of water resources of 4.70 million hectares. Besides, there is vast of marine fisheries resources expanding over an Exclusive Economic Zone (EEZ) of 1, 66,000 sq. km. Since time immemorial, these inland, coastal and marine waters are the main sources of fish. As an agro-based country, the contribution of fisheries sector to national economy has always been important and main source of animal protein, employment opportunities, food and nutritional security, foreign earnings, aquatic biodiversity conservation and socio-economic development. Fisheries sector contributes 3.57% to GDP and 25.30 % to agricultural GDP. Fish supplements to about 60% of our daily animal protein intake. More than 11% of the population depends directly or indirectly on the fisheries sector for their livelihood.

After 47 years of independence, Bangladesh becomes a self-sufficient country in fish production, with a per capita fish consumption of 62.58 g/day against set target of 60 g/day. The recent development and progress in fisheries sector was initiated by the Father of the Nation, Bangabandhu Sheikh Mujibur Rahman. It will be praiseworthy to note that, he initiated fisheries sector development programs during early seventy's, through fingerling release at Ganabhaban Lake in 1973, stock assessment of marine fisheries resources in 1973, etc. In continuation of that, the sector succeeded at today's height under the visionary focus, continuous guidance, deep affection and pragmatic leadership of the honorable Prime Minister Sheikh Hasina. Ministry of Fisheries and Livestock (MoFL) and the Department of Fisheries (DoF) has been implementing different socio-eco-friendly interventions to harness its potential.

Bangladesh produced a total of 4.277 million mt fish in FY 2017-18, where aquaculture production contributes 56.25 percent of the total fish production. Through this remarkable achievement, first time in the history, Bangladesh has been declared as self sufficient country in fish production in 2018. Last 10 years average growth performance of this sector is 5.26 percent. Aquaculture shows a sturdy and consistent growth, average growth rate is almost 10 percent during the same timeframe. Government is trying to sustain this growth performance, which eventually ensures to achieve the projected production target of 4.55 million mt by 2020-21.

Extension programs of sustainable aquaculture technologies for fish and shrimp, conservation and management of the freshwater and marine open water capture fisheries, optimization and fine-tuning of fish inspection and quality control programs and use of information and communication technologies in fisheries sector has been taken to achieve the much desired targets. As a part of the 'Digital Bangladesh' program the Government initiated e-Extension services of fish and shrimp culture and extension programs to provide appropriate services to the door steps of the farmers. In addition to these, existing laws and acts related to fisheries have been amended and updated to ensure quality fish and shrimp production and to make available quality inputs.

In conformity with the targets of 'Vision-2021' of the present Government, the Department of Fisheries (DoF) has also envisioned some important programs and targets to achieve that goal. Initiation of good practices in environment friendly fish and shrimp farming for promotion of export, biological management of jalmohals, establishing easy access of real fishers to the open

water capture fisheries, creation of employment opportunities and other various pragmatic programs have been taken by the DoF to facilitate achievement of 'Vision-2021'. It is expected that all these programs will contribute to reduce present poverty from 6.5 crores to 2.2 crores by the year 2021.

1.1 History of the Department of Fisheries

Department of Fisheries, Bangladesh was first established in the undivided Bengal of the British India in 1908 and since then it has experienced many changes. In 1910, the DoF was merged with the Department of Agriculture, but as per the recommendations of Mr. T. Southwell, the DoF regained its status as an independent organization in 1917. The DoF was abolished again in 1923. However, after a long gap, following the recommendations of Dr. M. Ramswami Naidu, the DoF was revived in May, 1942. Since the inception of the then East Pakistan, the activities of DoF had been continued. After the independence of Bangladesh in 1971, the organization renamed as Department of Fisheries (DoF) instead of the Central Fisheries Department in April 1975 later on in 1984, the Central Marine Fisheries Department merged with the DoF as Marine Fisheries wing.

1.2 Vision, mission and mandate

Vision: Meet the demand of animal protein, poverty alleviation and promote foreign earnings.

Mission: Support sustainable growth in fish and shrimp production with other aquatic resources for domestic consumption, exports and management of open-water fisheries resources through community participation leading to equitable distribution of the benefits for optimal economic and social growth in Bangladesh.

Mandate :

- Dissemination of improved aquaculture technologies through training and demonstration and to extend advisory services to the farmers;
- Enhancing fisheries resources through facilitating conservation and management measures;
- Assisting the administrative ministry in formulation of policies, acts etc;
- Enforcing quality control measures and issuance of health certificates for exportable fish and fish products;
- Conducting fisheries resources survey and assessment of stock to develop fisheries data base for proper planning;
- Facilitating arrangement for institutional credit for fish and shrimp farmers, fishers and fish traders;
- Facilitating alternative income generating activities for rural poor and unemployed people towards poverty alleviation;
- Formulation and implementation of development projects towards sustainable utilization of fisheries resources to ensure food security.

Strategic objectives: The key objectives of the NFP (National Fisheries Policy), 1998 are:

a. Enhancement of the fisheries resources and production;
b. Poverty alleviation through creating self-employment and improvement of socio-economic conditions of the fishers;
c. Meet the demand for animal protein;
d. Achieve economic growth and earn foreign currency by exporting fish and fisheries products;
e. Maintain ecological balance, conserve bio-diversity and improve public health.

Targets under 7FYP

a. Increased 45% aquaculture and 20% fisheries production by 2020;
b. Increased 20% hilsa and 18% marine fisheries production by 2020;
c. Raise per capita protein intake to 60 g from domestically produced fish and fisheries product by 2020;
d. Raise export earnings to US$ 1.25 billion by 2020 from frozen shrimp, fish and value added fish products;
e. Ensure quality seed and feed at growers level;
f. Reappear at least 75% of endangered fish species in sanctuary area by 2020 from baseline;
g. Creation of more (25%) employment opportunity for unemployed youths;
h. Fish farmers/ fishers income raise by 20% by 2020;
i. Participation of women in aquaculture production, fisheries CBOs and fish/ shrimp processing industries increase to 25%;
j. Good Aquaculture Practices (GAP) and Good Manufacturing Practices (GMP) at all stages of fish/shrimp supply chain to comply international market;
k. Food safety measures for domestic markets.

1.3 Organizational Setup

DoF has the following wings to render its services:

Inland Fisheries,
Marine Fisheries,
Fisheries Resource Survey System (FRSS),
Fish Inspection and Quality Control (FIQC), and
Training.

1.3.1 Manpower under revenue

In line with the Vision-2021 of the present democratic government in Bangladesh, the country is now well-poised to succeed in its quest for a Digital Bangladesh. While Bangladesh is taking great strides towards holistic and sustainable development, Department of Fisheries has been working hard since its inception to render the services and responsibilities for sustainable fisheries production and socio-economic development by providing modern and effective aquaculture technologies and efficient fisheries management practices to the fishers. The organization holds 5927 positions

under the Director General (DG) along with one Additional Director General (ADG), seven Principal Scientific Officer/Directors: there are eight divisional Deputy Directors, 64 District Fisheries Officers, 487 Senior/Upazila Fisheries Officers, and other staff members. Regardless, there is insufficient number of staff and manpower with various crucial positions remaining vacant. Manpower structure/sanctioned under revenue budget and manpower in position of DoF is shown in the following table 1.

Table 1: Manpower under revenue budget and manpower in position

Class	Sanctioned Posts	Posts in Position	Vacant Posts
1st Class - Cadre	1298	644	654
Non-Cadre	333	199	134
Class II	661	370	291
Class III	2101	1658	443
Class IV	1525	1356	169
TOTAL	**5927**	**4227**	**1691**

In order to meet the SGDs goals as well as EU requirements aligning the 7th Five Year Plan, it needs appropriate institutional framework with adequate educated qualified and skilled manpower to face future challenges for sustainable fisheries development. DoF does not have institutional set-up that provide quality technical support and know-how to undertake and successfully complete the massive task of rural fisheries development at union level. Globally, efficient service delivery and service receivers are now getting the highest priority. The service providers are encouraged to invent new processes to deliver the service at the door step of the people without any hindrance and delay. So, for ensuring prompt, trouble-free, people oriented, and efficient service delivery system, it would be strengthened to international standards with adequate professionally committed manpower with logistic supports and legal frameworks for efficient discharge of assigned duties and responsibilities. A way forward to institutional capacity of DoF is mentioned below in brief:

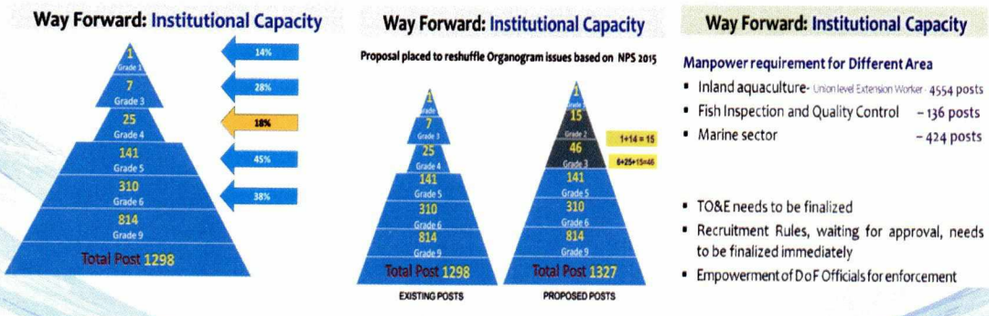


Figure 1: Manpower status

1.4 Budget allocation

The Departmental Budget is a comprehensive blueprint of the annual activities expressed in financial terms. The budget has two distinct categories: (a) Revenue and (b) Development.

1.4.1 Revenue budget

Activities which include expenditures of pay and allowances, supplies and services, repair- maintenance and rehabilitation, miscellaneous, procurement of civil works and projects and program apart from Annual Development Program (ADP) fall under revenue budget. During the last five years, non-development budget of DoF is shown below.

Table 2: Non-development budget of DoF (Taka in lac)

Code No.	Description	2013-14	2014-15	2015-16	2016-17	2017-18
4500	Pay of Officer	2463.72	2671.00	4869.27	5113.20	5394.43
4600	Pay of Staff	2597.12	2871.55	5771.53	4624.58	4878.93
4700	Allowances	4823.82	4855.35	5670.38	6909.21	7324.56
4800	Supplies and Services	4952.35	4394.08	4738.57	5597.20	6833.46
4900	Repair-Maintenance	674.01	722.00	754.70	743.56	761.62
7000	Civil Works	383.00	283.25	390.00	310.00	316.00
6800	Assets Procurement	247.00	371.38	349.00	360.00	375.00
6900	Land	0	0	0	0	90.00
Total		16141.02	16168.61	22543.45	23657.75	25974.00

1.4.2 Development budget

Development budget includes all expenditures under Annual Development Program (ADP).

Table 3: Development budget of DoF (Taka in lac)

Financial Year	Number of Project	Development budget						Achievement
		Allocation			Expenditure			
		Total	LC	PA	Total	LC	PA	
2013-14	26	21761.00	14979.00	6782.00	23407.57	14932.23	8475.34	107.57%
2014-15	21	30906.00	24390.00	6516.00	31035.11	23536.45	7498.66	100.42%
2015-16	26	38252.00	30222.00	8030.00	38285.53	30123.84	8161.69	100.09%
2016-17	22	34461.00	29004.00	5457.00	33187.07	28154.35	5032.72	96.31%
2017-18	18	34961.00	25787.00	9174.00	33881.42	25064.48	8816.94	96.92%

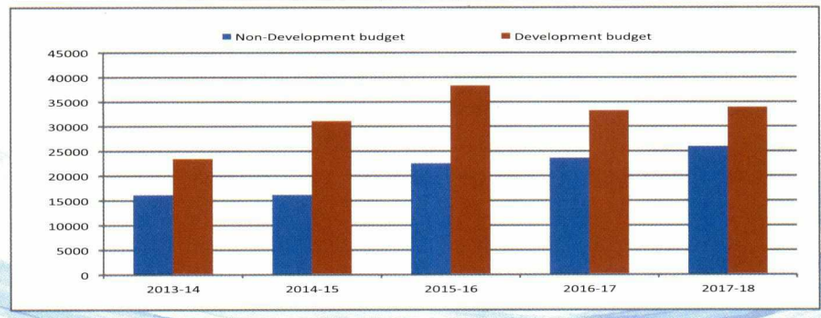


Figure 2: Development and Non-Development budgetary allocation of last five years

1.5 Revenue earnings

There are two major sources of government revenue earnings:

- Tax Revenues (TR)
- Non-tax Revenues (NTR)

All revenue earning by the DoF is non-tax revenues. During last five years, non-tax revenue earned by the DoF is shown in Table 4.

Table 4: Non tax revenue earned in last five years (Taka in Thousand)

Economic Code	Description	Financial Year				
		2013-14	2014-15	2015-16	2016-17	2017-18
1901	Penalty	**2830**	**2556**	**7171**	8449	5563
2037	Rent of Govt. vehicles	67	52	18	41	475
2047	Fish hunting fee	35	1438	3256	3177	3026
2071	Other service fee	183	17744	16922	16373	17934
2101	Rent of non residence	168	265	122	216	85
2111	Rent of Residences	1784	869	1707	1000	1122
2326	Fish and fisheries product	63782	62947	124242	63575	106152
2366	Tenders and other documents	1031	1812	1104	235	23
2371	Non usable materials and scrap etc.	2332	3	94	33	0
2376	Miscellaneous non commercial sale	163	138	531	1627	2943
2671	Refund of extra payment	30	9	191	2	51
2681	Miscellaneous revenue earning	21380	4012	3941	5982	3201
	Total	**94590**	**98298**	**159299**	**100710**	**140575.00**

2.0 Fisheries Resource Management

Fishing trawlers in the port, Chattogram

Inland open water

Bangladesh is endowed with rich and vast fisheries resources. Due to favorable natural conditions and geographical location, these fisheries resources having high potential of increasing fisheries production. Country's fisheries resources are divided into two major groups such as inland fisheries and marine fisheries. Inland fisheries is further divided into two groups i.e. aquaculture and inland capture. Inland fisheries occupy an area of 47.25 lac ha and marine capture covers 118813 sq. km along with 200 nautical miles of EEZ from the base line. The Culture fisheries include ponds, ox-bow lakes and coastal shrimp farms. The flood-plains and the beels, which cover an area of 28.26 lac ha, offering tremendous scope and potential for augmenting fish production by adopting aquaculture-based enhancement techniques.

The country has huge opportunities for the development of brackish water aquaculture boosting shrimp production and earning substantial amount of foreign currencies. Production of shrimp from culture and capture fisheries increased to a great extent in the beginning of 1980's. Since

then, shrimp farming has been expanded to over 2.58 lac ha of land by 2018 from 1.4 lac ha in 1980. It is expected that with the introduction of improved scientific method of shrimp culture, the present production of shrimp will be increased substantially. The country has limited access to marine fisheries resources in the Bay of Bengal. Only demersal fish and shrimp are being trapped from here. Other potential marine resources are yet to be exploited on commercial scale. Only 15.31% of total fish production comes from marine capture fisheries and 84.7% from inland fisheries. The status of fisheries resources and fish production of the Country is shown in Annexure 2.

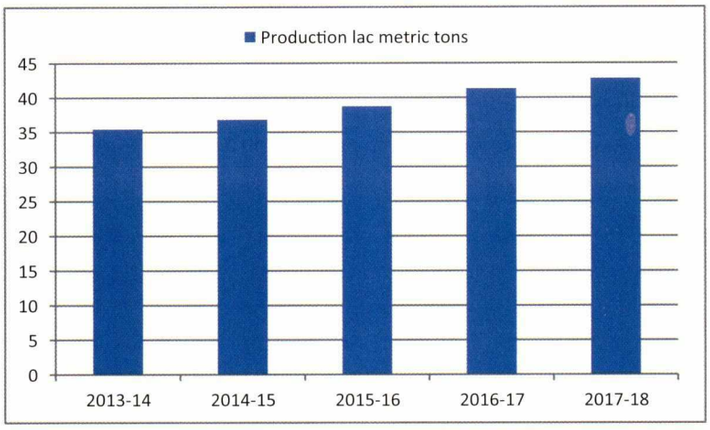


Figure 3 : Fish Production of last 5 years

The present democratic government has undertaken new policy for sustainable aquaculture production; provide need based aquaculture extension services, implements fish conservation activities which increased the national fisheries production as well as the in fisheries sector. Besides these, fisheries extension and conservation activities, AIGs and rehabilitation program for poor fishers etc. were undertaken. Through the execution of Fisheries Friendly Policy of the present government, total fish production has been increased from 34.1 lac metric ton in 2012-13 to 42.77 lac metric ton in 2017-18.

2.1 Aquaculture extension approach

DoF carries out its extension services by involving good number of professionals at different hierarchy. DoF motivate and facilitate fish farmers and fishers for adopting eco-friendly management regimes in aquaculture and fisheries resource management to enhance production and productivity. It provides updated research findings and better farm techniques to farmers/growers for increasing production through establishing effective linkage between the various research institutes and the fish farmers. DoF also serves as liaison agency between farmers and other organizations, both public and private.

In the recent past, several development projects of DoF have been launched with strong extension and institutional strengthening components for both carp and shrimp culture. Different approaches and strategies of aquaculture have been adopted under different projects. Extension services include technical advice on all sorts of aquaculture and related activities, user-friendly mobile apps,

publication and distribution of booklets, posters, leaflets etc. In addition to regular revenue budget-led extension and advisory services, following approaches are also focusing aquaculture and fisheries extension:

Demonstration of aquaculture technology

- Problem solving advices in the office;
- Use of Fisheries information & communication centre;
- Farm visit and advice;
- Farmers training and
- Group/Community based aquaculture and fisheries management.

2.2 Fish seed & post larvae production

2.2.1 Fish seed produced in hatchery/farms

During 1961-62 to 1974-75 the government has established Fish Seed Multiplication Farms (FSMFs) to supply required quantity of quality seeds to the fish farmers. During that period, mostly wild fish seeds collected from the rivers were reared in the FSMFs and supplied to the fish farmers. In the mid 60s, due to reduction in the availability of wild carp seeds in the rivers and as the natural fish seeds were not able to meet the growing demand of the fish farmers, the Govt. has established fish hatcheries to produce quality fish seed and at the same time the induced breeding technology was disseminated to the private sectors. At present the country is self-sufficient in carp seeds production, though quality fish seeds are produced in a limited scale. For that DoF has promulgated Fish Hatchery Act, 2010 and Fish Hatchery Rules, 2011 for the production of quality spawn and fingerlings by regulating fish hatchery and farms.

Table 5: Production of carp hatchling of last 5 (five) years

Source of Production	2014		2015		2016		2017		2018	
	No of hatchery	Production (kg)	No of hatchery	Production (kg)	No of hatchery	Production (kg)	No of hatchery	Production (kg)	No of hatchery	Production (kg)
Government fish farm	81	9222	76	9944	89	14775	85	12826	102	12059
Private	866	59858	852	477393	902	614433	814	650636	824	674695
Total	947	69080	928	486439	991	629208	899	663462	926	686754

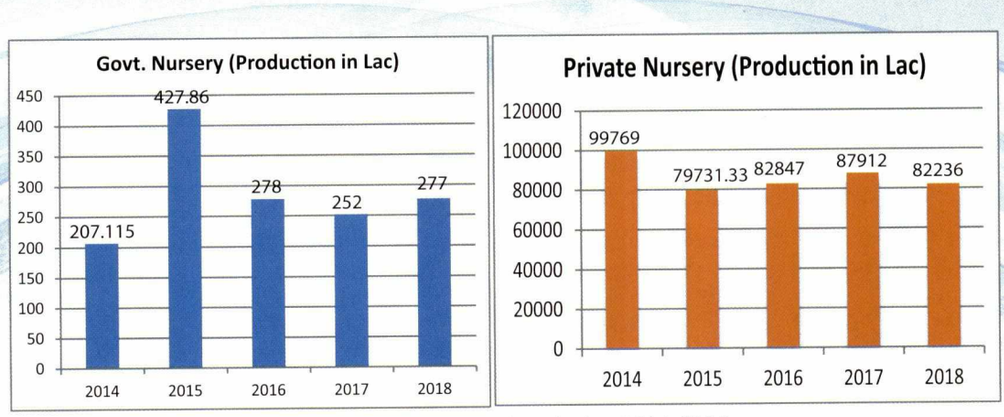
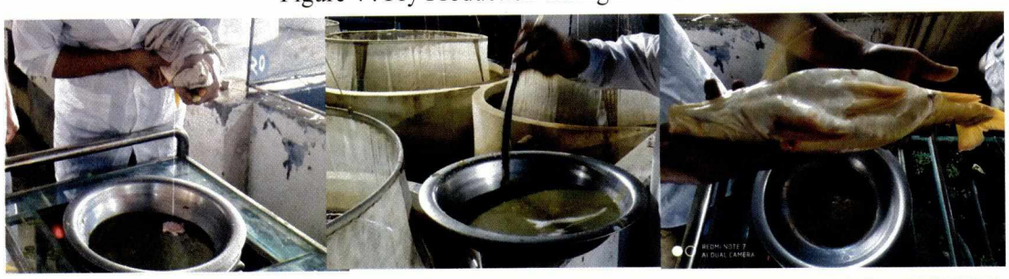


Figure 4 : Fry Production during 2014-2018



Fish seed produced by induced breeding

With the establishment of Brood Bank Project, DoF has taken initiative to produce quality brood fishes which are free from genetic drifts and in-breeding problems. Both Government and private fish hatcheries are producing quality brood for the production of quality hatchlings and fingerlings. Information regarding expenditures and income of Government FSMFs is shown in Annexure-(a).

2.2.2 Fish spawn/fry collected from natural sources

During sixties and early seventies aquaculture activities included mainly rearing of natural carp hatchlings collected from the river Jamuna, Padma, Boral, Old Brahmaputra and fertilized eggs from the river Halda of Chattogram. Availability of hatchlings from natural sources is declined due to habitat destruction and change in ecological system. The natural sources carp hatchling production during 2011-2018 is shown in the Table 6.

Table 6: Carp hatchlings collection from natural sources

Year	Fish Hatchling (Kg)
2011	4370
2012	4093
2013	3326
2014	2695
2015	4412
2016	4819
2017	5067
2018	9274

2.2.3 Shrimp/prawn PL production in hatchery

As a result of introduction and extension of breeding technology of galda and bagda, many private entrepreneurs have established shrimp hatcheries for the production of shrimp post larvae (PL). About 46 galda and 49 bagda hatcheries have been established by both Govt. and private sectors which produced 1412.04 crore bagda and 5.21 crore galda PL in the country in 2018 (Table-7).

Table 7: Production of galda and bagda PL during last 5 (five) years

Name	2014		2015		2016		2017		2018	
	No. of hatchey	Production (Pl in Lac)	No. of hatchey	Production (Pl in Lac)	No. of hatchey	Production (Pl in Lac)	No. of hatchey	Production (Pl in Lac)	No. of hatchey	Production (Pl in Lac)
Galda	27	270	21	331	27	4.13	36	5.05	46	5.21
Bagda	55	115880	60	92392	55	1244.05	49	1383.04	49	1412.04
Total	**82**	**116150**	**81**	**92723**	**82**	**1248.18**	**85**	**1388.09**	**95**	**1417.25**

2.3 Freshwater aquaculture

The country has immense natural potential for developing the fisheries sector. Aquaculture production contributes 56.25 % of the total fish production. Through this remarkable achievement, aquaculture is high priority and focused area during the recent past decades. Because of continuous deterioration of open water fisheries due to natural and man-induced changes in the fish habitats and fish populations, the Government has endeavored to increase fish production through aquaculture. The expansion of fish production is largely due to improvement in the use of aquaculture technologies by farmers. Extension and training support have aided the adoption of technologies by farmers. The development of long-term efficient and effective aquaculture training and extension support has contributed to the growth in aquaculture production in Bangladesh.

2.3.1 Freshwater fish culture in ponds

Currently pond aquaculture has been practiced in a total area of about 3.917 lac ha and pond aquaculture is producing about 19 lac mt fish which contributing 52.47% of total inland production in 2017-18.

Fish Harvesting in the pond

Table 8: Status of pond culture (2017-18)

Sl NO	Farming System	Area (ha)	Production (mt)
1	Extensive	36778	46462
2	Semi intensive	240090	842270
3	Intensive	97742	626110
4	Highly intensive	17143	385456
Total		**391753**	**1900298**

2.3.2 Fish culture in borrow-pit and khal/Ditch

Different types of water bodies improved under Enhancement of Fish Production through Restoration of Waterbodies Project (EFRWP) and other completed projects also included in the aquaculture systems. Information of developed water body and its area are shown in Table 9.

Aquaculture in borrow-pit Khal re-excavation in Jashore

Table 9: Improvement of different types of waterbody through various completed and ongoing projects.

Types of water body	2nd phase (FCDI)	3rd phase (FCDI)	4th phase (FCDI)	(EFCWP)		
	Developed water body (ha) 2000-2001 and 2002-2003 Financial year (Completed)	Developed water body (ha) 2006-2007 to 2009-2010 Financial year (Completed)	Developed water body (ha) 2011-2012 to 2013-2014 Financial year (Completed)	Developed water body(ha) 2015-2017 Financial year (On going)	Developed water body (ha) 2015-2017 Financial year (On going)	Total developed water body (ha)
Close Khal/ Dead river/ Borrow-Pit	389.087	331.808	460.884	176.15	136.89	1494.819
Ponds	58.052	122.762	150.167	164.5	108.72	604.201
Total	**447.139**	**454.57**	**611.051**	**340.65**	**245.61**	**2099.02**

2.3.3 Fish culture in baor (Ox-bow lake)

A total of about 600 baors having an area of 5,488 ha are situated in the south west part of the country. Different development projects are being implemented to increase the fish production from baor. Attempts have been taken for increasing fish production by adopting improved aquaculture through fingerling stocking and management practices. Six baors of Jashore and Jhenaidah districts were under the MoU signed between Ministry of Land and Ministry of Fisheries & Livestock for biological management. Besides this, 30 baors are managed according to the guidelines of OLP-2 project of DoF. These baors covered an area of 1137 ha and fish production has increased from 80 kg to 750 kg/ha. Local fisher communities are involved in the baor management and they have improved their livelihood.

Fish harvesting in Jessore

2.3.4 Cage culture

Several decades ago, attempts were taken to raise fish in cages under different development projects by several institutions / organizations of the country. Now a days, cage culture is being popularized as one of the most interesting and attracting means of livelihood and people's are engaging themselves day by day in this culture system with fish species like monosex tilapia, pangas, koi, singh, magur, thai sorpunti etc. Cage culture of monosex tilapia is being practiced in Chandpur, Laxmipur, Faridpur, Barishal, Mymensingh, Dhaka, Munsigonj, Gopalganj, Norsingdi, Pabna and other regions of the country. In 2017-2018, about 3523 mt fishes were produced from 6940 cages (area129000 m^3) by cage culture.

Cage culture in open water, Chandpur

2.3.5 Pen culture

Pen culture is also one of the potential means of producing fish from vast waterbody or canal. In recent years, pens are made with different materials like bamboo, net, iron-meshed, wooden pillar etc. The area of pen also varies in size from half to few hactare. The fish species reared in the pen are carp, tilapia, pangas etc. Feeds are also applied in pen culture system but not regularly. Both single and multi-owner are found in pen management. Culture period also varies from June to December depending on availability of water. Pen culture is becoming popular in and around Dhaka and Narayanganj and expanding every year. In 2017-2018, about 11015 mt fish were produced from pen culture

Pen culture in cannel

2.3.6 Fresh water mud eel culture

Monopterus cuchia is an important freshwater air breathing, swamp mud eel fish. It commonly occurs in the freshwater of Bangladesh, Pakistan, Northern and Northeastern India and Nepal. Once, indigenous cuchia was abundant throughout the Bangladesh, plenty in mud holes in shallow 'beels' and 'boro' paddy field particularly in old Sylhet, Mymensingh and Tangail Districts. But now a days this fish is hardly found in the open water area. The biodiversity, ecosystem of natural water bodies are being decreased due to global warming and climate change. *M. cuchia* is exported to many countries of south East Asia and Europe. Cuchia is an important fish for the livelihood of Tribal people in terms of home consumption and trade. The tribal people belonging to the Garo, Hajong, Shawtali and Koch-Rajbongshi community believes this fish to be therapeutic one and traditionally use for treatment of various ailments, viz. weakness, anemia, asthma, hemorrhoids and diabetes. Direct consumption of fresh blood of cuchia is reported to cure weakness, anemia and asthma.

Considering the importance of this species in nutritional, medicinal, economic and biodiversity, Department of Fisheries practices its culture system by a project. It is developed by aquaculture method and open water management method.

Table 10: Freshwater mud eel culture

Year	No. of Stakeholder	Area (ha)	Cuchia production (mt)	Remarks
2015-16	1190	48.3	35.80	Continuing mud eel culture practice.
2016-17	1210	49.8	93.12	
2017-18	1290	56.2	98.8	

2.4 Coastal aquaculture

2.4.1 Shrimp (bagda) culture

Black tiger shrimp (*Penaeus monodon*) in Bangladesh is known as Bagda. Bagda grows faster and bigger in size, the species is very popular for coastal aquaculture among shrimp species available in Bangladesh. Bagda culture has been started in the south-west region of the country using agricultural land since early 1970s. The larvae of shrimp and other fish are trapped into the crop fields during high tide and reared for several months. With the increasing demand of shrimp and prawn in the international market expansion of shrimp farming was observed in dyke elevated rice fields (traditionally known as gher).

Bagda farming in the Pond at Khulna

In 1994 government declared the coastal region as `Open for brackish water shrimp farming` through a government order. From then, brackish water shrimp farming has been expanded rapidly. The highest shrimp culture area was in south-west region i.e Bagerhat, Khulna and Satkhira region because of abundant source of saline water and shrimp post larvae (fry) in the Sunderbans mangrove forest and surrounding rivers and estuaries. Among the coastal districts, the highest production of bagda was observed in Bagerhat, Khulna, Satkhira and Cox`s Bazar. The culture system of bagda involves traditional extensive to improved extensive. In 2017-18 bagda production in Bangladesh was 61709.00 mt.

Table 11: Shrimp farming and production

Year	Farm size (ha)	Shrimp production (mt)	Remarks
2011-12	209456	57784.87	Paddy and salt are produced in very near to coast as alternative crops. White fish and crabs are also produced in some places as by-culture.
2012-13	210053	68948	
2013-14	215305	71430	
2014-15	216468	75274	
2015-16	206763	68217	
2016-17	205654	68272	
2017-18	184821	61709	

Source: Fisheries statistical yearbook of Bangladesh 2017-2018, FRSS, DoF.

2.4.2 Prawn (galda) culture

The Giant freshwater prawn (*Macrobrachium rosenbergii*), called as Galda in Bangla, were being trapped and reared with other fishes in the tidal pond and low lands. Generally, the species are harvested from the river/canals, floodplains and beel areas which have connectivity with rivers. At present *Macrobrachium sp.* is being cultured in gher in organized way along with other aquaculture, agriculture and horticulture crops. Different culture systems such as monoculture, poly-culture along with other fishes and aquaculture in paddy fields along with paddy are being practiced. In the year of 2017-18 the unit production of Galda is 698.23 kg/ha. Currently galda are farming in gher, pond and paddy field covering an area of about 0.74 lac ha. About additional 0.93 lac mt fish are produced along with galda.

Table 12: Prawn (galda) farming and production

Year	Farm size (ha)	Production (mt) Prawn
2010-2011	62874	30868
2011-2012	65777	45162.95
2012-2013	65221	43713
2013-2014	59972.23	42097
2014-2015	59115	42053
2015-2016	68746	46189
2016-2017	67063	48574
2017-2018	73860	51571

Source: Fisheries statistical yearbook of Bangladesh 2017-2018, FRSS, DoF

2.4.3 Development of SPF black tiger shrimp

Shrimp aquaculture is an important foreign currency earning sector of Bangladesh. Besides, more than one million coastal people depend for their livelihood on Black Tiger Shrimp (*Penaeus monodon*) culture. By 2017-18 over 206763 ha of lands were used for black tiger shrimp cultivation in south-west region i.e Bagerhat, Khulna, Satkhira and Cox`s Bazar. At present 49 Bagda shrimp hatcheries are operated in Bangladesh to produce post larvae (PL) for shrimp farms. These shrimp hatcheries produced about 1412.04 crore shrimp PL in the year 2017-18. All these shrimp hatcheries are using the wild brood stock from the Bay of Bengal that are mostly contaminated with microbial pathogens. Since the broods are collected in batches of 100 or more by fishing trawlers, it is practically impossible to screen out the broods from known pathogens through PCR tests. Besides, the shrimp hatcheries use many individual brood shrimp for maturation in community tanks. So, it is virtually impossible to screen-out the pathogen free brood shrimp in this set up.

SPF PL

SPF Shrimp

During the last one decade, there have been intensive efforts to domesticate *P. monodon* (black

tiger shrimp) broods to produce SPF stock through selection. The PL of these domesticated SPF broods performs better in terms of disease, survival, growth and FCR. The domesticated broods are known to be produced in Hawii, Mosambique and Thailand. The SPF broods have been successfully introduced in Vietnam, Malaysia and Philippines. In the year 2014, Bangladesh imported and introduced SPF broods for the first time from Hawii, America and then in 2017 again SPF broods imported from Thailand by two private hatcheries.

As per the government Fish Hatchery Act, 2010 and Fish Hatchery Rules, 2011, it is mandatory for hatcheries to supply disease free PL to the farmers. Therefore, for the sustainability of tiger shrimp hatcheries and farms it is imperative that the shrimp hatcheries use SPF (Specific Pathogen Free) Black Tiger Shrimp to produce disease free PL. By introducing SPF broods, contamination of pathogens to the post larvae from the broods could wholly or largely be eliminated depending on the degree of compliance with prescribed bio-security rules.

At present, disease free PL producing programs are continuing by SPF Black Tiger Shrimp brood. In the year 2015 about 3.1 crore and in the year of 2018 about 17.14 crore disease free PL were supplied among the farmers of Bagerhat, Khulna, Satkhira and Cox's Bazar districts.

2.4.4 Crab culture and crab fattening

Recently traditional mud crab (*Scylla serrata*) culture has been practiced in Bangladesh based on capture and fattening of juvenile from the wild. Now mud crab is recognized as an important export commodity. After shrimp, mud crabs have become the second-most exported crustacean from Bangladesh. Because of high prices in international markets, mud crab farming is gaining popularity in the coastal districts of Bangladesh. It has been harvested in greater Khulna, Barishal and Chattogram regions. Mud crabs are less susceptible to disease and more resistant to adverse environment conditions and climate change. Many shrimp farmers are switching to mud crab farming. Two types of crabs are available in the coastal region of Bangladesh - *Scylla serrata* and *Scylla olivacea*. From this only mud crab (*Scylla serrata*) is culturable in Bangladesh.

Mud Crab Farm at Dumuria, Khulna

Based on the increasing demand of gravid female in the South-east Asian countries, a sustainable aquaculture technology has been developed. Culture of juvenile crab in pen and cage is now being practicing in some selected areas of Bangladesh. This culture technology and production performance changed the socio-economic condition of the adopted communities and the fellow farmers also become interested to practice this kind of crab fattening. Department of Fisheries is implementing a project for the development of culture and management technique of crab in the selected areas of coastal region of Bangladesh.

Indigenous Technological Knowledge (ITK) of stakeholders and based on the lessons learnt from the culture practice the existing culture technology will be redesigned for future expansion. The

mud crab aquaculture will generate income and employment and enhance export earnings. Crab farming and production in Bangladesh is shown below.

Table: 13 Crab farming and production

Year	Farm area (ha)	Crab production (mt)	Remarks
2015-2016	19408	13160	Now-a-days Crabs are cultured as main crops in coastal area.
2016-2017	27010	14421	
2017-2018	9854	11787	

Source: Fisheries statistical year book of Bangladesh 2017-2018, FRSS, DoF.

A crab hatchery has been established in Kolatoli, Coxbazar in 2018 by DoF. Live food culture and production of crablet will be started there soon.

2.5 Inland Open- water fisheries resource management

The open water body of Bangladesh is looks like a vast sea as recognition of her large water body. It has potentiality as inland open water resources, including 8,53,863 ha of rivers and estuaries, about 1,77,700 ha of Sundarbans, 1,14,161 ha of natural depressions or beels, 68,800 ha of Kaptai reservoir and about 2712618 ha of floodplains. Annual flooding during the rainy season inundates up to 60% of the total land surface. Bangladesh possesses the 3rd largest capture fisheries and 5th culture fisheries in the world. After China and India, Bangladesh is the third largest country in the world of inland fisheries. The inland open water is inhabited by 260 species of fish and 24 species of shrimp. Despite the existence of huge resources the inland capture fisheries has over the years been replaced as top fish producing source by aquaculture, due mainly to decline and degradation of resources. The priority is given to improve biological management that will restrict the declination of resources and production. The DoF has prepared a sub strategy on Inland Capture Fisheries based on the National Fisheries Strategy 2006 and National Fisheries Policy 1998.

2.5.1 Community based fisheries management (CBFM)

Community based Fish culture Training in Bangladesh

Bangladesh has achieved recognition for its inclusive fisheries management through local community engagement. Community based management of resources is a time-driven and successful activity initiated by DoF. Bangladesh is emerging as a country of having positive lessons from community based management of open water. At present 8 out of 13 ongoing development projects under implementation includes community based fisheries management and more than 0.20 million people are enjoying the benefits. Establishment of Community Based Organizations (CBOs) and village level sub committees has been recognized as the first and fundamental step in creating sustainable co-management of fisheries resources in the decision making process by user's group. Initial work on networking by

community based organizations has been started at regional level. More emphasis has been given to work with community based fisheries management in the inland capture fisheries sub-strategy.

2.5.2 Fingerling stocking

Natural recruitment of carp spawn and fingerling declining due to human interferences and environmental degradation hampered the productivity of open water capture fisheries resources. To improve the productivity of open water the Ministry of Fisheries and Livestock through the Department of Fisheries initiated regular program from revenue and development budget to release fingerlings of major carp in open waterbodies, floodplains and closed waterbodies throughout the country. Stocking of fish fingerling into beels and floodplains is a temporary measure to address the quick declination of fish production in open water.

Fingerling stocking in Shyamnagar

Table: 14 Stocking of fish fingerling in open waterbodies and floodplains

Financial Year	Fund allocated Tk (crore)	Water area (hectare)	Fingerling released		No.of beneficiaries
			Number (million)	Weight (mt)	
2009-10	3.37	103657	14.40	200.45	530347
2010-11	4.00	123092	12.39	241.12	2363631
2011-12	8.86	109070	15.23	570.19	2365631
2012-13	8.74	142053	17.14	480.24	1012000
2013-14	7.16	114516	18.95	385.52	974186
2014-15	7.15	13679	15.54	317.72	1054100
2015-16	7.23	84746	29.33	320.38	1387300
2016-17 (P+R)	16.48	144539	23.90	968.98	801135
2017-18 (Revenue)	7.86	41965	11.48	279.88	1076000

2.5.3 Beel nursery:

Beel nursery activities

Beel nursery has been proved to be a significant tool for increasing fish production in natural water-bodies. DoF has continued the program as regular activity under revenue and development budget in various low lying rice field, floodplain, beel, haor, canal, river and government/non-government water bodies from 2009-10 fiscal year to increase natural production in these areas along with surrounding linked water bodies. During last year 267 beel nurseries were successfully established in 85.11 ha which produced 17.55 million fingerlings.

2.5.4 Establishment and Management of fish sanctuary

Fish Sanctuaary, Kichimichi Mora Nodi

Introduction of sanctuary approach for fisheries resource conservation opened up a new horizon for sustainable use of valuable fish species. To stop the degradation of aquatic biodiversity specially species diversity of fish and other aquatic species in open water, a set of technical interventions like establishment of fish sanctuaries, fish habitat restoration have been undertaken during the past years. Establishment of aquatic sanctuary is one of the effective tools for conserving fish stock, protecting biodiversity and increasing fish production. During the last five years, total numbers of 432 fish sanctuaries were established by DoF in different selected water bodies. As a result, a substantial increase in production of fish was found in those water bodies. At the same time there were found abundance of endangered species like Chital, Foli, Kalibaosh, Air, Tengra, Meni, Rani, Sarputi, Pabda, Kajoli, Gojar, Tara baim etc. On the other hand, to ensure the migration of fish during the breeding period, different connecting canals of rivers, dead rivers and beels were excavated and re-excavated by DoF. Besides, for the conservation and development of Hilsa fishery six sanctuaries were established in the selected river system. Hence, establishment of sanctuary has become obligatory to protect and conserve these species from extinction and increase fish biodiversity. From this point of view sanctuaries are managed regularly from 2015-16 fiscal year under revenue program.

2.6 Marine fisheries resources management

2.6.1 Maritime fisheries resource conservation and management

Bangladesh is blessed with her vast coastal and marine resources. Our great national leader, father of the nation Bangabandhu Sheikh Mujibur Rahman led our country during its Liberation War and his worthy daughter, Prime Minister Sheikh Hasina led our country to success in winning our maritime boundary case against Myanmar and India. This achievement offers a wide range of new economic opportunities for job and growth around sectors such as fisheries, aquaculture, tourism, exploitation of natural resources, trade and energy that lies within its territorial waters and exceeding its original claim of 1,18,813 square km in the Bay of Bengal.

Discussion on blue economy started in Bangladesh after the settlement of maritime boundary delineation dispute with Myanmar (2012) and India (2014). Bangladesh has been considered as a pilot country to implement blue economy concept. A National Action Plan has been developed including short term, mid term and long term plans to address sustainable catch and conservation of marine resources.

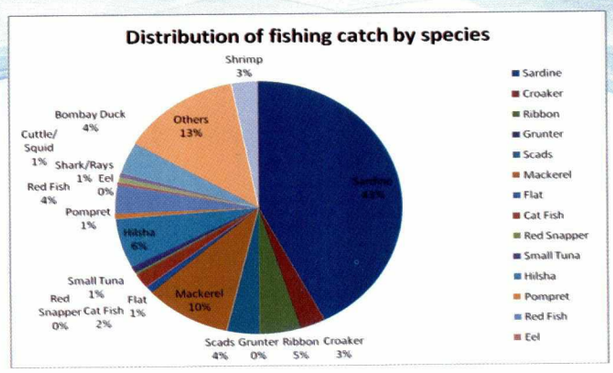


Figure 5. Pie chart of marine fish catch of national fleet, by species in 2017-18.

Current management and exploration is to address Sustainable Development Goals (SDGs) Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.Targeting by 2020, to effectively regulate harvesting and end of overfishing, illegal, unreported and unregulated (IUU) fishing and destructive fishing practices, to implement science-based management plans, in order to restore fish stocks in the shortest time feasible.

2.6.2 Stock assessment

1. Bangladesh has acquired a high-tech multipurpose survey and research vessel `R.V. Meen Shandhani' with the aid of Islamic Development Bank and Malaysian Government under the Marine Fisheries Capacity Building project of DoF. Honourable Prime Minister has launched it on 19 November, 2016.
2. A TCP project "Technical Support for Stock assessment of Marine Fisheries Resources in Bangladesh" funded by FAO has been cooperating DoF in marine stock assessment by operating survey cruises by 'R. V. Meen Shandhani'.
3. 'R. V. Meen Shandhani' has conducted 24 surveys including 10 (ten) shrimp surveys, 10 (ten) pelagic and 4 (four) demersal surveys.
4. Surveys identified 430 species consisting of 364 fish species, 33 shrimps and lobsters, 21 crabs and 12 cephalopods.
5. With the assistance of Food and Agriculture Organization of the United Nations (FAO) and Institute of Marine Research (IMR) under the program of EAF Nansen, an Acoustic Survey had been conducted in the Bay of Bengal with the Research Vessel R.V. Dr. Fridtjof Nansen during 2- 17 August 2018.
6. A database has been established which is accessible via DoF website, consistent with project provision. Data on craft and gear are collected and incorporated into the project Database (192.168.2.102/bmfcb). Updated data from the land based survey are incorporated into the project's website once in a year after ratification. Authorized persons and organizations can access data from the project site at www.fisheries.gov.bd.

2.6.3 Enacting Acts, Rules and Policies

1. Marine fisheries sector is governed by the Marine Fisheries Ordinance, 1983 and Marine Fisheries Rules, 1983;
2. A befitting act, "The Marine Fisheries Act 2018" is approved by the Cabinet and underway for the final approval;
3. After completing a series of policy dialogue with the concern stakeholders, a revised "National Marine Fisheries policy-2018" has been drafted and submitted to the ministry on December 2018;
4. All industrial trawlers and mechanized fishing boats are required to have license for fishing;
5. Industrial fishing trawlers are mandatorily to take sailing permission (SP) from Marine Fisheries Office under the Department of fisheries (DoF);
6. Trawlers are allowed to catch fish/shrimp in an area of not shallower than 40 meter depth. Mechanized fishing boats are allowed to fishing below 40 meter depth;
7. The Fish and Fishery Products (Fish Inspection and Quality Control) Rules, 1997 provide guidelines for the production of safe seafood in trawlers;
8. Currently, 63 freezing trawlers have been licensed by the Fish Inspection and Quality Control Office as their factory vessel complied with sanitary and hygienic standards.

2.6.4 Monitoring Control and Surveillance (MCS):

a. Establishment of Vessel Tracking Monitoring System (VTMS) :

   i. 133 Vessel Tracking Monitoring System (VTMS) has been installed in industrial trawlers by Department of Fisheries through the assistance of Bangladesh Marine Fisheries Capacity Building Project to ensure monitoring, controlling and Surveillance (MCS). Now the system is going to be upgraded for real time data generation.
   ii. 100 more VMS for industrial trawlers and 20,000 AIS for artisanal fishing boats are going to be procured by Sustainable Marine and Coastal Fisheries Project.
   iii. Database of 67,669 mechanized and non-mechanized boats have also been completed under Bangladesh Marine Fisheries Capacity Building Project.

b. Training and awareness programs

i. Fishers are provided with training on the FAO-CCRF, compliance with various acts, regulations and rules emphasizing the importance of conservation for sustainable exploitation of marine and coastal resources;

ii. Regular meetings are arranged on various issues of non-compliances happen by fishers with the presence of representatives from the Bangladesh Navy, Bangladesh Coast Guard, Rapid Action Battalion (RAB), Bangladesh Police, Marine Mercantile Department, Border Guard Bangladesh, Bangladesh Marine Fisheries Association, Mechanized Boats Owner Associations, District Fisheries Officers of costal districts to help mitigation measures and comply with rules and regulations;

iii. Mass awareness campaigns are organized in major fish landing centers and in fishing villages to actively discourage the deleterious impacts of destructive fishing methods. Fishers and the representatives of local people are motivated to show respect for Acts and Rules promulgated to restore our biodiversity and protect the resilience of the marine environment;

iv. Strong Monitoring, Control and Surveillance (MCS) procedures are in place to increase boat registration and issuance of fishing licenses. The National Plan of Action (NPOA) has been drafted to eliminate Illegal, Unregulated and Unreported (IUU) fishing in the Exclusive Economic Zone (EEZ) of Bangladesh.

2.6.5 Management approaches

i. Mesh size of trawl nets and gears are controlled for industrial trawlers;
ii. Minimum mesh size 45 mm is mandatory at the cod end for shrimp trawl nets and 60 mm for the fish trawl nets;
iii. ESBN (Estuarine Set Bag Net) has been banned (Prohibition in operating illegal estuarine set begs net throughout the year has been declared on 7 April, 2017);
iv. To facilitate spawning and conservation of marine fisheries resources, fishing has been banned for 65 days from 20 May to 23 July each year, for all fishing vessels;
v. The government has adopted coordinated program to conserve and protect Juvenile Hilsa and Brood Hilsa during spawning season. For smooth spawning, catch of brood Hilsa has been prohibited for 22 days every year in 7000 square km in the coastal waters;
vi. Juvenile Hilsa Conservation Week has been observed in 36 (Updated) districts as a national program to protect Juvenile Hilsa and ensure its growth;
vii. Under The Marine Fisheries Ordinance-1983, 40 meter water depth is reserved for small-scale fisheries to minimize the conflict between industrial vessels and artisanal fishers;
viii. Harvesting provisions are made in three tiers: (1) up to 40 m in depth from the coastline where artisanal boats operate; (2) from 40 m to 200 m in depth where industrial trawlers operate; and (3) from 200 m in depth to the end of the EEZ for long-lining;
ix. Fishing in less than 40 meters depth by the industrial fishing trawlers is completely prohibited by Marine Fisheries Rule 1983;
x. A gazette notification on 07 April, 2013 has made a prohibition not to fishing by any means in 10m depth near shore;
xi. No new fishing license for industrial fishing vessels (mid water/ bottom trawler/shrimp trawler) are providing since 2015 .

2.6.6 IUU fishing monitoring

1. The Government has amended the Marine Fisheries Ordinance, 1983 to incorporate FAO-CCRF to control, deter and eliminate Illegal, Unreported and Unregulated (IUU) fishing to conserve marine life;
2. The European Union through its Council Regulation EC 1005/2008 has laid down Catch Certificate Scheme (CSS) to combat IUU Fishing. Under this Scheme any company wanting to export marine fishes to European Union countries must have IUU-Catch Certificate (CC) approved by the flag state's Competent Authority;
3. The Marine Fisheries Ordinance, 1983 was amended in 2010 to facilitate issuing IUU-Catch Certificates by the Director, Marine Fisheries Office as Competent Authority;
4. Every month five industrial fishing trawlers are inspected to monitor IUU catches in the Bay of Bengal;
5. Food and Agriculture Organization of the United Nations (FAO) is going to implement a regional Technical Cooperation Project on "Support to countries to address Illegal Unreported and Unregulated Fishing (IUU)" with joint collaboration of Bangladesh, Cambodia, Myanmar, Thailand and Vietnam.

2.6.7 Marine protected Area

1. As a protective management measure, in the year of 2000 the Government declared 698 sq. km area as Marine Reserve area in the Bay of Bengal to protect and conserve the breeding grounds of marine fish;
2. In 2014, Government declared Swatch of No Ground (1726 km^2) as a Marine Protected Area to safeguard whales, dolphins, sea turtles, sharks, and other oceanic species under the Wildlife (Conservation and Security) Act, 2012;
3. Honorable Prime Minister has given a positive consent to declare Saint Martin island as a marine sanctuary to protect the biodiversity and natural coral reef;
4. An MPA (Marine Protected Area) covering around 3188 km^2 area at Nijhumdwip, Noakhali is under final declaration step.

2.6.8 Fishing Fleet Operation

In Bangladesh, traditional fisheries exist side by side with commercial fisheries. About 234 industrial trawlers were active in fishing out of 255 industrial fishing trawlers in the fiscal year of 2017-18. At the same time 67,669 mechanized and non-mechanized boats were engaged in traditional fishing in the Bay of Bengal. These traditional mechanized and non-mechanized fishing boats are involved in use of relatively simpler gears such as gillnets, set bag nets, trammel nets by the array of boats. Non-mechanized boats are engaged in daily fishing by nature in a very low depth close to coastline involving 3-5 fishermen. Mechanized boats typically fish for 5 to 7 days within 40 m depth of contour carrying ice cubes in their boats. Number of fishermen varies from 10 to 25 based on size and gear used.

Based on preservation capacities, industrial trawlers are of two kinds; trawlers having freezer and wooden body trawlers without freezers inside are non freezer trawlers. Based on fishing mode they are categorized as bottom fishing trawlers, mid-water trawlers and shrimp trawlers. Gross tonnage capacity of industrial fishing fleet ranged between 56 to 148 mt for wooden body and 251 to 668 mt for steel hulled freezer trawlers.

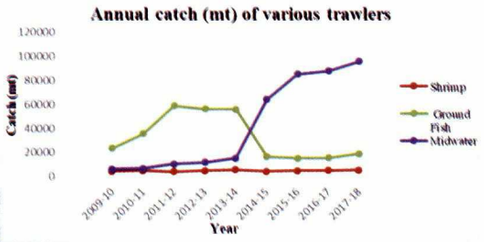


Figure 6: Historical annual catch by industrial trawler fleet (gear-wise), 2009-10 to 2017-18.

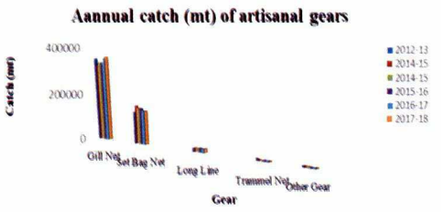


Figure 7: Historical annual catch by artisanal fleet (gear-wise), from 2012-13 to 2017-18.

2.6.9 Licensing activities of mechanized fishing boats

Marine Fisheries Office (MFO) under DoF provides fishing license for mechanized fishing vessels but the licensing required prior Certificate of Inspection (COI) and vessel registration from the Mercantile Marine Department (MMD). At present combined camps are being operated by MFO and MMD at different fishing sites to provide the same through one stop service.

Table: 15 Licensing activities of mechanized fishing boats

Year	License Issues (Nos.)			Revenue (Lac taka)
	New	Renew	Total	
2013-2014	614	1226	1840	29.74
2014-2015	319	1167	1486	45.81
2015-2016	273	1269	1542	40.89
2016-2017	313	1255	1568	41.57
2017-2018	332	1229	1561	42.13

2.6.10 Licensing activities of industrial fishing vessel/trawler

During 2017-18, a total number of 234 industrial trawlers out of 255 trawlers were engaged in fishing into the EEZ. The fleet comprised of 37 shrimp trawlers, 97 demersal trawlers and 119 mid-water trawlers. Forty (40) trawlers are permitted to fish on trial trip basis by the order of High Court Division of Honorable Supreme Court. Fishing license for industrial fishing vessels also require prior registration and COI from MMD. They also require fishing license from MFO or from coastal DFO's offices. All fishing licenses are subject to be renewed every year.

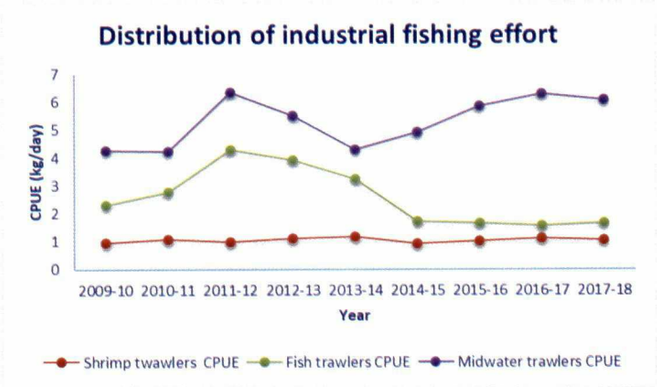


Figure- 8: Distribution of industrial fishing effort, by gear type for the national fleet.

2.6.11 Deep sea fishing

1. Government has taken initiative to exploit Tuna and Tuna like fish species from the EEZ and Area Beyond National Jurisdiction (ABJN). The Ministry of Fisheries and Livestock has issued permission against 10 long liner and 7 purse seiner vessels. The awarded companies are in the effort to collect appropriate vessel and equipment;
2. Bangladesh achieved her full membership that is the Contracting Party Status of IOTC in 2018 that would help Bangladesh to build up Tuna industry in near future.

2.6.12 Hilsa Fishery conservation, exploitation and management

Hilsa is a very popular and sought after food fish in the southern region of Asia. It is our national fish. This fish contributes about 12% of the total fish production and more than 1% of GDP in

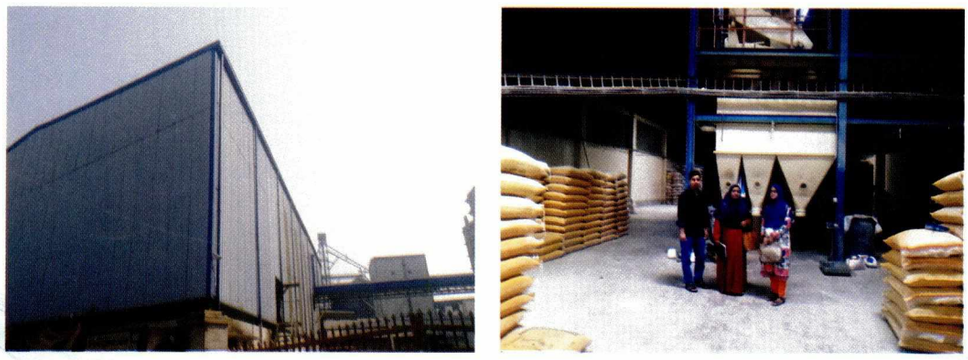
Bangladesh. About 5 lac fisherman are directly involved in the catching of the fish as a large part of their livelihood and 25 lac people are indirectly involved with the trade in Bangladesh.

For the sustainable Hilsa production it is imperative to protect Jatka and berried hilsa during the peak spawning period to ensure the unbated release of mature eggs.The Government has taken several initiatives, one of which is the ban of hilsa catching for 22 days at breeding period. During the ban period, the hilsa fishers receive an annual allowance of 20 kg food grain per house hold. For the conservation of hilsa fish during last 8 years 12908mobile courts were conducted and 62011 actions were taken. Through these actions fishers were fined 304.29 lac taka and 11609 fishers were sentenced to imprisonment. For these initiatives hilsa fish production increased from 2.99 lac mt in 2008-09 to 5.17 lac mt in 2017-18. Since 2007, Jatka Conservation Week has been observed as a national program to protect Jatka and ensure both of its growth and production. During the ban period, the jatka fisheries recieve an annual allowance of 40 kg of food grain per house hold per month. Government also provides financial incentives and distributes trade marterials to enlisted jatka fishers as Alternative Income Generation. In 2017-18, 248674 jatka fishers receive 39,787.84 mt VGF food in 85 upazilas of 17 districts.

On 6th August 2017, Bangladesh has received the recognition on hilsa as the product of Bangladesh. More than two third of hilsa production of total produced hilsa in the world is produced in Bangladesh mainly accounts for Geographical Indication (GI) of hilsa as a product of Bangladesh. Bangladesh has become a role model for hilsa conservation to other hilsa production countries.

3.0 Fisheries Regulatory Activities

3.1 Fish Feed and Animal Feed act 2010 and Fish Feed Rules 2011



Feed Factory in Gazipur

Fish feed is one of the most important factor for commercial aquaculture. There were no rules and regulations to maintain the quality of the feed and feed ingredients for the farmers before 2010. But the present democratic fish-friendly government has taken initiative to formulate the acts and rules and Fish Feed and Animal Feed Act 2010 and Fish Feed Rules 2011 are formulated. Currently it is

being implemented all over the country. The Status of the Fish Feed and Animal Feed Act, 2010 and Fish Feed Rules, 2011 are given in the table below.

Table 16: Status of fish feed license under the Fish Feed and Animal Feed Act, 2010 implementation (2017-2018)

Serial No.	Division/Head Office	Types of fish feed company (no.)				Total revenue income (lac Tk)
		Fish feed production: Category :1	Fish Feed Import-Export: Category:2	Fish Feed Sale: Category-3 a and b	Total Number	
1	2	3	4	5	6	7
1	Dhaka	49	39	427	515	7.60
2	Chittagong	53	33	522	608	4.77
3	Rajshahi	45	29	564	638	5.61
4	Khulna	7	15	329	351	4.69
5	Sylhet	1	1	141	143	1.27
6	Barisal	3	2	143	148	0.51
7	Rangpur	6	2	174	182	1.20
8	Mymensingh	4	6	88	98	3.56
Total		168	127	2388	2683	29.21

3.2 Fish Hatchery Act 2010 and Rules 2011

Fish Hatchery

Shrimp Hatchery

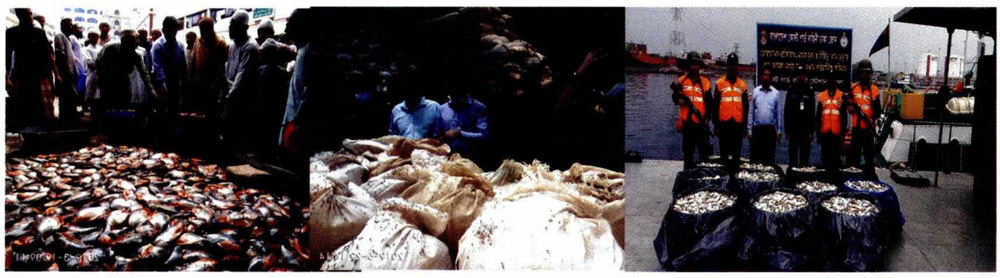
Aquaculture of Bangladesh is flourishing with the rapid expansion of public and private hatcheries providing support for good quality fish seed. But with the expansion of private hatcheries and for earning immediate profit the quality of fish seeds has declined over the years. The quality deterioration is mostly observed in private hatcheries. There are many reasons for the low quality, for instance, inbreeding, inter-specific hybridization, negative selection, improper brood-stock management. Furthermore, hybridization and cross breeding are threatening the genetic diversity of indigenous wild stocks of Indian Major Carps. To protect these undesirable practices, Bangladesh government promulgated the Fish Hatchery Act and Rules to ensure the quality of fish seed produced from public and private hatcheries. Under the act and rules, every hatchery must be taken registration from competent authority of DoF. The Status of the Fish Hatchery Act 2010 and Fish Hatchery Rule 2011 are given in the table below:

Table 17: Status of fish hatchery registration under the Fish Hatchery Act, 2010 and Fish Hatchery Rules, 2011 (2017-2018)

Division	Total Pvt. Hatchery (no.)	Registered(no.)	Unregistered(no.)	Total revenue earn (lac Tk)
Dhaka	46	40	0	0.58
Chittagong	235	242	01	2.52
Rajshahi	181	134	0	1.82
Khulna	123	89	0	1.47
Sylhet	26	17	01	0.19
Barisal	42	23	04	0.33
Rangpur	96	58	18	0.83
Mymensingh	283	104	0	2.98
Total =	**1032**	**736**	**24**	**10.75**

3.3 Protection and Conservation of Fish Act 1950 and Rules 1985

The provisions of Fish Act-1950 is the safeguard for breeding and growth of carp and other important fishes contributing to increase fish production in the country. Public awareness program were chalked out and implemented by the Upazila Fisheries Officers through meetings, general



Fish act implementation at Dhaka city

campaigns round the year and during observance of National Fish Week to create mass awareness about Fish Acts. Different awareness materials like posters, leaflets, booklets etc. were printed and distributed. In addition, TV spot prepared and broadcasted, street drama staged, workshops/seminars organized to create mass awareness. Appropriate measures were also taken to implement the Fish Act-1950 with assistance from local administration and law and enforcement agencies like Police, RAB, Coast guard, BGB, Navy etc. Mobile courts were conducted throughout the country.

Table 18: Enforcement of Fish Acts and Rules during 2017-18

Division	No. of Raid in the last year	No. of Mobile Court	Amount of Fish Seized (MT)	Amount of Current Jal seized (MT)	Case Filed	Jail	Penalty (Lac Tk)
Barishal	5172	2262	168.794	416.625	1329	927	60.33
Khulna	4137	548	5.188	3801781.05	77	62	8.0235
Rajshahi	6763	582	12.368	2484019	290	148	8.064
Dhaka	14029	1688	91.748	7586.9005	2199	1568	41.97
Sylhet	1150	613	5.521	3.87394	28	14	1.501
Chattogram	543	120	0	0	1	0	0
Rangpur	2829	510	5.58	13.0559	5	8	1.51
Mymensingh	2163	293	10.18	6.754	5	0	1.104
Total	36786	6616	299.379	6293827	3934	2727	122.5025

Considering the livelihoods of the fishers in the off-seasons and during implementation of fish acts, different income generating activities (IGA) program have been undertaken for the affected fishers.

3.4 Mass awareness campaign on regulatory framework

Mass awareness campaigns are organized in major fish markets, landing centers and in fishing villages to actively discourage the deleterious impacts of destructive fishing methods. Fishers and the representatives of local people are motivated to show respect for Acts and Rules promulgated to restore our biodiversity and protect the fisheries resource in Bangladesh. Regular meetings are arranged on various issues of non-compliances happened by fishers with the presence of representatives from the Bangladesh Navy, Bangladesh Coast Guard, Rapid Action Battalion (RAB), Bangladesh Police, Border Guard Bangladesh, Various fisheries related associations, boats owner associations, District Fisheries Officers to help mitigation measures and comply with rules and regulations.

4.0 Fish Inspection and Quality Control Activities

Fish and fishery products have been exported since the independence of the country. At present, these products are one of the major export commodities of Bangladesh. One of the other important agenda for the department is to facilitate and maintain fish and fishery products' quality and safety to enhance export and Fish Inspection and Quality Control (FIQC) deals with this job. Envisaging this context, Government implemented the National Fish Inspection and Quality Control Project in 1976 establishing two regional offices located at Chattogram and Khulna. The office of Dhaka zone was established in 1980 under 'Establishment of National Fish Inspection and Quality Control Service' project at Matsya Bhaban.

Besides inspection and certification of exported fish and fish products throughout the year, renewal of licenses is carried out by each FIQC offices covering the establishments under jurisdiction, like fish processing plants, depots/arots, ice factories, landing centres, packing centers, non-packer exporters etc. each year. Requests for enlistment of the names of fish processing establishments and exporters intended to export to EU countries, China and Russia are sent case to case basis. Competent authorities of other countries are communicated and their requirements are met to

continue and enhance export of fish and fish products. In this relation, Bangladesh has updated Health Certificate for exporting shrimp to Australia and fish and fishery products to the Republic of Korea. Residue monitoring of fish and fish products as well as fish feed is monitored throughout the year for ensuring safe and quality fish and fish products for the consumers. Routine inspection of fish processing establishments and ice plants etc. and testing of swab, ice, water etc. are also carried out round the year for ensuring food safety.

In 2018, signatures of authorized officers of each FIQC offices involved with certification of fish and fish products have been sent to China for updating the website of AQSIQ (Certification and Accreditation Administration of the People's Republic of China). This year three processing plants have been enlisted by Directorate General of Health and Food Safety (DG SANTE) of EU for exporting fish and fish products to EU countries. New format of Health Certificate approved by National Fishery Products Quality Management Service (NFQS) under Ministry of Oceans and Fisheries (MOF) of South Korea have been provided to facilitate export of aquatic animals including fish and fish products to the country under amended Enforcement Rules of the Aquatic Life Disease Control Act of South Korea. Format of Health certificate involved with exporting prawn (shrimp) and its products to Australia has also been updated to comply with new import conditions for breaded, battered and crumbed (BBC) prawns of the country with effect from 28 September, 2018. Moreover, 'Prawn Familiarization Visit' of two member delegates of the Department of Agriculture and Water Resources of the Australian Government have facilitated by DoF. EU FVO Audit of fish and fish products which was carried out during 6 to 15 November 2018. Formulation of new FIQC Act and amendment of FIQC Rules, 1997 are in progress.

4.1 Quality Control Laboratory Service

Department of Fisheries (DoF) has ISO 17025 accredited three Quality Control (QC) laboratories (previously known as Fish Inspection and Quality Control (FIQC) laboratories) at Dhaka, Chattogram and Khulna for testing fish and fish products, ice, swabs, fish feed and feed ingredients. QC laboratory (formerly known as FIQC laboratory), Dhaka has been shifted at new premises of Savar, Dhaka in 2014. The laboratories at Chattogram and Khulna under DoF by the financial assistance of UNIDO-SFIQC project during 2008-09. Testing of microbial quality of exportable fish and fishery products has routinely been performed by the three FIQC laboratories. Moreover these laboratories started testing harmful chemical residue analysis of fish and fishery products since 2007. From August, 2015, laboratory services were separated from Fish Inspection & Quality Control Services. Since then 'Fish Inspection & Quality Control Laboratory' have been designated as 'Quality Control (QC) Laboratory'.

To address requirements of EU and other importing countries, DoF has installed six LC-MS-MS machines at QC laboratory, Dhaka, Chattogram and Khulna for testing the contaminants and residues of prohibited antibiotics, dyes and anthelmintics in fishery product. Confirmatory test of the residues of chloramphenicol, nitrofuran metabolites (AMOZ, AOZ, AHD & SEM), metronidazole, malachite green, leuco-malachite green, crystal violet, leuco-crystal violet, anthelmintics (flubendazole, fenbendazole & mebendazole) etc. in fishery product are being tested through LC-MS-MS machines at QC laboratory, Dhaka. Method development of testing different chemical

residues through one LC-MS-MS machine at QC laboratory, Chattogram is under way. Furthermore, two ELISA systems have been added to each of QC laboratory, Chattogram and Khulna for screening tests of the residues of chloramphenicol, nitrofuran metabolites, oxy-tetracycline, tetracycline, chlor-tetracycline, metronidazole, malachite green, leuco-malachite green, crystal violet, leuco-crystal violet, histamine, methyl testosterone, diethyl stilbesterol etc. of fishery products. Method of testing of chloramphenicol, malachite green, leuco-malachite green, crystal violet and leuco-crystal violet has already been developed and validated through LC-MS-MS machine at QC laboratory, Khulna. Testing method of pesticide residues like DDT, Aldrin, Heptachlor, Endrin and Dieldrin by GC-MS (TOF) machine has been developed at QC Laboratory, Dhaka in 2017. Method has been developed and validated for confirmatory test of tetracylines in shrimp matrix through UPLC at QC lab, Chattogram in 2018 and development and validation of same test in fish matrix is going on at the same laboratory.

Method has been developed and validated for screening test of Amoxicillin, Gentamycin, Sulfonamides and Tylosin through ELISA at QC lab, Chattogram and Khulna in 2018. Method development of Confirmatory of testing of these compounds through LC-MS-MS at QC lab, Dhaka is under way. Method development for testing Mycotoxin and of fishery products is also going on at the same lab. Method development for testing heavy metals through ICP-MS has been started at QC lab, Dhaka and Chattogram in 2018 and QC lab, Chattogram has already completed the job together with successful participation in Proficiency Test.

Most of the tests of three QC laboratories are accredited according to ISO 17025: 2005 by Bangladesh Accreditation Board (BAB) except those which are very recently developed and validated. In 2018, BAB has carried out audit at the QC laboratories and accreditation of these three laboratories has been renewed upto 2021. Method of testing shrimp diseases specially those concerned with SPF shrimp has been developed and validated at QC lab at Chattogram and Khulna. These labs are already capable of detecting White Spot Syndrome Virus (WSSV), Yellow Head Virus (YHV), Acute Hepatopancreatic Necrosis Disease (AHPND), Infectious Hypodermal and Hematopoetic Necrosis Virus (IHHNV), Taura Syndrome Virus (TSV), Infectious Myonecrosis Virus (IMNV), *Macrobrachuium rosenbergii* Nodavirus (MrNV) by using PCR technique.

Following parameters are tested by the QC laboratories-

Name of Lab	**Test parameters**	
Quality Control Laboratory, Savar, Dhaka	**Fish & Fish Products**	**Fish Feed & Feed Ingredients**
	Microbiological Parameters: Aerobic Plate Count, Total *Coliforms*, Presumptive *E.coli*, *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Salmonella* spp. **Chemical Parameters:** Antibiotics-Nitrofuran metabolites (AMOZ, AOZ, AHD & SEM), Chloramphenicol, Metronidazole; Dyes (Crystal violet, Leucocrystal violet, Malachite green, Leucomalachite green); Anthalmintics (Flubendazole, Febendazole, Mebendazole); Pesticides (DDT, Aldrin, Heptachlor, Endrin, Dieldrin); Formalin; Moisture; pH	Antibiotics (Chloramphenicol); Proximate test of fish feed and feed ingredients (Crude Protein, Non-protein nitrogen, Fat, Fibre, Ash, Moisture); NIR Screening of fish feed

Quality Control Laboratory, 209 NM Khan Hill Road, Muradpur, Chattogram	**Microbiological Parameters:** Aerobic Plate Count, Total *Coliforms*, *E.coli*, *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Salmonella* spp., *Staphylococcus aureus*, *Listeria monocytogenes*, *Shigella* spp., WSSV, YHV, AHPND, IHHNV, TSV, IMNV, MrNV **Chemical Parameters:** Antibiotics-Nitrofuran metabolites (AMOZ, AOZ, AHD & SEM), Chloramphenicol, Tetracycline, Oxy-tetracycline, Chlortetracycline, Metronidazole, Gentamycin, Tylosin, Sulfonamides, Amoxicillin; Dyes (Crystal violet, Leucocrystal violet, Malachite green, Leucomalachite green); Heavy metals (As, Hg, Pb, Cd, Cr); Methyltestosterone (MTS); Di-ethyl stilbesterol (DES); Histamine; Total Volatile Basic Nitrogen (TVBN)/Tri-methyl Amine (TMA); Di-sodium di-phosphate/Total Phosphate; Filth; Formalin; Moisture; pH	Antibiotics-Nitrofuran metabolities (AMOZ, AOZ, AHD & SEM), Chloramphenicol, Tetracycline, Oxy-tetracycline, Chlortetracycline; Heavy Metals (Cr, Cd & Pb)
Quality Control Laboratory, Boyra, Khulna	**Microbiological Parameters:** Aerobic Plate Count, Total *Coliforms*, Presumptive *E.coli*, *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Salmonella* spp., *Staphylococcus aureus*, *Listeria monocytogenes*, *Shigella* spp., WSSV, YHV, TSV, IMNV, MrNV, AHPND, IHHNV, NHP-B **Chemical Parameters:** Antibiotics-Nitrofuran metabolites (AMOZ, AOZ, AHD & SEM), Chloramphenicol, Tetracyclines, Oxy-tetracycline, Chlortetracycline, Metronidazole, Tylosin, Gentamycin, Sulfonamides, Amoxilin; Dyes (Crystal violet, Leucocrystal violet, Malachite green, Leucomalachite green); Heavy metals (As, Hg, Pb, Cd, Cr); Histamine ; Total Volatile Basic Nitrogen (TVBN)/Tri-methyl Amine (TMA); Di-sodium di-phosphate/Total Phosphate; Filth; Formalin; Moisture; pH	Heavy Metals (Cd, Cr, Pb, Hg)

It is worthy to mention that testing method of Chloramphenicol and Nitrofuran metabolites (AHD, AOZ, AMOZ and SEM) for poultry meat matrix has been validated at QC laboratory, Dhaka in 2017. With a view to ensure external quality control, each QC Laboratory participated in international proficiency tests (PT) offered by world renowned PT provider organization on regular basis. In 2017-18 fiscal year, QC Laboratories participated in proficiency tests organized by different world renowned PT provider organizations is described below-

Name of the QC Laboratory	Name and Address of PT Provider	Period of PT	Name of the test parameters	Results/Comments
QC Laboratory, Dhaka	FAPAS UK	June-July, 2018	CV, LCV, TCV,CAP, NF	Satisfactory
		October-November, 2018	Nitrofuran metabolites	Satisfactory (Z-scores SEM-1.5 AMOZ -1.7)
QC Laboratory, Chattogram	Test VERITAS, Italy	September, 2018	Tetracyclines, Chloramphenicol, Histamine	Satisfactory
	Bipea, France		Pb, Cr, Cd, Hg, As	Passed except Pb
QC Laboratory, Khulna	Progetto Trieste, Italy	September, 2018	Chloramphenicol, TTC, OTC, CTC,	Satisfactory
	Bipea, France	October, 2018	Pb, Cr, Cd, Hg	Satisfactory for Hg

Analytical capacity of three QC laboratories was recognized through the overall comments in EU-FVO Audit Report-2018- "Significant improvements have also been noted in the performance of the laboratory network, accreditation of laboratories and validation of analytical methods and the competent authority can in general, have confidence in the reliability of analytical results".

4.2 Fish Inspection and Quality Control Services:

Mandate of FIQC is to ensure quality and safe fish and fishery product to global consumers. In order to maintain safety and quality of fish and fish products, following activities are carried out by three Regional FIQC offices located in Dhaka, Chattogram & Khulna.

1. Issuance of Licenses of fish processing establishments
2. Annual evaluation of establishments (instrumental & operational conditions) and renew of licenses
3. `Regular monitoring of establishments' activities regarding HACCP, EU, USDA, Australia, GCC regulations etc. as per Fish and Fish Products (Inspection & Quality Control) Rules, 1997 (amended in 2008, 2014 & 2017) and Official Control Protocol.
4. Monitor water, ice and swab quality of processing establishments and ice factories
5. Plan and implementation of NRCP (National Residue Control Plan), FRCP (Factory Residue Control Plan) & MMP (Microbiological Monitoring Plan)
6. Product inspection and issuance of certificates for exportable fish and fish products
7. Surveillance and mobile court to ensure safety of fish and fish products
8. Implementation of activities under APA
9. Conduct awareness meeting
10. Training of stakeholders
11. Inspect imported consignments of fish and fish products on request of Customs Department.

The summary activities conducted by three FIQC offices in 2018 is enumerated below-

No.	Title of activities conducted	Achievement
1	Fish Processing Establishments Inspection	
	(a) Number of declared consignments inspected	5929
	(b) Number of Fish Processing Establishments routinely inspected	553
	(c) Number of Fish Packing Centres routinely inspected	1171
2	Quality assurance of Depot/Arats and inspection of traceability documents	394
3	Inspection of Ice Factories	197
4	Trace back of Salubrity Certificates issued	91
5	No. of NRCP (National Residue Control Plan) samples tested	1376
6	No. of NRCP non-compliance (Chemical)	1
7	No. of trainees regarding training concerning NRCP non-compliance (Chemical)	0
8	No. of fish feed/feed ingredient tested	301
9	Mobile court/raid	
	(a) Number of Mobile court conducted	73
	(b) Number of raid/campaigns conducted	306
	(c) Amount of money fined (Tk.)	1732700
	(d) Shrimp destroyed (kg)	16409
	(e) Fin fish destroyed (kg)	0
	(f) Number of persons sentenced to jail	7
	(g) Number of cases filed	9
10	Amount of money fined from the fish processing establishments	185000
11	Number of fish transportation vehicles inspected	204

Number of different establishments involved in fish export value chain

Sl.No.	Type of Establishment	Number	Remarks
1.	Fish/Shrimp Processing plants	105	(EU approved 76)
2.	Factory Trawlers	41	
3.	Fish Packing Centres	76	
4.	Non Packer	81	
5.	Suppliers	65	
6.	Fish drying yards	11	
7.	Depots	933	
8.	Service centre/Landing centres	23	

4.3 Export of Fish and Fishery Products

Now a days, diversified fish and fishery products are produced and exported by Bangladesh to around 60 countries of the world. However, major export destinations of Bangladeshi fish and fishery products remain in the member countries of the European Union (EU). Among others, USA, Russia, China, Japan, Canada, Australia, India, Saudi Arabia, Malaysia, Thailand, Vietnam etc. are also major importing countries of Bangladeshi seafood. The success of export is achieved by ensuring quality shrimp by introducing Quality Assurance Program through 'Farm to Fork' approach along with implementation of GAP at farm level, HACCP in production and traceability throughout the value chain. Around 50-60% of total export is composed of shrimp contributing about 75-85% of total value indicates that shrimp is the major exporting item of the country most of which are of aquaculture origin and organic that grows naturally with minimal or no inputs. The exported items are-

- Shrimp/Prawn (processed, frozen, ready to cook and ready to eat)
- Finfish (whole, dressed, degutted, fillets; chilled, frozen)
- Dried fish
- Dehydrated fish
- Eels (live and frozen)
- Crabs (live and frozen)
- Shark fins
- Scales of finfish
- Shell of shrimp/prawn

Export statistics of Fish and Fishery Products of the last five fiscal years are presented below-

SL. No.	Fiscal year	Quantity of Shrimp exported (mt)	Value of Shrimp exported (Million USD)	Total quantity of fish and fishery products exported (mt)	Total value of fish and fishery products exported (Million USD)
1	2013-14	47,635.41	530.57	77,328.86	630.29
2	2014-15	44,278.21	506.11	83,524.37	599.05
3	2015-16	40,726.14	459.01	75,337.93	546.28
4	2016-17	39,705.85	456.91	68,305.68	532.03
5	2017-18	36,167.77	421.39	68,935.45	514.93

4.4 Adoption of Traceability

Traceability is the ability to track any food stuff through all stages of production, processing and distribution (including importation and at retail). When a potential food safety problem is identified, an effective traceability system can help isolate and prevent contaminated products from reaching consumers or recall if distributed into commerce and ensure corrective actions as needed. Traceability should mean that movements can be traced one step backwards and one step forward at any point in the supply chain. To ensure traceability, about 207,000 shrimp and 9,651 fin fish farms of Bangladesh have been registered. Other establishments involved in supply chain of fish and fish products in the country are also registered or licensed to ensure traceability.

4.5 On-line Certification System

TRACES (Trade Control and Export System) is the European Commission's multilingual online tool for certification on sanitary requirements for intra-EU trade and importation of animals, semen and embryo, food, feed and plants. The network not only promotes a better cooperation between the competent authorities but also between the traders themselves and their competent authorities. TRACES allows the quick detection of fake certificates and therefore contributes to the enhancement of trust vis-à-vis its partners. In 2017, Bangladesh has introduced online certification through TRACES for consignments of fish and fish products intended to export to the EU countries.

4.6 Aquaculture Residues monitoring

Residue Monitoring Program of DoF enforced as National Residue Control Plan (NRCP), is a program to monitor status of residues and contaminant in farmed fish and shrimp to reveal the illegal use of banned or unauthorized substances as well as to determine the origin of residue contamination. For implementation of NRCP, 'NRCP Policy Guidelines 2011 (amended in 2012)' was formulated in line with the Fish and Fish Product (Inspection & Quality Control) Rules-1997 (amended in 2008, 2014 & 2017). The National Residue Control Plan is based on measures to monitor certain substances and residues thereof in live animals and animal products and fixing the levels and frequencies of sampling provided the control of certain substances and residues thereof in certain animal products.

4.6.1 Planned NRCP-2018 for Shrimp and Finfish

Summary of NRCP -2018 for Aquaculture Crustaceans (Shrimp & Prawn) and Finfish is as follows:

NRCP 2018 for Aquaculture Crustaceans (Shrimp and Prawn) and Fin fish																	
	National Plan					Khulna Zone				Chattogram Zone					Dhaka Zone		
Test Parameters	*M. rosenbergii*	*P. monodon*	*P. monoceros*	Fin fish	Grand Total	*M. rosenbergii*	*P. monodon*	*P. monoceros*	Sub Total	*M. rosenbergii*	*P. monodon*	*P. monoceros*	Fin fish	Sub Total	*M. rosenbergii*	Fin fish	Sub Total
A1	0	0	0	16	16	0	0	0	0	0	0	0	12	12	0	4	4
A3	0	0	0	16	16	0	0	0	0	0	0	0	12	12	0	4	4
A6 (CAP)	64	90	8	7	169	62	74	5	141	1	16	3	5	25	1	2	3
A6 (NF)	64	90	8	7	169	62	74	6	142	1	16	2	6	25	1	1	2
A6 (MNZ)	32	46	4	2	84	30	38	3	71	1	8	1	1	11	1	1	2
A6 (Total)	160	226	20	16	422	154	186	14	354	3	40	6	12	61	3	4	7
B1 (Tetracyclines)	97	138	12	29	276	95	114	9	218	1	24	3	21	49	1	8	9
B1 (Amoxillin)	18	23	3	5	49	16	19	2	37	1	4	1	4	10	1	1	2

B1 (Sulfonamides)	17	23	2	4	46	15	19	1	35	1	4	1	3	9	1	1	2
B1 (Gentamycin)	16	23	2	5	46	16	19	1	36	0	4	1	4	9	0	1	1
B1 (Tylosin)	15	23	2	4	44	15	19	1	35	0	4	1	3	8	0	1	1
B1 (Total)	163	230	21	47	461	157	190	14	361	3	40	7	35	85	3	12	15
B2a	65	91	9	19	184	63	75	7	145	1	16	2	14	33	1	5	6
B3a	23	34	3	6	66	23	28	2	53	0	6	1	5	12	0	1	1
B3c	25	35	3	7	70	23	29	2	54	1	6	1	5	13	1	2	3
B3d	24	34	3	7	68	23	28	2	53	0	6	1	5	12	1	2	3
B3e	26	35	3	8	72	25	29	2	56	1	6	1	6	14	0	2	2
NC-B3e	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
Total	486	686	62	142	1376	468	566	43	1077	9	120	19	106	254	9	36	45

Remarks: A1 : Diethylstilbestrol; A3: Methyl Testosterone; A6: CAP = Chloramphenicol, NF = Nitrofuran metabolites (AHD, AOZ, AMOZ, SEM), MNZ = Metronidazole; B1: Tetracyclines (Tetracycline,, Oxytetracycline & Chlortetracycline), Amoxicillin, Sulfonamides, Gentamycin, Tylosin; B2a: Mebendazole, Fenbendazole; B3a: DDT, Aldrin, Heptachlor, Endrin, Dieldrin; B3c: Lead, Mercury, Cadmium, Chromium, Arsenic; B3d: Aflatoxin (B1, B2, G1 & G2); B3e: Malachite Green, Leucomelachite Green, Crystal Violet & Leucocrystal Violet

N.B. Four new parameters like Amoxicillin, Sulfonamides, Gentamycin, Tylosin under B1 group have been included in NRCP-2018. One *P. monodon* Sample was found as non compliant (N.C.) for detection of LCV (1 ppb) at Khulna region in 2017. So, 01 additional *P. monodon* sample under Group B3e was included as targeted sample in 2018 NRCP Plan.

In addition, testing of different chemical residues of 300 samples of fish feed have been planned for testing by three FIQC offices-

Sl No.	Parameters to be tested	Number of Feed Samples			Total
		Dhaka zone	Chattogram Zone	Khulna Zone	
1	A6 (CAP, AOZ, AMOZ, SEM and AHD)	15	27	28	70
2	B1 (TC, OTC and CTC)	10	22	28	60
3	B3c (As, Pb, Cr, Cd and Hg)	37	36	32	105
4	B3d (Aflatoxin B1, B2, G1, G2)	18	25	22	65
	Total	80	110	110	300

4.6.2 NRCP-2017 –Test details

Result of NRCP-2017 is as follows:

Test Parameters	Number of Samples Tested			Total	No of non - compliant samples
	FIQC, Dhaka	FIQC, Chattogram	FIQC, Khulna		
A1	4	12	0	16	0
A3	4	12	0	16	0
A6 (CAP)	3	20	132	155	0
A6 (NF)	3	25	149	177	0
A6 (MNZ)	2	07	49	58	0
A6 (Total)	8	52	330	390	0
B1	17	78	335	430	0
B2a	6	30	134	170	0
B3a	2	11	50	63	0
B3c	3	12	49	64	0
B3d	2	11	50	63	0
B3e	3	13	51	67	1
Total	49	231	999	1279	1

4.6.3 NRCP Findings in last six years

The total number of NRCP samples and number of non-compliant samples in last six years is presented in the following table. From the table, it is clear that, with the continuous effort and vigilance of the DoF, the number of non-compliant samples was reduced remarkably.

Sl No.	Year	Number of Sample Tested	Number of Non-compliance	Number of Non-compliance in substance
1.	2012	1342	34	CAP-03, SEM-20, AHD-10, AOZ-1
2.	2013	1332	49	CAP-08, SEM-33, AHD-02, CV-01, Pb-04, Afl-01
3.	2 014	1388	23	CAP-02, SEM-19, AHD-01, As-01
4.	2015	1355	7	SEM-06, CV-01
5.	2016	1363	0	Not applicable
6.	2017	1279	1	Dye (LCV)

4.7 Activities towards production of value added fish and fish products

The exporters are investigating more to produce value added products instead of traditional block products to meet the demands of the global market. Now a day, exporters are focusing more on production and export of value added products of shrimp and fish. As for example, in order to cope with the requirements of competitive global seafood market two fin fish processing factories- Virgo Fish and Agro Process Ltd. and Seven Oceans Fish Processing Ltd., Trishal, Mymensingh have started production and export of fish fillet of pangas. Installation of the facilities for preparing fish ball, fish nugget etc. is underway at Seven Oceans Fish Processing Ltd. Setting of facilities for extracting fish oil and preparation of fish meal at Virgo Fish and Agro Process Ltd. is underway. Construction of two other fin fish processing factory named Earth Agro Farms Ltd. at Gazipur and Globe Fisheries Ltd. at Noakhali are underway. A company named Bangladesh-American Agro-process Ltd. located at Cumilla has already started production of fish fillets from pangas and tilapia and other ready to cook value added products like fish finger, fish balls, fish nugget etc. of fish for local consumers. Construction of another fish processing plant named Alpha Accessories and Agro Export Ltd., Fakirhat, Bagerhat for production of 100% export oriented high value added products is also underway.

Besides ensuring production, distribution and export of quality and safe fish and fish products, Department of Fisheries has organized hands on training on value added product development with fin fish specially tilapia and pangas and other seafood items at Virgo Fish & Agro Process Ltd., Trishal, Mymensingh with the support of inter governmental organization, INFOFISH during 02-06 May, 2017. Participants from other fish industries like Seven Oceans Fish Processing Ltd. and Earth Agro Farms Ltd. also participated in the training. Initiatives have been taken to develop and commercial production of value added products like noodles, soup etc. of Hilsa with ECOFISH-BD Project support.

4.8 Training activities

As training is essential tool for increasing skills and competence to provide quality services, the department provides training for the officers of FIQC on Food Safety, ISO standards, GMP, GAP and

GLP, operation of LC-MS/MS machine, operation of GC-MS(TOF), Pesticide residue analysis, Proximate analysis of fish feed and feed ingredients Lab related activities and other necessary topics related to quality control. In 2017-2018, FIQC officials and QC lab analysts participated in training programmes mentioned below-

Sl. No.	Title of the Training	Time table/Duration	Country
1.	Method Development and Verification of WSSV and YHV	08-08-2017 to 11-08-2017	Bangladesh
2.	"Training of Trainers" course on TiLV Detection by PCR	26-09-2017 to 27-09-2017	Bangladesh
3.	Training course on 'Antimicrobial resistance susceptibility testing in fishery and aquaculture products'	27-11-2017 to 29-12-2017	Thailand
4.	Anti-microbial Residue Analysis of Fish and Aquaculture products	05-12-2017 to 08-12-2017	Vietnam
5.	In-house Hands on Training in Quality Control Laboratory on Test Procedure (Training on Shrimp Pathogen detection by using PCR)	09-12-2017 to 16-12-2017	Bangladesh
6.	Food Testing: Course 1 on Mycotoxins	26022018 to 9-3-2018	Belgium
7.	Food Testing: Course 2 MicrobiologyTS05	5-03-2018 to 16-03-2018	Belgium
8.	Analysis of heavy metals by using Microwave Digester	2-04-2018to 6-04-2018	India
9.	The use, maintenance, trouble shooting and Application of Atomic Absorption Spectroscopy(AAS)	21-07-2018to 26-07-2018	Bangladesh
10.	Residue Monitoring Activities on fish and Fisheries products	23-10-2018	Bangladesh
11.	NRCP and Traceability Implementation	19-05-2018-to 20-05-2018	Bangladesh

4.9 Laws, Policies and Documents

Fish and Fish Product (Inspection and Quality Control) Rules, 1997 was last amended on 21 December, 2017. Proposal for further amendment has been submitted to the ministry in 2018. Proposed Fish and Fish Product (Inspection and Quality Control) Act-2018 has been submitted to the Ministry of Fisheries and Livestock for approval of the Parliament. Legal basis for production of safe Fish and Fish Product to ensure the safety and quality of exportable fish and fishery products from farm to fork are as follows-

Legal Framework

- The Fish and Fish Product (Inspection and Quality Control) Ordinance, 1983
- The Marine Fisheries Ordinance, 1983
- The Marine Fisheries Rules, 1983
- The Fish and Fish Product (Inspection and quality control) Rules, 1997 (amended in 2008, 2014 & 2017)
- The Fish Hatchery Act, 2010
- The Fish Feed and Animal Feed Act, 2010
- The Fish Feed Rules, 2011
- The Fish Hatchery Rules, 2011
- The Fish Quarantine Act, 2018

In addition to the regulations, the following policies and guidelines are also in place for official control of fish products-

- National Fisheries Policy-1998
- National Residue Control Plan Policy Guidelines, 2011 (amended in 2012)
- National Shrimp Policy, 2014
- Fish and Fishery Products Official Control Protocol, 2015
- Guidelines for the Control of Aquaculture Medicinal Products-AMPs, 2015
- Manual on Good Aquaculture Practice- Trainer Manual
- Compliance Guidelines for Fish Feed Production, Import & Marketing
- Guidebook on Waste Management in Fish and Fishery Industries
- Good Aquaculture Practice – A Farmer's Guide
- Compliance Guidelines for Shrimp Hatchery
- ISO/IEC 17025:2005 General Requirements for Competence of testing Laboratories

4.10 Rapid Alert System for Food and Feed (RASFF)

Shrimp of aquaculture origin of Bangladesh being contaminated by the NF metabolite evolved through repeated Rapid Alert System for food in the year 2009. Meanwhile substantial actions/ programs have been implemented for the total development of infra-structure, management and documentation. Motivational programs and training have been undertaken to increase the awareness about product quality and safety and to comply with HACCP and international obligations. Beside this, traceability system in aquaculture and processed products are being implemented and taskforce activities related to develop HACCP system in every stage from hatchery to processing of shrimp are also implemented according to EU requirements. Due to the repeated Rapid Alert System for Food and Feed (RASFF) from EU, National Working Committee was formed and that committee is working to mitigate the problem. With the continuous effort and progress achieved in residue analysis, the number of rapid alert has been reduced to zero in 2013 from the highest number of 52 in the year 2009. In 2018, there was only 1 RASFF notification which was involved with microbial contamination.

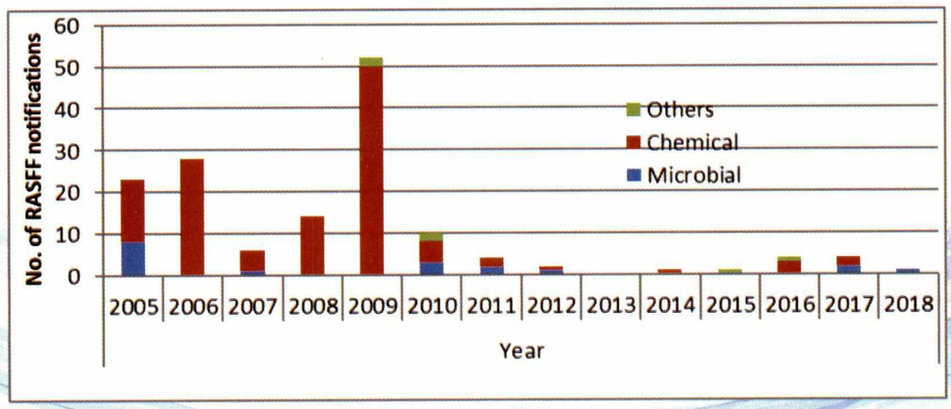


Fig. Number of rapid alerts concerning fish and fishery products exported to EU from 2005 to 2018.

4.11 Audit/exposure visit by delegates of competent authorities of importing countries

4.11.1 Australian Team Visit

Two officials of the Department of Agriculture and Water Resources (DAWR) of Australian government visited Bangladesh during 12 to 18 May, 2018 in the name of 'Prawn Familiarization Visit'. Their mission was focused on prawn aquaculture, biosecurity at farm level and disease testing method in Quality labs of Bangladesh. The team visited a processing plant in Chattogram (BD Seafood Ltd.) which involved in exporting prawn products to Australia, a prawn (shrimp) farm namely Gazi Fish Culture Ltd. at Dacope, Khulna and FIQC offices in Chattogram. The team also had a meeting with DG, DoF and the Secretary, MoFL. The delegates expressed satisfaction regarding their visit.

4.11.2 EU-FVO Audit-2018

EU-FVO Audit team consisted of three members visited from 5 to 17 November, 2018 to evaluate the control of residues and contaminants in live animals and animal products including controls on veterinary medical products. On 6th November 2018, they had briefing meeting with the Secretary, MoFL. On the same day they had opening meeting with CCA, and representatives of FIQC offices and testing laboratories. They visited shrimp farm at Bagerhat, and fin fish farm at Mymensingh, QC labs of Khulna, Dhaka and Chattogram; RCA Offices in Khulna, AMP stores and EU approved Aquaculture processing establishments in Khulna and Chattogram and IFST lab of BCSIR.

4.11.3 Conclusion

In the developed world, health consciousness is increasing day by day. So, currently safe food is the major issue in the developed countries. Significant efforts have been made for official control of fishery products & monitoring of residues in aquaculture towards ensuring export of fish and fishery products worldwide including EU countries, USA, Japan, Russia etc. Official protocol has been formulated & enforced. Capacity has been improved along with ISO accreditation of the Lab. With all this developments, Bangladesh is now on the way to achieve better standards in food safety. The continuous progress and effort of Bangladesh for ensuring safe fish and fish products for export has been approved through the comments of EU-FVO Audit Report-2015. Regarding public health of food safety of fisheries sector, the comments were as-

- Improvements have been made since last audit and in principle, the current organization of the CA and its documented operational procedures provide for an acceptable official control system for Fishery products which is implemented in satisfactory way.
- The system in place for residues controls in aquaculture offers guarantees equivalent to EU requirements.
- The residue monitoring plan satisfies the minimum requirements laid down in EU legislation and both it and PET program are effectively implemented as evidenced by a significant decrease in the no. of N/C samples relative to previous years.

Considering the comments of EU-FVO Audit Report-2015 and on very low number of non-compliant consignments, the European Commission has repealed the EC's Decision No. EC/630/2008 and comments of EC regarding repeal of the decision was- "it appears unnecessary to require that

consignments of the products imported into the Union from Bangladesh be accompanied by analytical tests" (Commission Decision no. 2015/2260)

5.0 Human Resource Development

5.1 Training

Human resource development is mandatory for DoF to enhance administrative, management and technological capacity in fisheries sector. The HRD activities meant to enhance capacity in the area of administrative, management, technological aspects and relevant cross cutting issues for conserving and managing the fisheries resources in sustainable manner. The ultimate objective is to augment productivity in fisheries sector, alleviate poverty, address gender issues, reduce unemployment and contribute balanced development having regard to goals and objectives of the national development plans. As a part of National Fisheries Policy implementation, DoF has developed a Human Resource Development Sub-strategy. DoF has organized both in-country and overseas training as major tool for technology transfer and extension activities in order to disseminate new technologies at field level. For this purpose regular training programs are being conducted from both revenue and development budget of DoF for the skill development of concerned personnel including DoF officials, fishers, fish farmers, unemployed youths, women, landless and marginal farmers etc. For the continuation of fisheries training, Government already created a new sub-head named "training" in the revenue budget. The progress of training activities at a glance is shown below-

Financial Year	In Country Training		Foreign Training	
	Government personnel	Fish Farmers/ Fishers/ NGO personnel	Government personnel	Fish Farmers/ Fishers/ NGO personnel
2008-2009	2801	51,761	118	06
2009-2010	3230	54,527	69	08
2010-2011	3500	60000	99	13
2011-2012	3750	65873	166	03
2012-2013	3995	275437	103	00
2013-2014	3154	298783	76	00
2014-2015	3143	76369	130	00
2015-2016	4379	185991	85	00
2016-2017	4379	185991	124	00
2017-2018	4522	200472	74	00

5.2 Development of mid level skilled manpower

The vision 2021 of the government has targeted to achieve self-sufficiency in food and increased food security. This requires achieving a dual objective of enhancing production and productivity, livelihoods security and equitable distribution of benefits side by side with the conservation of fisheries resources. Aquaculture and fisheries management in the suitable water-bodies is now becomes very popular job in rural areas. Moreover day-by-day fisheries entrepreneurship is increasing tremendously to meet-up the domestic as well as global demands. However, manpower

involved in such fast-growing industry is almost non-professional, without having any fundamental technical know-how. Presently they are serving only on the basis of their working experiences and very little informal trainings. To ensure the sustainable aquaculture production and environment-friendly management of the water-bodies to achieve the Vision 2021 goals, it is essential to provide grassroots level skilled technical manpower for the sector.

Fisheries Diploma institute at Kishoreganj

As per desires of the Honorable Prime-minister, Government of the People's Republic of Bangladesh, the Department established one Fisheries Diploma Institute at Chandpur by the Fisheries Diploma Course Implementation project to produce mid level technically skilled manpower. In this Institute academic activities have been started from 2009-10 academic years and admitted 25 students in first batch. The first batch student completed their Diploma in Fisheries course in the year 2013. Diploma in Fisheries course consists of eight semesters, duration of each semester is six months. The total duration of the Fisheries Diploma Course is four years.

Considering the necessity of more skilled manpower at grassroots level, the government of Bangladesh has implement another pragmatic project named Establishment of Fisheries Diploma Institute at Gopalganj, Kishoregonj and Sirajgonj districts to establish additional three new Fisheries Diploma Institutes at Gopalganj Sadar, Kishorganj Sadar and Belkuchi, Sirajganj. The construction of administrative building, academic building, principal residence, instructor's dormitory, staff dormitory, Boy's hostels, Girl's hostel, Electrical substation, Guard room of each Institute have been completed. The hostels, classrooms and laboratories of each institute have been furnished with necessary furniture, equipments, chemicals, computers and academic activities started from 2018-19 academic calender year.

Organizations like Department of Fisheries, Bangladesh Fisheries Research Institute, Bangladesh Fisheries Development Corporation, nationalized banks etc. will have the opportunity to utilize and appoint this sort of skilled manpower to progress the entire fisheries sector. Private sectors like fish processing plants, feed mills etc. and NGOs involving with this sector will also have the same opportunity. There also have some scope to utilize this sort of skilled manpower in the international labour market. So it will be easily possible to increase the productivity of the sector, both qualitatively and quantitatively, by the efficient utilization of skilled manpower.

Finally, it is expected that the establishment of Fisheries Diploma Institutes will create skilled manpower at grassroots level that will help to increase fish production in the country.

5.3 Gender perspectives

Women constitute half of the total population in our country. The economic and social status of rural women remains very low due to economic and gender inequality. They are also suffering from malnutrition. Women's employment can play a significant role in the socio-economic development and gender equality. To attain sustainable development, women's active participation in

income generating activities is urgently needed. Women's participation in aquaculture and fisheries activities is very crucial for the socio-economic development of Bangladesh. Considering these scenarios, the Department of Fisheries (DoF) has been working to create employment opportunity for women. In this regard the rural women have also been provided with various supports through different development projects of DoF.

Women working on Fishing Sector

5.3.1 Employment

According to statistics of 2017-18, about 1.4 million of women are involved in fisheries sector in various ways. In fish processing plants, working women represent 46.7% of total permanent workers while casual female workers consists 56.75% of total casual workers. The wage range of women varies from BDT 5,000-15,000/month for permanent workers and BDT 4,500-13,000/month for casual workers. Apart from this, DoF creates scopes for income generation of rural women through nominating them as LEAF (Local Extension Agent for Fisheries). They are provided with BDT 2,000/month. Besides income generation, DoF is trying to improve their leadership quality which is one of the important indicators of women empowerment and gender equality.

5.3.2 Supports for rural women

A total of 37229 fisher women have been registered under DoF and provided with ID cards. They are getting various types of supports like VGF, AIGA etc. and their family are also getting BDT 50,000 in case of accidental death of fisherman. Rural women are also being involved in open water fisheries management through development projects of DoF. Till now 2676 rural women have been included in 543 CBO groups and getting training on open water fisheries management. A total of 21,573 rural women have been trained on different aquaculture technologies.

In some of the development projects of DoF, there is a provision of Result Demonstrator (RD). There are about 470 RD women and 305 women as Common Beneficiary Group (CBG) members working in different areas. A total of 100 community savings groups (CSG) have been formed involving around 3,100 women with a savings of BDT 28, 41,370 in the 9 coastal districts.

A total of 4,722 women fishers received different AIGA trainings like aquaculture, goat rearing, bamboo craft making, tailoring and 15,000 households received different AIGA support/inputs including vegetables seeds, goat, poultry, sewing machine etc. from EcoFish BD project.

5.3.3 Agenda for sustainable development

The on-going and proposed activities of DoF are aligned with the government development plan and SDG (Sustainable Development Goal) focusing gender issues in the following ways:

- Encouraging women participation through promoting small scale aqua-farming
- Scale-up of integrated homestead aqua-farming for ensuring nutrition security at household level

Development projects and programs are being implemented through DoF ensuring at least 25% women participation as project beneficiaries.

6.0 Implementation of Development Plans and Polices

6.1 Annual performance agreement (APA)

With a view to ensuring institutional transparency, accountability, proper utilization of resources and above all enhancing institutional efficiency the Government of Bangladesh has taken an initiative to introduce a Performance Management System (PMS) in public sector organizations. With the objective of introducing PMS across the Government, it has been decided to have the Annual Performance Agreements (APAs) between the Cabinet Division as the 1st party and all other ministries/division as the 2nd parties. Main purposes of introducing APA are: (a) moving the focus of the ministry from process or intention to result orientation and (b) providing an objective and fair basis to evaluate overall performance of the ministry/division at the end of the year.

To achieve the vision, mission and strategic objective of the Department of Fisheries (DoF), APA between the Director General (DG) of DoF and the Secretary of the Ministry of Fisheries and Livestock (MoFL) were signed for the FY 2014-2015, 2015-2016, 2016-2017, 2017-2018. From the beginning, DoF implementing indentified interventions with due attention. Proper field monitoring has been done regarding the implementation of APA related activities. According to DoF Evaluation report and the MoFL Budget Management Committee (BMC) meeting Minutes, DoF showed admiring success in achieving APA targets. Credible Performance of DoF highly appreciated from all relevant corners including Cabinet Division. In this Connection APA for the financial year 2018-19 was signed in june 2018 between the Director General (DG) of DoF and the Secretary of the Ministry of Fisheries and Livestock (MoFL).

6.2 Seven Fifth Year Plan (7 FYP) and SDGs

A comprehensive action plan has been developed for the fisheries sector in line with the UN SDGs targets. A number of consultation with different stakeholder and field officials of DoF have been done to finalize the action plan to achieve the SDGs targets. Ongoing projects have been identified which are relevant and will contribute to achieve the 7th FYP and SDGs targets. Moreover projects intervention has been identified for 2021-2030 following the GED guideline. For the implementation monitoring of SDGs related activities data gap analysis is ongoing. Data provider identification will be finalized through this process. According to GED mapping MoFL has been identified as lead ministry for 14.2, 14.4, 14.5, 14.6, 14.7 and 14.b targets. DoF is the main stakeholder to achieve those targets. DoF needs strong collaboration with Mercantile Marine Department (MMD), Bangladesh Police, Bangladesh NAVY, Bangladesh Coast Guard, Riverine Police, Department of Environment, Department of Forest and Water Development Board etc. General Economic Division (GED) has prepared SDGs Financing Strategy. DoF has contributed in this document providing the financing needs for the identified projects to achieve the SDGs targets related to fisheries sector.

6.3 Master plan of Department of Fisheries

The Fisheries Sector represents one of the most productive and dynamic sectors in Bangladesh. The Master Plan is being formulated to propose ways in which the policies and strategies can be implemented and support can be offered to guide the sector, recognizing that over the next 25 years the requirements of the sector are likely to change as development continues rapidly.

The Master Plan is intended to be used by the implementers and is therefore rather detailed in the line of the Vision 2021 and Seventh Five Year Plan of the Government, and the agenda 2030 of the United Nations, the Sustainable Development Goals. It is being directed to achieve the visionary goals of the present government to be the middle income country by 2021 and the developed country by 2041.

The Master Plan would be a static document, but to regularly reviewed, revised and updated as new developments take place, experience from its implementations is gained, and new innovation and knowledge developed. The revision of the Plan should be coordinated with the annual work planning in the Department of Fisheries. The Plan represents the compilation of five thematic areas which have been developed to give specific direction to their specific areas. These have all been prepared using a participatory approach with inputs from the key stakeholders such as the private sector, research organizations, and other governmental agencies working in similar fields, NGOs and fish farmers and fishers. The building block thematic areas of the Master Plan are –

- Aquaculture;
- Inland Fisheries Management;
- Marine Fisheries Management;
- Fisheries Education, Research, Human Resources and Skill; and
- Promote Export Earning of Fish and Fishery Products.

Interventions and activities proposed in the master plan are to ensure and supply of additional 1.00 million metric tons of fish by 2021 and 1.9 million metric tons of fish by 2041 for the growing population considering the growth of 1.37% and as well as to enhance export earnings from fish and fishery products in a sustainable manner.

6.4. National Fish Week 2018

The Father of the Nation Bangabandhu Sheikh Mujibur Rahman inaugurated More Fish Culture Movement in 1974 by releasing 20,000 carp fingerlings at Gonobhabon Lake. Following that

Fingerling releasing by the Honorable Prime Minister Sheikh Hasina

movement, National Fish Campaign is being observed throughout the country to create mass awareness to impart in the process for harnessing the potential from fisheries sector for economic growth of the country since 1993. National Fish Week 2018 has been observed country wide from 18-24 July with due emphasis on fish culture for food safety. The commemorative slogan for National Fish Week 2018 was ***Shoyongsompurno mache desh, Bangabandhur Bangladesh.*** As per instruction of the Prime Minister, the Ministry of Fisheries and Livestock through the Department of Fisheries took up a program to build up awareness for conservation of fisheries resources among the people and to motivate them for participation in technology based improved fish culture for increased production of fish and shrimp.

7.0 Information and Communication Technology (ICT) in Department of Fisheries

Introduction:

Department of Fisheries (DoF) is working relentlessly to provide public services to citizens for improving the socio-economic condition of the people by increasing fish production. DoF is trying to digitalize the services so that citizens could get service quickly.

7.1 Development sequence and Innovation

Under the utmost supervision of Cabinet division, DoF has prepared Service Profile with 12 services with step identification for digitalization. ICT is incorporated to provide service more effectively. One can easily get various information from Fish advice system, mobile app, SMS service, website and web portal. From Department of Fisheries website, one can get leaflets of fish culture, publication, annual report and e-books without any cost. E-training and e-recruitment systems have introduced already and running smoothly. Fish feed licensing is about to replicate and hatchery licensing activities ongoing. Some internal services like webmail, group mail, and PDS introduced for better communication. PDS is playing a significant role to know the update information of officers which typically used for transfer and other purposes. To send different types of reports and information to the head office, the system has been digitalized. Various types of reports like Jholmohal, APA, Extension, Fish production are digitalized. Besides these, e-gp, e-nothi, Digital attendance, CCTV were introduced. Webmail is running by e-mail policy, 2018. To provide digital service 22 services selected for e-service under Digital Service Implementation Accelerator.

Key Developments as on 2018:

- Preparation of 12 service process maps;
- Development of two apps and one web-based application for providing services;
- Online Fish Feed license system Develop;
- Online e-recruitment system Develop;
- Online e-Training database system Develop;
- For Internal services, development of service process simplification in ICT Section and report automation system.

Figure - Innovation Second Showcasing of Department of Fisheries at Shilpakala Academy.

7.2 Future Planning:

To Provide ICT related activities, there is no alternative of high-speed internet and networking systems for digital Bangladesh. A robust infrastructure was developed and all offices were equipped with computers and other accessories. DoF installed internet connection with 110 Mbps speed through the optical fiber. In Matshya Bhaban, secure and effective internet connectivity was established in combination with the server, router, and manageable switches.

All employees of DoF has access to the internet for official work. Dot Bangla domain purchased and activities for receiving Shortcode is ongoing. All field offices connected with headquarter through social media and they are providing services by using social media.
Under the supervision of Cabinet division and a2i program, innovation activities are going on by the close supervision of innovation team. ICT section is supporting in ICT based innovations. DoF organized two innovation showcasing programs. Innovation corner is introduced on the website with plenty of Innovation information.

Service Process Simplification (SPS) and Small Improvement Project (SIP) are a continuous process. One SPS idea and one SIP will be replicated in this fiscal year.

DoF is working to reach the services to the doorsteps of people. We believe in giving better services that will reduce the time, cost and visit of the citizens. ICT section is trying to implement the mandate of DoF regarding information technology which will help to achieve the SDG targets and ultimately will build Digital Bangladesh.

8. Implementation of Development Projects

Government has taken necessary initiatives at the very beginning to increase investment for expected development of fisheries sector. An amount of taka 34961.00 lac has been allocated for 13 development projects in the financial year 2017-2018 under the annual development program of DoF. The actual expenditure and achievements were 33881.42 lac and 96.91% respectively. Some programs are also submitted to the ministry for budget allocation from revenue head. The list with allocation and expenditure of DoF development projects and programs for vision 2021 are shown in Annexure 7.

9.0 Conclusion:

Bangladesh is blessed with huge water resources having a total fish production of 42.77 lac mt, in the year 2017-2018. The average growth performance of this sector is almost 5.26 percent. Government is trying to sustain this growth performance, which eventually ensures to achieve the projected production target of 4.55 million mt by 2020-21. According to FAO statistics 2018, Bangladesh is ranked 3rd in inland capture fish production and 5th in world aquaculture production. The sector also has high potentiality for the perspective of economic development of the country. The declaration of Honorable Prime Minister Shiekh Hasina for food security, government has undertaken massive activities to obtain desired production of fish to meet the animal protein requirements up to 63% as well as crop production. It is believed that if the increasing trend of development activities of present democratic government continues, it will be possible to achieve the sustainable development goal by 2030 with which the creation of huge employment opportunity, poverty alleviation and food security ultimately will ensure the dream of Sonar Bangla as dreamt by the Father of the Nation, "Bangabandhu Sheikh Mujibur Rahman".

Annexure

Annexure-1: List of the winners of National Fish Week Awards 2018

Sl. No.	Field area	Name of the Person/Organization	Award
1.	**Fish spawn production**	**Onudan Matshya Projonon Kendra** Propr: Mr. Shakespeare Mahmud (Wakil) Father: Late Mokshed Ali, Mother: Mrs. Safiya Khatun Vill: Raghobpur, P.O: Raghobpur Madrsa, Upazila: Mymensingh Sadar, District: Mymensingh, Division: Mymensingh	**Gold Medal, 50000/ cash and a Certificate**
2.	**Fish fingerling production**	**Afil Aqua Fish Ltd** Harinnapota, Sharsha, Jashore Propr: Mr. Sheikh Afil Uddin M.P. Father: Sheikh Akij Uddin Mother: Sakhina Khatun Vill: Sharsha, P.O: Sharsha, Upazila: Sharsha, District: Jashore, Division: Khulna.	**Gold Medal, 50000/ cash and a Certificate**
3.	**Fish production**	**Mr. Md. Shahadat Hossain** Father: Late Habil Uddin, Mother: Late Motijan Begum, Vill: Singra bazar P.O: Singra Upazila: Singra, District: Natore Division: Rajshahi.	**Gold Medal, 50000/ cash and a Certificate**
4.	**Bagda PL production**	**Golden Aqua Shrimp Hatchery Ltd.** Propr: Alhaj Shahidul Alam Chowdhury Father: Late Nurul Alam Chowdury, Mother: Nurjahan Khanam Vill: Dowlotpur, P.O: Fajilkharhat, Upazila: Karnafuli, District: Chattogram Division: Chattogram	**Gold Medal, 50000/ cash and a Certificate**
5.	**Role of Organization to Fisheries Development**	**Bangladesh Coast Guard Force** Bangladesh Coast Guard Force Headquarter Sher-e-Bangla Nagar, Agargaon, Dhaka-1207	**Gold Medal, 50000/ cash and a Certificate**
6.	**Fish Spawn production**	Mr. Md. Shahinor Islam Rajon (Rangpur Hatchery ; Propr. Mrs. Masuda Begum) Father: Md. Shah Alam, Mother: Mrs Masuda Begum Vill: Khakhatya Dolapara, P.O: Khakhatya, Upazila: Rangpur Sadar, District: Rangpur Division: Rangpur	Silver Medal, 30000/ cash and a Certificate
7.	**Fish Fry/Fingerling production**	Mr. Babu Chakrabarti Father: Bijoy Chakrabarti, Mother: Badli Chakrabarti Vill: Satadium Area Rangamati, P.O Rangamati-4500, Upazila: Rangmati Sadar, District: Rangmati Division: Chattogram	Silver Medal, 30000/ cash and a Certificate
8.	**Fish Fry/Fingerling production**	Mr. Md. Saiful Islam Father: Md. Nurul Haque, Mother: Mrs. Nur Jahan Vill & P.O.: Kachubari, Upazila: Thakurgaon Sadar, District: Thakurgaon, Division: Rangpur	Silver Medal, 30000/ cash and a Certificate
9.	**Fish production**	Mr. Md Abul Hashem Father: Late A. Latif Miyah, Mother: Mrs. Surjaban Begum Vill: Barabo, P.O.: Jirandi, Upazila: Palash, District: Narsingdhi, Division: Dhaka.	Silver Medal, 30000/ cash and a Certificate

Sl. No.	Field area	Name of the Person/Organization	Award
10.	**Fish production**	Shima Rani Dhor Father: Subal Chandra Dhor, Mother: Anjana Rani Shaha Vill: Sadipur, P.O.: Manikdaha, Upazila: Vanga, District: Faridpur, Division: Dhaka	Silver Medal, 30000/ cash and a Certificate
11.	**Fish production**	Nabab Matshya Khamar Prokalpa Propr: Md. Akbar Hossain Father: Alhaj Md. Ettaj Ali Biswas, Mother: Mrs. Begum Vill: Chanipara, P.O.: Chapainababganj, Upazila: Chapainababganj SadarDi, strict: Chapainababganj, Division: Rajshahi.	Silver Medal, 30000/ cash and a Certificate
12.	**Shrimp Production**	Mes. Abul Fish Products Ltd. Propr. Alhaj Sheikh Abul Hossain Father: Late Sheikh Arshad Ali, Mother: Alhaj Majeda Begum. Vill+ P.O.: Chalna Bazar, Upazila: Dakope, District: Khulna, Division: Khulna	Silver Medal, 30000/ cash and a Certificate
13.	**Exporting Fish & Fishery Product**	M. U. Sea Foods Ltd. Propr. Shamol Das Father: Late Subal Chandra Das, Mother: Anjoli Vill: Baliyadanga (Bscic), P.O.: Jessore, Upazila: Jessore Sadar, District: Jessore, Division: Khulna	Silver Medal, 30000/ cash and a Certificate
14.	**Role of Community Based Organization to Fisheries Development**	Kathaliya & Aktapara Matshyajibi Samabay Samity Ltd. Kathaliya, Vimkhali, Dakkhin Sunamganj Sovapoti: Mr. Showkot Miyah Father: Golam Mostafa, Mother: Momotaj Begum Vill: Kathaliya, P.O.: Vimkhali, Upazila: Dakkhin Sunamganj, District: Sunamganj, Division: Sylhet	Silver Medal, 30000/ cash and a Certificate
15.	**Role of Community Based Organization to Fisheries Development**	Udanpur Nayan Club CBG Matshya Chashi Samity Sovapoti: Mr. Mojaffar Hossain Vill: Udanpur, P.O.: Pochamoriya, Upazila: Puthiya District: Rajshahi, Division: Rajshahi	Silver Medal, 30000/ cash and a Certificate
16.	**Role of Person to Fisheries Development**	Mr. Soroj Kumar Mistry Senior Upazila Fisheries Officer, Dumuriya, Khulna Father: Narayan Chandra Mistry, MotherRani Mistry Vill: Dawniyafhand, P.O.: Jalma, Upazila: Botiyaghata, District: Khulna, Division: Khulna	Silver Medal, 30000/ cash and a Certificate
17.	**Role of Person to Fisheries Development**	Sanjida Yasmin Upazila Nirbahi Officer, Nariya, Shariyatpur Spouse: Md. Mijanur Rahman, Mother: Rowshan Jahan Vill: 18, North Circular Road, Vooter goli, P.O.: New Market 1205, Dhanmondi, Dhaka, District: Dhaka, Division: Dhaka.	Silver Medal, 30000/ cash and a Certificate

Annexure 2: Year-wise fish production in Bangladesh during last 10 years

[Unit: Metric Ton]

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
A. INLAND FISHERIES	**2381917**	**2381916**	**2515354**	**2683162**	**2821266**	**2952730**	**3085048**	**3251796**	**3496958**	**3621954**
(a) Inland Openwater (Capture)	**1029937**	**1029937**	**1054585**	**957095**	**961458**	**995805**	**10,23991**	**1048242**	**1163606**	**1216539**
(1) River and Estuaries	153695	153695	144566	145613	147264	167373	174878	178458	271639	320598
(2) Sundarbans	8109	8,109	22451	21610	15945	18366	17580	16810	18086	18225
(3) Beel (Depression)	70209	70,209	81564	85208	87902	88911	92678	95453	58117	99197
(4) Kaptai Lake	7117	7,117	8980	8537	9017	8179	8645	9589	9982	10152
(5) Flood Plain	790807	790,807	797024	696127	701330	712976	730210	147872	765782	768367
(b) Inland Closewater (Culture)	**1351980**	**1351979**	**1460769**	**1726067**	**1859808**	**1956925**	**2061057**	**2203554**	**2333352**	**2405415**
(1) Pond and Ditch	1140485	1140484	1270966	1392412	1446594	1526160	1610875	1719783	1833114	1900298
(2) Semi-Closed	0	46,902	51230	132163	200833	193303	201280	207658	215547	216353
(3) Baor (Ox-bow Lake)	8727	8727	4868	5186	6146	6514	7267	7729	8002	8072
(4) Shrimp/Prawn Farm	145,585	155866	184939	196306	206235	216447	223582	235758	246406	254367
(5) Crab's	-	-	-	-	-	-	-	-	140421	11787
(5) Pen culture	-	-	-	-		13054	16084	13364	13368	11015
(6) Cage culture	-	-	-	-		1447	1969	2062	2490	3523
B. MARINE FISHERIES	**517282**	**517,282**	**546333**	**578620**	**588988**	**595385**	**599846**	**6265**	**637476**	**654687**
(a) Industrial	34182	34,182	41665	73386	73030	76885	84846	105348	108479	120087
(b) Artisanal	483100	483,100	504668	505234	515958	518500	515000	521180	528997	534600
COUNTRY TOTAL (A+B)	**28,99,199**	**28,99,198**	**30,61,687**	**32,61,782**	**34,10,254**	**35,48,115**	**36,84,894**	**38,18,324**	**41,34,434**	**42,76,641**
ANNUAL GROWTH RATE (%)	**5.39**	**7.32**	**5.6**	**6.5**	**4.55**	**4.04**	**3.85**	**5.00**	**6.60**	**3.439**

Annexure 3: Fish Production Trend (1983-84 to 2017-18)

Sector of Fisheries	Production (mt)							Growth Rate % (2017-18)
	1983 - 84	1993-94	2003-04	2013-14	2015-16	2016-17	2017-18	
1. River and Estuary	207766	143425	137337	167373	178458	271639	320598	*18.024*
2. Sundarbans	7783	7127	15242	18366	16870	18086	18225	*0.769*
3. Beel	51373	55592	74328	88911	95453	98117	99197	*1.101*
4. Kaptai Lake	4057	6635	7238	8179	9589	9982	10152	*1.703*
5. Floodplain	200616	360597	497922	712976	747872	765782	768367	*0.338*
Capture Total	**471595**	**573376**	**732067**	**995805**	**1048242**	**1163606**	**1216539**	*4.549*
6. Pond	107944	222542	795810	1526160	1719783	1833118	1900298	*3.665*
7. 7. Seasonal cultured waterbody	0	0	0	193303	207658	215547	216353	*0.374*
8. Baor	862	2201	4282	6514	7729	8002	8072	*0.875*
9. Shrimp/Prawn Farm	8219	39447	114660	216447	239798	246406	254367	*3.231*
10. Crab**	0	0	0	0	13160	14421	11787	*-18.265*
11. Pen Culture	0	0	0	13054	13364	13368	11015	*-17.602*
12. Cage Culture***	0	0	0	1447	2062	2490	3523	*41.486*
Culture Total	**117025**	**264190**	**914752**	**1956925**	**2203554**	**2333352**	**2405415**	*3.088*
Inland Fisheries Total	**588620**	**837566**	**1646819**	**2952730**	**3251796**	**3496958**	**3621954**	*3.574*
11. Marine Fisheries	--							
13. Industrial	14500	12454	32606	76885	105348	108479	120087	*10.701*
14. Artisanal	150382	240590	422601	518500	521180	528997	534600	*1.059*
Marine Fisheries Total	**164882**	**253044**	**455207**	**595385**	**626528**	**637476**	**654687**	*2.700*
Total Fish Production	**753502**	**1090610**	**2102026**	**3548115**	**3878324**	**4134434**	**42,76,641**	*3.439*

Annexure 4(a): Annual Carp Hatchling Production 2018

Source of Production	No of Hatchery	Hatchling Production (Kg)	%
1) Natural			
Jamuna River		1767	
Padma River		2049	
Arialkha River		262	
Brahmaputra River		126	
Garai/Madhumati River		561	
Surma		8	
Halda River		4507	
Natural Total		9280	**1.35**
2) Artificial			
Govt. Hatchery	102	12059	2.00
Private Hatchery	818	666088	96.66
Artificial Total	920	678147	98.65
COUNTRY TOTAL	920	687427	100.00

Note: Hatchling of 4-5 days old. Growth rate of Natural Hatchling is 5.15% and Growth of Artificial is 8.83% z

Annexure 4(b): Hatchling Production of Govt. Hatchery, 2018

Name/Location of Hatchery	No. of Hatchery	Hatchling Production (Kg)								
		Major Carp	Exotic Carp	Pangas	Thai Punti	Bata	Koi	Shingi/ Magur	Other	Total
Fish Seed Multiplication Farm										
1. Dhaka Division	13	694.00	320.00	0.00	88.00	115.00	0.00	1.00	20.0	1238.0
2. Mymensingh Division	9	818.50	391.00	126.00	78.00	15.50	0.00	0.00	0.00	1429.0
3. Khulna Division	14	2390.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2390.0
4. Barisal Division	10	297.50	45.00	20.00	3.00	20.00	0.00	0.00	0.00	385.50
5. Rangpur Division	15	740.85	517.90	0.00	99.50	144.00	0.00	0.00	0.00	1502.3
6. Rajshahi Division	17	1222.50	921.10	10.00	77.00	305.00	0.00	0.00	0.00	2535.6
7. Chittagong Division	18	1308.25	317.00	0.00	78.50	18.00	0.00	0.00	25.0	1746.8
8. Sylhet Division	6	631.35	53.00	0.00	142.50	5.00	0.00	0.00	0.00	831.85
Total	102	8102.95	2565.00	156.00	566.50	622.50	0.00	1.00	45.0	12059

Annexure 4(c): Hatchling Production of Private Hatchery, 2018

Division	No. of Hatchery	Hatchling Production (Kg)									Tilapia Juvenile (Lakh)
		Major Carp	Exotic Carp	Pangas	Thai Punti	Bata	Koi	Shingi/ Magur	Other	Total	
Dhaka	43	16410	6906	0	2333	2337	268	804	607	29665	583.90
Mymensingh	198	51830	48106	27345	8695	2949	4413	11964	25767	181069	6912.74
Khulna	198	51830	48106	27345	8695	2949	4413	11964	25767	181069	6912.74
Barisal	42	15474	5986	133	839	30	361	85	120	23028	206.58
Rangpur	72	17655	20610	5291	2937	6012	310	537	302	53654	78.08
Rajshahi	175	44340	39416	53506	4825	13462	1467	1960	2462	161437	5401.10
Chittagong	178	52523	26968	14002	4403	975	577	625	1119	101192	8643.77
Sylhet	20	9363	1863	78	2883	19	0	89	38	14333	951.66
TOTAL	825	261954	183124	104579	28949	29768	8644	16319	32751	666088	26949

Note : (1) About four lakh hatchlings contain in one kg spawn and one kg contains 1000-1200 Tilapia juvenile.
(2) Other Species: Ghonia, Chitol, Gulsa, Pabda etc.
(3) No. of Hatchery mentioned which is under operation only.

Annexure 4(d): Annual PL (Post Larva) Production, 2018

Source of Production	Galda Hatchery		Bagda Hatchery		Total	
	No. of Hatchery	PL Production (Core)	No. of Hatchery	PL Production (Core)	No. of Hatchery	PL Production (Core)
Govt. Hatchery	27	0.45	0	0.00	27	0.45
Private Hatchery	19	4.76	49	1412.04	68	1416.80
TOTAL	**46**	**5.21**	**49**	**1412.04**	**95**	**1417.25**

Note: No. of Hatchery mentioned which is under operation only.

Annexure 5: Annual Catch of Marine Fisheries 2017-18

Type of Fishing	Number of Craft (Trawler/ Boat)	Number of Unit (Gear/Net)	Catch in Metric Ton			
			Shrimp	Hilsa	Other Fish	Total
A. Industrial						
Trawl Fishing						
a) Shrimp Trawler	37	111	2621	0	2749	5370
b) Fish Trawler	216	648	1061	11060	102596	114717
TOTAL INDUSTRIAL	**253**	**759**	**3682**	**11060**	**105345**	**120087**
B. Artisanal						
1. Gill Net Fishing						
a) Mechanized	20359	77768	0	251140	66545	*317685*
b) Non Mechanized	16831	40585	0	22300	20550	*42850*
SUB-TOTAL	**37190**	**118353**	**0**	**273440**	**87095**	**360535**
2. Set Bag Net Fishing						
a) Seasonal (MB)	10000	22404	30600	0	102185	132785
b) Seasonal (NMB)	5200	10000	10100	0	1590	11690
c) All Seasonal (NMB)	5550	10025	1300	0	425	1725
SUB-TOTAL	**20750**	**42429**	**42000**	**0**	**104200**	**146200**
3. Long Line Fishing						
a) Jew Fish Long Line						
Mechanized	2500	10191	0	0	16550	16550
Non Mechanized	400	900	0	0	500	500
b) Other Long Line (NMB)	325	772	0	0	200	200
SUB-TOTAL	**3225**	**11863**	**0**	**0**	**17250**	**17250**
4. Trammel Net Fishing (NMB)	131	422	1140	0	4150	*5290*
5. Other Gears Fishing (NMB)	6373	15640	2025	0	3300	*5325*
TOTAL ARTISANAL	**67669**	**188707**	**45165**	**273440**	**215995**	**534600**
GRAND TOTAL (A+B)	**67922**	**189466**	**48847**	**284500**	**321340**	**654687**

Growth Rate : 2.71% , (Hilsa : 1.99%; Shrimp : (-) 1.56% and other species : 4.02%)
Growth Rate (Industrial) : 10.70%; Growth Rate (Artisanal) : 1.06%

Trawler		Boat		Gear	
Type	No.	Type	No.	Type	No.
Shrimp Trawler	37	**MB** *(Mechanized Boat)*	32859	Gill Net	118353
Fish Trawler	216	**NMB** *(Non-Mechanized Boat)*	34810	Set Bag Net	42429
				Long Line	11863
				Trammel Net	422
				Other Gear	15640
Total	**253**		**67669**		**188707**

Annexure 6 : Species-wise Catch of Marine Fisheries 2017-18

[Unit : Metric Ton]

Type of Fishing	Shrimp (A)	Hilsa (B)	Other Species									Grand Total (A+B+C)
			Sardine	Bombay Duck	Indian Salmon	Pom fret	Jew Fish	Cat Fish	Shark/ Skate/ Ray	Other Marine Fish	Total (C)	
A. Industrial Trawl Fishing	**3682**	**11060**	40936	6050	0	849	3862	2735	549	50364	105345	**120087**
B. Artisanal **1 Gill Net Fishing**												
a) Mechanized	0	251140	475	6500	425	2800	21550	1650	1450	31695	66545	**317685**
b) Non-mechanized	0	22300	0	80	0	200	1850	100	25	18295	20550	**42850**
SUB-TOTAL	**0**	**273440**	**475**	**6580**	**425**	**3000**	**23400**	**1750**	**1475**	**49990**	87095	**360535**
2. Set Bag Net Fishing												
a) Seasonal	40700	0	40	62125	0	8050	1475	55	165	31865	103775	**144475**
b) All Seasonal	1300	0	0	115	0	0	0	30	35	245	425	**1725**
SUB-TOTAL	**42000**	**0**	**40**	**62240**	**0**	**8050**	**1475**	**85**	**200**	**32110**	104200	**146200**
3.Long Line Fishing												
a) Jew Fish Long Line												
Mechanized	0	0	0	0	42	0	3800	4075	1680	6953	16550	**16550**
Non Mechanized	0	0	0	0	20	0	165	125	40	150	500	**500**
b) Other Long Line	0	0	0	0	0	0	85	50	30	35	200	**200**
SUB-TOTAL	**0**	**0**	**0**	**0**	**62**	**0**	**4050**	**4250**	**1750**	**7138**	17250	**17250**
4.Trammel Net Fishing	1140	0	0	40	0	0	1490	470	0	2150	4150	**5290**
5. Other Gears' Fishing	2025	0	35	175	0	0	1150	165	0	1775	3300	**5325**
TOTAL ARTISANAL	**45165**	**273440**	**550**	**69035**	**487**	**11050**	**31565**	**6720**	**3425**	**93163**	215995	**534600**
GRAND TOTAL (Industrial+ Artisanal)	**48847**	**284500**	**41486**	**75085**	**487**	**11899**	**35427**	**9455**	**3974**	**143728**	**321541**	**654687**
%	*7.46*	*43.46*	*6.34*	*11.47*	*0.07*	*1.82*	*5.41*	*1.44*	*0.61*	*21.95*	*49.11*	*100.00*

Annexure 6 : Species-wise Catch of Marine Fisheries 2017-18

Sector	Bagda (Tiger)	Harina (Brown)	Chaka (White)	Others	Total	Growth Rate (%)
Trawl Fishing	253.31	1714.86	53.72	1660.11	**3682**	*14.38*
Artisanal Fishing	2300	3150	4500	35215	**45165**	*(-) 2.66*
Total	**2553.31**	**4864.86**	**4553.72**	**36875.11**	**48847**	***(-) 1.56***

Annexure 7: List of on going Development projects (2017-18)

SSL. No.	Name of the project and Implementation Period	Total PP Cost(Fig. in lakh)	Project Area	Objectives	Major Activities	Achiev--ement (%)
1.	Bangladesh Marine Fisheries Capacity Building Project (IDB/GOB) (July,2007-June, 2019)	17023.00	14 coastal districts, 49 upazilas	1. Assess the standing stock and MSY of estuarine and coastal fisheries resources. 2. Assess the standing stock of pelagic and demersal stocks of aquatic resources. 3. Undertake census and establish data bank on different types of fishing crafts and gears. 4. Develop a catch assessment program for routine maintaining of the coastal and marine fisheries as to changes due to the dynamics of fishing. 5. Develop mechanism to implement MCS system to oversee and manage the resources.	1. Marine fisheries survey and development of management framework. 2. Staff training for HRD. 3. Procurement of Research/Survey Vessel. 4. Development of an integrated data base for MCS.	92.12%
2.	Establishment of Fisheries Diploma Institute at Gopalgonj, Kishorganj&Sirajganj Districts (July,2011-December, 2017)	14383.37	Gopalgonj Sadar, Kishorganj Sadar & Belkuchi, Sirajganj Districts.	1. To develop skilled technical manpower for the fast growing fisheries sector through offering Fisheries Diploma Course to eligible candidates. 2. To establish a well equipped three diploma institutes with modern teaching facilities for the purpose of running Fisheries Diploma Course.	1. Construction of administrative, academic building, hostels, residence, dormitories, auditorium, prayer mosque, guard room, garage, sub-station & building hatchery building. 2. Construction of internal road, compound drainage system & boundary wall. 3. Pond excavation (1ha) &turfing constructions of pond water supply system & hatchery compounds. 4. Reconstruction of pond dyke with carted earth & pond protection work by RCC retaining wall.	99.43%

3.	Rehabilitation & development of fisheries infrastructure to increase production of quality fish seed & fingerlings (Jan, 2012-June, 2018)	14603.00	All over Bangladesh (61 Districts, 147 Upazilas)	1. To increase good quality seed & fingerlings production by controlling genetic decadence of carps. 2. To demonstrate and dissemination of modern aquaculture technologies among the farmers. 3. Increase production capacity of infrastructures through application of improved aquaculture technologies.	1. Land acquisition for new constructed DD, DFOs & UFOs office buildings. 2. Construction of DD, DFOs & UFOs offices buildings. 3. Repairing & renovation of FSMF -83, FBRTC-04 & DFTC-04 (Shrimp), DD/DFOs including the Savaracademy Bhaban& all necessary civil works.	99.02%
4.	Fresh Water Prawn Culture extension Project (2nd Phase) (July,2012-June,2018)	6247.13	7 Division, 61 Districts, 400 Upazilas	1. Establishment of one prawn culture demonstration farm cum training center in Eller Char, Satkhira and three training centers in Gopalgonj, Barisal&khulna District. 2. Renovation & operation of existing 19 small-scale demonstration hatcheries & nurseries. 3. Establishment of 6 small-scale demonstration hatcheries & nurseries. 4. Operation of Demonstration nursery ponds in potential upazilas of 61 Districts. 5. Skill development training on prawn hatchery and farm management. 6. Extension of GAP & GMP in prawn production & safe aquaculture food production. 7. Prawn brood development in selected public & private farm.	1. Establishment of Training Centers. 2. Old hatchery renovation work. 3. Galda brood development. 4. Establishment of Prawn Hatchery. 5. Management of Prawn Nursery. 6. Prawn Demonstration Nursery Program. 7. Training program. 8. Extension material preparation. 9. Data base preparation & conservation. 10. Field tour for the beneficiaries (Exchange visit).	93.46%

5.	Aquaculture Development & Extension Project (3rd Phase) in Chittagong Hill Tracts (July,2012-June,2018)	7088.22	All Upazilas in Rangamati, khagrachari &Bandarban districts	1. To increase fish production, enhance income & fulfill the nutritional demand of the household of the hilly people. 2. To develop hilly creeks/wetlands for aquaculture by making dam. 3. To develop nursery for fish fry rearing. 4. To provide training on aquaculture through different technology packages.	1. Creek development. 2. Nursery development. 3. Establishment of Khagrachari mini hatchery. 4. Spawns and fry production. 5. Training for fish farmers. 6. Repairing & renovation of existing mini hatchery.	97.13%
6.	Establishment of Beel Nursery and Fingerling Stocking in Inland Open Waters 2014 - Dec, 2017)	10630.20	Suitable beel and open waters in 60 districts of the country	1. Increase fish production from the capture fisheries through establishment of beel nursery. 2. Develop fish stock in the open water bodies through stocking fingerlings. 3. Improve socio-economic condition of the open water dependent poor fishers. 4. Restore aquatic bio diversity through stocking endangered fish species. 5. Create awareness among the open water dependent people for its sustainable management.	1. Stocking fingerlings. 2. Training of fishers and fish farmers. 3. Radio/TV advertisement. 4. Workshop/Seminar. 5. Establishment of beel nursery. 6. Group mobilization.	99.87%
7.	Neemgachi Community Based Aquaculture Project (Sep, 2014 June,2019)	3700.00	Raiganj and Tarash Upazila in Sirajgonj District and Chatmohar and Bhanura Upazila in Pabna District	1. Introduce community based aquaculture interventions in the public/khas ponds through community mobilization and increase fish production in the Neemgachi and adjacent districts. 2. Sustainable aquaculture production from different water-bodies by adopting suitable technologies. 3. Management of good quality broods at hatchery complex ponds and supply to the private and Public hatchery owners at affordable price. 4. Produce good quality fish fry and fingerling by using genetically improved broods as well as avoiding inbreeding and maintaining other protocols of fish breeding. 5. Create employment opportunities for the poor beneficiaries and to improve their livelihoods. 6. Improve socio-economic condition and establishment of rights through group formation by involving ponds/water-body surrounding poor and marginal people.	1. Construction, repair, and renovation of hatchery building. 2. Pond/water-body development. 3. Demonstration to transfer modern fish culture technology. 4. Farmers rally/field day. 5. Institutional capacity building. 6. Empowerment and capacity building for sustainable management.	90.84%

8.	Fisheries Development Project in Rangpur Division (Jan, 2015-Dec,2019)	6997.00	58Upazila, 08 Districts in Rangpur Division	1. To increase fish production through development of degradated water bodies. 2. To conserve biodiversity by establishing fish sanctuaries. 3. To enhance fish production by establishing beel nursery and stocking fish species. 4. To create employment through aquaculture. 5. Skill development of relevant beneficiaries through local training and demonstration. 6. To disseminate aquaculture technologies through local extension agent for fisheries (LEAF). 7. To strengthen institutional capacity by aquaculture and fisheries development.	1. Development water bodies through re-excavation and minor infrastructure development. 2. Establishment of fish sanctuaries. 3. Establishment of Bell nursery in beels/flood plains. 4. Aquaculture in unutilized semi open water water bodies (Beels, Canals, Dead River etc.) 5. Construction of earthen Enclosure. 6. Stocking of indigenous fish and fingerlings. 7. Implementation of fish conservation Act.	80.23%
9.	Brood Bank Establishment Project (3RD Phase) (Sep,2014-Dec,2019)	6225.58	27 Upazilas, 23 Districts	1. Ensuring supply of quality brood and fingerling by addressing inbreeding and cross-breeding problems to the Government and Private Farms. 2. Genetic improvement of broodstock of Carp and SIS species. 3. Supply of quality fry/fingerling at farmers' level. 4. Increase fish production. 5. Employment generation. 6. Poverty reduction.	1. Modernization of hatchery. 2. Pond development. 3. Installation of water supply system. 4. Construction of structures/repair/renovation. 5. Repair/Construction of boundary wall.	99.82%
10.	Culture of Cuchia and Crab in the selected areas of Bangladesh and Research project (Feb,2015-June,2019)	2573.96	Different parts of Bangladesh	1. To develop the techniques for Crab and Cuchia culture in ponds and rice field using habitat development approach 2. To explore of indigenous knowledge on crab and cuchia, and its habitat as well as social aspects regarding community based management of resources 3. To develop capacity of all stakeholders on crab and cuchia culture and management 4. To create employment opportunity for the poor beneficiaries specially "Adibashi" to improve their livelihoods 5. To promote export of crab and cuchia;	1. Demonstration of Crab fattening and Cuchia culture 2. Data collection and data bank development 3. Construction of Crab Hatchery 4. Development of private entrepreneurs 5. Development of marketing system 6. Exchange visit 7. Training for DoF personnel and fish farmers 8. Project beneficiaries and group mobilization	98.50%

11.	Expansion of Aquaculture Technology Services up to Union Level Project (Phase-II) (Mar 2015-Jun 2020)	27058.00	355 Upazilas in 61 Districts, covering 3000 Union of Bangladesh	1. To enhance aquaculture production by introducing improved aquaculture technologies in selected unions ensuring participation of the local fish farmers 2. To create employment opportunities for rural people though expansion of aquaculture enterprises 3. To develop institutional capacity, knowledge and skills of the relevant stakeholders through adequate training and improved facilities 4. To ensure effective participation of local institutions (union parishad) for ration use of aquatic resources for fisheries development 5. To establish Union-based Aquaculture Extension (UAE) system with the joint efforts of the DoF, Union Parishad, LEAF and the local fish farmers for sustaining field level extension services.	1. Aquaculture extension through LEAF at Union level 2. Upgrading, establishment of training center with dormitory; Repair & renovation of existing DoF training centre 3. Result demonstration farm on different fish culture technology 4. Result demonstration of semi-intensive Carp polyculture technology 5. Result demonstration of mixed culture of galda/bagda with Carp 6. Result demonstration of paddy cum fish culture 7. Pangas culture 8. Monosex Tilapia culture 9. Koi, Shing, Magur culture 10. CBO management of Common Beneficiary Group (CBG) farm 11. Data base preparation & conservation 12. Exchange visit program for DoF/project staff & beneficiaries	99.40%
12.	Greater Comilla District Fisheries development Project (Jul 2015-Jun 2021)	21131.00	33 Upazilas, 03 Districts, 01 Division	1. To increase fish production utilizing local fisheries resources 2. To create employment opportunities 3. To develop rural economy through aquaculture and fisheries 4. To develop human resources through training	1. Excavation/re-excavation of Beel/water bodies 2. Excavation/re-excavation of govt. pond and other closed water bodies 3. Establishment of sanctuary 4. Exchange of fishing net 5. Enhance fish act implementation 6. Training on aquaculture 7. Support for alternate income generating activities (AIGAs) 8. Establishment of fish landing center 9. Establishment of pen and cage culture activities 10. Establishment of training center 11. Demonstration of koi, shing, magur etc. culture in pond	99.99%
13.	Enhancement of Fish Production through Restoration of	29215.09	53 Districts and 229 Upazilas	1. To ensure food security and support to the government's poverty reduction efforts through increase of fish production at sustainable level	1. Re-excavation (Pond, dighi) 2. Re-excavation (Silted Beel/Dead river/canal) 3. Construction of pipe culvert	99.30%

				2. To increase consumption of fish for the people of Bangladesh 3. To increase income for the poor and marginal farmers through fish culture interventions 4. To increase income and employment of small scale fish seed traders and producers 5. To provide initial training and extension service and inputs for aquaculture interventions 6. To ensure involvement of beneficiaries group in practices with improved technology packages established by the Department of Fisheries 7.To produce marketable fish.		
14.	Grater Jessor Fisheries Development Project (Jan 2016-Dec 2019)	3916.44	21 Upazilas of 4 District	1. To increase fish production both from culture and capture fisheries in the greater Jessore region. 2. To protect fisheries bio-diversity through establishing fish sanctuary, stocking endangered fish/fingerling and creating awareness. 3. To improve fish habitat through re-excavation and development of minor infrastructure in the selected water bodies. 4. To create self-employment opportunities for the poor and landless people by enhancing various fish culture and related activities in the project area. 5. To ensure better income for reducing poverty of the fisheries and poor people of the project area.	1. Establishment of seasonal sanctuary 2. Stocking of indigenous fish and carp fingerling 3. Human resources development and capacity building through training 4. Project beneficiaries and group formation 5. Re-excavation of baor and dead river 6. Excavation of beel nursery 7. Implementation of fish conservation act 8. Infrastructure development 9. Repair/renovation of 1st and 2nd OLP baor.	95.10%
15.	National Agricultural Technology Programme Phase II Project (NATP-2) Oct 2015-Sep 2021)	38828.00	270 selected Upazilas of 57 Districts	To increase agricultural productivity of smallholder farms and improve smallholder farmer's access to markets in selected districts.	1. CIG formation 2. Training 3. Dissemination of technology 4. Habitat restoration and conservation of endanger fish species 5. 40 beel management through community based fisheries management 6. Development of fish marketing system 7. Strengthening of District and Upazila Fisheries Office 8. Development of DoF training center	96.90%

16.	Enhanced Coastal Fisheries (Eco Fish BD) (Jun 2014-Dec, 2019)	10522.30	Barisal, Bhola, Barguna, Chandpur, Jhalokathi, Laxmipur, Shariatpur, Patuakhali& Pirojpur	1. Improved science-based fisheries management decision making 2. Strengthen fisheries adaptive co-management 3. Enhanced socio-ecological and economic resilience of target communities	1. Capacity building training 2. Training for coast guards & law enforcement agencies 3. Workshops/seminars	100%
17.	Technical Support for Stock Assessment of Marine Fisheries Resources in Bangladesh (Nov 2016-Jun, 2019)	271.00	Countrywide	1. To support sustainable fisheries management through improved information and management planning. 2. To strengthen institutional capacity on stock assessment through increased knowledge 3. To enhanced capacity for fisheries management planning.	1. Survey design, data collection & management, data analysis and stock assessment training 2. Taxonomy and species classification and training 3. Technical assistance for vessel equipment specification 4. Workshop	97.91%
18.	Sustainable Coastal and Marine Fisheries Project in Bangladesh (SCMFP): Preparation Facility (March 2017- Dec 2018)	938.85	3 Division, 16 District, 75 Upazila	The overall objective of the project is to prepare project proposal (DPP) for Sustainable Coastal and Marine Fisheries Project in Bangladesh (SCMFP) through performing preparatory works, appraisal the activities of DoF officials and other stakeholders for launching of SCMFP with good understanding of stakeholders.	1. To prepare DPP of Sustainable Coastal and Marine Fisheries Project in Bangladesh (SCMFP)	56.31%

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