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Department of Fisheries
Ministry of Fisheries & Livestock

Annual Report 2020

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Director General
Department of Fisheries Bangladesh
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Preface

Bangladesh is blessed with the world's largest delta, the Ganges delta and with resourceful open water bodies like rivers, estuaries, haors, baors, canals, beels, floodplains and closed water bodies like oxbow lakes, ponds, ditches, borrow pits etc. and vast marine water bodies of the Bay of Bengal in the south.

These valuable resources are enriched with wonderful types of fishes and other aquatic flora and fauna. Fisheries resources have been playing a vital role in Bangladesh to maintain livelihood for fishers, to meet the demand of significant portion of animal protein, to build a talented nation, to alleviate poverty, to promote socio-economic development and to earn foreign exchange by exporting fish, shellfish and other fishery products.

Along with open water fisheries management this country has been concentrating on both fresh water and coastal aquaculture to boost up production during the decade of eighties to meet the demand of increasing population. Now this country is a wonder of the world in fish production as it stands 3rd in inland capture fish production, 5th in aquaculture fish production and 1st in Hils ha fish production in the world. DoF, Bangladesh is now looking forward with a high ambition to use vast untapped marine water bodies with their eyes on encouraging better stewardship of our ocean in the name of 'blue economy' in a sustainable way.

The fisheries sector contributing 3.52% to national GDP, 26.37% to agricultural GDP making the country capable of being self-sufficient in fish production is committed to produce safe and quality fish food for the nation and the world. Bangladesh fisheries and aquaculture will reach its peak using the utmost potentialities. The Annual Report 2020 may do a good enough job for the people willing to have fisheries related information of Bangladesh. It has been completed by the tireless labour of all the people and entities involved, my thankful appreciation and gratitude go to them.

Quazi Shams Afroz

ABBREVIATIONS AND ACRONYMS

BARC	Bangladesh Agriculture Research Council
BBS	Bangladesh Bureau of Statistics
BFRI	Bangladesh Fisheries Research Institute
BFD	Bangladesh Forest Department
BFDC	Bangladesh Fisheries Development Corporation
CEGIS	Center for Environment and Geographic Information Services
CWB	Cultured Water Body
DoF	Department of Fisheries
FAO	Food and Agriculture Organization
FD	Forest Department
FY	Fiscal Year
FRSS	Fisheries Resources Survey System
GAP	Good Aquaculture Practice
GDP	Gross Domestic Product
GI	Geographical Indicator
GO	Government Organaization
GoB	Government of Bangladesh
Ha	Hectare
HACCP	Hazard Analysis Critical Control Point
MoFL	Ministry of Fisheries and Livestock
MPA	Marine Protected Area
NFS	National Fisheries Strategy
NFP	National Fisheries Policy
NGO	Non Government Organization
NOC	No Objection Certificate
MT	Metric Ton
Kg	Kilogram
PL	Post Larvae
SPARRSO	Space Research and Remote Sensing Organization
SDG	Sustainable Development Goal

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1. Introduction

From the time immemorial , the Bengalis have been bearing the adage "Machhe Bhate Bangali", which translates to "Fish and Rice makes a Bangali". Fish is a popular complement to rice in the national diet. The favorable geographical position of Bangladesh comes with a large number of aquatic species and provides plenty of resources to support fisheries potentials. The scope of production of fish has unfurled because of vast area of water. Bangladesh is named the 'land of rivers' with criss- crossed rivers, khal-beel, haor-baor, pond, lake, ditch, flood plains and vast marine area are blessed with fisheries resources. That's why, the father of the nation and a visionary leader- Bangabandhu Sheikh Mujibur Rahman stated that fish would be the second major foreign currency earning source of Bangladesh.

The water resources have driven Bangladesh one of the world's leading fish producing countries. In 2019-2020, her production 45.03 lakh MT fish whereas the target was 44.85 lakh MT. The fisheries sector plays an important role of animal protein consumption, employment opportunity, foreign earnings, maintaining aquatic diversity and uplifting socio-economic development of Bangladesh. It contributes 3.52% to GDP and 26.37% to agricultural GDP. Now per capita fish consumption attains 62.58 grams/day against the set target of 60 grams/day. This sector provides about 195 lakh people that is 12% employment opportunity of the total population directly or indirectly.

This contribution of fisheries sector comes from three broad areas: inland capture fisheries (38,66091 ha), inland aquaculture(8,36,796 ha) and marine fisheries, of which inland aquaculture sub-sector is contributing more than 57.38%, capture 27.72% and marine 14.90% of the total production. Now Bangladesh acquired 3rd position in open water fish harvesting, 5th position in inland water fisheries, 4th around the globe and 3rd within Asia in telapia production, and 1st in 11 vital Hilsha consuming countries. (According to the report of 'The state of world fisheries and aquaculture, FAO 2020').

Shrimp industry of Bangladesh is one of the most important contributors for its economic development. In Bangladesh the main cultured shrimp is Tiger shrimp (locally known as "Bangda Shrimp") . It is a marine shrimp. There are two production zones for shrimp in Bangladesh, the southern region and the Chattogram region. Shrimp farming is having a positive impact on the livelihood of many people especially in the coastal region.

Bangladesh is a role model for Hilsha production in the whole world. Hilsha is our national fish and it got GI (Geographical Indicator) certificate. Hilsha is our own national pride. Bangladesh produces over two-thirds of total production of Hilsha. We are known as Hilsha's country. In 2019-20, 5.5 lakh MT Hilsha were produced here which was 83.94%, more than the production of 2008-09.

In 2019-20 fiscal year, Bangladesh earns 3985.15 crore taka against 70945.39 MT fish and fisheries products. Here only shrimp (galda+ bagda) earns 2948.94 crore taka. Shrimp, prawn, life fish, frozen fish, chilled fish, dry fish, salted/dehydrated fish, crab, shark fin/fish maws and others were the export items of fish and fisheries product.

Promoting aquaculture and shrimp farming through extension services, management of wetlands, conservation of the freshwater and marine water fisheries, application of information technology in aquaculture and open water fisheries, optimization of fish inspection and quality control programs and acceleration of farm mechanization have been adopted to reach the target. Well-equipped DoF personnel has been rendering e-extension services through different apps to the root-level farmers in remote areas. Laws and acts have been formulated and amended for quality fish and shrimp production.

The strategies and policies adopted and amended by the Department of Fisheries (DoF) envisaged the targets of 'Vision 2021'. Hence, it is DoF's endeavour to reach the targets encrypted in the 'Sustainable Development Goals (SDGs)' and 'Vision 2021' to reduce existing 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; and
- 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; and

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; and
k. Food safety measures for domestic markets.

1.3 Organizational setup

DoF has the following wings to render its services for the development of fisheries sector:

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

1.3.1 Manpower under revenue budget

In line with the Vision-2021 of the present democratic government in Bangladesh, the country is now well-prepared to succeed in its motive 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 5943 positions under the Director General (DG) along with 1 Additional Director General (ADG), 8 Principal Scientific Officer/Directors: there are 25 Deputy Directors including 8 Divisional Directors, 64 District Fisheries Officers, 71 Senior Assistant Directors, 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
1		2	3	4
Class-I	Cadre	1303	688	614
	Non-Cadre	333	288	45
Class-II		664	354	310
Class-III		2110	1707	403
Class-IV		1534	1355	179
Total		**5944**	**4392**	**1551**

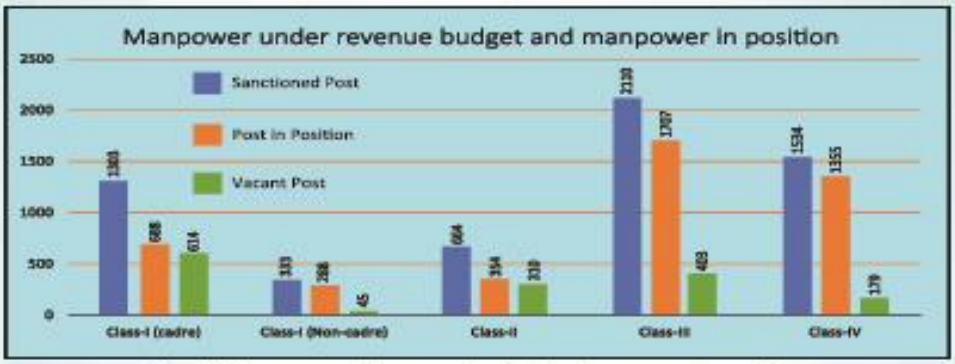

Fig. 1: Manpower under revenue budget and manpower in position

In order to meet the SDGs 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:

Fig.2: 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 lakh) (Taka in lakh)

Code No.	Description	2015-16	2016-17	2017-18	2018-19	2019-2020
1	2	4	5	6	7	
4500	Pay of Officer	4869.27	5113.20	5394.43	6591.23	7426.11
4600	Pay of Staff	5771.53	4624.58	4878.93	5431.4	5103.80
4700	Allowances	5670.38	6909.21	7324.56	8702.71	9222.04
4800	Supplies and	4738.57	5597.20	6833.46	6212.16	7282.05
4900	Repair-Maintenance	754.70	743.56	761.62	546.82	768.74
7000	Civil Works	390.00	310.00	316.00	340.67	30.00
6800	Assets Procurement	349.00	360.00	375.00	338.35	439.63
6900	Land	-	-	90.00	160.0	00
1200	Special Activities	-	-	-	180.0	180.00
Total		**22543.45**	**23657.75**	**25974.00**	**28503.34**	**30452.37**

1.4.2 Development budget

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

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

Financial Year	Number of Project	Development budget						Achievement
		Allocation			Expenditure			
		Total	Local Currency	Project Aid	Total	Local Currency	Project Aid	
1	2	3	4	5	6	7	8	9
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%
2018-19	14	35885.00	25993.00	9892.00	35464.59	25746.25	9718.34	98.83%
2019-20	10	34648.00	26071.00	8577.00	24645.49	18544.30	6101.19	71.13%

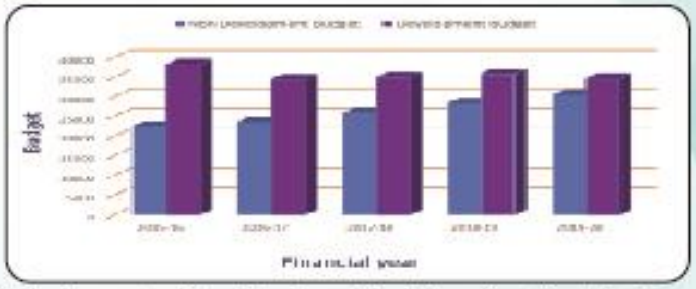

Fig.3: Development and Non-Development budgetary allocation of last five years

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	2015-16	2016-17	2017-18	2018-19	2019-20
1	2	4	5	6	7	
1431101	Penalty	7171	8449	5563	6030	3927
1423204	Rent of Govt. vehicles	18	41	475	27	23
1423213	Fish hunting fee	3256	3177	3026	2777	3303
1423213	Other service fee	16922	16373	17934	16223	186
1421301	Rent of non-residence	122	216	85	512	365
1421302	Rent of Residences	1707	1000	1122	1825	2531
1423213	Fish and fisheries product	124242	63575	10615	12344	90305
1422328	Tenders and other documents	1104	235	23	116	677
1423226	Non-usable materials and scrap etc.	94	33	0	120	3
1423226	Miscellaneous non-commercial sale	531	1627	2943	122	1382
1441202	Refund of extra payment	191	2	51	440	87
1441299	Miscellaneous revenue earning	3941	5982	3201	2242	9282
1423201	Examination fees					0
1431101	Forfeiture					7
1431101	Farm and company registration					1662
1422199	Lisence fee					28659
	Total	159299	100710	14057	15387	142399

2.0 Fisheries Resource Management

Bangladesh is endriched with vast fisheries resources. Due to favorable natural conditions and geographical location, these fisheries resources have a high potential of increasing fisheries production. The fisheries resources of our country 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 47.02 lakh ha and marine capture covers 1,18,813 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 27.65 lakh 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 2.57 lakh ha of land by 2020 from1.4 lakh ha in1980.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. Only14.90%

of total fish production comes from marine capture fisheries and 85.10% from inland fisheries. The status of fisheries resources and fish production of the country is shown in Annexure 2.

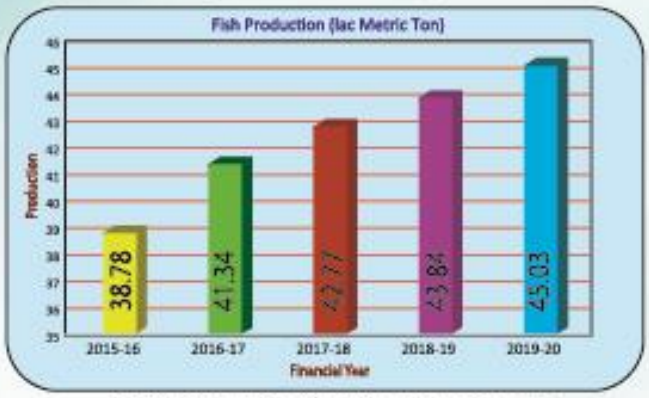

Fig. 4: Fish production during the last 5 years

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 were undertaken. Through the execution of Fisheries Friendly Policy of the present government, total fish production has been increased from 34.10 lakh MT in 2012-13 to 45.03 lakh MT in 2019-20.

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

- Demonstration of aquaculture technology;
- Problem solving advices in the office;

- Use of Fisheries information & community 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 (a): Production of carp hatchling of last 5 (five) years

Source of Production	2016		2017		2018		2019		2020	
	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)
1	4	5	6	7	8	9	10	11	12	13
Government fish farm	89	14775	85	12826	102	12059	103	13485	102	14924
Private hatchery	902	614433	814	650636	824	674695	935	650535	1068	972910
Total	**991**	**629208**	**899**	**663462**	**926**	**686754**	**1038**	**664020**	**1170**	**987834**

Table 5 (b): Production of fry in last 5 (five) years

Year	Govt.Nursery (Production in Lakh)	Private Nursery (Production in Lakh)
1	2	3
2016	278	82847
2017	252	87912
2018	277	82236
2019	338	82116
2020	441	95,726

Fig. 4: Fry production during 2016-2020

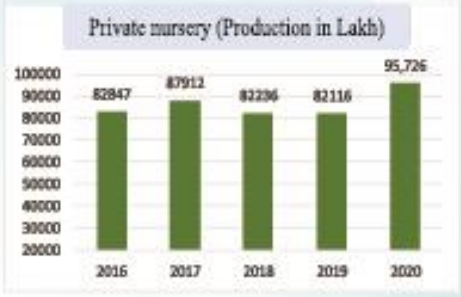

Fig. 5: Fry production during 2016-2020

Fish seed production 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.

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 2016-2020 is shown in the table 6.

Fertilized eggs collection from unique Halda river

Table 6: Carp hatchlings collection from natural sources

Year	Fish hatchling (Kg)
2016	4819
2017	5067
2018	9274
2019	2496
2020	2606

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 33 galda and 43 bagda hatcheries have been established by both Govt. and private sector which produced 792.952 crore bagda and 2.36 crore galda Pl in the country in 2020 (Table-7).

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

Name	2016		2017		2018		2019		2020	
Galda	36	4.65	36	5.05	46	5.21	35	1.58	33	2.36
Bagda	49	1314.20	49	1383.04	49	1412.04	42	979.37	43	792.952
	85	1318.85	85	1388.09	95	1417.25	77	980.95	76	795.312

2.3 Freshwater aquaculture

Harvesting of fish in freshwater

The country has immense natural potential for developing the fisheries sector. Aquaculture production contributes 57.38 % 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 4.04 lakh ha and pond aquaculture is producing about 20.46 lakh MT fish which contributing 45.44 % of total inland production in 2019-2020.

Fish culture in pond

Table 8: Status of pond culture (2019-20)

Culture Method	Production Range	Number of Pond	Area (Ha)	Production (MT)
Extensive	*<1.5MT/Ha*	4,97,296	32,606	43710
Semi-intensive	*1.5-4 MT/Ha*	14,32,410	2,43,650	897923
Intensive	*>4 - 10MT/Ha*	4,84,585	1,09829	752164
Highly Intensive	*>10 MT/Ha*	75,612	19412	362,461
Total		**24,89,903**	**4,04,497**	**20,46,258**

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 Water bodies 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

Project : Enhancement of Fish Production through Restoration of Waterbodies Project Year: 2019-20

Table 9: Improvment of different types of water bodies under Enhancement of Fish Production through Restoration of Waterbodies Project

No of sceme	No of district	Developed area	Total expenditure(lakh taka)	No of beneficiaries
217	19	181.808 ha	2929.694	2941

Developed waterbody

2.3.3 Fish culture in baor (Ox-bow Lake)

Baor at Jashore

Six baors of Jashore and Jhenaidah districts were taken under DoF through the MoU signed between Ministry of Land and Ministry of Fisheries & Livestock for biological management. In 2019-20, 570.53 MT of carp fishes and 258.82 MT of Small Indigenous Species (SIS) were produced from six Baors. These baors produce 1225 kg of fishes per hectare. Local fisher communities are involved in the baor management and they have improved their livelihood. There are 5,671 ha baor area in the south-west part of our country where total 10,969 MT fish are produced in 2019-20. Defferent 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. Major carps, pangas, boal, shol, gazar, koi, shing, magur, tilapia, nilotica, shar puti/thai puti, cuchia, other inland fish, big shrimp, small shrimp/prawn, various exotic carps are available in baors.

2.3.4 Cage culture

Cage culture

Several decades ago, attempts were taken to raise fish in cages under different development projects by several institutions / organizations of the country. Nowadays, cage culture is very popular, interesting and attracting means of livelihood and people are engaging themselves day by day in this culture system with fish species like monosex tilapia, pangas, koi, singh, magur, thai swarpunti etc. Cage culture of monosex tilapia is being practiced in Chandpur, Laxmipur, Faridpur, Barishal, Mymensingh, Dhaka, Munsigonj, Gopalgonj, Norsingdi, Pabna and other regions of the country. In 2019-20 highest cage culture is done in Sirajgonj district.all over the country .In 2019-20, about 4590 MT fishes wre produced from 9646 cages (area:179223 m3) by cage culture.

2.3.5 Pen culture

Pen culture is also one of the potential means of producing fish from vast water body 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 2019-20, about 13425 MT fish were produced from pen culture area of 7263 hac.

Pen culture

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 nowadays 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. In 2019-20 11827.32 MT cuchia is exported earning 254.32 crore taka.

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, reported to cure weakness, anemia and asthma.

Fresh water mud eel culture

Considering the importance of this species in nutritional, medicinal, economic and biodiversity, by a project of DoF, cuchia culture has been started. In 2019-20, through culture and capture, cuchia's total production was 13424 MT.

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 being cultured 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).

Shrimp farming

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. By 2020 over 186275ha of land were brought under bagda culture and till it is increasing. 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 cultured in Bagerhat, Khulna, Satkhira and Cox`s Bazar. The culture system of bagda involves traditional extensive to improved extensive. In 2019-20 bagda production in Bangladesh was 64688 MT.

Table 10: Shrimp farming and production

Year	Area farmed (ha)	Shrimp production (MT)	Remarks
2015-16	206763	68217	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.
2016-17	205654	68272	
2017-18	184821	61709	
2018-19	185308	63171	
2019-20	186275	64688	

Source: Fisheries statistical yearbook of Bangladesh 2019-2020, 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 were harvested from the rivers, 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.

Golda prawn

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 2019-20 the unit production of galda is 713 kg/ha. Currently galda are farmed in gher, pond and paddy field covering an area of about 0.71 lakh ha. About additional 1.42 lakh MT fish are produced along with galda.

Table 11: Prawn (galda) farming and production

Year	Area farmed (ha)	Production (MT) Prawn
2015-2016	68746	46189
2016-2017	67063	48574
2017-2018	73860	51571
2018-2019	73245	52197
2019-2020	71613	51096

Source: Fisheries statistical yearbook of Bangladesh 2019-2020, FRSS, DoF.

2.4.3 SPF black tiger shrimp

Shrimp aquaculture is an important foreign currency earning sector of Bangladesh. Besides, more than a million coastal people depend on their livelihood on Black Tiger Shrimp (*Penaeus monodon*) culture. By 2019-20 over 186275 ha of lands are used for black tiger shrimp cultivation in south-west region i.e Bagerhat, Khulna, Satkhira and Cox's Bazar. At present, 43 Bagda shrimp hatcheries are operated in Bangladesh to produce post larvae (PL) for shrimp farms. These shrimp hatcheries produce about 792.952 crore shrimp PL in the year 2019-20. 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 have performed 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 first time from Hawii of America.

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 farming 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 the year of 2020 about 41.581 crore disease free PL are 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 a valuable export commodity. After shrimp, mud crabs have become the second-most exported crustacean from Bangladesh. Because of high prices ininternational markets, mud crab farming is gaining popularity in the coastal districts of Bangladesh. It has been harvested in greater Khulna, Barisal and Chittagong 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 crab 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 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.

Adult crab

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: 12 Crab farming and production

Year	Area farmed (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	
2018-2019	9377	12084	
2019-2020	9535	12562	

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

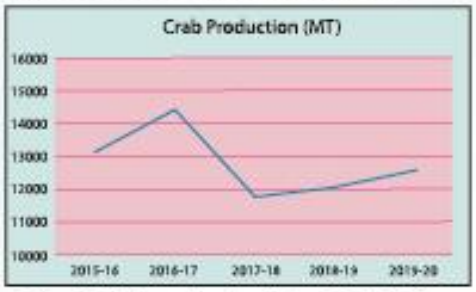

Fig. 6: Crab production during 2016-2020

A crab hatchery has been established in Kolatoli, Cox's bazar in 2018 by DoF. Live food culture and production of crablet started.

2.5 Inland open- water fisheries resource management

Flood plain

The open water body of Bangladesh looks like a vast sea as recognition of her large water body. It has potential as inland open water resources, including 8,53,863 ha of rivers and estuaries, about 1,77,700 ha of Sundarbans (in 2019-20 annual fish production was 21007 MT), 1,14,161 ha of natural depressions or beels, 68,800 ha of Kaptai reservoir (in 2019-20 production was 12696 MT) and about 2651567 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)

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 10 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.

CBO's meeting

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 water bodies, floodplains and closed water bodies 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.

Stocking of fish fingerlings

Table: 13 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
2018-2019 (P+R)	7.3225	87361	9.887	266.00	971488
2019-20(P+R)	7.3976	86530	7.308	270.82	843100

2.5.3 Beel nursery:

Beel nursery has been proved to be a significant tool for increasing fish production in natural waterbodies. 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

Beel nursery activities

water bodies. During 2019-20 fiscal year 420 beel nurseries were successfully established 387.60 lakh fish fry added with stock, and 336991 beneficiaries are involved .

2.5.4 Establishment and management of fish sanctuary

Fish sanctuary at Pabna

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. Sanctuary management enhance and conserve aquatic bio-diversity, protect and conserve endangered fish species from extinction. It ensure food scurity through fish production, increase fish stock, ensure flow of food chain and protect the genetic pollution. Fish sanctuary is the permanent shelter for protection of fish for natural propagation. By sanctuary management there were found abundance of endangered species like Chital, Foli, Kalibaosh, Aair, Tengra, Meni, Rani, Swarputi, Pabda, Kajoli, Gojar, Tara baim etc. Hence, establishment of sanctuary has become obligatory to protect and conserve these species from extinction and increase fish biodiversity. In fact the advantages of sanctuary is infinite. From this point of view sanctuaries are managed regularly from 2015-16 fiscal year under revenue program. Besides this, different development projects are establishing and restoring habitat as santuary.

2.6 Marine fisheries resources management

2.6.1 Marine fisheries resource conservation and management

Bangladesh is blessed with her vast coastal and marine resources. By the virtue of Solemnity and sincere leadership of Honorable Prime Minister Sheikh Hasina, Bangladesh established her legitimate right in 1,18,813 sq Km area of the Bay of Bengal resolving dispute over maritime boundary with neighbour countries Myanmar and India during 2012 and 2014 respectively settled by International Tribunal on the Law of the Sea (ITLOS) and International Court of Arbitration. This verdict ensures the sovereign right to explore, exploit, use, preserve, develop and manage the living and non-living resources in the EEZ of the Nation. Moreover, it also opens the opportunity for Bangladesh to fulfillment of animal protein, employment, poverty alleviation, export earnings, growth around sectors such as fisheries, aquaculture, tourism, explore of natural resources, trade as being to promote and strengthen her blue economy for well-being of the nation. It is now very significant to take effective initiatives for promotion and strength of her blue economy keeping the Marine Bio-bank sustain through proper conservation, management and scientific yield from the vast Marine ecosystem.

Discussion on blue economy started in Bangladesh after the settlement of maritime boundary. In 2014 by the guidance of the Ministry of Fisheries and Livestock, Department of Fisheries has taken short term, midterm and long term "Plan of Action (NPOA)" to address sustainable catch and conservation of marine fisheries resources to rise up Bangladesh as a middle earning's country. The "Plan of Action" updated in 2018 according to the SDG (2018-2030) of FAO.

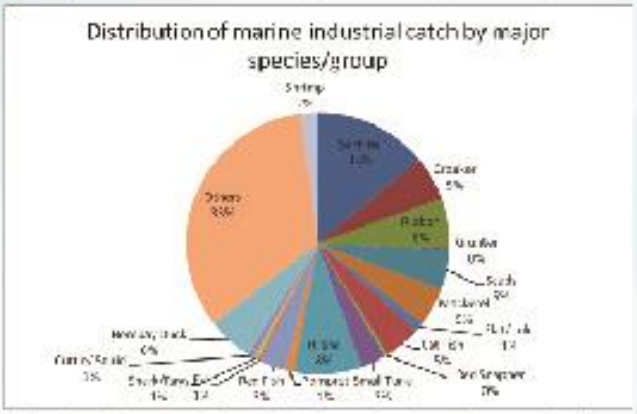

Fig. 07: Distribution of marine industrial fish catches by major species/group in 2019-20

Current management and exploration is to address Sustainable Development Goals (SDGs) Goal 14 life below water: 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 marine fisheries resources

1. Bangladesh has acquired a high-tech multipurpose fisheries survey and research vessel "R V Meen Shandhani" with the aid of Islamic Development Bank and Malaysian Government under the previous project "Marine Fisheries Capacity Building (BMFCB)" under DoF. Honourable Prime Minister has launched it on 19 November 2016.
2. A TCP Project on "Technical Support for Stock Assessment of Marine Fisheries Resources in Bangladesh" funded by FAO has been implemented for skill develop, formulate survey design and plan, operating survey cruises by "R V Meen Shandhani". The project has been completed in June 2019.
3. The Fisheries Research and Survey vessel "R V Mean Shandhani" have already conducted 31 survey cruises till May 2021 in the Bay of Bengal. All the collected data by the survey vessel have been preserved for further biological analysis. The first Survey Report for 2016-17 to 2018-19 has been published (link: http://mfsmu.fisheries.gov.bd/site/download/03cb42dc-8a4f-4dd3-a08943e5f5bcf61b).
4. The report now being used for the development of Marine Fisheries Management Plan.
5. In accordance with the report, from 31 survey cruises, 457 fish and others species has been

identified. Where 373 species of fish, 21 species of sharks & rays, 24 species of shrimps, 21 species of crabs, 03 species of lobsters, 01 species of mantis, 04 species of octopus, 05 species of squids and 05 species of cuttle fish have been recorded.

Survey vessel R. V. Meen Shandhani

6. With the assistance of Food and Agriculture Organization (FAO) of the United Nations and Institute of Marine Research (IMR) under the program of EAF-Nansen, an Acoustic Survey has been conducted in the Bay of Bengal with the Research Vessel R.V. Dr. Fridtjof Nansen during 02- 17 August 2018.

7. A database has been established which is accessible via DoF website. Data on crafts and gears have been collected and incorporated into the project Database (192.168.2.102/bmfcb). Updated data from the land based survey have been incorporated. Authorized persons and organizations can access data from the DoF website at www.fisheries.gov.bd.

2.6.3 Enacting Acts, Rules and Policies

1. Marine fisheries sector is governed by "Marine Fisheries Act, 2020" (Previous The Marine Fisheries Ordinance, 1983);
2. "Marine Fisheries Act, 2020" has been passed on 16 November 2020 in the 11th National Parliament and published to Govt. gazette on 26 November 2020;
3. After completing a series of policy dialogue with the concerned stakeholders, a revised "National Marine Fisheries policy 2020" has been drafted and submitted to the Ministry of Fisheries and Livestock on 06 February 2020;
4. All industrial fishing trawlers and mechanized fishing boats are required to have license for fishing;
5. Industrial fishing trawlers are mandatory 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 zone. Mechanized fishing boats are allowed to fishing below 40 meter depth zone.

2.6.4 Monitoring Control and Surveillance (MCS):

a. Establishment of Vessel Monitoring System (VMS) and Joint Monitoring Center (JMC) :

Observation of vessel monitoring by Director General of DoF

i. Vessel Monitoring System (VMS) software prepares, Fisheries Monitoring Centre (FMC) and establishment work is ongoing by "Sustainable Coastal and Marine Fisheries (SCMF)" Project.;

ii. Automatic Identification System (AIS) shall have to install in large mechanized fishing boats by this project;

iii. Joint Monitoring Center (JMC) approved by Ministry of Fisheries and Livestock;

iv. DoF prepared a draft of Memorandum of Understanding (MoU) for operation Joint Monitoring Center (JMC);

b. Surveillance check post and landing centre:

i. DoF has a Marine Fisheries Surveillance check post at Patenga, Chattogram and 16 Marine Fisheries Surveillance check posts are going to be set up at coastal areas by "Sustainable Coastal and Marine Fisheries" Project;

ii. Primary site selection completed for establish of 16 Marine Fisheries Surveillance check posts;

iii. Procurement process is ongoing of 16 patrolled boats for 16 Marine Fisheries Survlance check posts;

iv. 65 landing centers shall be establish by "Sustainable Coastal and Marine Fisheries" Project.

c. 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, Mercantile Marine Department, Border Guard Bangladesh, Bangladesh Marine Fisheries Association, Mechanized Boat Owner's Association, 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 fisher's villages to actively discourage the deleterious impacts of destructive fishing methods and gears. Fishers and the representatives of local people are motivated to show respect for Marine Fisheries Ordinance 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) to eliminate Illegal, Unregulated and Unreported (IUU) fishing in the Exclusive Economic Zone (EEZ) of Bangladesh in place.

2.6.5 Marine fisheries resource management approaches

1. Mesh size of trawl nets and gears are controlled for industrial fishing trawlers;
2. Minimum mesh size 45 mm is mandatory at the cod end for shrimp trawl and 60 mm for the fish trawl;
3. ESBN (Estuarine Set Bag Net) has been banned (Prohibition in operating illegal estuarine set beg net throughout the year has been declared on 7 April, 2013).
4. To facilitate spawning and conservation of marine fisheries resources, fishing has been banned for 65 days from 20 May to 23 July in each year, for all types of vessels in the Bay of Bengal;
5. The Government has imposed a 22 days ban period during the peak breeding season of Hilsa in every year to ensure the breeding of Hilsa;
6. The Government has prohibited "Jatka" (Below 25 cm size Hilsa) fishing for 08 months (November to June) in every year to coastal and marine water;
7. Juvenile Hilsa (Jatka) Conservation Week has been observed in 36 Upzella as a national program to protect Juvenile Hilsa to ensure their growth;
8. Under The "Marine Fisheries Act, 2020" (Previous The Marine Fisheries Ordinance, 1983) fishing area is demarcated for small-scale fisheries to minimize the conflict between industrial fishing vessels and artisanal fishing vessels;
9. Harvesting provisions are made in three tiers: (1) up to 40 m depth artisanal and mechanized boats operate; (2) from 40 m to 200 m depth industrial trawlers operate; and X. (3) from 200 m depth to the end of the EEZ long-liner and purse seiner operate;
10. No new fishing license for industrial fishing vessels (mid water/ bottom trawler/shrimp trawler) are providing since 2015;

2.6.6 IUU catch monitoring

1. The Government has enacted the "Marine Fisheries Act, 2020" 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 (CCS) 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. The "National Plan of Action" (NPOA)- IUU Fishing has been developed with the assistance of Food and Agriculture Organization (FAO) of the United Nations through a regional Technical Cooperation Project (TCP) on "Support to countries to

address Illegal, Unreported and Unregulated (IUU) fishing" with joint collaboration of Bangladesh, Cambodia, Myanmar, Thailand and Vietnam. The project completed its tenure in December 2019. The draft "National Plan of Action" (NPOA)- IUU Fishing has been approved by the Ministry of Fisheries and Livestock;

6. Bangladesh has signed the FAO Agreement on Port State Measures (PSMA) 2009 in 2019 to prevent, deter and eliminate Illegal, Unreported and Unregulated (IUU) fishing.

2.6.7 Marine Reserve/Protected Area (MR/MPA)

1. As a protective management measure, in the year 2000 the Government has declared 698 sq. km Marine Reserves (MR) area in the Bay of Bengal to protect and conserve marine fisheries resources. Marine Reserves area is protected from fishing.
2. In 2019 the Government has declared 3,188 sq. km area at NijhumDewip and it's adjacent area of Hatia, Noakhali coastal zone as "NijhumDewip Marine reserves". To take a management plan of reserves is under processing.
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.

2.6.8 Fishing Fleet Operation

In Bangladesh, traditional fisheries exist side by side with commercial fisheries. About 231 industrial trawlers were active in fishing out of 257 industrial fishing trawlers in the fiscal year of 2019-20. At the same time 67,669 mechanized and artisanal boats were engaged in traditional fishing in the Bay of Bengal. These traditional mechanized and artisanal fishing boats are involved in use of relatively simpler gears such as gillnets, set bag nets, trammel nets by the array of boats. Artisanal 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 7 to 9 days within 40 m depth of contour carrying ice cubes in their boats. Number of fishermen varies from 15 to 30 based on size and gear used.

Based on freezing and preservation capacities, industrial trawlers are of two kinds; trawlers having still hulled (Categorized as freezer trawler) and wooden body trawlers (Categorized as non- freezer/ice trawler). Based on fishing mode they are also different types like bottom fishing trawler, mid-water trawler and shrimp trawler. 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.

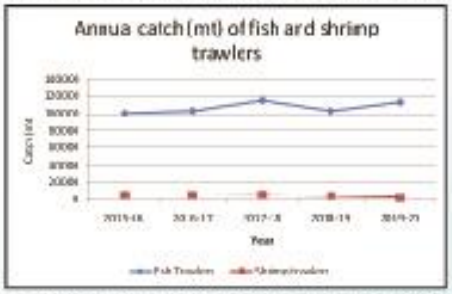

Fig. 08: Historical annual catch by industrial trawler fleet 2015-16 to 2019-20.

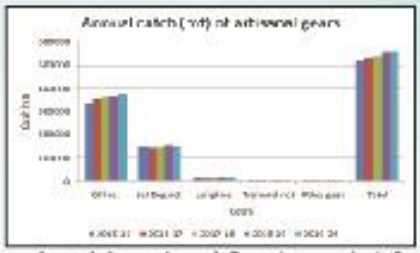

Fig. 09: Historical annual catch by artisanal fleet (gear-wise) from 2015-16 to 2019-20.

2.6.9 Licensing activities of mechanized fishing boats

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

Table 14: Licensing activities of mechanized fishing boats

Year	License Issues (Nos.)			Revenue (Lac taka)
	New	Renew	Total	
2015-2016	273	1269	1542	40.89
2016-2017	313	1255	1568	41.57
2017-2018	332	1229	1561	42.13
2018-2019	114	1186	1300	37.41
2019-2020	159	1295	1454	45.16

2.6.10 Licensing activities of industrial fishing vessel/trawler

During 2019-20, a total number of 257 industrial trawlers were engaged in fishing into the EEZ. The fleet comprised of 37 shrimp trawlers, 59 demersal trawlers and 122 mid-water trawlers. 39 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 MMO. They also require fishing license from MFO or from coastal DFO's offices. All fishing licenses are subject to be renewed every year.

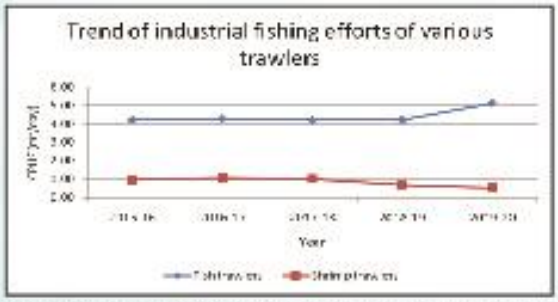

Fig. 10: Trend of industrial fishing efforts of various trawlers from 2015-16 to 2019-20.

2.6.11 Deep sea fishing

1. The Government has taken initiatives to exploit tuna and tuna like fishes and other large pelagic fishes from the deep sea Area Beyond National Jurisdiction (ABJN). The Ministry of Fisheries and Livestock has issued permission against 10 long liner and 07 purse seiner vessels. The awarded companies are in the effort to collect appropriate vessel and equipments.
2. Ministry of Fisheries and Livestock have been permitted to import/bring 01 long liner type and 01 purse seiner type fishing boat by joint venture to exploit tuna and tuna like fishes and other large pelagic fishes from the deep sea area of international waters;
3. Bangladesh has achieved her full membership that is the Contracting Party Status of Indian Ocean Tuna Commission (IOTC) on 24.04.2018 that would help us to build up tuna industry in near future.
4. A pilot Project is implementing on "Tuna and Tuna like Fishing and other Pelagic Fishing at the Deep Sea". Project cost is GoB contribution 6,106.00 lac tk. and Project period is July 2020 to December 2023; By this project:

i) 03 long liner type fishing vessels (fishing boats including fishing gears) have to procure under processing;
ii) Have to conduct the abundance of tuna and tuna like fishes in the deep sea area of Bangladesh EEZ and international waters;
iii) Appreciate the private entrepreneurs to exploit tuna and tuna like pelagic fishes in the deep sea Area Beyond National Jurisdiction (ABJN);
iv) Achieve the knowledge and experience about exploit tuna and tuna like pelagic fishes in the deep sea and international waters;
v) There is provision to employ 44 nos of crews including 07 nos of foreign crews;
vi) Build up 100 numbers of experienced manpower to exploit tuna and tuna like fishes and other large pelagic fishes from the deep sea area;
vii) Explore opportunities of abroad training and study tour about abundance and exploit tuna and tuna like pelagic fishes in the deep sea area of 26 officers.

2.7 Hilsa fishery conservation, exploitation and management

Hilsha is the most popular food for its taste and flavor to the southern people of Asia. It is indissolubly linked with our tradition and culture. Hilsha is also our national fish. Not only that, hilsha has a great economic contribution to our national economy. In 2019-20 the production of hilsha is 5.50 lakh MT which contributes 12.21% of total fish production which is the highest as a single species and more than 1% of total GDP. About 6 lakh people are directly involved with hilsha catch and about 25 lakh people are indirectly involved with the trade of hilsha. Hilsha production is increased about 78.24% in previous 11 years, that means the average growth rate of hilsha production is 7.11% per year and in previous 17 years hilsha production has been increased about more than 2.5 times.
Growth Chart of Hilsha Production:

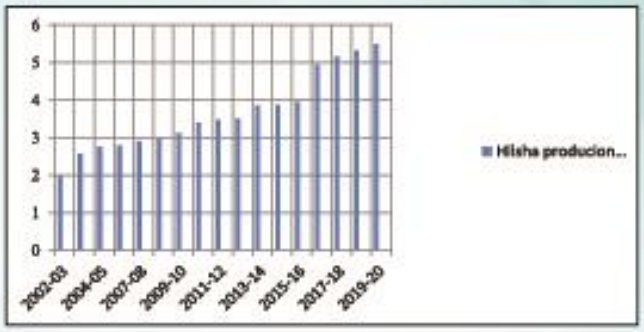

Fig.11: 17 years hilsha production

Government took different initiatives to increase and sustain the hilsha production. The major activities are

- Formulating and implementing "Hilsha Fisheries Management Action Plan";
- Identifying 7000 sq. km. major hilsha breeding area in the Bay of Bengal;
- Establishing 6 hilsha sanctuaries;
- declaring 3188 sq. km. Marine Reserve Area Adjacent to Nijhum dwip;
- Imposing 22 days ban on hilsha fishing at the peak spawning period of hilsha;
- Imposing 8 months (November-June) ban on jatka fishing;
- Imposing 65 days ban on all kind of fishing in the Bay of Bengal;
- Developing the livelihood of hilsha fishermen by giving VGF (vulnerable group feeding) and AIG (Alternative Income Generation).

2.7.1 Brood hilsha conservation activities:

In 2002, Department of Fisheries prepared the Hisha Fisheries Management action plan and Ministry of Fisheries and Livestock approved that, after giving approval according to the rule 13 (b) of the The Protection and Conservation of Fish Rules, 1985, brood hilsha conservation activities had been started from 2006 in 7000 sq. km. of the Bay of Bengal for 10 days. In 2011, government amended the rule 13 of the The Protection and Conservation of Fish Rules, 1985 by a gazette notification. After that from 2011 to 2014 brood hilsha conservation activities substantiated for 11 days. In 2015 government further amended the rule with the consultation of the hilsha researchers and other stakeholders, in that amendment the ban period on hilsha fishing was increased from 11 days to 15 days. Then finally the hilsha ban period was ordained 22 days during the peak spawning season of hilsha by a gazette notification in 2017. By the direct guidance of Ministry of Fisheries and Livestock Department of Fisheries substantiate the brood hilsha conservation operation and the civil administration, Bangladesh Navy, Bangladesh Air force, Bangladesh Police, River Police, RAB (Rapid Action Battalion), Coastguard, BGB (Border Guard Bangladesh) etc cooperate to implement the operation during 22days ban period on hilsha fishing.

In 2020, "Brood Hilsha Conservation Operation-2020" was substantiated all over the country from 14 October to 04 November. During this period 2640 mobile court and 19818 operations were conducted, by which about 45.413 MT brood hilsha and 1291.45 lakh meter fishing net were seized.

Seized net were destroyed in the presence of executive magistrates and the fish were distributed to the orphanages. Through these operations fishermen were fined 90.83 lakh taka and 5533 fishermen were sentenced to imprisonment.

A bird's eye view of "Brood Hilsha Conservation Operation" from 2016 to 2020:

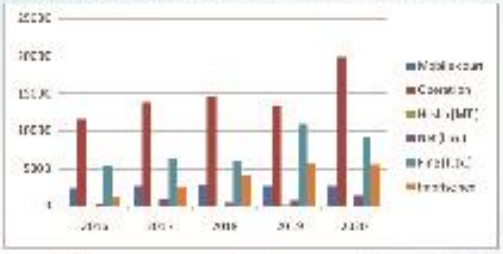

Fig: 12: Brood Hilsha Conservation Operation" from 2016 to 2020

2.7.2 Hindrance of jatka fishing:

According to The Protection and Conservation of Fish Rule, 1985, 10 inch or less than 10 inch size hilsha fish is called jatka. In The Protection and Conservation of Fish Rule, 1985, the size of jatka was 9 inch and ban on jatka fishing was November to April. At last in 2014 to amend the existing rule, jatka size was ordained 10 inch and the ban period on jatka fishing had also been increased from November to June. In the ban period on jatka fishing DoF conducts operation in cooperation with the law enforcing agency like Bangladesh Police, River Police, Navy, coastguard etc. In 2019-20, hindrance of jatka fishing during ban period (November to June) 142 mobile court and 8811 operations were conducted, by which about 263.91 MT, jatka and 1689.68 lakh meter fishing net were seized. Seized net were destroyed in the presence of executive magistrates and the fish were distributed to the orphanages. Through these operations fishermen were fined 68.21 lakh taka and 981 fishermen were sentenced to imprisonment. It also should be mentioned that, Government has fixed the mesh size 6.5 cm. (2.6 inch) of gill net to prevent the jatka fishing.

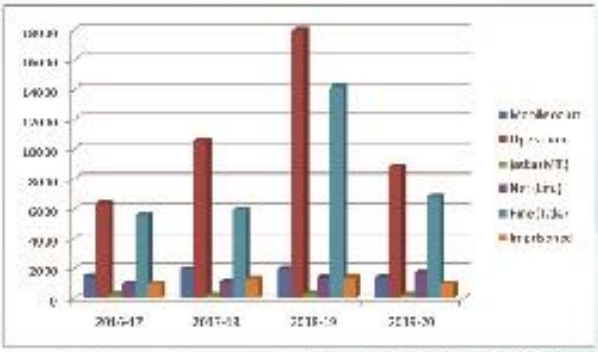

Fig. 13: The scenario of law enforcement on jatka fishing from 2016-17 to 2019-2020

2.7.3 Extirpating the illegal net through "Special Combing Operation":

From 2016 the "Special Combing Operation" had been started to extirpate the abuse of illegal net in fishing. In that time this activities were substantiated only three coastal districts (Bhola,

Patuakhaki, Barguna). Over the next time working area of special combing operation was increased gradually and in 2020, 13 districts (Barishal, Bhola, Patuakhali, Barguna, Pirojpur, Chandpur, Noakhali, Cox's Bazar, Chattagram, Khulna, Bagerhat, Satkhira and Munhsiganj) were included. The Special Combing Operation scenario is given below:

Table 15: Special Combing Operation.

Year	No. of districts	Mobile court	operation	No. of Behundi net	Current net (L.m.)	Jatka (Mt.)	Fine (L. Tk.)	Jail
1	2	3	4	5	6	7	8	9
2016	3	225	433	1326	13.37	2.284	3.99	13
2017	5	265	489	833	30.69	4.92	4.13	44
2018	10	341	935	1442	34.04	3.85	3.35	2
2019	11	424	1235	1883	88.916	8.82	5.82	7
2020	13	387	1554	2267	716.18	19.46	10.02	61

2.7.4 VGF (Vulnerable Group Feeding) activities:

At the beginning of this activity, hilsha fishermen would receive only 10 kg food grains (rice) per family per year as an annual allowance. The Honorable Prime Minister Sheikh Hasina, M.P. daughter of Bangabandhu realized the poor condition of jatka fishermen during ban period of jatka fishing and increased the amount of VGF (rice) from 10kg to 40 kg per family per month. Under the humanitarian aid program in 2019-20 fiscal year 39787.84 MT food grains (rice) were distributed to 3,01,288 fisher family for four months (February to May) in 96 upazila of 20 districts.

Table 16: VGF distributed to jatka fishermen from 2009-10 to 2019-20

Sl. no.	Fiscal Year	Distributed VGF (rice) mt.	No of family of beneficiary	Graph
1	2009-10	19768.60	164740	
2	2010-11	14470.64	186264	
3	2011-12	22351.68	186264	
4	2012-13	24747.48	206229	
5	2013-14	35856.32	224102	
6	2014-15	35856.32	224102	
7	2015-16	37788.16	236176	
8	2016-17	38187.68	238673	
9	2017-18	39787.84	248674	
10	2018-19	39787.84	248674	
11	2019-20	46778.08	301288	

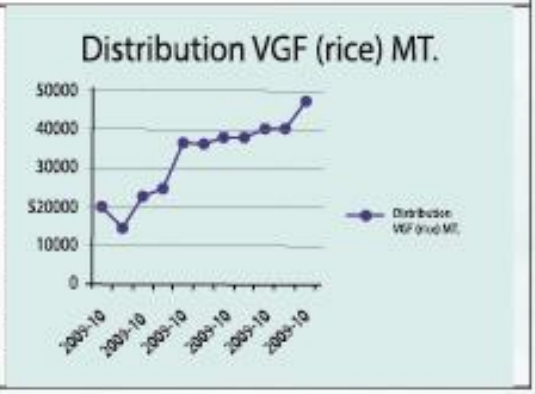

Fig : 14: VGF distributed to Jatka fishermen from 2009-10 to 2019-20

VGF has also been allocated for the hilsha fishermen during the 22 days ban on hilsha fishing from 2016. In 2020, 10566.84 MT food grains (rice) were distributed to 528342 fisher family for 22 days in 152 upazila of 36 districts.

Table 17: VGF distributed to hilsha fihermen from 2016-2020

Sl. no.	Year	Distributed VGF (rice) mt.	No of family of beneficiary
1	2016	7134.46	356723
2	2017	7689.24	384462
3	2018	7914.18	395703
4	2019	8166.58	408329
5	2020	10566.84	528342

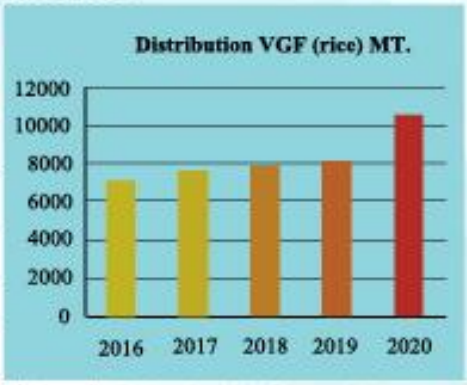

Fig. 15: VGF distributed to hilsha fishermen in last 5 years.

To increase public awareness regarding the conservation and protection of brood hilsha and jatka, DoF conducts different type of activities like poster, leaflet distribution, decoration of fish market, arot, fishery ghat with banner, festoon and arranging awareness program with the fishermen and other stakeholders. Since 2007, Jatka Conservation Week has been observed as a national program to protect jatka and ensure both of its growth and production as an awareness program.

On 17 August 2017, Bangladesh has received the recognition on hilsha as the product of Bangladesh. More than two third of hilsha production of total produced hilsha in the world is produced in Bangladesh mainly accounts for Geographical Indication (GI) of hilsha as a product of Bangladesh. Bangladesh has become a role model for hilsha conservation to other hilsha production countries.

3.0 Fisheries Regulatory Activities

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

Feed Factory Factory in Bangladesh

Fish feed is one of the most important factors 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 18: Status of fish feed license under the Fish Feed Act, 2010 implementation (2019-2020)

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	65	90	750	905	9.20
2	Chattogram	54	38	630	722	5.17
3	Rajshahi	53	38	658	749	6.66
4	Khulna	16	46	926	978	5.91
5	Sylhet	4	3	152	159	0.39
6	Barishal	2	1	182	185	0.38
7	Rangpur	7	8	231	246	1.74
8	Mymensingh	33	39	642	714	4.42
Total		234	263	4161	4658	33.91

3.2 Fish Hatchery Act 2010 and Rules 2011

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 the competent authority of DoF. The Status of the Fish Hatchery Act 2010 and Fish Hatchery Rule 2011 are given the table below:

Table 19: Status of fish hatchery registration in 2020 under the Fish Hatchery Act, 2010 and Fish Hatchery Rules, 2011

Serial No.	Division	Carp Hatchery: C1	Galda/ Bagda Hatchery C2	Others Native Fish Hatchery C3	Monosex Tilapia Hatchery C4	Ornamental Fish Hatchery C5	Hatchery Otherthan Fish (Crabs/ Turtoise) C6	No. of Total Private Hatchery	Total revenue earned (lakh Tk)
1	2	3	4	5	6	7	8	9	10
2	Dhaka	28	0	13	5	0	0	46	0.38
3	Chattogram	88	50	3	59	1	0	201	2.24
4	Rajshahi	161	1	18	9	0	0	189	1.79
5	Khulna	51	24	4	38	2	1	120	1.88
6	Barishal	18	6	2	10	0	0	36	0.21
7	Sylhet	20	0	2	8	0	0	30	0.18
8	Rangpur	79	0	6	6	0	0	91	0.78
9	Mymensingh	75	0	213	54	0	0	342	2.85
Total		520	81	261	189	3	1	1055	10.34

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 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. are printed and distributed. In addition, TV spot are prepared and broadcasted, street drama are staged, workshops/seminars are organized to create mass awareness. Appropriate measures are 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 are conducted throughout the country.

Table 20: Enforcement of FishActs and Rules during 2019-20

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)
1	2	3	4	5	6	7	8
Dhaka	1523	235	1.285	6950.02	103	7	14.03
Chattogram	948	190	0.452	89.082	19	3	1.393
Rajshahi	1010	249	0.501	38.6468	23	24	1.16
Khulna	1045	174	0.04	90.65	0	0	5.78
Barishal	484	267	0.163	74.7624	14	12	0.8
Sylhet	222	67	0.01	4.80673	6	0	0.31
Rangpur	779	127	0.03	7.836	4	10	2.31
Mymensingh	473	94	0.02	3630.93	1	0	1.04
Total	6484	1403	2.51	10887	170	56	26.78

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 fisers. 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.

4. Fish Inspection and Quality Control (FIQC)

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 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 2020, signatures of authorized officers of each FIQC offices involved with certification of fish and fish products has been sent to China for updating into the website of AQSIQ (Certification and Accreditation Administration of the People's Republic of China). This year two crab processing plants (Japan Fast Trade Ltd;SAT-134 and Farid Nine Stars Agro Foods (BD) Ltd. ;SAT-141) have been enlisted by Directorate General of Health and Food Safety (DG(SANTE)) of EU for exporting fish and fish products to EU countries. With these two, total number of Bangladeshi fish processing plants eligible for export to EU countries is 77. New format of EU Health Certificate has been introduced to facilitate exporting edible aquatic animal products to China.

The new Fish and Fisheries Products (Inspection and Quality Control), Act 2020 is approved by the national parliament and the formulation of rules is under process..

4.1 Quality control laboratories

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 by reshaping construction design, on the 11th floor of Matsya Bhaban building in 1994 which was shifted at new premises at Savar, Dhaka in 2014. Two more modern laboratories have been established at Chattogram and Khulna under DoF by the financial assistance of UNIDO-SFIQC project during 2008-09. Since the creation of lab facilities, testing of microbial quality of exportable fish and fishery products has routinely been performed by the officials of three FIQC laboratories (presently Quality Control Laboratories). Moreover these laboratories started testing residues of harmful chemical residue analysis of fish and fishery products since 2007. From August 2015, laboratory services were separated from Fish Inspection & Quality Control Services and since then 'Fish Inspection & Quality Control Laboratory' have been designated as 'Quality Control (QC) Laboratory'.

Quality Control Laboratory at Chattogram

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), Aflatoxin (B1, B2, G1 and G2) etc. in fishery product are being tested through LC-MS-MS machines at QC laboratory, Dhaka. Moreover, activities related to method validation of Amoxicillin and Tylosin is going on. Fish and fish products are tested for heavy metals by ICP-MS at the laboratory of Dhaka and Chattogram. 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. Method validation of testing nitrofuran metabolites through LC-MS-MS machines is underway at this laboratory. 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 has been completed in 2019 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. Now method has been developed and validated for screening test of Gentamycin, Sulfonamides and Estradiol hormone through ELISA at QC lab, Dhaka in 2020.

Most of the test scopes of three QC laboratories are accredited according to ISO 17025: 2017 by Bangladesh Accreditation Board (BAB) except those very recently developed and validated. In 2018, BAB has carried out audit to 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. Furhtermore, testing protocol for porcine and bovine test through PCR machine has been validated at the Quality Control laboratory of Chattogram.

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); Aflatoxin (B1, B2, G1 & G2), Pesticides (DDT, Aldrin, Heptachlor, Endrin, Dieldrin); Formalin; Moisture; pH; Gentamycin, Sulfonamides; Estradiol hormone;Oxalinic Acid	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 metabolites (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 Chloramphenical 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 ensuring external quality control, each QC Laboratory participated in international proficiency tests (PT) offered by world renowned PT provider organization on regular basis.

Analytical capacity of three QC laboratories was recognized through the overall comments in EU-FVO Audit Report-2015- "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 & 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 2020 is given below at a glance-

No.	Title of activities conducted	Achievement
1	Fish Processing Establishments Inspection	
	(a) Number of declared consignments inspected	7503
	(b) Number of Fish Processing Establishments routinely inspected	480
	(c) Number of Fish Packing Centres routinely inspected	1739
2	Quality assurance of Depot/Arats and inspection of traceability documents	324
3	Inspection of Ice Factories	164
4	No. of NRCP (National Residue Control Plan) samples tested	1365
5	No. of NRCP non-compliance (Chemical)	0
6	No. of fish feed/feed ingredient tested	300
7	Mobile court/raid	
	(a) Number of Mobile court conducted	36
	(b) Number of raid/campaigns conducted	238
	(c) Amount of money fined (Tk.)	775000
	(d) Shrimp destroyed (kg)	3170
	(e) Fin fish destroyed (kg)	0
	(f) Number of persons sentenced to jail	10
	(g) Number of cases filed	10
10	Amount of money fined from the fish processing establishments	885000

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 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 'Firm 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 seafood 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

Table 21: Export statistics of fish and fishery products of the last seven 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
6	2018-19	33,362.52	365.54	73,171.32	503.00
7	2019-20	30,036.18	347.55	70945.39	469.67

4.4 Adoption 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 well. 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)

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. On 14 December, 2019, DG-SANTE has introduced improvised format of TRACES which is called TRACES-NT, i.e., TRACES New Technology. Deputy Director of three FIQC offices have been already trained at Bangalore, India on TRACES-NT certification and Bangladesh has already started using TRACES-NT for ET certification in exporting fish and fish products to EU.

4.6 Aquaculture residues monitoring through NRCP

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) Act-2020 and 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 NRCP: Test parameters

Group name	Parameters tested
A1	Stilbenes (Diethylstilbestrol)
A3	Steroids (Methyl Testosterone)
A6	Banned Antibiotics: Chloramphenicol (CAP), Nitrofuran metabolites (AOZ, AMOZ, AHD, SEM), Metronizole (MNZ)
B1	Antibacterial substances: Tetracycline, Oxytetracycline & Chlortetracycline (TC, OTC, CTC); Amoxicillin; Gentamycin; Sulfonamides; Tylosin
B2(a)	Anthelmintics: Mebendazole, Fenbendazole
B3(a)	Organochloride pesticides (DDT, Heptachlor, Endrin, Aldrin, Di-eldrin)
B3(c)	Chemical elements (Lead, Mercury, Cadmium, Chromium, Arsenic)
B3(d)	Micotoxins (Aflatoxin B1, B2, G1, G2)
B3(e)	Dyes (Crystal Violet, Leuco Crystal Violet, Malachite Green, Leuco Malachite Green (CV, LCV, MG, LMG))

4.6.2 Planned NRCP-2020 for shrimp and finfish

Table 22: Summary of NRCP -2020 for Aquaculture Crustaceans (Shrimp & Prawn) and Finfish is as follows:

NRCP -2020 for Aquaculture Crustaceans (Shrimp & Prawn) and Finfish																	
	National Plan					Khulna Zone				Chattogram Zone					Dhaka Zone		
Test Parameter	M. rosenbergii	P. monoden	M. monoceros	Fin fish	Grand Total	M. rosenbergii	P. monodon	M. monoceros	Sub Total	M. rosenbergii	P. Miranda	M. monoceros	Fin fish	Sub Total	M. rosenbergii	Fin fish	Sub Total
	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan
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)	69	84	9	6	168	67	68	7	142	1	16	2	5	24	1	1	2
A6 (NF)	69	84	9	7	169	67	68	7	142	1	16	2	6	25	1	1	2
A6 (MNZ)	34	40	3	3	80	32	34	2	68	1	6	1	2	10	1	1	2
A6 (Sub-total)	172	208	21	16	417	166	170	16	352	3	38	5	13	59	3	3	6
B1 (Tetracyclines)	107	128	13	30	278	105	104	8	217	1	24	5	22	52	1	8	9
B1 (Amoxicillin)	17	21	2	5	45	15	17	1	33	1	4	1	4	10	1	1	2
B1 (Gentamycin)	17	21	2	5	45	15	17	1	33	1	4	1	4	10	1	1	2
B1 (Sulfonamides)	17	21	2	5	45	15	17	1	33	1	4	1	4	10	1	1	2
B1 (Tylosin)	17	21	2	5	45	15	17	1	33	1	4	1	4	10	1	1	2
B1 (Sub-total)	175	212	21	50	458	165	172	12	349	5	40	9	38	92	5	12	17
B2a	70	85	8	20	183	68	70	5	143	1	15	3	14	33	1	6	7
B3a	18	22	2	6	48	16	17	1	34	1	5	1	4	11	1	2	3
B3c	35	42	4	9	90	33	35	2	70	1	7	2	7	17	1	2	3
B3d	18	22	2	6	48	16	17	1	34	1	5	1	4	11	1	2	3
B3e	35	41	4	9	89	33	34	2	69	1	7	2	7	17	1	2	3
NC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	523	632	62	148	1365	497	515	39	1051	13	117	23	111	264	13	37	50

Remarks: A1:Dietylstilbestrol; A3:Methyl Testosterone; A6:CAP = Chloramphenicol, NF = Nitrofurans (AHD, AOZ, AMOZ, SEM), MNZ = Metronidazole; B1:Tetracycline, Oxytetracycline, Chlortetracycline, Amoxicillin, Gentamycin, Sulfonamides, 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

Table 23: Result of NRCP-2020 is as follows:

Substance category	Substance	Number of Sample Tested	Number of NC
A1	Diethylbestrol	16	0
A3	Methyl Testosterone	16	0
A6	CAP, AMOZ, AOZ, AHD, SEM	417	0
B1	TC, OTC & CTC, Amoxicillin, Gentamycin, Sulfonamaides, Tylosin	458	0
B2a	Mebendazole, Fenbendazole	183	0
B3a	Pesticides (DOT, Aldrin. Heptachlor, Endrin & Dieldrin)	48	0
B3c	Heavy metals (Pb, Cr, Cd, Hg & As)	90	0
B3d	Aflatoxin (B1, B2, G1, G2)	48	0
B3e	MG, LMG, CV & LCV	89	0
Total		1365	00

4.6.4 NRCP findings in last nine years

The total number of NRCP samples and number of non-compliant samples in last seven 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.	2020	1365	0	NA
2.	2019	1340	0	NA
3.	2018	1376	1	Heavy metal (Pb)
4.	2017	1279	1	Dye (LCV)
5.	2016	1363	0	Not applicable
6.	2015	1355	7	SEM-06, CV-01
7.	2014	1388	23	CAP-02, SEM-19, AHD-01, As-01
8.	2013	1332	49	CAP-08, SEM-33, AHD-02, CV-01, Pb-04, Afl-01
9.	2012	1342	34	CAP-03, SEM-20, AHD-10, AOZ-1

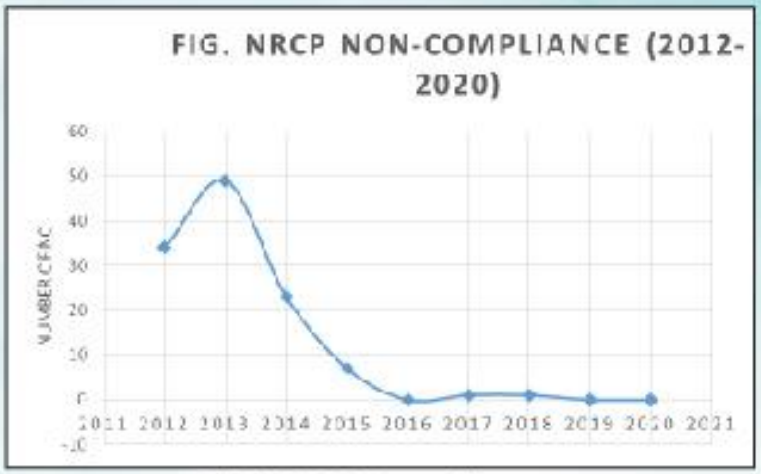

Fig. 16: NRCP Non-compliance

4.6.5 Feed residue testing

In addition, testing of different chemical residues of 300 samples of fish feed have been plannedin 2020 for testing by three FIQC offices-

Testing Parameters	Number of Feed Samples			Total
	FIQC Office, Dhaka	FIQC Office, Chattogram	FIQC Office, Khulna	
A6 (CAP, AOZ, AMOZ, SEM & AHD)	12	22	26	60
B1 (TC, OTC & CTC)	10	22	28	60
B3c (As, Cd, Pb, Cr & Hg)	40	41	34	115
B3d (Aflatoxin B_1, B_2, G_1, G_2)	18	25	22	65
Total	80	110	110	300

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 coup 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 processing at Gazipur

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 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 intergovernmental 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.

4.7.1 Laws, policies and documents

Fish and Fish Product (Inspection and Quality Control) Act, 2020 is approved by the National 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) Act, 2020
- The Marine Fisheries Act, 2020
- 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

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 17025:2017 General Requirements for Competence of testing Laboratories

4.8 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 has 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 2019, there were 4 RASSF notifications (one microbial and three chemical) for fish and fish products.

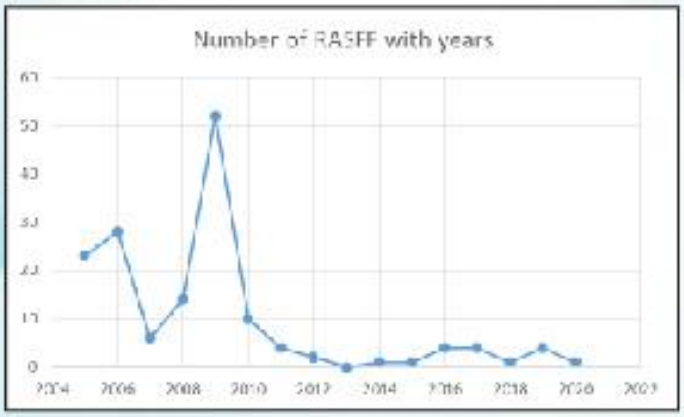

Fig.17: Number of rapid alerts concerning fish and fishery products exported to EU from 2005 to 2020.

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

4.9.1 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.

4.9.2 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.

4.9.3 Visit of Rosselkhoznadzor Auditors

The Federal Sanitary and Phytosanitary Surveillance of the Russian Federation (Rosselkhoznadzor) auditors will visit Bangladeshi Fish Processing Plants interested to export fish and fish products to the Russian Federation. In this relation, the response of DoF has been sent to the Russian Federation. DoF is awaiting to receive itinerary of the auditors. Meanwhile, PSO (FIQC) has visited the processing plants and instructed them for renovation in compliance with HACCP requirements and the regulations of the Russian Federation.

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 was 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).

Inspection & Quality Control Services and 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), Aflatoxin (B1, B2, G1 and G2) etc. in fishery product are being tested through LC-MS-MS machines at QC laboratory, Dhaka. Moreover, activities related to method validation of Amoxicillin and Tylosin is going on. Fish and fish products are tested for heavy metals by ICP-MS at the laboratory of Dhaka and Chattogram. 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. Method validation of testing nitrofuran metabolites through LC-MS-MS machines is underway at this laboratory. 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 has been completed in 2019 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. Now, Method has been developed and validated for screening test of Gentamycin, Sulfonamides and Estradiol hormone through ELSA at QC lab, Dhaka in 2020.

Most of the test scopes of three QC laboratories are accredited according to ISO 17025: 2017 by Bangladesh Accreditation Board (BAB) except those very recently developed and validated. In 2018, BAB has carried out audit to 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. Furhtermore, testing protocol for porcine and bovine test through PCR machine has been validated at the Quality Control laboratory of Chattogram.

5. Human Resource Development

5.1 Training

Training at Fisheries Training academy, Savar

Human resource development is mandatory for DoF to enhance administrative, managerial and technological capacity in fisheries sector. The HRD activities meant to enhance capacity in the area of administrative, managerial, 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-

Table 24: Training activities in last 10 (ten) years

Financial Year	In Country Training		ForeignTraining	
	Government personnel	Fish Farmers/ Fishers/ NGO personnel	Government personnel	Fish Farmers/ Fishers/ NGO personnel
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
2018-2019	2521	36865	201	01
2019-2020	2702	35011	64	00

Table: 25: Training activities with workshops, seminars of 10 development projects (2019-20)

Sl no	Fish farmer/Fishers/NGOs workers(person)	Government personnel	No of participants		Allocated money(lac taka)	Total expenditure(lac taka)
1	130283	935	28092 (women)	103129(men)	2314.36	1561.37

5.2 Development of mid level skilled manpower

Diploma Institute at Gopalgonj

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 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 Seven Five Year Plan/Vision 2021 goals, it is essential to provide grassroots level skilled technical manpower for the sector.

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 build 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 taken 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 academic activities of these diploma institutse has been started from 2018-2019 academic calendar year and already two batches students are studying in each institutions.

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 total production 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 activities in aquaculture

The development of a country depends on men and women's participation in all sectors. The constitution of Bangladesh states that women have equal footing with in all spheres of public life. It is said, recently women empowerment status has been changed and meaningful improvement has occurred in Bangladesh through their economic, social and political dimensions. But still now, due to various reasons, rural women are falling behind than the urban women. In this context, women education and employment, women's participation in income generating activities may change our socio-economic status of Bangladesh. Women's participation in aquaculture and fisheries activities is vital for the socio-economic development of Bangladesh. Considering all, ministry of Fisheries and Livestock, through the Department of Fisheries (DoF) has been working to create employment opportunity for women.

5.3.1Employment and status of women in fisheries sector

In 2019-20, female officers and staffs provide services in different layers of the Department of Fisheries are 18.09% and 12.03% and more than 11% people of total population are involved in fisheries sector among them 14 lakh are women. From fish processing plants to casual work women are working in different ways. 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. In the development project women beneficiaries were the highest 33.89%, in beel nursery and fry rearing activity among the activities of traning, fingerling release fish sanctuary management, fish habitat restoration and demonstration of farm. Between in two development projects there are 332 women out of 5640 LEAFs in 2019-20, at various development project of DoF, women participation is 30.52%.

To ensure active participation of women in fish culture and management, DoF adopted various strategies:

- All development projects have taken priority based beneficiary selection specially for women, its target is 25-30 percent. In 2019-20 fiscal year, women beneficiaries got training 21%, involved 32.96% in fingerlings release in open water, in establishment of beel nursery and fry production 33.89%, in sanctuary establishment 27.65% and in fisheries demonstration farm 21%. Almost 36% women are selected as CIG members.
- At present 80% women labour are working in fish processing factory.
- In 2019-20, among 18,506 beneficiaries, 25% women beneficiaries got material assistance for alternative employment. 7432 women of fisher family got training for alternative employment opportunity.

- 24% women received micro credit assistance support from DoF. Using this credit today they are capable and successful fish farmers. Now they can meet up their protein demand and play an important role financially.
- Among CIG members 151 are being elected as a member of union parisad, so they can participate in development of the nation.

Womens participation in income generation through fish culture

Women constitute half of the total population in our country. The economic and social status of rural women remains extremely 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.

5.3.2 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 25-30% women participation as project beneficiaries.

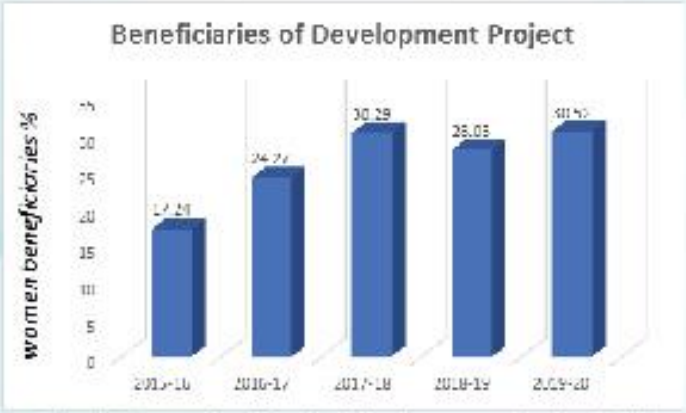

Fig. 18: Women beneficiaries of development project in 2016-20

6.0 Implementation of Development Plans and Polices

6.1 Annual Performance Agreement (APA)

Annual Performance Agreement (APA) has been introduced under the government performance management system to increase transparency and accountability in government activities, ensure proper use of resources and improve institutional capacity. This agreement sets out the strategic objectives of the concerned ministry/department, the activities undertaken to achieve these Strategic Objectives and the performance indicators and targets for measuring the results of these activities. At the end of the relevant financial year, the actual achievement of the concerned ministry/department will be evaluated against the targets set in the agreement. This document contains not only the agreed objectives, but also performance indicators and targets to measure progress in implementing them.

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) has been duly signed for the FY 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2018-19 and 2019-20. DoF has been implementing indentified interventions with due attention. For implementation of APA activities, proper field monitoring has been done. According to DoF final 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. Among the departments under the Ministry of Fisheries and Livestock, DoF has secured the 3rd position in the implementation of APA in 2019-20. In this connection APA for the financial year 2020-21 was signed in July 2020 between the Director General (DG) of DoF and the Secretary of the Ministry of Fisheries and Livestock (MoFL).

6.2 7th Five Year Plan (FYP) and Sustainable Development Goals (SDGs)

The extension departments, research institutes and other agencies under the Ministry of Fisheries and Livestock (MoFL) are implementing various socio-eco-friendly interventions aligning with its mandate. MoFL in consultation with relevant stakeholders has already developed SDG Action Plan and Monitoring Framework through National Mid-Term and Long-Term Development Plans. MoFL has taken necessary initiatives to review the progress of the planned interventions, which eventually contributes to achieve the specific SDG targets. As per GED Handbook on Mapping of Ministries by targets in the implementation SDGs aligned with 7FYP (2016-2020), MoFL has identified as Lead ministry for the SDG targets- 14.2, 14.4, 14.5, 14.6, 14.7 and 14.b under the Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development and co-lead the SDG targets-2.1, 2.3 and 2.5 under the Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture. Department of Fisheries (DoF) is the main stakeholder to achieve those targets of Goal 14. Under the supervision of MoFL, DoF is working to achieve the related goals and targets of the SDGs and 7th Five Year Plan.

A comprehensive action plan has been developed for the fisheries sector in line with the SDGs targets. Ongoing projects has 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. DoF needs strong collaboration with Mercantile Marine Department (MMD), Bangladesh Police, Bangladesh NAVY, Bangladesh Coast Guard, River Police, Department of Environment, Bangladesh Forest Department and Water Development Board etc.

6.3 Master plan of Department of Fisheries

The Fisheries sector represents one of the most productive and dynamic sector 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 Observation of National FishWeek 2020

The Father of the Nation Bangabandhu Sheikh Mujibur Rahman inaugurated More Fish Culture Movement in 1973 by releasing 20,000 carp fingerlings at Gonobhabon Lake. Following that 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. Honourable Prime Minister Sheikh Hasina inaugurated the

national fish week 2020 releasing fingerlings at Gonobhaban Lake. National Fish Week 2020 has been observed nation wide from 21-27 July with due emphasis on fish culture and conservation. The monumental slogan for National Fish Week 2020 was **Machh utpadan briddhi kori, Shukhi samriddho desh gori**. As per instruction of the Prime Minister, the Ministry of Fisheries and Livestock through the Department of Fisheries took up various programs to create mass awareness about producing more fish and conservation of fisheries resources. To motivate the fish farmers, DoF distributed fish culture helping materials (lime, fish feed, fingerlings etc), organized technology based improved fish culture training programs, tested various parameters of water quality, conducted mobile court/ovijan, exhibited documentary film (pramannya chitra) etc.

Fingerlings Realising at the Gonobhaban lake, National Fish Week 2020

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

Today,s world is the world of ICT. Information and Communication Technology (ICT) permeates all aspects of life, providing newer, better and quicker ways for people to interact, network, seek help, gain access to information and learn . Now ICTs are using in all the sectors. Its presence everywhere ICT has an immense socio-economic significance. To provide services to public, Department of Fisheries is working hard digitally. The ICT related activities of Department of Fisheries cited below:

Fish culture apps

- Website Management - There are web portals including 492 upazilas , 64 districts, 8 divisions. Websites are managed with regular updates.
- PDS - A total of 4215 officers and employees of the Department of Fisheries have registered with the PDS. Cadre officials are regularly updating the PDS.
- Web Mail - Webmail is available for all offices including farms, upazilas, districts, divisions. There are 910 accounts in total.
- Internet / Wi-Fi / LAN - 110 Mbps connection to BTCL is enabled. DOF building is connected with High-speed Wi-Fi. All computers are connected through CAT-6.
- E-Training: DOF uploads the information of the trainees and trainers after completion of the training through e-training. And reports on this are prepared from the dashboard. So far, the data of 896 training batches has been uploaded.
- E-nothi management - Progress of e-nothi at headquarters is 80%. The first phase of training is completed in each division. Training of Trainers (TOT) is completed in which 72 officers at different level participated.

- File Server Management - FTP has access to the file server on all computers in the head quarters of the Department of Fisheries.
- Database of registered fishermen: Database of registered fishermen has been uploaded on the website of the Department of Fisheries. Reports can be prepared according to the upazila and district.
- Content upload in Website: - Letters, Office Orders, Passport Letters, NOC, Fisheries Order, Training, ICT, Innovation and all related letters uploaded from various section.
- e-GP – e-GP activities of revenue and various projects are ongoing. egp of total Tk 4845.01 lac has been completed under 83 packages. Overall implementation rate is 75.91%.
- All cadre PMIS: 754 officers have been registered in all cadre PMIS.
- Service Process Simplification - Five services have been simplified (Fisheries advisory Services) and have been published in the SPS manual. one service has been converted to e-service. (Online Fish Feed Licensing).
- Innovation –Two innovations are replicated throughout the country. Ten innovator got innovation fund for implementation of their innovative ideas. The Department of Fisheries has completed three innovation showcasing so far. The activities are in line with the annual innovation work plan.
- E-Services: -Fish Feed Licensing System (link to website)
- Fish Advice System (link to website)
- Fish Advice (Available on Google Play Store)
- Fisheries Messages (in Google Play Store)
- Dr. Fish (in the Google Play Store)
- Fishing School (in the Google Play Store)
- Online School (YouTube Channel)
- E-Book Management
- Digital attendance management - Presence reports of officers are created and maintained.
- CCTV Management - The Department of Fisheries has CCTV for overall safety which is maintained by ICT section.
- ICT can play a significant role in fisheries sector. People are getting various advisory services by using digital devices which will contribute a lot to increase fish production that will play significant role in our national economy and build a prosperous Bangladesh.

7.1 Innovation Activities 2019-20

To simplify the service delivery process from manual to online, the Department of Fisheries has been implementing various innovations programs. Innovation activities ensure improved citizen access to public services and bring services to the citizen's doorstep. In 2019-20, the Department of Fisheries got 40 innovation ideas from field level officers. Among them DoF provided financial assistance to 11 potential innovators to continue their innovation endeavors. Department of Fisheries formed an Innovation Team according to the Advertisement of the Cabinet Division. Department of Fisheries has simplified one of their services called "Matshya Poramorsho Sheba" from the service profile through Service Process Simplification. Fish farmers are getting services by using some mobile apps innovated from Department of Fisheries. The most useful apps with their details are cited below:

Fish Advice mobile application is to provide services to the root level fish farmers and entrepreneurs. A lot of information about fish farming techniques, fish diseases and their remedy, fish species selection, and other general problems are described in this apps. The mobile application is available in the Google play store and has been downloaded more than 70,000 times.

Dr. Fish

Some fish farmers are reluctant to get information from the fisheries office. In some cases, their ponds are located very far from the fisheries office, so the visiting cost to the Upazila Fisheries Officer is too high. The Department of Fisheries introduces an application that allows fish farmers to call the officer through a video call to solve this problem. They can show their ponds and fish to the officers and get immediate feedback from the authorized person. The download number of the app is 3000.

Matshya Chashi School

Matshya Chachi School is another app-based solution where almost all of the information related to fish culture are provided. Integrated with Online School YouTube channel, this application provides services to the grass root people of Bangladesh. More than 41,000 people have downloaded the application and getting the services. This application also has a chat service option where fish farmers can chat with the officer and get valuable feedback.

Matshya Chashi Barta

MatshyaChachiBarta is an android based mobile application by which fish farmers will get a real-time notification for their benefits. This application stores Upazila-wise fisheries data and can send a time-to-time notification to the fish farmers to that specific area or nationwide whenever necessary. This application can be used as a tool for fish preservation. This mobile application is available in the Google play store.

Department of Fisheries is trying to facilitate innovation as much as possible from the field level along with Service Process Simplification in the Head Office so that mass people can get maximum benefit of the Digital Bangladesh.

8.0 Mujib Borsho and Fish village:

Mujib Borsho has been declared by the Government marking the 100 th anniversary of the birth of the Father of the nation, Bangabandhu Sheikh Mujibur Rahaman. The Mujib year is the period from 16 March, 2020 to March 17, 2021. Nextly, it is extended 16 December 2021. To celebrate the centernary, Prime Minister Sheikh Hasina inaugurated the year long progra also announced the celebration of Mujib year jointly with the Government of Bangladesh. The main purpose of celebration the year of Mujib is to present the eventful life of this great leader and

Sowing machine distributed at Naria, Shariatpur

Fish culture at Naria, Shariatpur

his ideals to the young generation of the country and the abroad. As part of celebration Government as well as all departments undertook various program with fruitful/visionary slogan. Department of Fisheries also took programs with slogan **Nirapod machhe Bhorbo Desh, Mujib Borshe Bangladesh**. Celebrating this year, the Department of Fisheries declared two villages as Fish Village – South Bishiura graam of Netrokona district and Hailsar graam of Naria Upazilla of Shariotpur distrct targeting the villages ideal and exemplary to others. It is aligned with the Government's special promise, **Aamar graam, aamar Shahor**. From revenue and development budget of DoF and with other departments, various programs are taken here :

- Package based fish culture demonstation.
- Establishment of sanctuary.
- Establishment of beel nursery.
- Fry release.
- Community based fisheries Management
- Net supply
- Restoration of water bodies.
- Establishment of sanitary latrine
- Ensure child education
- Environmental protection
- Development of marketing system of various local products. In fact, Mujib Borsha has brought many positive changes for Bangladesh. It will become a part of history for the freedom loving people of Bangladesh and the world.

9.0 Covid -19 Pandemic and Fisheries sector

9.1 Impact of pandemic Covid-19 on aquaculture sector

Coronavirus was first detected in Bangladesh on 8 March 2020 and first casualty was reported on 18 March 2020 by IEDCR. On 22 March, Bangladesh declared a 10-day shutdown effective from 26 March to 4 April which was later extended upto 30 May 2020. On March 16, the country imposed a 14-day obligatory quarantine to all travelers entering the country. From the first week of March, Bangladesh started to postpone all types of mass gatheringsas a preventive measure against the spread of Covid-19. Afterward, the Government banned all political, social, cultural, and religious rallies and gatherings in the country. Bangladesh deployed 3000 soldiers from Bangladesh Army and 400 from Bangladesh Navy on 24 March to enforce the start of a nationwide 10-day shutdown to slow the spread of the coronavirus in the country along with local administration. From 25 March vehicle movement was restricted throughout the country with other precautions and guidance as below:

- The people will have to stay compulsorily at home
- They will not go out except in most emergent situations
- After 6:00 pm at evening no one will go out and with violation lawful actions will be taken
- Movement from one area to another was strictly prohibited
- Public officers and staffs are instructed to stay at their own work station to carry out their duties

The emergent services remained out of these restrictions:

- Electricity, water, gas, fire services, cleanliness activities, telephone and internet services
- Agricultural commodity, fertilizer, insecticide, fuel, newspaper, food, industrial materials, medical equipment and machineries and another emergent materials movement
- Vegetable market, food, pharmaceutical products and hospital services
- Pharmaceutical industry, production and export-oriented industries, banking hour were restricted Honorable PM Sheikh Hasina on 3 April 2020 declared 31 points directions:
- Treatment system development and making awareness among the people
- No hide and seek, go to doctors for covid-19 treatment
- PPE for physicians is must and biosafety and biosecurity for them ensured
- Emphasizing on special taking care for the health workers to get treatment
- Humanly attitude needs to be shown on affected persons
- Health rules regarding biosecurity i.e. hand washing, wearing masks and maintaining social distances among the people
- River ambulance for river/water habituated area is must
- Other diseases are also to take under treatment
- Cleanliness at municipality both local and urban city must be ensured
- Need to emphasize on day laborers, poor farmers and distressed people so that they do not die from hunger
- No corruption in relief work and social safety net activities should be strengthened
- Food production system should be on running mode and supply system should be run smoothly. Price of emergent daily need commodity needs to controlled
- Local public representatives, elite persons will provide relief and give health services to the distressed people in coordination with the local administration
- Food supply to the distressed people according to Word wise made list giving special care on senior citizens and children. Prices of essential goods will have to be kept under control
- Daily important household materials and food components production, supply and marketing should be monitored
- Disaster related orders (SOD) need to be implemented well
- Farmers will continue their production. Incentive will be given towards them.
- Industry owners, business men and all men will keep their industry premises and house premises clean
- Do not pay heed to public rumor

Restrictions on movement of people, vehicles etc. and panic among service providers cause low market price of fishes, difficulty in input collection, low consumer demand due to rumour of corona infection through fishes in some cases, high price of feed and other inputs, low price of hatchery produced spawn and fingerlings, delayed new stocking due to unsold mature fish, increased fish

disease susceptibility, lack of capital and inability to pay workers by ownersin private sector, labor shortage etc. were to paralyze the aquaculture industry more or less. At the appalling situation of Covid 19 people did not feel easy to go outside their home due to get infected by the pathogen. They stored some food items to live on instead of going to open market with public gathering. On the other hand, for the first time some people paid heed to rumor that fishes from market may cause to infect coronavirus pathogen.

9.2 Steps taken by the Bangladesh Government

At this critical period, Department of Fisheries with the help of Ministry of Fisheries and Livestock took several interventions to normalize the situation and to run the wheel of aquaculture industry by retaining the marketing chain of fish and fish products along with its forward and backward linkages.

9.2.1 Control room:

Ministry of Fisheries and Livestock opened a control room to monitor all the activities related with fishery and livestock on 2 April 2020. Public officers carried out their duties in the control room by turns and they made aware of the people so that they do not pay heed to rumor. If any hindrance in market chain of fishery and livestock is seen and got any complain, control room officers did instant action to solve any crisis by coordination with the local administration. They would record all the complaints and solve the problems by consulting with senior officials of MoFL, DoF and DLS jointly

9.2.2 Making growth centers or mobile market systems:

Department of Fisheries issued instructions to the Fisheries Officers at the field level to make a link of the small and marginal fishermen with market through making growth centers or mobile market systems. The local administration provided adequate assistance in this regard. As a result of taking this action, there was a huge response. Local officers from fisheries sector made a link of growth centers and mobile markets with the producers, harvesters and through this way up to 15 August 2020, a total of 703.14 crore worth 37099.35 MT of fish were sold in 64 districts. Farmers got relaxation to market their fish and became able to stock fish fry again in their waterbodies.

Mobile marketing at Vhairab, Kishoreganj 2. Dirai, Sunamganj 3. Dumuria Khulna 4.MonirampurJashore

9.2.3 Online fish marketing:

The online fish marketing system played a more important role in solving the problem of fish marketing in cases of corona infection. Entrepreneurs would buy fish from fish farmers at a fair price

Online fish marketing at Kaliganj, Satkhira news in the Daily ProthomAlo, 12 May 2020

Online fish marketing at Jamalpur Sadar,Jamalpur

Online fish marketing at Dhaka of fishmart.com

Online fish marketing at Dhaka of bengalfish.com

and deliver it to the buyer's home on the basis of an online order for some profit. The Director General, Department of Fisheries, Bangladesh issued a letter regarding the adoption of online fish marketing system in all subdistricts. About 30 districts and 40 sub-districts took measures for online fish marketing and upto 6 Aug 2020 total 78,486 KG fish with a value of BDT 1.74 Crore i.e. 17.4 million BDT. It also helped a lot to solve the stagnant market system.

9.2.4 Delivery of fish with relief materials:

Fish marketing strategy with relief materials was another step forward in overcoming the fish marketing problem of fish farmers. Fish is the ideal source of safe animal nutrition with government relief. The Director General, Department of Fisheries, Bangladesh, issued an office order at the field level to provide fish while delivering relief to the poor and helpless people with the help of the local administration. The local administration and many wealthy people responded to this management. 22 Subdistricts of 15 Districts across the country responded to this management system to cope up with the COVID-19 crises regarding fish marketing.

Online fish marketing at Jamalpur Sadar,Jamalpur

9.2.5 Incentive to the farmers who become affected by Covid-19

DoF gave TK 100 crore i.e. 10 million BDT to 78074 affected fish farmers to minimize their loss. This money amounting TK 10000-18000 was provided directly to the farmers through nogod and Bkash. This incentive did a lot for the small-scale farmers to minimize their loss and get back in aquaculture.

9.2.6 Low rate of interest credit to the affected farmers:

A 50 billion BDT Stimulus Package for Agriculture was announced by the honourable Prime Minister to address the impact of the COVID-19 pandemic (CIP2 monitoring report 2020). Loan at 4% rate of interest amounting TK 13.8 million BDT were disbursed to 5743 farmers engaged in fishery and livestock up to Dec 2020. On other hand, Govt. instructed all scheduled banks to disburse agri-credit to the farmers affected by Covid-19

9.2.7 Alternative income generation activities to the fishermen

Like every year, in 2020 alternative income generation activities to the fishermen was strengthened to reinstate them to earn their livelihood. Fishing nets, sewing machines, cows or goats etc. were provided to the fishermen as alternative income generation items to make them economically sound and to repair their loss. On the other hand, Government allotted 298.85 million BDT Tk for the stakeholder affected by Covid 19 and up to 28 May 2020 144.73 million BDT Tk were distributed for them. It was in cash, kinds or rice as VGF (Vulnerable Group Feeding).

9.2.8 Fish production and resources conservation campaign

Campaign for boosting fish production and resource conservation national fish week was observed between 21-27 July 2020. To raise awareness of the people throughout the country for the conservation and management of fisheries resources, this program did a lot to regain the vigor and work strength in the fisher-folk community.

9.2.9 Other activities:

The fish seed multiplication centers, hatcheries and nurseries took the responsibility to reach fish spawn/fingerling to the farmers/nursery owners' doorstep by their own vehicle. Maintaining social distance and complying health rules fish spawn/fingerling were sold to the farmers/nursery owners. Farmers, traders, hatchery owners would seek help from govt authority and control room extended its hands to help them and if any barrier occurs for transportation of aqua inputs i.e. fingerlings/spawn/fish feed/aqua medicine, control room members instantly dialed local administration to solve the problem. All the government officers would continue attending their offices and render advisory services to the farmers pond or water body. Government of Bangladesh took various program to raise awareness among the consumers that underwater aquatic organisms are not infected by coronavirus and it is not able to spread it through fishes. To increase demand, some TVC fillers were also made by DoF to understand the people that fish protein is very necessary to enhance resistance power against pathogens. All the farmers training was conducted near the waterbody by complying with health rules, maintain social distances and supplying sanitizers and mask freely to the farmers.

10.0 Impelimentation of development projects

Present government is very much fisheries department friendly. Government has taken various initiatives from very beginning to increase investment for expected development of fisheries sector. An amount of taka 34648.00 lakh has been allocated for 10 development projects in the financial year 2019-2020 under the annual development program of DoF. The actual expenditure and achievements were 24645.49 lakh and 71.13 % respectively. The list with allocation and expenditure of DoF development projects and programs for 2019-20 are shown in Annexure 8.

11.0 Conclusion

Bangladesh has an impressive track record for growth and development in fisheries sector. Aquaculture has increasingly been playing a major role in total fish production of the country and presently more than half of the total production comes from aquaculture. If the available resources can manage more scientifically and mechanized way then the growth rate of fish production will create more employment opportunity, ensure food security that leads to the SDGs and vision 2041 respectively. The fisheries resource of Bangladesh has ample scope of development to strengthen the national economy. To realize the potentials we need integrated collaboration resource management for conservation of fisheries resources. Ministry of Fisheries and Livestock (MoFL) and the Department of Fisheries (DoF) are aligned to implement all possible interventions using the limited resources to uplift the socio-economic status of Bangladesh. Since , the sector has been flourishing, and now been accelerated by Honourable Prime Minister Sheikh Hasina, through the implementation of the dream of Bangabandhu to make a self-sufficient sovereign `Sonar Bangla'.

Annexure

Annexure 1: Year-wise fish production in Bangladesh during last 10 years;

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
A. INLAND FISHERIES	**2515354**	**2683162**	**2821266**	**2952730**	**3085048**	**3251796**	**3496958**	**3621954**	**3724310**	**3832267**
(a) Inland Openwater (Capture)	**1054585**	**957095**	**961458**	**995805**	**10,23991**	**1048242**	**1163606**	**1216539**	**1235709**	**1248401**
(1) River and Estuaries	144566	145613	147264	167373	174878	178458	271639	320598	325478	331793
(2) Sundarbans	22451	21610	15945	18366	17580	16810	18086	18225	18282	21007
(3) Beel (Depression)	81564	85208	87902	88911	92678	95453	58117	99197	99890	103104
(4) Kaptai Lake	8980	8537	9017	8179	8645	9589	9982	10152	10578	12696
(5) Flood Plain	797024	696127	701330	712976	730210	147872	765782	768367	781481	779801
(b) Inland Closewater (Culture)	**1460769**	**1726067**	**1859808**	**1956925**	**2061057**	**2203554**	**2333352**	**2405415**	**2488601**	**2583866**
(1) Pond and Ditch	1270966	1392412	1446594	1526160	1610875	1719783	1833114	1900298	1974632	2046258
(2) Semi-Closed	51230	132163	200833	193303	201280	207658	215547	216353	217340	225948
(3) Baor (Ox-bow Lake)	4868	5186	6146	6514	7267	7729	8002	8072	10343	10969
(4) Shrimp/Prawn Farm	184939	196306	206235	216447	223582	235758	246406	254367	258039	270114
(5) Crab's	-	-	-	-	-	-	140421	11787	12084	12562
(5) Pen culture	-	-		13054	16084	13364	13368	11015	12361	13425
(6) Cage culture	-	-		1447	1969	2062	2490	3523	3802	4590
B. MARINE FISHERIES	**546333**	**578620**	**588988**	**595385**	**599846**	**6265**	**637476**	**654687**	**659911**	**671104**
(a) Industrial	41665	73386	73030	76885	84846	105348	108479	120087	107236	115354
(b) Artisanal	504668	505234	515958	518500	515000	521180	528997	534600	552675	555750
COUNTRY TOTAL (A+B)	**30,61,687**	**32,61,782**	**34,10,254**	**35,48,115**	**36,84,894**	**38,18,324**	**41,34,434**	**42,76,641**	**4384221**	**4503370**
ANNUAL GROWTH RATE (%)	**5.6**	**6.5**	**4.55**	**4.04**	**3.85**	**5.00**	**6.60**	**3.439**	**2.52**	**2.72**

Annexure 2: Fish Production Trend (1983-84 to 2019-20)

Sector of Fisheries	Production (MT)									Growth Rate % (2019-20)
	1983-84	1993-94	2003-04	2013-14	2015-16	2016-17	2017-18	2018-19	2019-20	
A. Inland Fisheries										
1. River and Estuary	207766	143425	137337	167373	178458	271639	320598	325478	331793	1.94
2. Sundarbans	7783	7127	15242	18366	16870	18086	18225	18282	21007	14.90
3. Beel	51373	55592	74328	88911	95453	98117	99197	99890	103104	3.22
4. Kaptai Lake	4057	6635	7238	8179	9589	9982	10152	10578	12696	20.03
5. Floodplain	200616	360597	497922	712976	747872	765782	768367	781481	779801	-0.22
Capture Total	**471595**	**573376**	**732067**	**995805**	**1048242**	**1163606**	**1216539**	**1235709**	**1248401**	1.03
6. Pond	107944	222542	795810	1526160	1719783	1833118	1900298	1974632	2046258	3.63
7. Seasonal cultured waterbody	0	0	0	193303	207658	215547	216353	217340	225948	3.96
8. Baor	862	2201	4282	6514	7729	8002	8072	10343	10969	6.05
9. Shrimp/Prawn Farm	8219	39447	114660	216447	239798	246406	254367	258039	270114	4.68
10. Crab	0	0	0	0	13160	14421	11787	12084	12562	3.95
11. Pen Culture	0	0	0	13054	13364	13368	11015	12361	13425	8.61
12. Cage Culture	0	0	0	1447	2062	2490	3523	3802	4590	20.73
Culture Total	**117025**	**264190**	**914752**	**1956925**	**2203554**	**2333352**	**2405415**	**2488601**	**2583866**	3.83
Inland Fisheries Total (A)	**588620**	**837566**	**1646819**	**2952730**	**3251796**	**3496958**	**3621954**	**3724310**	**3832267**	2.90
B. Marine Fisheries										
13. Industrial (Trawler Fishing)	14500	12454	32606	76885	105348	108479	120087	107236	115354	7.57
14. Artisanal	150382	240590	422601	518500	521180	528997	534600	552675	555750	0.56
Marine Fisheries Total (B)	**164882**	**253044**	**455207**	**595385**	**626528**	**637476**	**654687**	**659911**	**671104**	1.70
TOTAL FISH PRODUCTION (A+B)	**753502**	**1090610**	**2102026**	**3548115**	**3878324**	**4134434**	**4276641**	**4384221**	**4503371**	2.72

Annuexure 3(a): Annual Carp Hatchling Production in 2020

Source of Production	No. of Hatchery	Hatchling Production (Kg)	%
1) Natural			
Jamuna River	-	1087	-
Padma River	-	825	-
Arialkha River	-	95	-
Brahmaputra River	-	59	-
Garai/Madhumati River	-	146	-
Surma	-	0	-
Halda River	-	394	-
Natural Total		**2606**	**0.39**
2) Artificial			
Govt. Hatchery	103	15411	*2.31*
Private Hatchery	963	648486	*97.30*
Artificial Total	**1066**	**663897**	***99.61***
COUNTRY TOTAL	**1066**	**666503**	*100*

Annexure 3(b): Hatchling Production of Govt. Hatchery in 2020

Name/Location of Hatchery	No. of Hatchery	Hatchling Production (Kg)									Tilapia Juvenile (lakh)
		Major Carp	Exotic Carp	Pangas	Thai Punti	Bata	Koi	Shingi/ Magur	Other	Total	
Division-wised Fish Seed Multiplication Farm											
1. Dhaka	13	1167	268	0	47	32	0	0	0	1513	1.50
2. Mymensingh	9	1282	263	5	210	120	0	2	0	1882	0.00
3. Khulna	14	2631	0	0	0	0	0	2	0	2633	0.00
4. Barishal	9	527	52	30	5	0	0	5	0	619	0.00
5. Rangpur	16	1146	745	0	73	121	0	0	1	2086	1.20
6. Rajshahi	17	1563	822	37	61	301	0	10	140	2934	1.65
7. Chattogram	18	1710	418	0	201	57	0	0	0	2386	2.80
8. Sylhet	6	699	91	0	135	11	0	0	25	960	0.00
TOTAL	**102**	**10725**	**2658**	**72**	**731**	**642**	**0**	**19**	**166**	**15013**	**10.15**
BFRI, Mymensingh	1	270	45	10	63	0	9	0	1	398	0
COUNTRY TOTAL	**103**	**10995**	**2703**	**82**	**794**	**642**	**9**	**19**	**167**	**15411**	**10.15**

Annexure 3(c): Hatchling Production of Private Hatchery in2020

Division	No. of Hatchery	Hatchling Production (Kg)									Tilapia Juvenile (lakh)
		Major Carp	Exotic Carp	Pangas	Thai Punti	Bata	Koi	Shingi/ Magur	Other	Total	
1. Dhaka	42	12516	4805	25	2186	2980	677	450	570	**24209**	255
2. Mymensingh	328	60381	54118	6850	14101	2711	6357	26917	20314	**191749**	4879
3. Khulna	97	39390.5	36793	4761	1997	1866	1092	462	4551	**90913**	2258
4. Barishal	35	11609	5764	320	2859	260	355	450	2267	**23884**	194
5. Rangpur	94	26774	28106	0	4859	10048	428	1905	1300	**73420**	225
6. Rajshahi	177	59521	55704	12646	5654	13504	2354	9072	16084	**174539**	19000
7. Chattogram	166	33999	12938	6614	1747	777	232	131	4829	**61267**	2771
8. Sylhet	24	4322	3164	30	636.12	241	25	0	88	**8506**	1843
TOTAL	**963**	**248513**	**201392**	**31246**	**34039**	**32387**	**11520**	**39387**	**50003**	**648486**	**31426**

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

Annexure 3(d): Annual PL (Post Larvae) Production in 2020

Source of Production	Galda Hatchery		Bagda Hatchery		Total	
	No. of Hatchery	PL Production (Crore)	No. of Hatchery	PL Production (Crore)	No. of Hatchery	PL Production (Crore)
Govt. Hatchery	27	0.4	0	0	27	0.40
Private Hatchery	6	1.96	43	792.952	49	794.91
TOTAL	**33**	**2.36**	**43**	**792.952**	**76**	**795.31**

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

Annexure 4: Annual Catch of Marine Fisheries in 2019-20

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	30	90	1457	0	2749	4206
b) Fish Trawler	190	570	979	9616	100558	111148
TOTAL INDUSTRIAL (A)	***220***	***660***	***2436***	***9616***	***103302***	***115354***
B. Artisanal						
1. Gill Net Fishing						
a) Mechanized	20359	77768	0	268900	69896	338796
b) Non-mechanized	16831	40585	0	25050	11589	36639
SUB-TOTAL	***37190***	***118353***	***0***	***294950***	***81485***	***376435***
2. Set Bag Net Fishing						
a) Seasonal (MB)	10000	22404	30885	0	115970	146855
b) Seasonal (NMB)	5200	10000	6110	0	1335	7445
c) All Seasonal (NMB)	5550	10025	750	0	445	1195
SUB-TOTAL	***20750***	***42429***	***37745***	***0***	***117750***	***155495***
3. Long Line Fishing						
a) Jew Fish Long Line						
i. Mechanized	2500	10191	0	0	17035	17035
ii. Non-mechanized	400	900	0	0	375	375
b)Other Long Line (NMB)	325	772	0	0	140	140
SUB-TOTAL	***3225***	***11863***	***0***	***0***	***17550***	***17550***
4. Trammel Net Fishing (NMB)	131	422	950	0	2265	3215
5. Other Gears Fishing (NMB)	6573	15640	1685	0	1370	3055
TOTAL ARTISANAL (B)	**67669**	**188707**	**40380**	**294950**	**220420**	**555750**
GRAND TOTAL (A+B)	**67889**	**189367**	**42816**	**304566**	**323722**	**671104**

- AnnualGrowth Rate:1.70% , (Hilsa : 4.91%; Shrimp : 0.16% and other species : -0.96%)
- Annual Growth Rate (Industrial) : 7.57%; Growth Rate (Artisanal) : 0.56%

Trawler		Boat		Gear	
Type	Number	Type	Number	Type	Number
Shrimp Trawler	30	**MB** *(Mechanized Boat)*	32859	Gill Net	118353
Fish Trawler	190	**NMB** *(Non-Mechanized Boat)*	34810	Set Bag Net	42429
				Long Line	11863
				Trammel Net	422
				Other Gear	15640
Total	**220**		**67669**		**188707**

Annexure 5: Species-wise Catch of Marine Fisheries in 2019-20

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	**2436**	**9616**	16154	6494	0	1205	6271	5223	602	67353	103302	**115354**
B. Artisanal												
1.Gill Net Fishing												
a)Mechanized	0	269900	650	5900	135	2320	25650	2375	1458	30408	68896	**338796**
b) Non- mechanized	0	25050	0	100	0	110	1755	70	18	9536	11589	**36639**
SUB-TOTAL	**0**	**294950**	**650**	**6000**	**135**	**2430**	**27405**	**2445**	**1476**	**39944**	**80485**	**375435**
2. Set Bag Net Fishing												
a) Seasonal	36995	0	10	57820	0	6345	3255	55	85	50735	118305	**155300**
b) All Seasonal	750	0	0	155	0	43	0	12	10	225	445	**1195**
SUB-TOTAL	**37745**	**0**	**10**	**57975**	**0**	**6388**	**3255**	**67**	**95**	**50960**	**118750**	**156495**
3. Long Line Fishing												
a) Jew Fish Long Line												
i. Mechanized	0	0	0	0	28	0	3497	5223	1163	7124	17035	**17035**
ii. Non-mechanized	0	0	0	0	14	0	132	88	25	116	375	**375**
b) Other LongLine	0	0	0	0	0	0	48	34	12	46	140	**140**
SUB-TOTAL	**0**	**0**	**0**	**0**	**42**	**0**	**3677**	**5345**	**1200**	**7286**	**17550**	**17550**
4.Trammel Net Fishing	950	0	0	45	0	0	745	330	0	1145	2265	**3215**
5. Other Gears' Fishing	1685	0	0	235	0	0	590	200	0	345	1370	**3055**
TOTAL ARTISANAL	**40380**	**294950**	**660**	**64255**	**177**	**8818**	**35672**	**8387**	**2771**	**99680**	**220420**	**555750**
GRAND TOTAL (Industrial+ Artisanal)	**42816**	**304566**	**16814**	**70749**	**177**	**10023**	**41943**	**13610**	**3373**	**167033**	**323722**	**671104**
%	***6.38***	***45.38***	***2.51***	***10.54***	***0.03***	***1.49***	***6.25***	***2.03***	***0.50***	***24.89***	***48.24***	***100.00***

Species-wise Annual Shrimp Catch in Marine Fisheries

Sector	Bagda (Tiger)	Harina (Brown)	Chaka (White)	Others	Total	Growth Rate (%)
Trawl Fishing	281	886	54	1215	**2436**	*-10.87*

Annexure 6 : List of on going development projects (2019-2020)

1.	Fisheries Development Project in Rangpur Division (Jan, 2015-Jun, 2021)	8679.00	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.	90.52
2.	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.	98.98

3.	Expansion of Aquaculture Technology Services up to Union Level Project (Phase-II) (Mar 2015-Jun 2022)	37838.00	464 Upazilas in 61 Districts, covering 4300 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	82.82%
4.	Greater Comilla District Fisheries development Project (Jul, 2015-Jun, 2022)	21131.00	34 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	98.97

5.	Enhancement of Fish Production through Restoration of Waterbodies Project (Oct, 2015-Jun, 2022)	40900.00	61 Districts and 349Upazilas	1. To ensure food security and support to the government's poverty reduction efforts through increase of fish production at sustainable level 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 poor beneficiaries group in aquaculture practices with improved technology packages established by the Department of Fisheries 7. To produce marketable fish.	1. Re-excavation (Pond, dighi) 2. Re-excavation (Silted Beel/Dead river/canal) 3. Construction of pipe culvert	34.13
6.	Grater Jessor Fisheries Development Project (Jan, 2016-Dec, 2019)	3916.44	21 Upazilas of 4 Districts	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.	98.48

7.	National Agricultural Technology Programme Phase II Project (NATP-2) (Oct 2015-Jun 2023)	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 endangered 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	95.03
8.	Sustainable Coastal and Marine Fisheries Project (July 2018- June 2023)	186886.55	4 Division, 16 District, 75 Upazila	The overall objective of the project is to explore greater opportunity from Coastal and Marine fisheries resources while promote sustainable management of fisheries stock and environment to reduce poverty and improve livelihood of the coastal community.	1. Enabling sustainable fisheries sector investments and growth 2. Improvement of infrastructure and production practices 3. Community empowerment and livelihood transformation 4. Project management and monitoring	39.20
9.	Fisheries Development Project in Rajshahi Division (Jan 2019-Dec 2022)	4747.00	8 Districts 65 Upazila In Rajshahi division	1. To enhance fish production and productivity from aquaculture and capture fisheries of Rajshahi division. 2. To protect fish biodiversity through establishing fish sanctuary, stocking endangered fish fingerlings and creating awareness. 3. To improve fish habitat for sustaining water ecosystem and productivity. 4. To improve socio-economic condition of the vulnerable fishers community and fish farmers. 5. To adopt climate smart technologies to address climate change vulnerability in Rajshahi division. 6. To create more livelihood opportunities of marginal people of Rajshahi division.	1. Re-excavation of waterbodies 2. Establishment of sanctuary 3. Demonstration of farm on different fish culture technology 4. Support for alternate income generating activities (AIGAs) 5. Renovation of existing FSMF 6. Capacity development of different stakeholders 7. Farm registration and development of database.	94.22

10.	Enhanced Coastal Fisheries (Eco Fish BD) (Jun 2014-Dec, 2019)	10522.30	Barisal, Bhola, Barguna, Chandpur, Jhalakhati, 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

Annexure 6(a): Manpower under development project and manpower in position

Heads	Category	Numbers of posts	Numbers of vacant posts	In position
Development Projects (10 Nos)	Class-I	216	81	135
	Class-II	30	20	10
	Class-III	893	93	800
	Class-IV	48	19	29
	Total	1187	213	974

Annexure 6(b): Allocation and expenditure of development budget of DoF

Financial year	Number of Project	Development budget						Achievement (%)
		Expenditure			Allocation			
		Total	LC	PA	Total	LC	PA	
2019-20	10	24645.49	18544.30	6101.19	34648.00	26071.00	8577.00	71.13