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Shri Radha Mohan Singh, Union Minister for Agriculture and Farmers Welfare, Inaugurating the World Fisheries Day Programme on 21st November 2016 at New Delhi. Also seen are (from left to right) Dr. Joykrushna Jena, Shri Sudarshan Bhagat, Shri Aditya Kumar Joshi and Shri Devendra Chaudhry

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Days to Remember

Feb 02	World Wetlands Day
March 22	World Water Day
March 23	World Meteorology Day
April 05	National Maritime Day
April 16	World Entrepreneurship Day
April 22	International Mother Earth Day
May 22	International Day for Biological Diversity
May 23	World Turtle Day
May 24	World Fish Migration Day
June 05	World Environment Day
June 08	World Oceans Day
July First Saturday	International Day of Cooperatives
July 10	National Fish Farmers' Day
	NFDB Formation Day
July 11	World Population Day
Sept 16	International Day for Preservation of Ozone Layer
Sept 18	World Water Monitoring Day
Sept 26	World Hunting & Fishing Day
Oct First Monday	World Habitat Day
Oct 16	World Food Day
Nov 21	World Fisheries Day
Dec 03	World Conservation Day
Dec 05	World Soil Day
Dec 14	World Energy Day

Seasonal Fishing Ban/ Closed Season (60 days)

East Coast of India	15 April to 14 June
West Coast of India	01 June to 31 July



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Cover Story

World Fisheries Day 2016 Observed - 'Blue Revolution Scheme' to Increase Fish Production and Productivity in India

The World Fisheries Day 2016 was observed by the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare, Govt. of India, by organizing an impressive function on 21st November 2016 at Vigyan Bhawan in New Delhi. On this occasion the Union Minister for Agriculture and Farmers Welfare Shri Radha Mohan Singh said that due to rapid increase in fisheries and aquaculture, the income of fish farmers is constantly increasing and in the coming days it will benefit fish farmers on a large scale.



Shri Radha Mohan Singh, Union Minister for Agriculture and Farmers Welfare, addressing the gathering on the occasion of the World Fisheries Day 2016, in New Delhi on 21st November 2016

Shri Radha Mohan Singh said that development of the livestock is the best strategy for doubling the farmers' income. For this reason, the 2016-17 budget allocation of this department is Rs. 1700 crore, which is 21% higher than previous year budget. The Union Minister said that it is a matter of pride that this year more than 72% of the budget has been released for the development of the States, which has never happened in the past. Shri Singh said that now it is the responsibility of the States to spend it properly and not to park the funds. The Union Minister said that fish farming will have three benefits: first, increase in farmers' income; secondly there will be progress in the country's export and GDP and thirdly it will ensure nutritional and food security in the country.

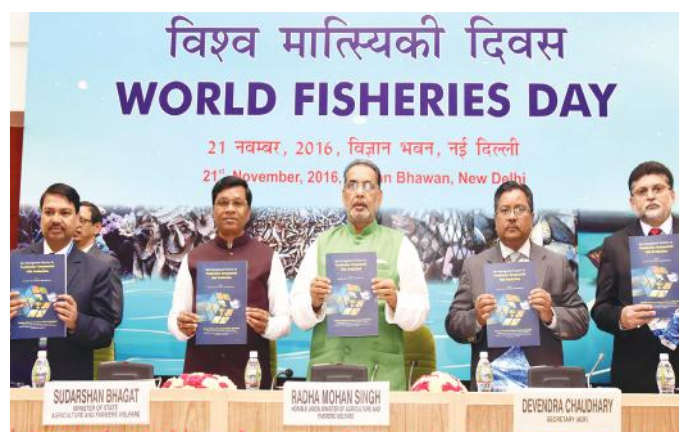
Shri Radha Mohan Singh said that for the last six months, the Department of Animal Husbandry, Dairying and Fisheries is formulating many new schemes. According to estimates for the year 2015-16, there was about Rupees one lakh crore value of fisheries production within the country.

The Union Minister said that in fish production, India is constantly at the second position after China. Fisheries are a big sector in the country and around 150 lakh people are engaged in fisheries activities. India occupies first place in the world in shrimp production and it is one of the largest exporter of shrimp. Shri Singh said that putting all fisheries (capture & culture) production together, there was an estimated 10.8 million tonnes fish production in the country in year 2015-16, which is around 6.4 per cent of total fish production of the world. India is the second largest

producer of fish from aquaculture (42.10 lakh tonnes). It contributes about 6.3 per cent in global aquaculture. For the last decade, where the average annual growth rate of export of fish and fisheries production in the world remained 7.5 per cent, India retained the first place with an average annual growth rate of 14.8 per cent in the export of fisheries product.

Shri Singh said that in the last two and half years, the government has constantly formulated new schemes in the interest of fisheries sector and farmers and has implemented them successfully throughout the country. World Fisheries Day is also being organized since last two years after formation of the present government. The Minister said that Hon'ble Prime Minister of India, Shri Narendra Modi has given the slogan and vision for the complete development of India - to double the income of farmers. To achieve this target, government has laid emphasis on development of the fisheries and its target is to double the income of the fishers and fish farmers by 2020 through marine fisheries and aquaculture.

Shri Radha Mohan Singh said that with a fish production of 72.1 lakh tonnes from fisheries, India occupies second place in the world. India can achieve about 8 per cent growth rate in the fisheries sector. Looking at the large potential in the development of fisheries, the Hon'ble Prime Minister Shri Narendra Modi has called for "Blue Revolution" in the field of fisheries. Thereafter, ministry has merged all the existing schemes and started a Rs. 3000 crore umbrella scheme "**Blue Revolution: Integrated Development and Management of Fisheries**". This scheme includes inland fisheries, aquaculture, marine fisheries comprising of deep sea fishing, mariculture and all the activities of national fisheries development board (NFDB).



The Union Minister for Agriculture and Farmers Welfare, Shri Radha Mohan Singh releasing publications viz., National Fisheries Action Plan, BMPs for Freshwater Ornamental Fish Production, Guidelines for Cage Culture in Inland Open Water Bodies of India and Compact Disc on Fish Farming, on the occasion of the World Fisheries Day 2016

Shri Singh informed that the Department of Animal Husbandry, Dairying and Fisheries has prepared a National Fisheries Action Plan 2020 (NFAP) for the next five years to increase fish production and productivity and to achieve the target of Blue Revolution. In this Action Plan all the different fisheries resources of the country like ponds and tanks, wetlands, brackish water, cold water, lakes reservoirs, rivers and canals and marine sectors are included. All the states / UTs have been requested to prepare State Action Plan (SAP) for the next five years to achieve the objective of Blue Revolution according to the NFAP 2020. The Minister said the aim of Blue Revolution scheme is to increase the fish production and productivity by 8 per cent annual growth rate and to reach 15 million tonnes mark by 2020. Efforts are being made to formulate a "National Inland Fisheries Policy", along with a new "National Marine Fisheries Policy", which will decide

an overall and integrated growth framework in the area of inland fisheries throughout the country.

Shri Radha Mohan Singh said that around 26.869 hectares area has been developed for aquaculture which has benefited 63,372 fish farmers. He said that during the last two years, under 'National Scheme for the Welfare of Fishermen', assistance was provided for construction of 9,603 houses, training 20,705 fishermen, and around 50 lakh fishermen were provided annual insurance assistance.

Shri Sudarshan Bhagat, Minister of State for Agriculture and Farmers Welfare, Shri Devendra Chaudhry, Secretary, Department of Animal Husbandry, Dairying and Fisheries, Shri Aditya Kumar Joshi, Joint Secretary DAHDF and Chief Executive of NFDB, Dr. Joykrushna Jena, Deputy Director General (Fisheries) ICAR, other officers of various Ministries, Departments, and officials of NFDB were also present on the occasion.

[Source: Press Information Bureau, Govt. of India: Release 21 November 2016]

As part of the programme on World Fisheries Day 2016, a couple of presentations were made and deliberated upon. Shri Bh. R. Viswanadha Raju, a progressive fish farmer, who had established M/s Anjali Aquaponics Farm in Gundedu village, Balanagar mandal Mahboobnagar district, Telangana State (65 km from Hyderabad), made a presentation on "Re-circulatory Aquaculture System (RAS) in India" highlighting the innovative work done on his farm. The exemplary work done by Shri Viswanadha Raju was appreciated and the Union Minister for Agriculture and

Farmers Welfare Shri Radha Mohan Singh complimented and honoured him on this occasion.



Shri Radha Mohan Singh, Union Minister for Agriculture and Farmers Welfare, honouring Shri Bh. R. Viswanadha Raju, progressive fish farmer from Mahboobnagar district, Telangana State (above); the RAS Unit established and shown by Shri Viswanadha Raju (below two rows) in his presentation: "Re-circulatory Aquaculture System (RAS) in India" during the World Fisheries Day 2016 function at New Delhi

1. North and Northeast

1.1 Meet on 'Mahseer in Recreational Fisheries and Eco-tourism in Northeast India' held at Nagaon, Assam

A two-day Interactive Meet on 'Mahseer in Recreational Fisheries and Eco-tourism in Northeast India', co-sponsored by NFDB, was organized by the Directorate of Coldwater Fisheries Research (ICAR-DCFR), Bhimtal on October 1 and 2, 2016 at Jasingfaa Aqua Tourism Centre, Nagaon, Assam. Shri Parimal Suklabaidya, Hon'ble Minister of Fisheries, Assam, the Chief Guest, inaugurated the meet and released a bulletin entitled "Mahseer in Recreational Fishery and Ecotourism in India" compiled and edited by Dr. D. Baruah & Dr. D. Sarma and published by the DCFR. Dr. A.K. Singh, Director, ICAR-DCFR, Bhimtal welcomed the dignitaries and participants and highlighted that Mahseer is an important sport fish forming cornerstone in recreational fisheries and ecotourism particularly in the Northeastern Region.



Shri Parimal Suklabaidya, Hon'ble Minister of Fisheries, Assam, addressing the delegates (above) and release of manual on 'Mahseer in Recreational Fisheries and Eco-tourism in Northeast India' (below) at Jasingfa Aqua Tourism Centre, Nagaon, Assam

Dr. K.K. Vass, Dr. Gopal Krishna, Director, ICAR-CIFE, Shri S.N. Ogale, Dr. P.C. Mahanta, Dr. Kuldeep Lal, Director, NBFGR, Directors of State Fisheries Departments particularly Mr. R.K. Dogra, Mr. S.K. Das, Mr. S.P. Singh and others were also present. The program was co-ordinated by Dr. Debajit Sarma, Principal Scientist of ICAR-DCFR, Bhimtal. Dr. Sanjay Sarma, Officer-In-Charge and Dr. B. Lahon, Sr. Consultant (Fisheries), NFDB Regional Centre participated.

About 120 delegates from different parts of the country including scientists, academicians, State fishery officials, NGO's, entrepreneur and anglers participated. An angling festival was also organized on the first day where 96 anglers from different Northeastern states and from Uttarakhand participated. Further, 30 post-graduate students of Tourism Department were also given training on various aspects of eco-tourism including Mahseer fish angling.



Dr. A.K. Singh, Director, DCFR, angling Mahseer (above) and renowned angler Derek D Souza training student participants (below) at Jasingfa Aqua Tourism Centre, Nagaon, Assam

1.2 NFDB Sponsored Training-cum-Demonstration Programme on ‘Development of Freshwater Ornamental Fisheries Sector of Northeast India’ held at Guwahati, Assam

A three-day Training-cum-Demonstration Programme on ‘Development of Freshwater Ornamental Fisheries Sector of Northeast India’ was organized by the NFDB North-East Regional Centre, in collaboration with CIFRI Regional Centre, and in association with Gauhati University and Dept. of Fisheries, Govt. of Assam, at the ICAR-CIFRI Regional Centre, Guwahati, during 4 - 6 October 2016. An amount of Rs. 1.63 lakh was sanctioned by NFDB for conducting the three-day workshop.

A total of 52 participants from almost all the Northeastern States attended the programme. Shri S.K. Das, Director of Fisheries, Govt. of Assam, inaugurated the programme and released the Training Manual “*Development of Freshwater Ornamental Fisheries Sector of Northeast India*”. The resource persons included Dr. B.K. Bhattacharjya, Principal Scientist and Head; Dr. D. Debnath, Scientist; Dr. Pronob Das, Scientist; Mrs. Niti Sharma, Scientist and Mr. Simanku Borah, Scientist from ICAR-CIFRI Regional Centre, Guwahati. Others include: Dr. V.V. Raju, Assistant Director, MPEDA, Regional Centre, Guwahati; Dr. Dandadhar Sharma, Associate Professor, Gauhati University; Mr. Raben Das, FEO, Dept. of Fisheries, Govt. of Assam; Mr. Prabal Sarma and Mr. Bikul Goswami; Progressive Ornapreneurs from Assam besides Dr. Sanjay Sarma, Sr. Executive (Tech), Shri Apurba K. Das, Sr. Executive (Tech) and Dr. B. Lahon, Sr. Consultant (Fisheries) from NFDB Regional Centre, Guwahati. Demonstrations were done at the NFDB funded Integrated Ornamental Fish Unit at Gauhati University, and trainees were taken on a field visit to the Ornamental Fish Breeding Unit, Dept. of Fisheries, Amranga (Kamrup district), Assam. Prof. Jatin Kalita, Dean (Science Faculty), Gauhati University gave away certificate to the participants.



Shri S.K. Das, Director of Fisheries, Govt. of Assam, releasing the training manual during the inaugural session (left), trainees at the Integrated Ornamental Fish Unit at Gauhati University (above) and on a field visit to Ornamental Fish Breeding Unit of the Dept. of Fisheries, Amranga, Assam (below)



Training Manual on “Development of Freshwater Ornamental Fisheries Sector of Northeast India” prepared by NFDB Regional Centre, Guwahati for the 3-day training programme from 4th to 6th October 2016 at Guwahati, Assam

1.3 NFDB sponsored programmes under 'Swachhta Pakhwada' conducted at various locations in the State of Assam

Under the 'Swach Bharat Mission' a nation-wide cleanliness campaign was launched by Govt. of India. As a part of the above mission 'Swachhta Pakhwada' – a cleanliness fortnight was observed under which NFDB sponsored 50 Awareness Camps and 5 State Level Workshops, with special emphasis on hygienic handling of fish and maintaining hygienic conditions in fish markets. The following activities were undertaken in the State of Assam:

(i) Workshop on 'Recycling of Waste through Fish Farming' at CVSc, AAU, Guwahati, Assam:

NFDB sponsored one-day Workshop on 'Recycling of Waste through Fish Farming' was organized by the NFDB Regional Centre, on 18 October 2016 at the College of Veterinary Science, Assam Agricultural University (AAU), Khanapara, Guwahati. More than 100 participants from different parts of the State of Assam participated in the workshop. The main objective of the Workshop is to create a general awareness of the need for cleanliness in all walks of life in general and recycling of wastes through Integrated Fish Farming in particular.



Workshop on 'Recycling of Waste through Fish Farming' and release of fish seed organized under 'Swachhta Pakhwada' on 18 October 2016 at Veterinary College, AAU, Guwahati, Assam

Shri S.K. Das, Director of Fisheries, Govt. of Assam, Dr. D. K. Sarmah, Director, ICAR, National Research Centre on Pig, Rani, Assam, Dr. R. N. Goswami, Dean, College of Veterinary Science and Dr. A.K. Chakravarty, Director of

Research (Vety), Dr. K. Kalita, Professor (Pathology), College of Veterinary Science, AAU, Dr. S. K. Das, Principal Scientist and Head (Fisheries Division), ICAR Research Complex for NEH Region, Barapani, Dr. B.K. Bhattacharjya, Principal Scientist and Head, ICAR-CIFRI Regional Centre, Guwahati, officials of Dept. of Fisheries, Govt. of Assam, Dr. Sanjay Sarma of NFDB Regional Centre and others participated. On this occasion fish seed was released in the Pig Waste Recycling Fish Tank on the campus of the College of Veterinary Science, Khanapara, Guwahati

(ii) Dept. of Fisheries conducts Workshop and Awareness Camp at Sulung Fish Market, Nagaon, Assam:

A daylong awareness camp on 'Hygienic Fish Market' was organized by Dept. of Fisheries, Govt. of Assam on 27 October 2016 in the premises of NFDB assisted Modern Hygienic Fish Market at Sulung, Nagaon, Assam. NFDB sanctioned Rs. 1.00 lakh for conducting the workshop and awareness camp. A booklet on 'Hygienic Handling of Fish' was released on the occasion. Garbage bins were also distributed to the traders for proper waste disposal. Officials of the NFDB Regional Centre, Guwahati participated.



Release of booklet on 'Hygienic Handling of Fish' published in Assamese and Bengali during Workshop organized on 27 October 2016 by Dept. of Fisheries (above) and cleanliness drive (below) under Swachhta Pakhwada at Sulung Fish Market, Nagaon, Assam

(iii) NFDB-NERC, Guwahati, Organizes Awareness Camp at Betkuchi Fish Market, Guwahati, Assam:

The North-East Regional Centre of the NFDB at Guwahati, Assam organized an Awareness Camp cum Cleanliness Drive under 'Swachhta Pakhwada' on 28 October 2016 at Betkuchi Wholesale Fish Market, Guwahati, Assam. Dr. S. Sarma, Sr. Executive (Tech) and Officer-in-Charge and other officials of NFDB participated. They interacted with fish traders and vendors at Betkuchi Wholesale Fish Market and impressed up on them the need for maintaining hygienic conditions in the fish market. Garbage bins were distributed for hygienically disposing waste from fish dressing.



NFDB North-East Regional Centre, Guwahati organized 'Swachhta Pakhwada' cleanliness drive on 28 October 2016 at Betkuchi Wholesale Fish Market, Guwahati, Assam

(iv) Dept. of Fisheries conducts Workshop and Awareness Camp at Fatakbar Fish Market, Silchar, Assam:

The Dept. of Fisheries, Govt. of Assam organized a daylong Awareness Camp on 30 October 2016 at Fatakbar Wholesale Fish Market, Cachar, Silchar, Assam. NFDB

sanctioned Rs. 1.00 for this purpose. The Silchar Municipal Board and Wholesale Fish Market Committee actively involved in the cleanliness drive. An awareness rally and a community signature campaign were also carried out. A meeting was organized on hygienic handling of fish, where Shri S. Biswanathan, Deputy Commissioner, Cachar and Shri D. K. Bhuyan, Marketing Officer (Fishery), Directorate of Fisheries, Govt. of Assam were present. Dustbins, garbage bags, etc., were distributed among the traders of the Fatakbar Wholesale Fish Market.



Cleanliness drive at Fatakbar Wholesale Fish Market, a rally and awareness workshop organized during 'Swachhta Pakhwada' at Cachar, Silchar, Assam

(v) NFDB sponsored State Level Workshop on 'Hygienic Handling of Fishes' organized at Directorate of Fisheries, Govt. of Assam:

A State level workshop on 'Hygienic Handling of Fishes' sponsored by NFDB was organized at the Directorate of Fisheries, Govt. of Assam on 31st October, 2016. Progressive fish farmers, fish vendors, scientists and extension personals from various organizations took part in the workshop. Shri S. K. Das, Director of Fisheries, delivered welcome address. Mrs. Juri Deka Thakur, Joint Secretary to the Dept. of Fisheries, Govt. of Assam, was the Chief Guest. Dr. B. K. Bhattacharjya, Head, ICAR-CIFRI Regional Centre, Guwahati, Shri P.K. Hazarika, Nodal Officer (Fisheries), BTC, Shri Satyajit Sarma and Shri Ranjan Kr. Sarma, Joint Director, Department of Fisheries, Dr. Dipesh Debnath, Sr. Scientist, ICAR-CIFRI Regional Centre, Mr. S.R. Laskar, O-i-C, FISHCOPPED, Dr. D. Sarma, Assoc Professor, Gauhati University, Dr. R.C. Barman, Asst. Fishery Information Officer, and Extension

Officers from the State Dept. of Fisheries, Assam, Dr. Sanjay Sarma, Officer-in-Charge, Dr. B. Lahon, Sr. Consultant, Shri A.K. Das, Sr. Executive (Tech), Mr. S. Baishya and Mr. T.D. Sarmah, Jr. Consultants of NFDB, RC, Guwahati, participated.



NFDB sponsored Workshop on 'Hygienic Handling of Fishes' organized by the Dept. of Fisheries, Govt. of Assam, under 'Swachhta Pakhwada' on 31 October 2016

1.4 'Swachhta Pakhwada' observed in Modern Wholesale Fish Market at Moirang, Manipur

A one-day awareness camp under 'Swachhta Pakhwada' programme sponsored by NFDB was organized in the NFDB funded modern Wholesale Fish Market at Moirang, Manipur, on 28 October 2016. Shri David K. Shimray, Director of Fisheries, Shri L. Samananda Singh, CEO of FFDA, Shri M. Panchom Singh, DFO of Bishnupur, Shri L. Gojen Singh, Project Planning Officer, and around 60 persons including representatives of 'Women Fish Vendors Association', many fish vendors from Moirang, members of municipal council, Fishery Officers and Staff of Loktak Modern Wholesale Fish Market, Moirang, Bishnupur district, Manipur, took part in the awareness programme. Ms Dorothy M.S, Executive Assistant represented NFDB.

All the participants including officers cleaned the market by clearing the drains, sweeping the floors, moping and wiping platforms of the fish stalls. The programme concludes with distribution of trash bins to all the vendors. The women vendors then resumed sale of fish at their respective stalls.



Cleanliness drive, distribution of trash bins to vendors and resumption of fish sales thereafter at NFDB funded Wholesale Fish Market in Moirang, Manipur

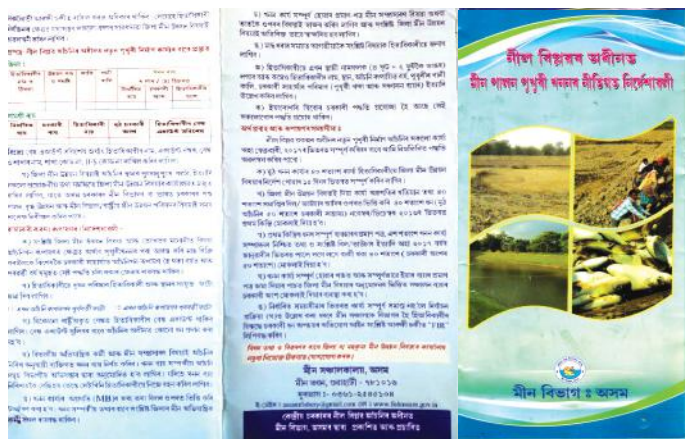
1.5 Blue Revolution Programme Inaugurated in Assam

The Dept. of Fisheries, Govt. of Assam organized a day-long 'Inauguration of Blue Revolution Programme of Assam' on 12 November 2016 at Bharaliparia Kanyaka Bohumukhi Pam, Biswanath Chariali, Assam. Under the Blue Revolution Programme the Govt. of India sanctioned Rs.16.41 Crore to the Dept. of Fisheries, Govt. of Assam for the year 2016-17. Out of this amount Rs. 90.66 lakh was sanctioned to 100 members of the Bharaliparia Kanyaka Bohumukhi Pam for construction of New Fish Ponds on 100 bighas (13.33 ha) and towards first year input costs of fish farming. Shri Parimal Suklabaidya, Hon'ble Minister of Fisheries, Govt. of Assam inaugurated the programme in presence of Shri M.C. Jauhari, Principal Secretary (Fisheries), Shri S.K. Das, Director, Dept. of Fisheries, Govt. of Assam; Dr. Dilip Kumar, Advisor, BTC,

Assam; Shri P. Hazarika, MLA (Sootea Constituency, Biswanath Chariali), scientists from ICAR-CIFRI, ICAR-CIFE, Shri A.K. Das, Sr. Executive (Tech) and Dr. B. Lahon, Sr. Consultant of NFDB Regional Centre, Guwahati participated in the programme. On this occasion a leaflet on “Construction of New Ponds and Tanks under Blue Revolution” and two video documentary CDs in Assamese language published with NFDB assistance by Dept. of Fisheries, Govt. of Assam were released and distributed among the participants.



Inauguration of Blue Revolution Programme of Assam on 12 November 2016 at Biswanath Chariali, Assam



Leaflet on “Construction of New Ponds and Tanks under Blue Revolution” (left) and Video Documentary CDs on “ABC of Fish Seed Production” (above left) and “Fish Farming” (above right) published with NFDB assistance in Assamese language by Dept. of Fisheries and released during inaugural function of Blue Revolution Programme

1.6 NFDB assisted Wholesale cum Retail Fish Market at Dimapur, Nagaland inaugurated

The Wholesale-cum-Retail Fish Market under Dimapur Municipal Council, Dimapur, Nagaland, constructed with NFDB assistance was inaugurated by Shri R. Tohanba, Secretary for Municipal Affairs, Economics and Statistics, at Bamunpukhuri Village-1 under Dimapur, Nagaland, on 12 November 2016.



Inauguration of the NFDB funded Wholesale-cum-Retail Fish Market (above) and Dr. Sanjay Sarma of the NFDB addressing the gathering (below) on 12 November 2016 at Dimapur, Nagaland

Shri R. Tohanba, the Chief Guest, urged the people to make the best use of the market and maintain it properly in the years to come. Dr. Sanjay Sarma, Officer-in-Charge, NFDB Regional Centre, Guwahati, addressed the gathering and urged people to maintain hygiene. Other dignitaries present in the inauguration programme include: H. Athokye Aye, DMC Administrator; Imti Longkumer, Additional Director, Fisheries Department, Kohima and Vikishe Achumi, Village I Bamumpukhuri, Dimapur, Nagaland, and Mr. A.S. Ahmed, Consultant, NFDB Regional Centre, Guwahati.

1.7 Beneficiary fish farmers from Bodoland Territorial Council, Assam receive NFDB financial assistance

NFDB sanctioned and released Rs.184.50 lakh in two installments for construction of 164 ha new ponds along with one time inputs cost. The Bodoland Territorial Council (BTC), Assam implemented the scheme and payments were made through cheques to the beneficiary fish farmers at a function organized at ICAR-CIFRI Regional Centre, Guwahati on 22 November 2016. The programme was co-ordinated by Mr. P.K. Hazarika, Nodal Officer, BTC, Assam. Shri Satyajit Sarma, Jt. Director (Fisheries), Govt. of Assam, the Chief Guest, highlighted the importance of NFDB in promoting the development of fisheries in the region and also assured the beneficiaries of every possible support from the State Fisheries Dept. to achieve the target of Blue Revolution in the days ahead. Dr. B.K. Bhattacharjya, Principal Scientist and Head, Dr. Pronob Das, Scientist, Mr. Simanku Borah, Scientist and Mrs. Niti Sharma, Scientist of ICAR-CIFRI Regional Centre, Guwahati; Dr. Dhruvaji Sharma, Fishery Extension Officer, Dept. of Fisheries, Dr. Sanjay Sarma, O-i-C, Shri Apurba Kumar Das, Sr. Executive (Tech), Dr. B. Lahon, Sr. Consultant and Mr. S. Baishya, Jr. Consultant, NFDB Regional Centre, Guwahati, participated.



Beneficiary fish farmers from Bodoland Territorial Council (BTC), Assam, receiving cheques under NFDB assistance at a function organized at CIFRI Regional Centre, Guwahati

1.8 NFDB funded Rearing Ponds constructed in Beels of Assam inspected

NFDB provided financial assistance of Rs. 192.37 lakh to Assam Fisheries Development Corporation (AFDC) Ltd. for the construction of 95 Rearing Ponds in 19 Beels of Assam. On 6 December 2016 Dr. B.K. Chand, Executive Director (Tech), NFDB, Hyderabad visited Hajo, Kamrup, Assam to observe implementation of the project 'Construction of Rearing Tank at Gorjan-Bullatjan Beel' financed by NFDB. He was accompanied by Sri Apurba Kumar Das, Sr. Executive (Tech.), Dr. B. Lahon, Sr. Consultant, NFDB-RC, Guwahati, Sri Mohitosh Barman, Jr. Engineer, AFDC Ltd. and the lessees of Gorjan-Bullatjan Beel. Netting of the Rearing Ponds was done to observe the growth of farmed fishes.



Netting of fish in the NFDB funded Rearing Ponds in Gorjan-Bullatjan Beel, at Hajo, Kamrup district, Assam

1.9 Visit to NFDB assisted *Pangasius* farm in Baksa district, Assam

NFDB funded the project “Renovation of ponds and first year inputs for culture of *Pangasius sutchi* in 3 ha area” implemented by Mr. Haren Rabha of Baksa district of Assam. On 17 December 2016 Dr. Sanjay Sarma, Sr. Executive (Tech) & Officer in Charge, Dr. A. K. Das, Sr. Executive (Tech), Dr. Bhupen Lahon, Sr. Consultant and Mr. A. S. Ahmed, Consultant, NFDB Regional Centre, Guwahati visited the site to assess the outcome. Mr. Haren Rabha started *Pangasius sutchi* culture in his farm but felt that, although the species can be cultured easily in ponds, it cannot be considered a profitable venture because people in the region do not prefer the species as food fish and market demand is poor. Mr. Rabha intends to diversify into culture of GIFT Tilapia, Koi (*Anabas testudinius*), Pacu (*Piaractus brachypomus*), etc. He is also constructing a hatchery, which on completion will be another source of income.



NFDB-NERC Guwahati team inspecting the fish farm and hatchery of Mr. Haren Rabha in Udalguri, Baksa district, Assam

1.10 NFDB organizes workshop on Fish Feed Formulation at Guwahati, Assam

A two-day workshop on ‘*Fish Feed Formulation, Preparation and its Importance in Northeast India*’ was organized by NFDB Regional Centre, Guwahati in collaboration with ICAR-Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar and ICAR-Central Inland Fisheries Research Institute (CIFRI), Regional Centre, Guwahati on 22 and 23 December 2016 at ICAR-CIFRI, Regional Centre, Guwahati, Assam. A total of 32 entrepreneurs from the Northeastern Region took part in the programme. The workshop was inaugurated by Shri Parimal Suklabaidya, Hon’ble Minister of Fisheries, Govt. of Assam. He also released the compendium of workshop. Mr. S.K. Das, Director of Fisheries, Assam was the Guest of Honour. Dr Dhrubajyoti Sharma, Fishery Officer, Dept. of Fisheries anchored the inaugural session.



NFDB sponsored workshop on ‘Fish Feed Formulation, Preparation and its Importance in Northeast India’ organized at ICAR-CIFRI, Guwahati, Assam

Dr. K.N. Mohanta, Principal Scientist and Head, Fish Nutrition and Physiology Division (FNPd), ICAR-CIFA, highlighted the production potential of aquaculture in India

and importance of use of fish feed in aquaculture. He detailed about the use of locally available alternate protein source for minimizing fish feed cost. He encouraged the participants to take up fish feeding techniques for increasing fish production. Other resource persons included Dr. K.C. Das and Dr. S.C. Rath, Principal Scientists from ICAR-CIFA, Bhubaneswar; Dr. B.K. Bhattacharjya, Principal Scientist & Head, ICAR-CIFRI, NERC, Guwahati and Dr. Dandadhar Sarma, Associate Professor, Dept. of Zoology, Gauhati University, Guwahati. The plenary session was chaired by Dr. Dilip Kumar, former Vice-Chancellor, ICAR-CIFE, Mumbai. Dr. R.S. Biradar, former Jt. Director, ICAR-CIFE, Mumbai.

1.11 NFDB participates in Awareness Camp organized by a Progressive Ornapreneur in Goalpara district, Assam

Mr. Bimol Roy a pioneering Ornapreneur (ornamental fish entrepreneur) of Assam took the initiative of organizing a day-long 'Awareness Camp on Ornamental Fish Farming' on 28 December 2016 at his farm in Bhelakhmar village, Krishnai, Goalpara district, Assam. He has been assisting the women in nearby villages with hands-on training on ornamental fish breeding and culture. About 60 women from five different Self Help Groups namely, Rupali SHG, Pragati SHG, Priya SHG, Jonali SHG and Rupantar SHG actively participated in the programme. He had invited Dr. Sanjay Sarma, Officer-In-Charge, Dr. B. Lahon, Sr. Consultant (Fisheries) and Mr. Trinayan Deb Sarmah, Jr. Consultant (Fisheries), NFDB Regional Centre, Guwahati to participate. They addressed and interacted with the SHG members (housewives) highlighting on the scope of generating additional income by spending their spare time at home, the export value of indigenous ornamental fish species and importance of ornamental plants.



Women SHG members with Mr. Bimol Roy and NFDB Team (left); Dr. Sanjay Sarma, Officer-in-Charge, NFDB Regional Centre, Guwahati, showing ornamental fish to the participants (above)

1.12 NFDB Team visits 'Samaria Cluster Fish Villages' in Kamrup district, Assam

The Northeast Zone Welfare Development Society, Assam, was established in the year 2000. This Society is registered under Farmers' Producers' Company Act. There are 450 registered farmers and more than 700 co-members in the Society. Mr. Bimal Chandra Ray on behalf of Northeast Zone Welfare Development Society requested the Officers at NFDB-NERC, Guwahati, to explore the possibility of extending NFDB assistance to develop the area where people living in the cluster of villages are involved in traditional fish farming practice. Dr. Sanjay Sarma, Sr. Executive (Tech) & Officer in Charge, Dr. B. Lahon, Sr. Consultant (Fisheries) and Sri. T.D. Sarmah, Jr. Consultant (Fisheries) of NFDB Regional Centre, Guwahati visited the Samaria Cluster Fish Village, Kamrup (R) district, Assam on 28 December 2016; Mr. Kholilur Rahman, Social Worker accompanied the team.

The villagers in the cluster are very keen and interested in developing the low laying areas into fish ponds. The villagers told that there are more than 500 bighas of low-land that can be converted into fish ponds for scientific fish farming, and that a hatchery is very much required in the area. At present, the farmers are buying fish seed from a far off place which increase the seed cost up to four times. Dr. S. Sarma interacted with the farmers and also visited many of the potential sites. Mr Bimal Chandra Ray, Executive Member of the Northeast Zone Welfare Development Society, explained to NFDB team about the potentiality and the needs of the fish farmers of the region.

Dr. Sarma advised Mr. Ray to prepare a DPR and submit to the Directorate of Fisheries, Govt. of Assam for onward transmission to NFDB for consideration.



Dr. Sanjay Sarma, Officer-in-Charge, NFDB Regional Centre, Guwahati addressing the farmers of 'Samaria Cluster Fish Villages' (left); NFDB Team visits fish ponds in the Cluster Villages (right) in Samaria, Kamrup district, Assam

2. Farmers' Note Book

2.1 Giant Gourami – a less known but Economically Important Freshwater Fish

In this Chapter, in the previous six Issues, under the head 'Lesser Known Freshwater Fish with Good Economic Potential', general information on the Striped Murrel *Channa striata* (Bloch, 1793), the Spiny Eel *Mastacembelus armatus* (Lacepède, 1800), Climbing Perch *Anabas testudineus* (Bloch, 1792), Mola Carplet *Amblypharyngodon mola* (Hamilton, 1822), Desi Magur/ Walking Catfish *Clarias batrachus* (Linnaeus, 1758) and Asian Seabass *Lates calcarifer* (Bloch, 1790) was provided.

In this issue some general information about the fish popularly known as **Giant Gourami**, a less known but economically important freshwater fish is being presented. Gouramis or Gouramies are a group of freshwater Perciform fishes belonging to the family, Osphronemidae, comprising of four subfamilies, 15 genera and some 133 species. Many Gouramis have an elongated, feeler-like ray at the front of each of their pelvic fins. Many species show parental care, some are mouth-brooders and others build bubble nests. Quite a few species are of ornamental value, while others are food fish. The Giant Gourami is also considered to be a good game fish.

Osphronemus goramy Lacepède, 1801

Common Name

Giant Gourami

Vernacular Names

English	:	Giant Gourami,
Malayalam	:	Gourami
Marathi	:	Gourami
Tamil	:	Sangara, Sankara
Telugu	:	Gourami, Java Sundari

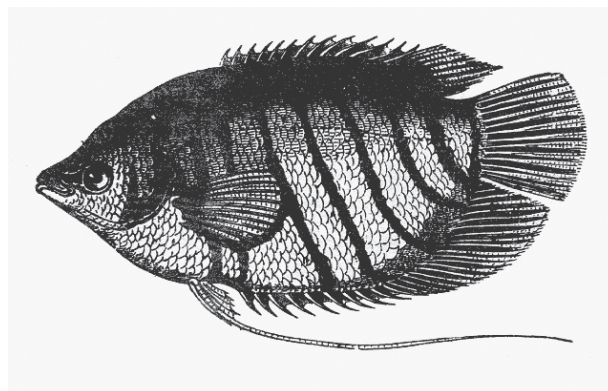


Diagram of juvenile Gourami (*Osphronemus goramy*) showing banding pattern and a beak like mouth [From Günther, A.C.L.G., 1880, 'An introduction to the study of fishes'; Source: <http://www.fishbase.org>]

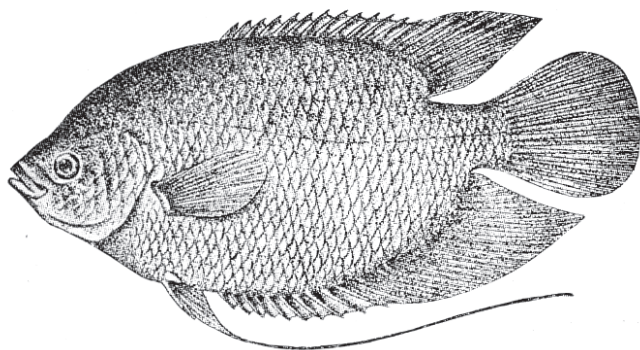


Diagram of adult Gourami (*Osphronemus goramy*)
[Source: The Wealth of India Vol. IV, Fish and Fisheries, CSIR, New Delhi, 1962, page 49]



Adult Giant Gourami (*Osphronemus goramy*) [Photo by Joshua Sherurcij, Liberty Building in Buffalo, New York; Source: <https://en.wikipedia.org>]



Albino Giant Gourami (*Osphronemus goramy*) [Photo by George Chernilevsky - Own Work, Public Domain; Source: <https://en.wikipedia.org>]

Description

Body of the Giant Gourami is oblong, compressed, mouth superior (facing up); Lateral line scales 31-34; Dorsal fin with 12-14 spines and 10-13 soft rays; Anal fin with 9-13 spines and 18-21 soft rays; Pelvic fins with first soft ray prolonged into a thread-like tentacle; Caudal fin rounded or obtusely rounded, not truncate or emarginated. The head in a mature fish will develop a hump just above the eyes. Colour variable, it is a pale to golden yellow, with silvery, pale blue stripes running vertically along its body; a blackish spot at the base of the pectoral fin; in the juveniles there are 4-5 or even 8-10 dark vertical bands along the body; adults without vertical bands. It is an incredibly hardy, long-lived fish which can survive for over 20 years in captivity. These fish are said to develop a real personality and can learn to recognise their owner.

Habit & Habitat

Thrives both in freshwater and brackish waters; it inhabits rivers/streams, lakes/ponds, swamps/stagnant water bodies, among vegetation; enters flooded plains. The presence of labyrinthiform organ in Gourami facilitates aerial respiration and enables them to resist low oxygen content in water. The fish breathes moist air and can be kept alive for long periods out of water, making it possible to distribute it in areas lacking a cold chain.

Food & Feeding

Osphronemus goramy is omnivorous; feeds on both plants and animals such as some aquatic plants, weeds, algae, earthworms, insects, small shrimps/prawns, fish, frogs, and sometimes dead animals, detritus, debris. It will accept a variety of feeds, including pellets, frozen foods and vegetable matter/ kitchen refuse, etc. The Giant Gourami is said to be a voracious herbivore feeding on aquatic plant leaves with a preference for Water Lettuce *Pistia stratiotes*, which is the breeding source of mosquito *Mansonia* (*Mansonioides*) *sp.* the main vector of Brugian filariasis/ elephantiasis in India and other South-east Asian countries (Sabesan, Rajendran and Pradeep Kumar, 1997). The fish has also been used for weed control in irrigation canals in India (Hora and Pillay, 1962).

Size & Weight

The Giant Gourami grows to a maximum length of 80 cm weighing about 15.00 kg (Temenggor Reservoir, Malaysia), although fish captured from the wild usually measure less

than 45 cm. A fish captured by Angling/ Rod & Reel method had a record length of 72 cm weighing about 9.00 kg (Palm Tree Lagoon, Thailand). Even under sub-optimal conditions, Gourami was observed to grow from 7.5 cm to 50 cm in four years.



A record size Giant Gourami (Osphronemus goramy) [Locality: Thailand, Bung Sam Lan Lake, Picture by Jean-Francois Helias / Fishing Adventures Thailand; Source: www.fishbase.org]

Reproduction & Breeding

In mature males the dorsal and anal fins are more pointed, and the body is darker changing to nearly black during spawning; mature females develop thicker lips. The diploid chromosome number is 48 (haploid number 24). The species is sexually mature from 6 months onwards; young fish can be used for breeding purposes. The species breeds throughout the year, but there is a seasonal peak. Surface vegetation must be provided; the male builds a large nest out of vegetation (including grasses and roots). The Giant Gourami is an egg layer; the male builds the bubble nest in which the female lays about 500 to 3,000 eggs which are then fertilised by the male; hatched larvae float and are protected by the male. The female is chased away at this point and should be removed. The eggs hatch in 24-36 hours and the fry become free swimming 3-5 days later. The male continues to guard them for 2-3 weeks in the wild, but can be removed once the young are free-swimming. They are large enough to accept brine shrimp nauplii and formulated feed from the first day. The fry and fingerlings primarily feed on zooplankton, insect larvae and soft vegetable matter.

Distribution

Osphronemus goramy is essentially a tropical fish native to Southeast Asia: Sumatra, Java, Borneo (Indonesia), the Malay Peninsula, Thailand and Indochina (Mekong basin). The Gourami was introduced to several countries including India, Pakistan, Sri Lanka, Mauritius, Seychelles, Madagascar, Uganda, Philippines, Australia, New Zealand, Papua New Guinea, Japan, Hawaii, Colombia, France, Italy, etc., for aquaculture purposes. It got established in most countries whereas in some countries it did not establish.

In India the Gourami was introduced from Mauritius and Java (Indonesia) into Madras during 1865-66. The Dept. of Fisheries, Govt. of the erstwhile Madras State distributed the fish stocks to different parts of the country. It thrives in freshwater as well as brackish water; it establishes well in regions where the water temperature is between 21-35°C.

Fisheries & Aquaculture

Osphronemus goramy is a commercially important fish. However, catch statistics of its fishery and aquaculture production are scanty. It is cultured commercially for food on a large-scale in several countries such as Indonesia, Myanmar, Philippines and Thailand, the total aquaculture production in these four countries in 1994 was 27,651 tonnes. It is among the most delicious of freshwater fish; it is eaten pan-fried, steamed and baked. In some parts of India it is dried and then eaten.

Gourami as compared to Major Carps is a slow-growing fish. The maximum length-weight attained in India is 60 cm/4.54-5.44 kg in more than 6 years. In India Gourami culture was attempted in the experimental fish ponds at erstwhile Pond Culture Division of Central Inland Fisheries Research Institute (CIFRI) at Cuttack, Odisha. It is reported that in 9 months the fry stocked at the rate of 2,500/ha attained an average size of 92 mm/15 g. In combination-stocking with other fishes, the Gourami reached an average length-weight of 334 mm/688 g during the above period. In this case, however, the Gourami were only 75 in number out of a stocking density of 5,075/ha (Devaraj, K.V., 1975, *Seafood Export Journal*, Vol. 7, pp 35-41).

Ornamental Fish

Some 15 species/varieties of Gouramis are popular as aquarium fish. Examples of commonly kept Gouramis are Honey Gourami, Chocolate Gourami, Blue or Three Spot Gourami, Pearl Gourami, Croaking Gourami, Giant



Gourami, Dwarf Gourami and of course the famous Kissing Gourami.

The Giant Gourami is often traded as an ornamental fish too and sold as cute juveniles in aquarium shops. The young fish have an attractive banding pattern, which fades as the fish grow. A golden variety also exists among aquarists. The albino variant of Giant Gourami measuring 3 inch (7.5 cm) in length is quoted at Rs. 190 apiece in Mumbai, and in California a 20 inch (50 cm) long fish is quoted at US\$ 75 (Rs. 5,113).

Current Population Trend

According to the IUCN Red List, *Osphronemus goramy* is categorized under least concern, its current population as stable, conservation not required but population and habitats should be monitored, and major threats include wetlands degradation, pollution.

Scope for Propagation in India

The Gourami, although introduced in India during 1865-66, did not received adequate attention despite its economic potential. It is highly suitable for stocking in wetlands and

un-cleared swamps/ derelict water bodies. These water bodies locally known as *Beels* (Assam, West Bengal, Tripura), *Maun*, *Chaur*, *Dhal* (Bihar), *Jheel* (U.P) and *Pat* (Manipur) are amenable to development of capture fisheries/ culture-based capture fisheries and play a significant role in inland fish production and also provide livelihoods to riparian populations by generating additional employment and incomes.

The Giant Gourami, *Osphronemus goramy*, by virtue of its: (i) ability to thrive both in freshwater and brackish waters, (ii) air-breathing habit, (iii) voracious herbivorous as well as omnivorous feeding habits, (iv) potential to grow to a very large size, (v) very long life-span, (vi) ability to breed multiple times in a year in confined waters bodies and thereby auto-stock, (vii) delicious flavor, etc., offers ample scope for extensive propagation especially in the hinterlands of various States.

[Source: *The Wealth of India Vol. IV, Fish and Fisheries*, CSIR, New Delhi, 1962; <https://en.wikipedia.org>; www.fishbase.org; www.seriouslyfish.com; www.iucnredlist.org]

3. New/ Innovative Technologies in Fisheries

3.1 Bioremediation in Shrimp Aquaculture Systems using Agro-waste Products

The Central Institute of Brackishwater Aquaculture (ICAR-CIBA), Chennai, Tamil Nadu, has been working on need based research for shrimp farmers and involved in developing products for sustainable and eco-friendly shrimp culture. To meet the growing demand for bioremediation products in shrimp aquaculture, scientists at the ICAR-CIBA invented a process for immobilization and biostimulation of bacteria implicated in bioremediation using agro-waste products.

(i) Scope of the Technology:

Shrimp aquaculture has extensively been practiced in India. As is the case in any farming system, shrimp farming also results in accumulation of nitrogenous metabolites such as ammonia and nitrite in the culture system, causing stress among the animals. To maintain a healthy ecosystem in aquaculture ponds, biostimulation of indigenous bacteria in culture system is the best eco-friendly practice. In the

present invention, a biostimulator has been developed from abundantly available agro-waste for shrimp aquaculture.

For utilization of naturally occurring microorganisms in the pond for bioremediation, the bacteria must be immobilized in a matrix that can sustain the bacterial cell so that the matrix will have longer shelf-life and retention period. Currently several products such as polymeric materials, other bio-support materials, zeolite, activated carbon and glass beads, are being used as the immobilization matrix for the bacterium of choice. These solid matrices are mostly synthetic polymers or inorganic materials. Further, these materials are expensive and also pose disposal problems. Matrix developed in the present invention does not have these problems as it is an abundantly available agro-waste, which is not only cost effective but also environment-friendly. This matrix as a supporting substrate is an ideal alternative to the expensive solid matrices presently being used.

(ii) Technology description:

The technology is based on low cost abundantly available agro-waste (bagasse, the dry pulpy residue left after the extraction of juice from sugar cane) for immobilization of bacteria and the development of a biomass of bacterial matrix on it by an easy process for immobilization. The main characteristics of the product developed are adequate substrate concentration, high surface area for maintenance of a high microbial cell density and optimization of microbial growth, longer biomass retention-time and shelf-life, and protection from inhibitory compounds. The product, a 'Biostimulator' developed from agro-waste, helps to enhance bioremediation of aquatic nitrogenous metabolites such as ammonia and nitrite. The product developed has excellent mechanical stability with no residue problem and no adverse effect on cultured shrimp.

(iii) The Product:

The biostimulating matrix (CIBAX-1) has been successfully tested with various ATCC bacteria and other bacterial isolates implicated in bioremediation under Institute's laboratory experimental conditions. The matrix has been characterized by scanning electron microscope, X-ray photo electron spectroscopy and Fourier transform infra-red spectroscopy. Molecular tools have been applied to detect immobilized organisms on the matrix. The retention-time and shelf-life may vary (increase or decrease) based on the type of bacteria to be immobilized. The biostimulation capacity also depends on other water quality parameters. Hence, prior to use, the matrix and its bioremediation potential has to be tested with the organisms to be immobilized and under conditions where the product has to be applied.

The biostimulating matrix developed as a supporting substrate is an ideal alternative to the expensive solid matrices for the development of bioremediation products, microbial products and probiotics. The very low cost of this lingo-cellulosic material is a real advantage that renders it a suitable alternative for the remediation of ammonia. CIBA has successfully demonstrated the use of bagasse as biostimulator for ammonia removal from seven different zero-exchange shrimp aquaculture systems. Bagasse biostimulator technology for ammonia detoxification is available for adoption by the aqua-farmers. Based on the requirement liquid matrix is also provided.



Bagasse an agro-waste product, used in biostimulator technology for ammonia detoxification, displayed at a shrimp farm (above); Matrix (CIBAX-1) the biostimulator for immobilization of probiotic bacteria developed by the ICAR-CIBA (below)

[Source: <http://www.ciba.res.in/index.php/ciba-technologies>; <http://www.ciba.res.in/index.php/tech-commercialisation>; Central Institute of Brackishwater Aquaculture (ICAR-CIBA), #75, Santhome High Road, Raja Annamalai Puram, Chennai, Tamil Nadu – 600 028; Phone: 044-24618817, 24616948, 24610565; Fax: 044-24610311; Email: director.ciba@icar.gov.in, director@ciba.res.in]

4. NFDB Initiatives

4.1 Review Meet on MUDRA Loan Scheme held at NFDB

Under the '*Pradhan Mantri Mudra Loan Yojana*' (PMMY) the 'Micro Units Development and Refinance Agency' or the MUDRA Bank was created to provide loans to small businesses and micro-institutions under three categories: *Shishu* – to provide a loan up to Rs. 50,000/-; *Kishore* – to provide loans from Rs. 50,000 to Rs. 5.0 lakh; and *Tarun* – to provide loans from Rs. 5.0 to 10.0 lakh. Under the MUDRA Loan Yojana no collateral security or application fee is required and the interest rate is only 1%. The PMMY intends to help small businesses and entrepreneurs from lower income groups to develop and grow and increase their social upward mobility and in turn develop the country's economy.

As desired by the Secretary, DADF, Govt. of India and at the instance of the NFDB, the Dept. of Fisheries, Govt. of Andhra Pradesh, conducted 13 Precursor Meetings (district level) and MUDRA Loan Awareness Campaigns at 25 places during August – September 2016. As a follow up, the Review Meet on MUDRA Loan Scheme, with respect to Fish Marketing, was held on 18 October 2016 at NFDB, Hyderabad. The objective was to evolve a strategy to organize Awareness Campaigns and to facilitate and promote availing MUDRA Loans by fishers in all the States.

Senior Bank Officials: Shri Manas Mohanti, General Manager, RBI, Hyderabad; Shri Malkit Singh, Vice-President/ DGM, NABCONS, Hyderabad; Shri Sampath Kumar, General Manager, SIDBI, Hyderabad; Shri PSN Murthy Asst. General Manager MUDRA, Mumbai; Shri Bala Bhaskar, AGM, SLBC, Hyderabad; *State Level Bankers' Committee (SLBC)* members; Bankers representing 25 different branches from Andhra Pradesh and Telangana States; Traditional Fishermen Service Organisation members; Gangaputra Sangam members; representatives from civil societies and Women Self Help Groups participated in the meeting. Dr. Utpal Kumar Sar, Executive Director (Tech), gave opening remarks; Dr. R. Suresh, Sr. Consultant and Ms. S. Glory Swarupa, Consultant, HRD, coordinated the programme.



Review Meet on MUDRA Loan Scheme held at NFDB (above), a presentation on Prime Minister Mudra Yojana Loans to Fish Vendors (middle) and participants (below)

The following presentations were made: (i) Shri Sampath Kumar, General Manager, SIDBI, Hyderabad: Role of SIDBI in MUDRA Scheme Implementation for Fisheries Sector; (ii) Shri PSN Murthy Asst. General Manager MUDRA, Mumbai: MUDRA Vision for Fisheries Sector; (iii) Shri Manas Mohanti, General Manager, RBI, Hyderabad: General Introduction and Information; (iv) Shri Malkit Singh, Vice-President/DGM, NABCONS, Hyderabad: Issues Emerged during Precursor Meetings; (v) Shri Srinivas, FDO and Shri Pavan Kumar, FDO, Govt. of AP: Highlighted the activities carried out so far by the Dept. of Fisheries, Govt. of Andhra Pradesh; (vi) Shri Bala Bhaskar, AGM, SLBC, Hyderabad: Role of Banks in MUDRA Scheme Implementation in Fisheries Sector.

Speakers representing civil society and traditional fishermen of Andhra Pradesh include: Shri Naidu Venkateshwara Rao, President, Traditional Fishermen Service Organisation; Shri Amarananda, General Secretary, Traditional Fishermen Service Organisation; Ms. Padma, President, MKMKS, Hyderabad; Shri Arjilli Dasu, President, Fisher Folk Foundation, Visakhapatnam; Shri Bhanu Murthy, President, Ennela NGO, Hyderabad; Shri Narsimha Raju, Thallarevu, East Godavari; Shri Somasekhar, Fisher Folk Foundation; and Shri K. Pandayya, Srikakulam.

4.2 NFDB sponsored Training Programme for Fisheries Extension Officers conducted by MANAGE, Hyderabad

A six-day Induction Training Program for the Newly Recruited Fisheries Extension Officers on “Extension Management Approaches for Fisheries Development”, sponsored by NFDB (Rs. 6.32 lakh sanctioned), was conducted by National Institute of Agricultural Extension Management (MANAGE) from 17 to 22 October 2016 at their campus in Rajendranagar, Hyderabad. 25 Fisheries Officials from Andaman & Nicobar Island, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Odisha and Tamil Nadu participated. Smt. V. Usha Rani, Director General, MANAGE, Hyderabad, inaugurated the programme.

Topics covered during the training include: Overview & Status of Fisheries development, in the country – issues & challenges; Status of Fisheries Extension in the country; Extension Reforms – (Decentralized Extension Delivery System), issues and challenges in convergence; Integrated

Extension Services (Farming System Approach & Farming Situation Based Extension); Social Mobilization and formation of Community Based Organisations (CBO), Extension Approaches of NFDB in Promoting Fisheries Development; Orientation on Process Documentation of Extension Services; Orientation on Fisheries Entrepreneurship Development; Public Private Partnership Initiatives in Fisheries Development and Social Media for Fisheries Development.

The participants were encouraged to prepare a Fisheries Extension Plan based on the resource availability in their respective States. Field visit to a nearby intensive aquaculture farm was also arranged. Participants visited NFDB for a discussion on schemes, funding pattern and subsidy and also interacted with Officers-in-charge of their respective States. Participation certificates were awarded during the valediction.



Participants of the NFDB sponsored training programme on ‘Extension Management Approaches for Fisheries Development’

4.3 NFDB sponsored Training Programme for Aquapreneurs conducted by MANAGE, Hyderabad

A two-week residential Training Programme for Aquapreneurs on “Advances in Fisheries Technologies and Extension Management for Fisheries Development” was conducted for the aspirant Aquapreneurs under Agri-Clinics & Agri-Business Centres (AC&ABC) Scheme of National Institute of Agricultural Extension Management (MANAGE), from 15 to 27 November 2016 at their campus in Rajendranagar, Hyderabad, for which NFDB Sanctioned Rs. 16.67 lakh.



Smt. V. Usha Rani, Director General, MANAGE, Shri Aditya Kumar Joshi, Chief Executive, NFDB and Dr. M.V. Gupta, World Food Prize Laureate addressed trainees at the inaugural session on 15th November 2016

Twenty one participants from Maharashtra, Tamil Nadu and Telangana States attended the training programme. Latest technologies and business opportunities in the sector were discussed at length. Talks on Marketing Strategies, Business Incubation, and Export Opportunities were delivered by eminent Scientists. The participants were encouraged to identify a viable fisheries related business activity and with the help of banker, a draft project report was prepared and presented. Visits to local enterprises, farms and NFDB were also organized. Discussions were facilitated, doubts were clarified and finally a re-cap of the learning was conducted.

The participants were taken on an Exposure Visit to establishments of fisheries interest in East and West Godavari districts of Andhra Pradesh. They visited: (i) Fisheries Research Station, SVVU, Undi, where they learnt about polyculture of Indian major carps, aquaponics and bio-floc models, various fish species, disease symptoms, management and control measures; (ii) KVK, ANGRAU, Undi, where they learnt about integrated fish farming with poultry and horticulture; (iii) UNO Feeds Factory, Bhimavaram, where they witnessed process of manufacturing floating fish feed and observed feeding of fish in their ponds; (iv) Yanam Retail Fish Market and Wholesale Fish Market (under construction) funded by NFDB; interacted with the fisherwomen selling both fresh & dry fish, observed freezing process and interacted with the fishermen; (v) Fish Landing Centre at Vakalapudi and Fishing Harbour at Uppada; interacted with fisherman community and observed fish auction process, post-harvest operations for domestic and export purpose;

(vi) Fisherwomen SHG to observe fish drying process and interact with members; (vii) Mangrove Forest at Koringa to observed the ecosystem and bio-diversity (fishes, turtles, snails, plants, animals, birds, snakes), and also shrimp culture ponds nearby; (viii) State Institute of Fisheries Technology (SIFT), Govt. of A.P., to see laboratory facilities, specimens, models, interact with the Principal, Faculty and fisherwomen undergoing training on value addition in fish.



Participants of the NFDB sponsored training programme for Aquapreneurs on 'Advances in Fisheries Technologies and Extension Management for Fisheries Development'

4.4 NFDB conducts Training Programme on Preparation of Fisheries Projects

A five-day training programme on Preparation of Fisheries Projects, third in the series, was conducted by NFDB from 28 November to 2 December 2016 at the National Institute of Plant Health Management (NIPHM), Rajendranagar, Hyderabad. Thirty seven participants comprising of Officers of the Dept. of Fisheries, Fisheries SMSs from KVKs and Scientists from Fisheries Research Institutes in the States of Andhra Pradesh, Bihar, Chhattisgarh, Haryana, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Manipur, Odisha, Tamil Nadu, Telangana, Uttar Pradesh and West Bengal underwent training.

Dr. Bimal Kinkar Chand, Executive Director (Tech), NFDB inaugurated the program; Dr. R. Suresh, Sr. Consultant and Ms. S. Glory Swarupa, Consultant, HRD, coordinated the programme.

Important topics discussed and deliberated during the training include: Project Cycle, General Principles of Project Preparation, Reservoir Fisheries Management Projects, Selected DPRs of Fisheries Projects, Wetlands/

Floodplains Development Projects, Domestic Fish Marketing Projects, Project Preparation, Project Analysis, DPR Preparation, Fisheries Projects Preparation and NFDB Schemes for Fisheries Development. Case study on fisheries projects was also discussed. Practical sessions were conducted on MS Excel package and data analysis. Dr. S. Subramaynam, Sr. Consultant; Dr. R. Suresh, Sr. Consultant; handled most of the sessions. Guest speakers from NIRD&PR and CESS were invited for specific topics.



Dr. Bimal Kinkar Chand, ED (Tech) addressing the participants at the inaugural session of the NFDB training programme on 'Preparation of Fisheries Projects'

A field visit to M/S Anjali Aquaponics, Gundedu Village, Balanagar (M), Mahabubnagar District was arranged to expose the participants to an entrepreneurial venture. The participants were given an opportunity to practice data analysis practically. On the last day of the programme, group presentations were made on the fisheries projects. The participants expressed that this learning would help them in preparation of good proposals to avail financial assistance from NFDB and other funding agencies as well.



Participants during various sessions of the NFDB training programme on 'Preparation of Fisheries Projects'

4.5 Review Meeting on Capacity Building for promotion of Deep Sea Fishing held at NFDB, Hyderabad

A meeting to review Capacity Building for promotion of Deep Sea Fishing with special reference to Tuna Long Lining and Mariculture was convened on 7 December 2016 at NFDB, Hyderabad. The meeting was Chaired by Shri Aditya Kumar Joshi, Chief Executive, NFDB and attended by Fisheries Development Commissioner (FDC) and Joint Commissioner (Fy), DADF, Additional Director of Fisheries, Govt. of Tamil Nadu, Director CIFNET, Director General i/c, FSI, Naval Architect & Principal Scientist, CIFT, Executive Directors, Sr. Consultants and other Officers of NFDB.



Shri Aditya Kumar Joshi, Chief Executive, chairing the review meeting at NFDB, on Capacity Building for Deep Sea Fishing

The Chief Executive, NFDB briefed the participants about the proposed scheme launched by the DADF for promotion of Deep Sea Fishing with special reference to Tuna Long Lining and Mariculture among traditional fishers in the States of Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and Odisha as an alternate to bottom trawling. The meeting was held to discuss modalities of capacity building through

hands-on training on-board the CIFNET and FSI fishing vessels. Duration of each training program would be for a maximum of 10 days with 80% practical sessions. CIFNET and FSI have agreed to train 5 fishermen each on-board their vessels.

Considering the seasonality of Tuna resources, it was decided to impart training in a phased manner. The first phase will be from January to March 2017 and the Department of Fisheries, Govt. of Tamil Nadu would

identify the beneficiaries/ trainees. NFDB would provide financial assistance as per approved unit cost of training components under DADF scheme. It is also proposed to build capacity for on-board handling, grading, processing, ascertaining quality and certification of Tuna for export. After the initial training programme by CIFNET and FSI, the training schedule would be developed into a Skill Development Qualification Pack (QPs) in coordination with ASCI by HRD Division of NFDB.

5. Important Events

5.1 Scrutiny of DPRs of Project Proposals under 'Central Sector Scheme on Blue Revolution: Integrated Development and Management of Fisheries' held at NFDB

The NFDB was entrusted with responsibility of scrutinizing and recommending the proposals from Dept. of Fisheries of the States and Union Territories received by the Dept. of Animal Husbandry, Dairying and Fisheries (DADF, MOA&FW), Govt. of India, for funding under the "Central Sector Scheme on Blue Revolution: Integrated Development and Management of Fisheries". For this purpose, a 'Blue Revolution Cell' was constituted at the NFDB.

Scrutiny of the proposals was done in two spells: first from 4 to 7 October 2016 and subsequently on 17 October 2016. During the first spell, besides NFDB Officials, Shri L. Shankar, Jt. Commissioner (Fy.) and Dr. Salim Sultan, Sr. Consultant (Fy.) from the DADF, Govt. of India, participated as observers and addressed the gathering. Shri V.K. Shukla, Director of Fisheries, Chhattisgarh, Shri Mohan Sundaram, Addl. Director of Fisheries, Tamil Nadu, and other Senior Officials of State Fisheries Departments also participated.

Detailed Project Reports (DPRs) brought by the representative of the Dept. of Fisheries of different States and Union Territories were scrutinized, discussed and finalized by the Officials of NFDB dealing with respective States and later the same were submitted to the Ministry for further necessary action.





The Executive Directors (Tech), NFDB (left above), Jt. Commissioner (Fy), DADF (left second row) addressing officials of Dept. of Fisheries of States & UTs and scrutiny of the proposals (left bottom two rows and above) at the Meeting convened at NFDB, Hyderabad to finalize proposals for funding under Central Sector Scheme on Blue Revolution

5.2 Training on ‘Disease Diagnostics and Disease Management in Aquaculture’ conducted by CIFT under NFDB sponsored NSPAAD Project

A four-day training programme on ‘Disease Diagnostics and Disease Management in Aquaculture’ was organized at ICAR-Central Institute of Fisheries Technology, Cochin during 18-21 October 2016 under the NFDB funded “National Surveillance Programme on Aquatic Animal Diseases” (NSPAAD), to strengthen the skill of State Fishery Officers on disease diagnostic tools and methods in aquaculture.



Training programme on ‘Disease Diagnostics and Disease Management in Aquaculture’ organized at ICAR-CIFT, Cochin, under NFDB sponsored NSPAAD project

Twenty three Officers from Dept. of Fisheries and Agency for Development of Aquaculture (ADAK), Govt. of Kerala, were trained on diseases of finfish and shellfish, diagnostic techniques, water quality parameters, methods of sample collection, preservation and transportation of samples for disease diagnosis, bio-security in aquaculture and key inputs in aquaculture. Hands-on practical sessions on disease diagnosis were also provided to all participants.

The training programme was formally inaugurated by Dr. Ravishankar C.N, Director, ICAR-CIFT. During the programme Dr. K.V. Lalitha, Principal Investigator of the Project and Course Director, welcomed the gathering and Dr. V. Murugadas, Scientist proposed a vote of thanks. Dr. Toms C. Joseph, Principal Scientist gave an over-view of the training course. Dr. A.K. Mohanty, HOD, EIS offered felicitation.

5.3 NFDB participates in ‘Purvanchal Krishi Pradarshni Evam Kisan Sangosthi-2016’ in Gorakhpur, Uttar Pradesh

Two-day long ‘Purvanchal Krishi Pradarshni Evam Kisan Sangosthi-2016’ was organized by Agriculture Technology Application Research Institute (ATARI), Zone-IV, Kanpur, on 23 and 24 October 2016 at Mahant Digvijaynath Inter College Grounds, Village Chowk-Mafi, Gorakhpur, Uttar Pradesh. Dr. Ajay Pandey, Consultant (M&E) and Dr. M. Vishwas Rao, Jr. Consultant (Fy.) participated and put up the NFDB Stall showcasing various NFDB activities and Schemes.

Shri Radha Mohan Singh, Hon’ble Union Minister for Agriculture and Farmers Welfare, Govt. of India, inaugurated the event, and also laid the foundation stone for a new Krishi Vigyan Kendra (KVK) in Village Chowk-Mafi. He advised the farmers and entrepreneurs to take advantage of the information and technologies showcased in the fair. Farmers at the Meet were also addressed by Shri Yogi Aaditya Nath, Hon’ble Member of Parliament, Gorakhpur, Shri Fateh Bahadur Singh, Member of State Legislative Assembly of Uttar Pradesh and Dr. A.K. Singh, Deputy Director General (Agricultural Extension), ICAR. The Hon’ble Union Minister for Agriculture and Member of Parliament visited NFDB stall and enquired about the various NFDB activities related to promotion of fisheries and aquaculture sector. A large number of people including farmers, entrepreneurs and research scholars visited the NFDB stall to learn about the Blue Revolution Schemes and NFDB activities.



Shri Radha Mohan Singh, Hon'ble Union Minister for Agriculture and Farmers Welfare (above), farmers and Shri Yogi Aaditya Nath, Hon'ble Member of Parliament visit NFDB Stall (below) at Kisan Gosthi during the 'Purvanchal Krishi Pradarshni Evam Kisan Sangosthi-2016' in Gorakhpur, U.P.

5.4 NFDB sponsored 'Swachhata Pakhwada' observed at Dubbaga Fish Market, Lucknow, Uttar Pradesh

As part of the 'Swachh Bharat Abhiyan', the Dept. of Fisheries, Govt. of Uttar Pradesh launched the 'Swachhata Pakhwada', a 14-day cleanliness drive, in the NFDB funded Dubbaga Fish Market, Lucknow. Staff of Dept. of Fisheries, Government of Uttar Pradesh along with the fish traders and members of Dubbaga Fish Market Managing Authority participated in the drive from 17 to 31 October 2016.

During the 'Swachhata Pakhwada', a one-day NFDB sponsored awareness campaign was organized on 26 October 2016 at Dubbaga Fish Market by the DoF, Govt. of U.P. Shri Kausal Kishor, Hon'ble Member of Parliament from Lucknow (Dehat), the Chief Guest, presided over the function. He appreciated efforts made by stakeholders in organizing the programme and encouraged the participants in the market to make it a routine practice. Dr. Ajay Pandey, Consultant, NFDB participated in the event as observer. The day long programme included various activities such as cleaning the market premises and distribution of trash bins to fish vendors followed by a technical talk on 'maintenance of cleanliness in the fish market and hygienic handling of fish'.



Cleanliness drive observed (above) and a one-day NFDB sponsored awareness campaign organized (below) during the 'Swachhata Pakhwada' at Dubbaga Fish Market, Lucknow, U.P.

5.5 NFDB participates in National Workshop on Mainstreaming Climate Change Adaptation and Mitigation in Agriculture and Allied Sectors

A two-day National Workshop on 'Mainstreaming Climate Change Adaptation and Mitigation in Agriculture and Allied Sectors' was held on 16-17 November 2016 at National Institute of Agricultural Extension Management (MANAGE), Rajendranagar, Hyderabad.

The objective of the Workshop was to Exchange the experiences of Climate Resilient practices, Mitigation and Adaptation options in agriculture and allied sectors and Develop a Framework for mainstreaming Climate Change Adaptation into agricultural development planning and programs. It comprised of interactive sessions on themed presentation, case method and group discussions. Scientists from SAUs/ ICAR-KVKs, Faculty of SAMETIs, Senior and Middle level Officers from Agriculture and Allied Departments and NGOs participated. Dr. V.V. Sugunan, Sr. Consultant, NFDB participated in the inaugural function and addressed the participants.



5.6 NFDB participates in USFDA-MPEDA Training Workshop on ‘Good Aquaculture Practices and Food Safety – Preventive Controls for Aquaculture Farms’

USFDA-MPEDA Training Workshop on ‘Good Aquaculture Practices and Food Safety – Preventive Controls for Aquaculture Farms’ was conducted on 17 and 18 November 2016 at Visakhapatnam, Andhra Pradesh. The two-day workshop was a Trainers Training Programme which covered topics such as: Overview of Preventive Controls for Aquaculture Farms, Preventive Controls of Farm Biosecurity-Outside the Farm, Aquaculture Drugs and Laboratory Testing, Good Aquaculture Practices for India, Good Aquaculture Practices Plan Elements (GAqP) inside the Farms, USFDA Seafood HACCP Regulations, USFDA Seafood Import Program and Preventive Controls for Seafood Safety.

The Training Workshop was lead by Mr. Stanley Serfling, Consumer Safety Officer (USFDA) and Mr. Shiva (USFDA). The topics covered have great relevance to present day aquaculture in India. Ms. Sreerenu Hariharan and Ms. Dorothy M.S, Executive Assistants (Technical), NFDB, Hyderabad, participated. Ms. Sreerenu Hariharan presented group discussion output on “Preventive controls for food safety for large-scale shrimp farms with special references to animal health and worker safety”, while Ms. Dorothy M.S. presented group discussion outcome on “Preventive controls for food safety in family owned small-scale farming that produce shrimps both for local and export market with special reference to microbiological parameters”.



Participants (above) and presentation of outcomes of group discussions by Executive Assistants (Tech) of NFDB (below) at USFDA-MPEDA Workshop held at Visakhapatnam, Andhra Pradesh

5.7 NFDB participates in ‘Vision Vibrant Uttar Pradesh – 2016’ at Telibagh, Lucknow, Uttar Pradesh

A three-day event ‘Vision Vibrant Uttar Pradesh – 2016’ was organized at Indian Institute of Sugarcane Research (IISR), Telibagh, Lucknow, from 26 to 28 November 2016 in partnership with IRCTC, NIFTEM, NFDB, CCRAS, Tata Chemical Limited, NSDC, NCDC, Bank of Baroda, Ministry of Earth Science, NRDC, Botanical survey of India, IISR etc. It was supported by Ministry of Food Processing Industries and Ministry of Agriculture & Farmers Welfare, Govt. of India. NFDB provided assistance of Rs. 2.4 lakh for the State-level event; Dr. Radheyshyam, Sr. Consultant (Fisheries) and Mr. Taru Haapa, Intern, NFDB, Hyderabad put up a stall displaying NFDB activities.

The event was inaugurated by Mr. Aswani Datt Pathak, Director IISR under the Chairmanship of Dr. Anish Ansari, Ex-Agriculture Production Commissioner, Govt. of Uttar Pradesh. They advised farmers to adopt modern technologies to increase the production, productivity, income and employment in participatory mode. Mr. Shailendra Jain, Chairman, ASSOCHAM, and Mr. Sudhansu Sharma Regional Director, NCDC, also addressed the farmers. A workshop was also organized on different aspects of farming for the benefit of the farmers. About 500 to 600 agricultural farmers, fish farmers, aqua-entrepreneurs, women, students, extension workers, school

dropouts, etc. visited the exhibition each day. On the concluding day Dr. Akhtar Haseeb, Vice-chancellor Narendra Deva University of Agriculture, Faizabad, U.P., distributed prize and Mementos to the farmers and participants of exhibition.



Dr. Radheyshyam, Sr. Consultant (Fisheries) explaining about Blue Revolution Schemes to bankers, farmers and fishers at NFDB Stall in the Exhibition at 'Vision Vibrant Uttar Pradesh – 2016' in Telibagh, Lucknow

5.8 NFDB participates in Seminar at Eklabya Fisheries Training Institute, Lucknow, Uttar Pradesh

A Seminar on 'Enhancement of Production and Productivity through adoption of various advanced technologies for Development of Fisheries with special reference to Blue Revolution Mission, 2020' was held on 15 December 2016 at Eklabya Fisheries Training Institute, Lucknow. The Seminar was organized by Dr. S.K. Singh, Joint Director of Fisheries under the Chairmanship of Shri Deena Nath Gupta, Special Secretary Fisheries, Govt. of Uttar Pradesh. NFDB provided Rs. 1.0 lakh assistance. There were 146 participants including 90 Districts & Divisional Fisheries Officers, 20 Officers & Staff from Fisheries Federation & Nigam, 36 fisheries entrepreneurs from different parts of U.P. and delegates from NBFGR, Lucknow, CIFRI, Barrackpore, NCDC, NABARD, FISCOFFED, etc. Ms. Monisha Singh, ADF, welcomed while Dr. (Ms.) Sushma Rani Sharma, DDF, co-ordinated the programme.

Shri Deena Nath Gupta, Special Secretary Fisheries, informed that U.P. Govt. will provide 25% subsidy support along with 50% central subsidy support for all relevant Blue Revolution Schemes in order to double fish production in Uttar Pradesh by 2020. Dr. Radheyshyam, Sr. Consultant (Fisheries), NFDB, the Chief Guest, inspired fishery officials and fish farmers for speedy implementation of the Blue Revolution Schemes to make the UP State self-sufficient in fish seed, fish feed and food fish production. Dr. Harendra Prasad, ADF, presented the status, explained the lapses and gaps in the fisheries development of UP and informed that Govt. of India in principle approved Rs. 20 crore towards launching Blue Revolution Schemes in the State. Shri Shyam Prakash, Hon'ble MLA, Hardoi and Guest of Honour acknowledged the transparent and effective contribution of NFDB in the development of Fisheries in UP.



Dignitaries on the dais (above) and participants (below) at the Seminar at Eklabya Fisheries Training Institute, Lucknow, Uttar Pradesh

Guests of Honour Dr. Sarad Kumar Singh, Principal Scientist, NBFGR and in-charge, Chinhath Training Centre, Lucknow, and Dr. K.D. Joshi, Principal Scientist, CIFRI, Barrackpore, offered suggestions. Dr. (Ms.) Maya Devi,

Deputy General Manager, NABARD in her speech invited proposals under RIDF for fisheries development. Such loan will be free from interest for 5 years. This includes 95% NABARD share and 5% State share and the interest rate is minimal. Dr. Sudhansu Sharma, Regional Director, NCDC presented fisheries related schemes for availing financial support from NCDC for fisheries development by fisheries co-operative societies. He informed that U.P. being in the category of underdeveloped States with respect to fisheries, the Fisheries Co-operative Societies are entitled for 20% subsidy on the NCDC loan.

Aquaculture entrepreneur Mr. Parvez Khan presented the Re-circulatory Aquaculture System (RAS) developed by him at Barabanki in UP. He constructed 38 cemented tanks (25' x 25' x 6') for *Pangsius* culture 8 years ago. He produced about 3.2 tonnes/ tank/ crop. Water requirement for raising fish was estimated to be only 6-10 litre/kg fish. He requested for the establishment of a large-scale Fish Feed Plant (6-10 ton/hr) through financial assistance under Blue Revolution but he pointed to anomalies in the Scheme with reference to production capacity as well as unit cost and requested for revision by the Govt. of India to make it feasible. Based on intensive brainstorming, recommendations were made for fisheries development in Uttar Pradesh.

5.9 NFDB sponsored 'International Conference on Recent Advances in Aquaculture' organized by Dept. of Marine Living Resources, Andhra University, Vishakhapatnam

A two-day 'International Conference on Recent Advances in Aquaculture (RAA-2016)' sponsored by the NFDB was organized on 16 and 17 December 2016 by the Department of Marine Living Resources at the YVS Murthy Auditorium, College of Engineering, Andhra University, Visakhapatnam. Prof. G. Nageswara Rao, Vice-chancellor, Andhra University, Chaired the Inaugural Session and Shri Ganta Srinivasa Rao, Hon'ble Minister for HRD & Education, Govt. of Andhra Pradesh, was the Chief Guest. Dr. Somanadha Rao Paluri, Member, Executive Council, Andhra University, Prof. V. Uma Maheswara Rao, Registrar, Andhra University, Dr. S. Kandan, Deputy Director (Aqua), MPEDA, Vijayawada, Dr. Ansar Ali, Deputy Director, MPEDA, Visakhapatnam, were the Guests of Honour. Prof. C. V. Raman, Principal, AUCST, was President of the conference, Dr. K. Ramesh Babu, was the Convener, and Prof. P. Yedukondala Rao, Head, Department

of Marine Living Resources, Andhra University was the Coordinator.

Scientists from ICAR Institutes CMFRI, CIBA, CIFT, delegates from various Universities and Academic Institutions in the States of Maharashtra, Goa, Karnataka, Tripura, Odisha, Tamil Nadu, Chattisgarh, Gujarat, West Bengal and Andhra Pradesh, Aqua Industries and Aqua Utilities, attended the Conference. Dr. M. Vishwas Rao, Jr. Consultant (Fy), NFDB, Hyderabad participated.

A souvenir was released on the occasion. Twelve presentations were made, including one by Dr. Md. Akhtar Hossain, Professor, Dept. of Fisheries, University of Rajshahi, Bangladesh, on 'Aquaculture in Bangladesh: Advances and Strategies', besides others by delegates from MPEDA, CMFRI, TNFU, Industry, etc.



Release of Souvenir (above) and a view of the participants (below) at the International Conference on Recent Advances in Aquaculture organized by Dept. of Marine Living Resources, Andhra University, Visakhapatnam, Andhra Pradesh

5.10 Review Meeting on NFDB Activities held at Krishi Bhavan, New Delhi

A Review Meeting on NFDB Activities was held at Krishi Bhavan, New Delhi on 21 December 2016. The meeting was chaired by Shri Sudarshan Bhagat, Hon'ble Minister of State for Agriculture & Farmers Welfare, Govt. of India. Shri Aditya Kumar Joshi, Chief Executive, NFDB, Shri P. R. Meshram, Director (Fy-Stat), Dr. P. Paul Pandian, Fisheries Development Commissioner (FDC), Shri L. Shankar, Joint Commissioner (Fisheries) and other Officials of the Ministry, Govt. of India, Dr. B. K. Chand, Executive Director (Tech) and Shri Chandan Chetri, Senior Executive (Tech) from NFDB, Hyderabad attended the meeting.



Shri Sudarshan Bhagat, Hon'ble Minister of State for Agriculture & Farmers Welfare, Govt. of India Chairing the Review Meeting on NFDB Activities at Krishi Bhavan, New Delhi

Shri Joshi, CE, NFDB briefed about the objective of the meeting and made a presentation on NFDB Activities. The presentation included vision, mission and objectives of NFDB; concerns and opportunities in fisheries sector; details of fund released to the States/ UTs and other implementing agencies; physical achievements and activity photographs. During discussion the Hon'ble Minister desired that NFDB should promote: mobile fish marketing vehicles; integrated fish farming with emphasis on indigenous fishes such as Magur; establish a craft and gear museum depicting different fish catching methods; and explore possibilities of Central Assistance to the new Fisheries College at Gumla, Jharkhand.

The meeting resolved following action points:

1. Promotion of at least one Mobile Fish Marketing Vehicle at State capitals of the country.
2. Promotion of Integrated Fish Farming like Paddy-cum-Fish Culture with emphasis on Magur (*Clarias batrachus*) at pilot scale.
3. Initiative for establishing a Craft and Gear Museum depicting various fishing method at Hyderabad.
4. Exploring possibilities of Central Assistance to the new and upcoming Fisheries College at Gumla, Jharkhand.

6 NFDB Field Notes

6.1 Successful demonstration of Indian White Shrimp Culture at Kakdwip (West Bengal) and Balasore (Odisha) under NFDB funded project

Demonstration trials under the NFDB funded project: 'Upgradation of Breeding and Culture Technology of Indian White Shrimp *F. indicus* through Stock Evaluation and Culture Demonstration' were carried out by the Central Institute of Brackishwater Aquaculture (ICAR-CIBA), Chennai. The project envisages evaluation of different genetic stocks of the indigenous species of shrimp *Fenneropenaeus indicus* (H. Milne Edwards, 1837) (= *Penaeus indicus*) for development of a genetically improved

strain. Different stocks, viz., East coast (Odisha), South East Coast (Tamil Nadu) and South West Coast (Kerala) were procured, transported and quarantined to ensure the utilization of healthy broodstock for breeding purposes. The seeds produced from different stocks are being evaluated through culture demonstration under monoculture/polyculture mode in six locations of different coastal States like Andhra Pradesh, Kerala, Gujarat, West Bengal, Odisha and Tamil Nadu.

Dr. V.V. Sugunan, Sr. Consultant (Fisheries), and Dr. Utpal Kumar Sar, Executive Director (Tech), NFDB visited demonstration farm at Kakdwip (West Bengal) and the former also witnessed harvest at the other demonstration

farm at Balasore (Odisha), along with Dr. K.K. Vijayan, Director, CIBA, Chennai, to review the progress of trials being conducted to evaluate performance of the endemic Indian White Shrimp *Fenneropenaeus indicus*.

(i) Indian White Shrimp (*F. indicus*) Harvest Mela & Farmers Meet at Kakdwip, West Bengal on 28 November 2016:

The demonstration of *Fenneropenaeus indicus* grow-out was undertaken in low salinity water at Kakdwip from July to November 2016. Disease-free quality seeds produced at CIBA and other hatcheries near Chennai were stocked at a density of 25 pieces/sq m in two ponds and reared for four months in a biosecured, zero-water-exchange system developed at Kakdwip Research Centre of CIBA. These shrimps, reared with indigenously developed feed, reached an average body weight of 18-20 g and a production rate of up to 3.08 tonnes/ha. A high survival rate of 75% was achieved in spite of extremely low salinity during the culture period. Significantly, the Indian white shrimp registered a better growth rate compared to that of Pacific White Shrimp *Litopenaeus vannamei*. However, during the latter part of culture, growth rate was affected due to low temperature and salinity. The harvested shrimps were sold at Rs 330/- per kg to an exporter in West Bengal.



*Indian White Shrimp (*F. indicus*) harvested at Kakdwip Research Centre of ICAR-CIBA under NFDB funded project*

A Farmers Meet was organized on the occasion of the *Harvest Mela* to sensitize the farmers about the farming potential of *F. indicus* as an alternative brackishwater shrimp species. The programme was attended by 150 farmers from different districts of West Bengal.

(ii) Indian White Shrimp (*F. indicus*) Harvest Mela & Farmers Meet at Balasore, Odisha on 30 November 2016:

The demonstration of *Fenneropenaeus indicus* grow-out was undertaken at M/s Dandapat Aquatics, Sahada, Basta, Balasore, Odisha where shrimps were stocked at two stocking densities viz., 10/ sq m and 35/ sq m in earthen ponds (3,500 - 4,000 sq m each), in a biosecured, zero-water-exchange system developed at the Kakdwip Research Centre of CIBA. Bird net, crab fencing and foot-dip were provided as biosecurity measures. Salinity during the culture period ranged from 2-12 ppt. At the end of 125 - 130 days of culture period, a final body weight of 28-30 g was attained at lower stocking density and 17-20 g at higher stocking density.

On the first day, around 2.5 tonnes of shrimps were harvested, chill killed and ice packed for the processing plants. The farm gate price received was Rs 430/- per kg for bigger size shrimp taken from low stocking density ponds and Rs 330/- for smaller size shrimp from high stocking density ponds. Revenue of Rs. 8.0 lakh was realised on the first day and harvesting was continued the next day. A production of up to 4.5 tons/ ha is expected from this demonstration.



*Indian White Shrimp (*F. indicus*) harvested at M/s Dandapat Aquatics, Sahada, Basta, Balasore, Odisha under ICAR-CIBA project funded by NFDB*

Over 500 farmers, entrepreneurs, officials from MPEDA, NACSA, Dept. of Fisheries, Odisha, and representatives from other ICAR Institutes witnessed the harvest on the first day. There was an overwhelming response from progressive farmers and entrepreneurs, who expressed their willingness to adopt culture of this indigenous species.



*Farmers Meet at Harvest Mela of Indian White Shrimp (*F. indicus*) organized in Odisha by ICAR-CIBA under NFDB funded project*

After the onset of winter in the month of November, because of low temperature and low salinity, the growth rate slowed down a bit and feed consumption was reduced drastically. However, the performance of Indian white shrimp is comparable to the exotic SPF Pacific White Shrimp *Litopenaeus vannamei*. This demonstration highlights the potential of the Indian White Shrimp *Fenneropenaeus*

indicus, which is endemic to the Indian coast, for standardization and upgradation of breeding and seed production through stock evaluation programme.



*Harvest of Indian White Shrimp (*F. indicus*) from a demonstration trial by ICAR-CIBA under NFDB funded project*

7. Fishers & Farmers News

7.1 Fishers in Andaman & Nicobar Islands undergo NFDB sponsored training

NFDB sanctioned two training-cum-demonstration programmes to Krishi Vigyan Kendra, ICAR-CIARI, Nimbudera, Mayabunder Tehsil, North & Middle Andman District, Union Territory of Andman & Nicobar, to improve the skill of fish farmers. An amount of Rs 98,250/- was sanctioned for the two programmes. Experts from KVK and line Department were the resource persons. Mr. Shailesh Kumar, SMS (Fisheries) was the Course Director.

(i) Five-day training cum demonstration on 'Pond-based Integrated Farming System in Island Condition' from 07 to 11 November 2016:

Twenty seven farmers participated in the training programme. Smt. K. Nachiamma, Pramukh, Mayabunder was the chief guest of inaugural function. Farmers were motivated to adopt scientific method of fish farming for improving fish production on sustainable basis. The importance of integrated farming system for meeting the requirement of nutritional security and for sustainable farm-income was explained to the farmers. Theory and practical's

on different aspects of pond-based integrated farming system, including fish seed production, stocking, post-stocking and feed management in culture ponds, integration of duck, poultry, goat, pig and different vegetable crops were covered. Different strategies to manage health of animals and plants were also discussed for the benefit of participants. Topics like culture and hatchery technology of freshwater prawn, floriculture and practicals on feed making were also covered at the request of farmers. Visuals on integrated farming system were shown and participants were also taken on an Exposure Visits to farms of Veterinary Department at Sitanagar and different fields of progressive and innovative farmers in Diglipur. Smt. Bina Rao, Sarpanch, Gram Panchayat Basantipur gave away certificates to participants.



Inaugural functions (above) and participants (below) of the NFDB sponsored training programme on 'Pond-based Integrated Farming System in Island Condition' conducted at Krishi Vigyan Kendra, ICAR-CIARI, Nimbudera, Mayabunder, Andaman & Nicobar Islands

(ii) Five-day training cum demonstration on 'Rearing of Stunted Fingerlings under Composite Fish Farming' from 15 to 19 November 2016:

Twenty eight farmers participated in the training programme. Shri Saw Tathu, Adhyaksh, Zilla Parishad, the

Chief Guest inaugurated the programme in presence of Up-Pradhan and PRI Members, Basantipur. Farmers were taught theory and practical aspects of rearing stunted fingerlings under composite fish farming. Details of nursery and grow-out pond preparation, stocking and post-stocking management, fish seed production and feeding fish in nursery, feed preparation and feeding in grow-out pond, fish fry rearing in paddy field and broad-bed-furrow system, important soil and water quality parameter and common diseases of pond fish were discussed. Participants were also apprised of schemes of Andaman & Nicobar Fisheries Dept. and NFDB. At the request of fish farmers, hatchery and grow-out technology of freshwater prawn were also covered. Exposure Visits was conducted to fields of progressive and innovative famers in Diglipur and farm of Veterinary Department at Sitanagar. Shri S. K. Taluker, Asst. Director (Fisheries), North & Middle Andaman District gave away certificates to participants.



Inaugural functions (above) and participants (below) of the NFDB sponsored training programme on 'Rearing of Stunted Fingerlings under Composite Fish Farming' conducted at Krishi Vigyan Kendra, ICAR-CIARI, Nimbudera, Mayabunder, Andaman & Nicobar Islands

7.2 Fishermen of Mandvi Kutch, Gujarat attend 'Workshop on Lobster Traps and Benefits of Trap Fishing'

The World Wild Life Fund (WWF) in association with ICAR-CIFT conducted a 'Workshop on Lobster Traps and Benefits of Trap Fishing' for promoting and supporting the sustainable small scale fisheries, especially Spiny Lobster Fisheries in Mandvi region of Gujarat State. The one-day awareness programme was conducted on 10 November 2016 at Vivekanand Research and Training Institute, Mandvi, Kutch district, Gujarat, in which twelve fishermen of Mandvi Fishermen Society participated.



Presentation on 'Lobster Traps and Benefits of Trap Fishing' (above) and Participants of Workshop along with resource persons (below)

The programme was inaugurated by Shri Haji Yakubhai Patel, President, Mandvi Fishermen Society. Dr. K.K. Prajith, Scientist, Veraval Research Centre, ICAR-CIFT, spoke on "Lobster traps: Design and operation strategies for resource conservation". He explained the use and benefits of lobster trap designed and popularized by ICAR-CIFT in Southern coast of India. He further stressed on the need for using energy efficient and eco-friendly fishing gear for resource conservation and sustainable harvest. A leaflet on "Trap fishing for resource conservation and energy

efficient fishing" was also distributed to the fishermen. Fishermen asked for demonstration and field trials with ICAR-CIFT designed Lobster Traps at various fishing grounds along Mandvi coast. Dr. D. Divu, Scientist, Veraval Regional Centre, spoke on "Sustainable lobster fishery management and culture aspects". Shri B. Vishnu, Fisheries Officer, Bhuj, Govt. of Gujarat spoke on "Lobster fishery along Gujarat coast". Shri V.K. Ghoe, WWF-India made a presentation on "Scope of eco-labeling/ MSC certification of lobster fishery".

7.3 FISHFED Odisha celebrates 63rd All India Cooperative Week - 2016

The Odisha State Fishermen Co-operative Federation Ltd. (FISHFED) celebrated the 63rd All India Cooperative Week-2016 from 14 to 20 November 2016. In this connection a State Level Function-cum-Fish Farmers Mela was organized for which NFDB provided financial assistance. Shri Pradeep Kumar Maharathy, Hon'ble Minister for Agriculture and Farmers Empowerment, Fisheries and ARD, Govt. of Odisha hoisted the National Flag and inaugurated the celebrations on 14 November 2016 and addressed the gathering. NFDB participated in the Farmers Mela by putting up a stall to explain the various activities and financial assistance available under various schemes. Demo Mobile Fish Retail Outlets were also put on display.



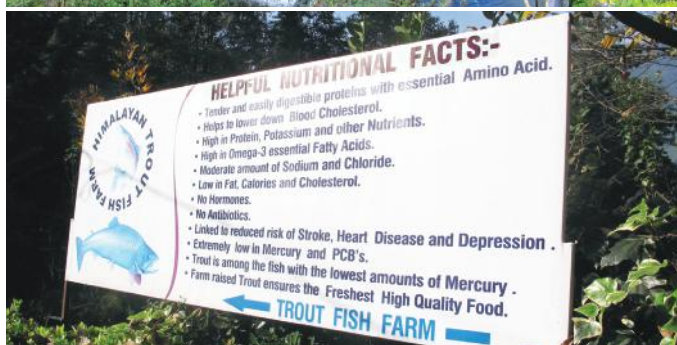
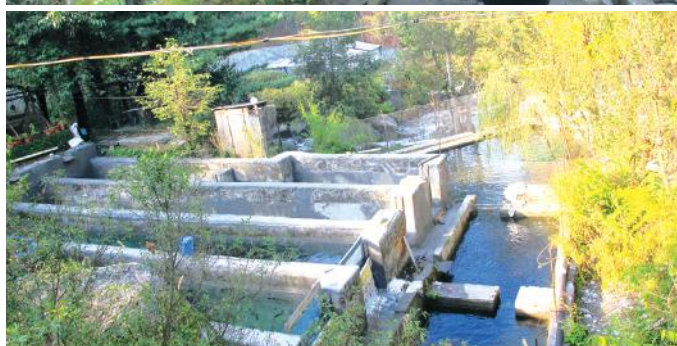


State Level Function-cum-Fish Farmers Mela (left) and exhibits (above) organized by Fisheries Federation of Odisha on the occasion 63rd All India Cooperative Week-2016

7.4 Trout Farmers Association formed in Kullu, Himachal Pradesh

The Trout Farmers of Kullu district formed an Association under the Himachal Pradesh Societies Registrations Act on 5 November 2016. According to Shri Shakti Singh Jamwal, President of the Trout Farmers Association, Kullu, Himachal Pradesh, this is the first such association in the State formed to look after the interests of Trout Farmers and solve the problems faced by them.

Trout is farmed in raceways in Kullu district using technology developed with Norwegian assistance during 1989-91. The exotic Brown Trout (*Salmo trutta fario*) and Rainbow Trout (*Oncorhynchus mykiss gairdneri*) were initially introduced in the State to encourage Sport Fisheries. But now, they are not only being farmed commercially for table fish production, but are also being promoted by farmers highlighting the heart-healthy and nutritional qualities of Trout such as low in fat and cholesterol, high in essential (omega-3) fatty acids, etc.



Trout Fish Farms name boards (above), Trout Raceways (middle) and a banner promoting Trout as heart-healthy, nutritional food (below) put up by farmer in Kullu district of Himachal Pradesh

8. Fisheries & Aquaculture Industry News

8.1 Hilsa the Indian Shad – Fishery Declines but Farming Prospects Improve

(i) Hilsa Fishery:

Hilsa is a much sought after fish and a gourmet's delight in several maritime States of India. It is considered the **King of Fish** in Bengal (West Bengal). It is the **National Fish** of Bangladesh, contributing about 12% of the total fish production and about 1% of GDP of that country. Livelihoods of about 4,50,000 people are directly dependent on fishing for Hilsa and around four to five million people

are said to be indirectly involved in its trade. Hilsa, *Tenualosa ilisha* (Hamilton, 1822), inhabits marine, estuarine and riverine environments. Its distribution ranges from the Persian Gulf, Red Sea, Arabian Sea, Bay of Bengal, Vietnam Sea to China Sea. However, it contributes to a major fishery in Bangladesh, India and Myanmar. Bangladesh contributes 50-60 per cent of catch (about 3.5 lakh tonne/year), Myanmar 20-25 per cent (1.0-1.25 lakh tonne/year), India 15-20 per cent (0.50-0.60 lakh tonne/year) and other countries in the region contribute 5-10 per cent. The total production is 4.0-5.0 lakh tonne (DoF, 2008).

Hilsa catches in India have come down from 77,912 tonnes in 2000-01 to 9,887 tonnes in 2014-15, a decline of close to 90%. Catch decline is more pronounced in river stretches than in marine waters. From 2000 to 2015, the catch off the Bengal coast has gone down 80% (44,810 to 8,900 tonnes) while the inland catch dwindled nearly 97% (33,102 to 987 tonnes).



*The Hilsa Shad, **Tenualosa ilisha** (Hamilton, 1822), juveniles (above) and adult (below) [Source: The Wealth of India Vol. IV, Fish and Fisheries, CSIR, New Delhi, 1962, Plate-III]*

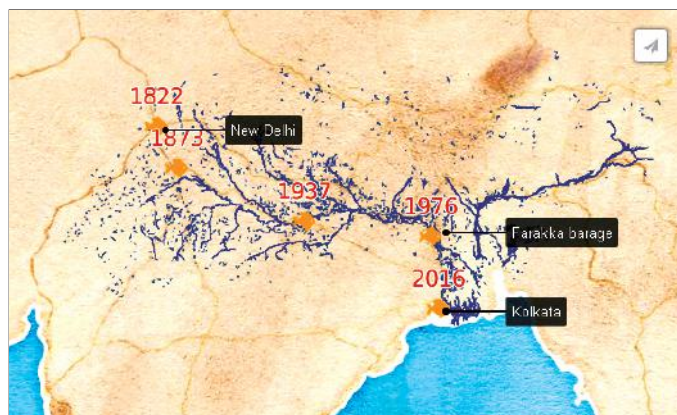
Hilsa is an anadromous fish – it lives most of its life in the sea, but ascends the rivers to spawn. During breeding season Hilsa migrates from the Bay of Bengal, swims against the tide to enter rivers such as the Hooghly-Bhagirathi in Bengal, the Padma-Meghna in Bangladesh and Irrawaddy in Myanmar. Hilsa starts spawning migration upstream from the sea/ coastal waters during the Southwest monsoon when the Ganges, Brahmaputra, Meghna Rivers are flooded.



The Ganges, Brahmaputra, Meghna Rivers and Sundarban Delta at the head of Bay of Bengal, which sustain the Hilsa fishery [Map Credit: Wikimedia.org]

The spawning-migration in the direction of estuaries and rivers occurs in two phases: first one is from July, peaks in August, subsides in September and ends in October; the second phase is from January to March. Peak breeding of Hilsa takes place during full moon in October. The mean size of migratory population is around 300 mm weighing 750 grams to a maximum size of around 600 mm weighing 1,500 grams.

Hilsa fishery provides livelihood to many fishers in Hooghly estuarine system. Baksi village, 55 km from Kolkata on the banks of the Rupnarayan River (a tributary that joins Ganges just before it opens into the Bay of Bengal), is known as Hilsa village because a majority of its residents catch and sell Hilsa. But now Hilsa is hardly found in this stretch. In the past, before the Farakka Barrage was built in 1974, the Hilsa during years of abundance migrated up to Agra, Kanpur and Delhi (along the Yamuna River), while in normal years it migrated up to Allahabad. At present, Hilsa migration is largely restricted up to Diamond Harbour, around 75 km from Ganges estuary, as a result of overfishing of adults, juveniles and fry, loss of spawning and nursery grounds due to decreased water flow downstream, pollution, siltation, and increase in salinity in the Sundarbans.



Retreat of Hilsa in the Ganges River over the years from 1822 to 2016 [Source: <https://www.thethirdpole.net/2016/04/15/no-silver-sheen-in-the-ganga/>]

Hilsa fishermen started capturing the fish from the estuary or the sea even before it begins its migratory journey upstream. Therefore, the Govt. of Bengal declared three stretches along the Ganges as Hilsa Sanctuaries – Godakhali near Diamond Harbour, Hooghly Ghat near Triveni and Lalbag-Farakka. Further, Hilsa fishing has been banned

during the peak breeding season — around the full moon in October. Bangladesh too banned Hilsa fishing between November and June when the juveniles return to the sea, and also created five sanctuaries. As a result, Hilsa stock has increased in its rivers, and Barisal in Bangladesh has become a major port where Hilsa is landed, marketed and exported. Hilsa which sells for Rs. 250 to 300/ kg in the wholesale market in Barisal, Bangladesh is sold at Rs. 1,000 to 1,500/ kg in India. Hilsa catches from Irrawaddy River, Myanmar are also, exported to India.

Apart from the major Hilsa fisheries associated with River Ganges at the head of Bay of Bengal, minor Hilsa fisheries are supported by the Mahanadi, Godavari, Krishna and Cauvery Rivers. Hilsa populations in the Arabian Sea migrate up the Narmada and Tapi Rivers. In all these rivers Hilsa's spawning-migration is hindered by dams/weirs at distances of less than 100 km from the river-mouth and as a result its fishery had declined.

[Source: (i) *The Wealth of India Vol. IV, Fish and Fisheries*, CSIR, New Delhi, 1962; (ii) <https://en.wikipedia.org>; (iii) *Migration, Spawning Patterns and Conservation of Hilsa Shad (Tenulosa ilisha) in Bangladesh and India*, by Dewan Ali Ahsan, M Niamul Naser, Utpal Bhaumik, Sugata Hazra and Subhra Bikash Bhattacharya. IUCN and Academic Foundation, New Delhi, 2014; (iv) *The Third Pole*, Jayanta Basu: <https://www.thethirdpole.net/2016/04/15/no-silver-sheen-in-the-ganga/>; (v) *The Indian Express*, Kaushik Dasgupta, August 14, 2016: <http://indianexpress.com/article/lifestyle/food-wine/a-river-for-hilsa/>]

(ii) Successful Captive Rearing of Hilsa (*Tenulosa ilisha*) in Brackishwater Pond by ICAR-CIBA at Kakdwip, West Bengal:

According to the scientific reports, most of the Hilsa are captured before attainment of first maturity and do not get a chance to breed even once in the lifetime, and hence conservation and management of the stock need immediate attention. In this context, Indian Council of Agricultural Research (ICAR) has taken up a project entitled “*Stock characterization, captive breeding, seed production and culture of Hilsa*” on a network mode involving CIFRI, CIBA, CIFA, CIFE, CMFRI, NBFGR and Visva Bharati University with financial support from National Agricultural Science Fund (NASF).

The collaborating ICAR Institutes, viz., CIFRI, Barrackpore and CIFA, Kalyani Centre have taken up assessment of natural stock, habitat preference, biology of Hilsa in different ecosystems and standardization of captive breeding in freshwaters, while the Central Institute of Brackishwater Aquaculture (CIBA), through its Kakdwip Research Centre (KRC) located in West Bengal, is engaged in the standardization of protocol for the captive rearing of Hilsa in brackishwater ponds using formulated feeds.

Hilsa fry collected from Muriganga River through bag nets were transported immediately to the pond at KRC of CIBA, Kakdwip, in oxygenated polybags or aluminum *handi* fitted with aerators. Seeds were released in pond after acclimatization at a stocking density of 8,800 fry/ha. Pond water depth was maintained at 120-150 cm. Aeration was given to create water flow in the pond and to maintain desired oxygen concentration (>7 ppm). Live feed such as copepods, rotifer and microalgae produced at KRC wet lab facility were supplemented in the rearing ponds. Also formulated feed was developed at the recently established experimental feed mill at KRC, and used for feeding the captive stock of Hilsa. Sampling was carried out monthly to observe the growth and health status of the fish. Hilsa



Captive rearing of Hilsa in brackishwater pond at Kakdwip Research Centre (KRC) of ICAR-CIBA located in West Bengal

fry weighing 1.37 g (52.97 mm) that were stocked attained 330-423 g (320-350 mm) in 31 months with an estimated survival of 15-20%. The maturation process, with egg development up to Stage-III condition in female and sperm development in male has been recorded in the pond reared Hilsa stock. Initially, the transportation of live Hilsa fry from natural environment to pond and subsequent rearing process was a big challenge. Prior to this breakthrough Hilsa did not survive in the pond even for a day. With continued efforts of the scientists, it has now become possible to maintain live Hilsa in pond/tanks for a long time using artificial feeds. This is a significant step towards the captive rearing of Hilsa. The CIBA scientists are continuing their efforts for development of Hilsa broodstock in brackishwater pond.

Hilsa is known for its slow growth; the stock reared in the brackishwater ponds at KRC of CIBA attained more than 400 g in two and half years, the growth rate being 30% less than that recorded in nature. This is the first successful rearing attempt of Hilsa in brackishwater pond in India. Dr. K.K. Vijayan, Director, CIBA is optimistic that once

the research efforts initiated by CIBA at Kadwip Research Centre to produce Hilsa brooders in captivity become successful, captive breeding of Hilsa will be an achievable target in the coming years. This will open up a new horizon in the ranching of young ones of Hilsa in the Bengal waters and achieve the goal of stock improvement and increased production of Hilsa from natural waters. Once the breeding and seed production technologies are standardized, a flagship programme could be taken up on Hilsa selective breeding for growth with technological backup from CIBA, which then may be used as an aquaculture species for culture in farmers' ponds.

The scientists' team comprised of Dr. Debasis De (Principal Investigator), Dr. T.K. Ghoshal, Dr. Prem Kumar, Dr. Shyne Anand, Dr. G. Biswas, Dr. Sanjoy Das and Ms. Christina, L. from the Kadwip Research Centre of CIBA, with technical support by Dr. M. Kailasam from CIBA Headquarters, Chennai.

[Source: ICAR-CIBA: www.ciba.res.in; Soumya Das, *The Hindu*: Kolkata, 27 October 2016]

9. NFDB News

9.1 Shri K. N. Kumar, Chief Executive, NFDB, Hyderabad relieved

Shri K.N. Kumar, IAS, who assumed the charge of Chief Executive, National Fisheries Development Board (NFDB), Hyderabad, on 21 July 2015 got relieved on 17 October 2016 to join his parent cadre in Meghalaya. During the one year three months stint at NFDB Shri K.N. Kumar took several initiatives for the overall development of fisheries sector in the country by convening and chairing a series of review meetings, scientific seminars, workshops, write-shops, conferences, conclaves, and interactions with stakeholders, to: ascertain status of fisheries and knowledge base; up-grade technology; focus attention on lesser known and small indigenous fish species of economic value; build capacity; motivate financiers; develop policy framework for aqua-crop insurance, promote best management practices; develop guidelines and package of practices; draft national action plan; develop detailed project reports; review, scrutinize and sanction projects for implementing

in the States and Union Territories; initiate monitoring & evaluation; disseminate information through outreach programmes; upgrade and popularize NFDB Newsletter 'Matsya Bharat' (English and Hindi) across the country; etc. The Officers and Staff of NFDB presented a Memento and bid farewell to him.





Memento being presented to Shri K.N. Kumar, IAS (left) and Officers and Staff with Shri Kumar (above) on the occasion of farewell to him at NFDB Hyderabad

9.2 Shri Aditya Kumar Joshi, Joint Secretary (Fisheries) holds Additional Charge of Chief Executive, NFDB

Shri Aditya Kumar Joshi, IFS, Joint Secretary (Fisheries), Dept. of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture & Farmers Welfare, Govt. of India, is holding Additional Charge of Chief Executive (CE) of the National Fisheries Development Board (NFDB), Hyderabad. On 27 October 2017 he interacted with the Officers and Staff of NFDB, Hyderabad and reviewed the activities and projects.



Shri Aditya Kumar Joshi, Chief Executive (second from left above) interacting with the Officers and Staff of NFDB, Hyderabad

Shri Joshi emphasized that NFDB is the implementation arm of the Dept. of Animal Husbandry, Dairying & Fisheries and that it is the agency to usher in Blue Revolution in the country through Central Sector Schemes

and Central Sponsored Schemes to achieve the envisaged 8% growth and 15 million metric tons production in the country by 2020. Shri S.K. Rath, Asst. Commissioner (Fy), spoke about the requirement of Geo-tagging and developing GI Log of all the Fisheries Schemes/ Projects sanctioned.

9.3 NFDB observes 'Swachhta Pakhwada' on its premises and environs at Hyderabad

'Swachh Bharat' Mission is a nation-wide mass movement/campaign for cleanliness launched by the Govt. of India. As part of this movement it was decided to observe 'Swachhta Pakhwada' (cleanliness fortnight) during 16 - 31 October 2016. Under this programme NFDB sponsored 50 Awareness Camps and 5 State Level Workshops in different States and UTs, especially for maintaining cleanliness in the NFDB funded Fish Markets.

On their part, Officers and Staff at NFDB, Hyderabad observed 'Swachhta Pakhwada' on 21 October 2016 by cleaning the premises inside the Fish Building complex and its environs, and on 31 October 2016 by cleaning inside the Office, Record Rooms and Stores.



Officers and Staff observed 'Swachhta Pakhwada' at NFDB, Hyderabad



10. NFDB in the Media



11. Announcements

11.1 Aquaculture America 2017

Aquaculture America 2017, the only major national aquaculture conference and exposition in the U.S., is to be held in San Antonio, Texas, USA, from 19 - 22 February 2017. The U.S. Aquaculture Society (formerly U.S. Chapter of WAS) joins with National Aquaculture Association and the Aquaculture Suppliers Association to produce the annual Aquaculture America meetings. These sponsors are joined by the annual meetings of Aquacultural Engineering Society, American Tilapia Association, Striped Bass Growers Association, US Trout Farmers Association, US Shrimp Farming Association and many more associations to make Aquaculture America 2017 a big event in the U.S.

Aquaculture America 2017 will have the largest aquaculture trade show in the Western Hemisphere and one of the largest anywhere in the world with nearly 200 booths. This is an opportunity for one to inspect the latest in products and

services for the aquaculture industry. It is the place to visit current suppliers and make new contacts. To keep ahead and to keep profits building, one needs to keep pace with the technological advancements in the industry - and Aquaculture America 2017 is one such place.

11.2 World Ocean Summit 2017

The Economist Events' World Ocean Summit 2017 will be held at Sofitel Bali Nusa Dua Beach Resort, in Bali, Indonesia, on 22 - 24 February 2017, and will bring a critical eye to the vital issue of how to finance a sustainable ocean economy. Our aim is ambitious: to mobilise a new discussion on how capital and the private sector can drive scalable, sustainable investment in the ocean. At the World Ocean Summit one will: Meet with ESG and impact investors, decision makers and government officials who can drive scalable, sustainable investment in the ocean; Discover investments opportunities in the ocean economy;

Learn about emerging blue industries and solutions to overcome the problem of overfishing and pollution; Hear from businesses that are working with governments and academia to build sustainable best practices and lead change; Discuss the role of marine protected areas (MPAs) and sustainable aquaculture. Featured speakers: Anwar Hossain Manju, minister of environment and forests, Bangladesh; Heraldo Muñoz, minister of foreign affairs, Chile; Susi Pudjiastuti, minister of maritime affairs and fisheries, Indonesia; Karmenu Vella, commissioner for environment, maritime affairs and fisheries, European Commission; U Ohn Win, minister of natural resources and environmental conservation, Myanmar; Amina Mohammed, minister of environment, Nigeria; Mark Burrows, managing director and vice-chairman, global investment banking and capital markets, Credit Suisse; Namita Vikas, group president and managing director, climate strategy and responsible banking, Yes Bank.

11.3 The 7th Offshore Mariculture Conference

The 7th Offshore Mariculture conference, to be held in conjunction with Inapesca, Conapesca and Sepesca at The Ensenada Centre of the Arts, Ensenada, Baja California, Mexico, from 6 to 10 March 2017, will examine the prospects for and practical solutions to issues around farming marine finfish and bivalves offshore in Mexico. It will also provide information about innovative feed solutions and alternatives, opportunities for financing aquaculture projects, the logistics of setting up offshore and how to meet increasing demands for sustainability in today's society. A day and a half of technical visits to working offshore fish farms, hatcheries and research centres will provide delegates with a valuable insight into their inner workings.

The Offshore Mariculture Conference Mexico will examine the prospects for and practical solutions to issues around farming offshore in Mexico, and will focus on the production of Abalone, Mussels and the offshore farming of marine fin fish.

11.4 GIANT PRAWN 2017

GIANT PRAWN 2017 (GP 2017) is poised to be the next big thing to happen in the global farming and conservation of freshwater prawns of the genus *Macrobrachium*. Although the name could be taken to refer only to the Giant Malaysian prawn *M. rosenbergii*, in fact the event will encompass all species of *Macrobrachium* that are currently

farmed. This event will be held at Asian Institute of Technology (AIT), Bangkok, Thailand from 20 - 24 March 2017, and is organized by Salin Krishna at Aquaculture and Aquatic Resources Management, SERD, AIT and Michael New, past President of WAS and EAS. With nearly 30 invited international speakers, GIANT PRAWN 2017 presents global who-is-who of the research and industry supporting freshwater prawn. Speakers include: Peter Mather (Australia), Md Ayaz Hasan Chisty (Bangladesh), Patricia Moraes Valenti (Brazil), Wagner Cotroni Valenti (Brazil), Anthony Ostrowski (China), Yang Guoliang (China), Denis Lacroix (France), C. Mohanakumuran Nair (India), Endhay Kusnendar (Indonesia), Amir Sagi (Israel), Ilan Karplus (Israel), Mohd Fariduddin Othman (Malaysia), Nyan Taw and Soe Tun (Myanmar), Timothy Pickering (Pacific Islands, tbc), Nikolina Kovatcheva (Russia, tbc), Jose Fernandez Polanco (Spain), Rohana Subasinghe (Sri Lanka), I-Chiu Liao (Taiwan, tbc), Amaratne Yakupitiyage (Thailand), Uthiarat Na-Nakorn (Thailand), William Daniels (USA, tbc), James Tidwell (USA) and Tran Ngoc Hai (Vietnam).

Selected papers presented at GIANT PRAWN 2017 will be published in a special edition of the Journal of the World Aquaculture Society (JWAS). There will be farm tours on 24 March 2017 to prawn farms and hatcheries in Thailand, and a Trade Exhibition for aquaculture companies to participate.

[Source: www.was.org]

11.5 Climate Change: Facing the challenge beyond COP21

The 1st International Conference on Climate Change 2017 (ICCC 2017) which will be held on 16 and 17 February 2017 in Colombo, Sri Lanka under the theme "Climate Change: Facing the challenge beyond COP21". ICCC 2017 will continue its momentum in 2017 to explore a platform to exchange ideas on Climate Change, discover new opportunities, reacquaint with colleagues, meet new friends, and broaden their knowledge. Chemists, physicists, biologists, material scientists, biomedical researchers, engineers, environmentalists, social workers and other researchers who are active at the frontiers of this diverse and multidisciplinary field are encouraged to spread knowledge through the ICCC-2017 which will act as a global platform.

[Source: <http://aquaconference.com>]



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