MPEDA

Newsletter

VOL. VIII NO. 12 MARCH 2021

New Lab for Diagnosing Aquatic Animal Disease

Institute of the Month
Central Institute of Brackishwater Aquaculture (CIBA)

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MPEDA Newsletter
VOL. VIII / NO. 12 / MARCH 2021

On the Platter

K. S. Srinivas IAS
Chairman

Dear Friends,

After a long gap, exports have shown a trend reversal during March 2021 compared to the figures of March 2020 with a provisional growth percentage of 35% in quantity and 55% in US$ value. The surge was propelled by an increase in the exports to USA. Despite this, the overall export figures for the financial year 2021 still sees red with a shortfall of 17% in quantity and 16% in US$ value. However, the decline in rupee value is limited to 12% because of the depreciation of Indian rupee against US currency.

The container shortage as well as increase in the freight charges continues to plague the exports to major markets especially Europe and China. Continued lockdown in certain EU countries has also affected the exports.

As a part of market promotion measure, MPEDA has organized a primary buyer seller meet in the form of webinar on German and European seafood retail markets. In addition, virtual buyer seller meets were also organized with the help of Indian Missions in Lisbon (Portugal), Brussels (Belgium), Johannesburg (South Africa) and Hague (Netherlands). The Dutch Fish Importers Association was also associated with the BSM on Netherlands. MPEDA has roped in an agency to undertake market research on China so as to recommend ways and means to improve our market share in that country, which is considered as one among the largest importers of the seafood in the world.

As a part of digitization drive, MPEDA has launched online services for three more trade certificates such as Duty free import certificate, Non Radio Activity certificate, and Certificate of Legal Origin. Such measures are envisaged to facilitate ease of doing business in line with the policies of Government of India, especially when the sector struggles to move forward.

Thank you,

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Kochi, Keralam, India 682 020
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www.bworld.in, life@bworld.in

LAYOUT
Mr. Bijo Francis John

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FAO – Code of Conduct for Responsible Fishing Part 3

INTRODUCTION

Fisheries, including aquaculture, provide a vital source of food, employment, recreation, trade and economic well being for people throughout the world, both for present and future generations and should therefore be conducted in a responsible manner. This Code sets out principles and international standards of behaviour for responsible practices with a view to ensuring the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity. The Code recognises the nutritional, economic, social, environmental and cultural importance of fisheries, and the interests of all those concerned with the fishery sector. The Code takes into account the biological characteristics of the resources and their environment and the interests of consumers and other users. States and all those involved in fisheries are encouraged to apply the Code and give effect to it.

AQUACULTURE DEVELOPMENT

Responsible development of aquaculture, including culture-based fisheries, in areas under national jurisdiction

- States should establish, maintain and develop an appropriate legal and administrative framework which facilitates the development of responsible aquaculture.

- States should promote responsible development and management of aquaculture, including an advance evaluation of the effects of aquaculture development on genetic diversity and ecosystem integrity, based on the best available scientific information.

- States should produce and regularly update aquaculture development strategies and plans, as required, to ensure that aquaculture development is ecologically sustainable and to allow the rational use of resources shared by aquaculture and other activities.

- States should ensure that the livelihoods of local communities, and their access to fishing grounds, are not negatively affected by aquaculture developments.

- States should establish effective procedures specific to aquaculture to undertake appropriate environmental assessment and monitoring with the aim of minimizing adverse ecological changes and related economic and social consequences resulting from water extraction, land use, discharge of effluents, use of drugs and chemicals, and other aquaculture activities.

Responsible development of aquaculture including culture-based fisheries within transboundary aquatic ecosystems

- States should protect transboundary aquatic ecosystems by supporting responsible aquaculture practices within their national jurisdiction and by cooperation in the promotion of sustainable aquaculture practices.

- States should, with due respect to their neighbouring States, and in accordance with international law, ensure responsible choice of species, siting and management of aquaculture activities which could affect transboundary aquatic ecosystems.

- States should consult with their neighbouring States, as appropriate, before introducing non-indigenous species into transboundary aquatic ecosystems.

- States should establish appropriate mechanisms, such as databases and information networks to collect, share and disseminate data related to their aquaculture activities to facilitate cooperation on planning for aquaculture development at the national, subregional, regional and global level.

- States should cooperate in the development of appropriate mechanisms, when required, to monitor the impacts of inputs used in aquaculture.

Use of aquatic genetic resources for the purposes of aquaculture including culture-based fisheries

• States should conserve genetic diversity and maintain integrity of aquatic communities and ecosystems by appropriate management. In particular, efforts should be undertaken to minimize the harmful effects of introducing non-native species or genetically altered stocks used for aquaculture including culture-based fisheries into waters, especially where there is a significant potential for the spread of such non-native species or genetically altered stocks into waters under the jurisdiction of other States as well as waters under the jurisdiction of the State of origin.

• States should, whenever possible, promote steps to minimize adverse genetic, disease and other effects of escaped farmed fish on wild stocks.

• States should cooperate in the elaboration, adoption and implementation of international codes of practice and procedures for introductions and transfers of aquatic organisms.

• States should, in order to minimize risks of disease transfer and other adverse effects on wild and cultured stocks, encourage adoption of appropriate practices in the genetic improvement of broodstocks, the introduction of non-native species, and in the production, sale and transport of eggs, larvae or fry, broodstock or other live materials.

• States should facilitate the preparation and implementation of appropriate national codes of practice and procedures to this effect.

• States should promote the use of appropriate procedures for the selection of broodstock and the production of eggs, larvae and fry.

• States should, where appropriate, promote research and, when feasible, the development of culture techniques for endangered species to protect, rehabilitate and enhance their stocks, taking into account the critical need to conserve genetic diversity of endangered species.

Responsible aquaculture at the production level

• States should promote responsible aquaculture practices in support of rural communities, producer organizations and fish farmers.

• States should promote active participation of fish farmers and their communities in the development of responsible aquaculture management practices.

• States should promote efforts which improve selection and use of appropriate feeds, feed additives and fertilizers, including manures.

• States should promote effective farm and fish health management practices favouring hygienic measures and vaccines. Safe, effective and minimal use of therapeutants, hormones and drugs, antibiotics and other disease control chemicals should be ensured.

• States should regulate the use of chemical inputs in aquaculture which are hazardous to human health and the environment.

• States should require that the disposal of wastes such as offal, sludge, dead or diseased fish, excess veterinary drugs and other hazardous chemical inputs does not constitute a hazard to human health and the environment.

• States should ensure the food safety of aquaculture products and promote efforts which maintain product quality and improve their value through particular care before and during harvesting and on-site processing and in storage and transport of the products.

INTEGRATION OF FISHERIES INTO COASTAL AREA MANAGEMENT

Policy measures

• States should promote the creation of public awareness of the need for the protection and management of coastal resources and the participation in the management process by those affected.

• In order to assist decision-making on the allocation and use of coastal resources, States should promote the assessment of their respective value taking into account economic, social and cultural factors.

• In setting policies for the management of coastal areas, States should take due account of the risks and uncertainties involved.

• States, in accordance with their capacities, should establish or promote the establishment of systems to monitor the coastal environment as part of the coastal management process using physical, chemical, biological, economic and social parameters.

• States should promote multi-disciplinary research in support of coastal area management, in particular on its environmental, biological, economic, social, legal and institutional aspects.

Regional cooperation

- States with neighbouring coastal areas should cooperate with one another to facilitate the sustainable use of coastal resources and the conservation of the environment.

- In the case of activities that may have an adverse transboundary environmental effect on coastal areas, States should provide timely information and, if possible, prior notification to potentially affected States; and consult with those States as early as possible.

- States should cooperate at the subregional and regional level in order to improve coastal area management.

Implementation

- States should establish mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas.

- States should ensure that the authority or authorities representing the fisheries sector in the coastal management process have the appropriate technical capacities and financial resources.

- Competent international organizations should, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished.

- Relevant technical and financial international organizations should, upon request, support States in their research efforts, devoting special attention to developing countries, in particular the least-developed among them and small island developing countries.

Courtesy: www.fao.org

To be continued in next issue

CCRF: POST-HARVEST PRACTICES AND TRADE

Blockchain applications in the fisheries sector

Dr. T R Gibinkumar, Deputy Director MPEDA (Market Promotion & Statistics)

Nowadays, consumers increasingly want to be informed about the products they are buying or consuming, especially when it comes to food, such as fish. Besides nutritional information, consumers want to know about the fish origin, whether it has been properly stored and transported, etc.

At the same time, for public health reasons, authorities may need to know the current location of certain fish lots (which have been caught or produced in a specific location, have been stored in a certain place, have been transported by a certain truck, etc.). In other words, consumers and society in general demand transparency throughout all the value chains of fish products and it is necessary to implement traceability in all the fish and fishery value chains.

Frank Yiannas, former vice president of food safety for Walmart

"The one-step-up and one-step-back model of food traceability was outdated for the 21st century,"

However, from capture or production until it reaches the final consumer, fish can pass through several companies. This means that the same fish or fish lot can be part of several companies' processes. So, it is necessary to integrate all processes internal to each company involved in the value chain, to know the whole history of the fish.

As a way of preventing potential public health disasters caused by food products, authorities in the major markets like the European Union has comes out with the directives requiring registration and control, improving product traceability and enabling faster recalls when necessary. As a consequence, several proposals for the implementation of traceability have been carried out within food value chains, including fish products.

Blockchain Defined

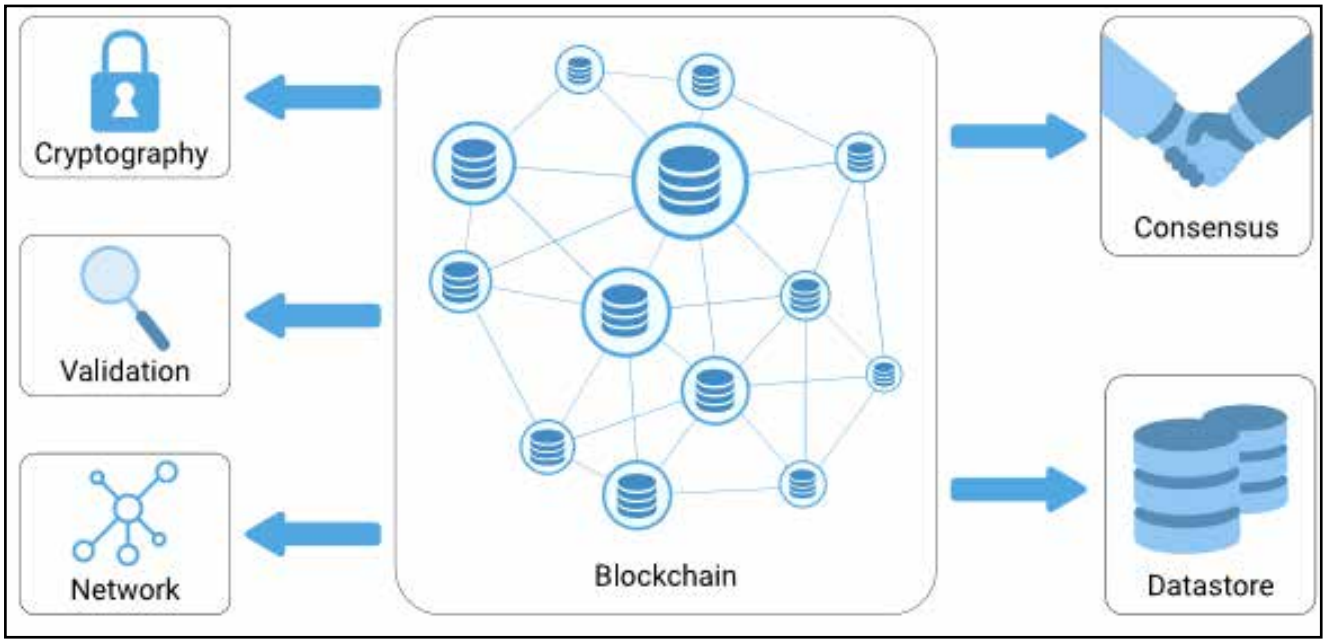
Blockchain is a sequence of consensually verified transaction blocks that are chained together. An expandable list of records, or blocks, each containing data representing an individual transaction by members of a network. Each block consists of a data set, time stamp, a cryptographic hash (a cyber security fingerprint) and the hash of the previous block, mathematically linking them together.

One of the most important technologies to emerge from this decade's cryptocurrency "revolution" is blockchain. Although blockchain was introduced as a back end technology for tamper-proof recordkeeping of transactions for Bitcoin, it was soon elevated to the status of an independent technology that had much broader applications than just in cryptocurrencies. Today, blockchain is accepted as a standalone solution for a broad class of problems that require permanent, unalterable storage of digital assets. To implement traceability in the fisheries and aquaculture value chain many authors proposed the use of blockchain technology, mostly because this technology fits perfectly in the purpose of product traceability, as it allows registering all chain activities in a distributed, transparent, secure and trustful manner.

A related term, "digital ledger technology," is an inclusive label for all types of blockchains plus related technologies that are functionally equivalent to blockchain, for instance, directed acyclic graph-based platforms, such as IOTA and Hashgraph.

The traceability platform is being created with two main goals. The first one is to give the authorities information about the current location of a fish lot. The second goal is to give the final consumers the possibility to know the origin of the fish (where it was captured or raised), how it was captured (harvesting methods), who captured it (or created it), when it was captured, under what conditions it was stored, under what conditions it was transported, what process of transformation it has undergone and in what conditions, etc.

Blockchains can be generally catalogued as permissionless public blockchains include the public blockchain platforms (such as Bitcoin or Ethereum) that are open and do not impose any entry barriers on users and permissioned private blockchains (closed networks) such as Ripple, Fabric or Sawtooth which allow only verified parties to use them. Some authors also mentioned hybrid blockchains (permissioned public blockchains) which will be the combination of public and private blockchain platforms.



Blockchain components

Blockchain Cryptography

Satoshi Nakamoto introduced the model comprising a network of nodes that collaborate with the aim of maintaining a distributed and secure database and developed a first blockchain digital currency called Bitcoin.

For all practical purposes, blockchain provides an immutable data store where the cost of enforcing trust is near-zero (since modifying data written earlier is practically impossible). This makes it an attractive option for storing digital assets that are unchangeable in nature, such as certificates, financial records, land records or personal wills.

Since falsification is impossible, new and faster ways of executing tasks are possible with blockchain.

Blockchain Components

Blockchain has strong points like shared governance and operations, resilience to data loss, provenance tracking and auditable. These points are very important to the fishery value chain. The value chain operators want to be part of a system but do not blindly trust each other. Using blockchain technology, they can share governance and operations.

The consensus protocol is an agreement between those operators about the operations that will be executed by the system. Besides, the data is stored and replicated in each node which assures resilience to data loss. On the other side, when a transaction is performed, a new block is appended to the blockchain with information about the transaction including the timestamp. This new block is approved by the consensus protocol approved by the value chain operators, and hence the audit function is also provided by the blockchain.

Suitability of fisheries for blockchain

Blockchain-based technology is rapidly being adopted by different sectors, including banking and finance, supply chain, shipping and logistics, healthcare and government. It promises several-fold acceleration in time for many tasks, including settlement and audit. The global fish trade has several interesting characteristics that make it amenable to the use of blockchain technology:

• It is a high-volume, high-value business.

• The producer and consumer are located in different parts of the country or the world.

• The supply chain has a number of actors who never meet face-to-face (but are forced to trust each other).

• Fish is a complex product that has widely varying prices depending on the size, quality, source, etc. There can be multiple sources for the same species (e.g. culture vs. wild fish) or species that look similar but have significantly different prices or other characteristics. Overall, the chances of mislabelling or product substitution are high.

• Fish trade has complex food safety and other reporting requirements (e.g. fisheries management reporting, hazard analysis and critical control point), some of which, as paper documents, could permit tampering.

• Overall, auditing the entire chain for food safety or other compliance poses formidable challenges.

A number of initiatives in the fisheries sector are exploring blockchain technology to ensure trust and transparency in global fish supply chains for both capture and culture fisheries. For instance, a consumer today might be forced to trust all the information provided about the fish that is purchasing, which could include the country of origin, type of fishers or fishing gear, certification, and quality or environment-related labels. With blockchain, the consumer can directly verify any part of this information and be confident in the authenticity of the information.

Major Blockchain based Initiatives in fisheries

Notable blockchain initiatives in fisheries include IBM's Food Trust, an initiative that attempts to bring in transparency to commodities such as fish, milk, fruits and vegetables.

Another initiative is FishCoin, a start-up that attempts to make the fisheries sector more sustainable by incentivizing all reporting through a crypto-token called FishCoin (fishcoin.co). In Australia, the World Wide Fund for Nature Australia is piloting the From Bait to Plate initiative (www.worldwildlife.org/pages/bait-to-plate), which tracks tuna from the Pacific Islands to the final consumer.

Every individual fish can be instantly checked on the blockchain to confirm that it is "sustainable, ethical and legal" and not IUU. Earth Twine is a collaborative technology company that uses blockchain to enhance IUU compliance and simplify audits (bit.ly/2ylQZJ7) In Indonesia, the Provenance project (www.provenance.org) ensures that only the catch from local fishers — registered through an SMS as soon as the fish is caught and receiving a unique ID for the fish in return can be processed, and not fish from poaching vessels from neighboring countries.

Fish Traceability Platform using Blockchain

The smart contract is the basis of the traceability platform that register and provide traceability information, so that, given the identification of a lot number, the platform must provide its current location (or locations) and all the activities/events occurred since capture or production. The value chain operators are responsible to gather and store information of the process activity, so each operator is a participant in the blockchain.

There are four different types of users (User entity); The SysAdmin, that can create and add new operators; The worker, that represents a person that works to a value chain operator and is responsible for storing information about the executed activities; The workerAdmin, which is an Administrator within the scope of a value chain operator; and, a final consumer, who is any unregistered user, which can read the traceability information about any fish lot.

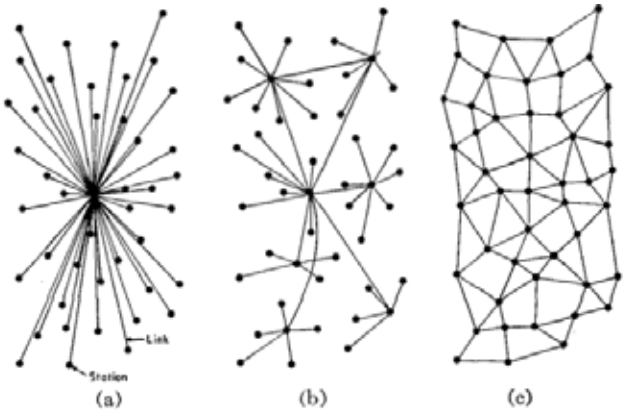


Fig. 1—(a) Centralized. (b) Decentralized. (c) Distributed networks.

A Solidity smart contract is composed of the declaration of data types needed (set of data structs), a set of data

storage variables and a set of functions, including a constructor. This code resides at a specific address on the blockchain and forms the basis for the entire application defining all the needed data structures as well as all support functions.

A Smart Contract is also called as “a digital contract that controls a user's digital assets including the formulation of the participant’s rights and obligations. High level programming languages such as Solidity, Hawk etc are used for implementing smart contracts on several blockchain platforms. After deployment, the contract runs on the Virtual Machines on a specific address.

A set of functions is implemented in order to allow users to add (store) and read information from the blockchain. Basically, each activity or event operation (capture, transformation, etc.) is implemented as a function which may have pre-conditions that can be generic or specific.

All objects created in the functions of the contract, and stored in the defined storage variables, are stored in the blockchain and cannot be modified. This implies that the implemented structure is extremely solid, leveraging the benefits of the blockchain (decentralization, immutability, security, and transparency).

CONCLUSIONS

Blockchain is still evolving with the drastic evolution of the Support Technologies, infrastructure and Programming. The Return on Investment will vary by company and level within the supply chain with lots of new development underway at first mile.

In the value chain of fish and its derivatives there are many operators involved, from fish capture or aquaculture production to the final consumer, including transport, logistics and industry.

Each company controls its internal processes, however, in order to understand and be sure that the fish is in good condition for consumption, it is necessary to know its entire value chain path. For that, we need to know the value chain process that arises from integrating all the companies’ processes involved in the fish path.

It is important to note that the use of blockchain does not eliminate all chances of misreporting or fraud. Since handling of fish (including transport, processing, shipping, repackaging and retailing) are physical, off-chain activities, which take place outside the blockchain), the possibility of misreporting at the point of capture of these transactions on blockchain still exists. However, once captured correctly, the transaction remains as a permanent, immutable record. Increasing automation, for instance by using IOT-enabled equipment, and onsite genetic identification can reduce this risk.

The Future of Blockchain?

Expected to be used for retail and seafood supply chain mainly for tracking and tracing, counterfeit prevention, inventory management and auditing In the consumer perspective influence for showing that, consumers are becoming more aware and taking care to track the origin of their consumables Expected to be used in some fashion by most industries within 5 -10 years

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Export Performance during April 2020 to February 2021

India's marine exports declined, increase in average Unit Value Realization

During the financial year 2020-21, India has exported 8,91,309 MT of seafood worth US$ 4.81 Billion. The USA and China are the major importers of Indian seafood. Frozen Shrimp continued to be the major export item followed by frozen fish.

Export summary reports are given in the Table.1

Export performance during 2020-21* compared to 2019-20

Export details	2020-21*	2019-20	Growth %
Quantity in Tons	8,91,309	12,05,535	-26.07
Value in Crores	34,703.03	43,912.79	-20.97
USD in Million	4,814.04	6,295.33	-23.53
Unit Value (USD/Kg)	5.40	5.22	3.43

**MPEDA HO Module ported data, April 2020- February 2021: Provisional export figure*

This year the export has shown a decline in rupee term by 20.97%, however the quantity and US dollar value has declined by 26.07% and 23.53% respectively. The average unit value realization of marine products has improved from USD 5.22 to 5.40.

Major item-wise exports details

Frozen shrimp continued to be the major item of export in terms of quantity and value, accounting for a share of 53.01 % in quantity and 73.54% of the total USD earnings. Shrimp exports during the period decreased by -23.42% in USD value and -23.38% in quantity.

The overall export of shrimp during 2020-21 was to the tune of 4,72,493 MT worth USD 3,540.05 Million. The USA remained the largest market with import of 2,30,843 MT of frozen shrimp followed by China (86,581 MT), the European Union (58,917 MT), Japan (36,438 MT), South East Asia (31,472 MT), the Middle East (23,518 MT) and other countries (31,720 MT).

The export of Vannamei shrimp has decreased from 5,34,389 MT to 4,48,175 MT in 2020-21. Out of the total Vannamei shrimp exports in value terms, about 57.41 % was exported to the USA followed by 13.87% to China, 7.85% to the European Union, 5.95% to Japan, 5.47% to the South East Asia, 3.31% to the Middle East and 6.11% to other countries. Japan is the major market for Black Tiger shrimp too with a share of 41.63% in terms of value followed by the USA (25.34%) and the European Union (8.71%) in USD.

Frozen Fish is the second largest export item, accounting for a share of 16.45% in quantity and 7.00% in USD earnings. This year the export of Frozen fish has declined by 26.48% in Quantity and 28.22% in terms of USD value.

Export of Frozen Cuttlefish has shown a negative growth of 30.73 % in quantity, 33.66% in rupee value and 36.79% in USD terms

Frozen squid has shown a decline of 46.33%, 30.48%, and 33.98% in terms of quantity, rupee value and USD earnings respectively.

Export of Chilled items has shown a decline of 35.98%, 37.57% and 40.81% in terms of quantity, rupee value and USD earnings respectively. Dried items have shown a decline of 31.27%, 11.89% and 8.91% in terms of quantity, rupee value and USD earnings respectively.

Live Items have shown a decline of 50.62%, 38.08% and 41.21% in terms of quantity, rupee and USD value respectively. However the unit value realization increased from 6.34 to 7.55 USD this year.

Other Items have also shown a decline of 17.01%, 18.65% and 0.22% in terms of quantity, rupee and USD value respectively.

The details of major items of exports are given in the Table.2

Item-wise export compilation 2020-21 (April-February)

Q: Quantity in Tons, V: Value in Rs. Crores, $: USD Million

ITEM		Share %	Apr-2020 - Feb-2021*	Apr-2019 - Feb-2020	(%)	Variation
FROZEN SHRIMP	Q: V: $: UV$:	53.01 75.30 73.54	472493 26131.88 3540.05 7.49	616643 32221.33 4622.70 7.50	-23.38 -18.90 -23.42 ***	-144150.10 -6089.46 -1082.65 0.00
FROZEN FISH	Q: V: $: UV$:	16.45 6.86 7.00	146628 2379.92 336.87 2.30	199448 3289.21 469.30 2.35	-26.48 -27.64 -28.22 -2.36	-52820.10 -909.28 -132.43 -0.06
FR CUTTLE FISH	Q: V: $: UV$:	5.28 3.68 3.61	47047 1276.50 173.56 3.69	67917 1924.17 274.56 4.04	-30.73 -33.66 -36.79 -8.75	-20869.86 -647.67 -101.00 -0.35
FR SQUID	Q: V: $: UV$:	5.01 4.15 4.07	44693 1440.46 196.09 4.39	83278 2072.03 297.00 3.57	-46.33 -30.48 -33.98 23.02	-38584.80 -631.57 -100.92 0.82
DRIED ITEM	Q: V: $: UV$:	6.05 2.36 2.53	53932 820.09 121.90 2.26	78465 930.79 133.82 1.71	-31.27 -11.89 -8.91 32.53	-24532.69 -110.69 -11.92 0.55
LIVE ITEMS	Q: V: $: UV$:	0.39 0.56 0.55	3483 193.28 26.30 7.55	7054 312.15 44.73 6.34	-50.62 -38.08 -41.21 19.05	-3570.55 -118.87 -18.44 1.21

CHILLED ITEMS	Q: V: $: UV$:	1.41 1.07 1.05	12558 370.99 50.39 4.01	19617 594.23 85.15 4.34	-35.98 -37.57 -40.81 -7.55	-7058.42 -223.24 -34.75 -0.33
OTHERS	Q: V: $: UV$:	12.39 6.02 7.66	110474 2089.90 368.87 3.34	133114 2568.87 368.06 2.77	-17.01 -18.65 0.22 20.76	-22639.21 -478.97 0.81 0.57
TOTAL	Q: V: $: UV$:	100.00 100.00 100.00	891309 34703.03 4814.04 5.40	1205535 43912.79 6295.33 5.22	-26.07 -20.97 -23.53 3.43	-314225.72 -9209.76 -1481.29 0.18

** provisional figure*

Figure.2

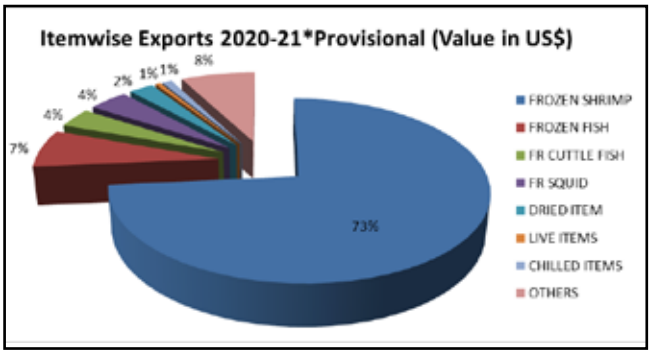
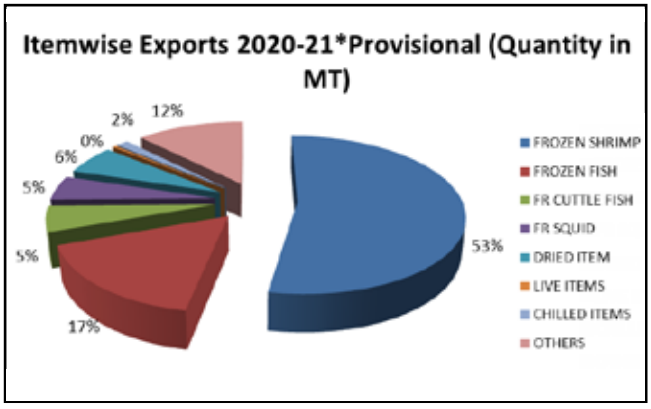


Figure.3



Market-wise export details

The USA continued to be the major importer of Indian seafood with a share of 40.59% in terms of USD. The country imported 2,31,309 MT of seafood in the current financial year. Export to the USA has shown a decline of 19.53% in quantity, 14.50% in rupee value and 19.16% in USD terms. Frozen Shrimp continued to be the principal item exported to the USA with a share of 95.83% in USD value. Exports of Vannamei shrimp to the USA showed a decline of 10.82% in quantity and 9.75% in USD terms. The Black Tiger Shrimp exports to the USA decreased by 73.19%, 68.31% in terms of quantity and USD terms respectively.

China is the second largest market destination for Indian Seafood with a share of 16.10% in USD earnings and 20.00% in quantity terms. Exports to China decreased by 41.88% in quantity, 37.30% in rupee value and 40.73% in USD terms. Frozen Shrimp is the major item of exports to China accounting for a share of 46.40% in quantity and 60.96% in USD earnings. China imported 1,86,593 MT of Seafood worth USD 804.51 million.

European Union continued to be the third largest destination for Indian Seafood with a share of 13.06% in USD. Frozen Shrimp continued to be the major item of exports to the EU accounting for a share of 46.10% in quantity and 58.86% in USD earnings out of the total exports to the EU. Export of frozen shrimp to the EU decreased by 15.60% and 16.33% in quantity and USD value.

South East Asia is the fourth largest market destination of Indian Marine products accounting for a share of 10.71% in USD terms. Overall exports to South East Asia declined by 22.81% in quantity, 19.69% in rupee value and 22.81% in US $ earnings.

Japan is in fifth largest destination for Indian Seafood with a share of 9.10% in USD earnings and 7.83% in quantity terms. Exports to Japan have shown a negative growth of 9.53 % in rupee value however, shown a decline of 5.77% in quantity and 9.58% USD earnings.

Frozen Shrimp continued to be the major item of exports to Japan accounting for a share of 48.01% in quantity and 75.04% in USD earnings. Exports of Frozen shrimp to Japan decreased by 3.41%, 5.77% and 11.22% in quantity, rupee value and USD value respectively.

Exports to the Middle East have shown a negative growth of 26.31% in rupee value and 30.29% in USD

value, however they have shown a negative growth in quantity by 30.81%.

The exports to Other Countries showed a negative growth of 17.99%, 19.53% and 23.06% in quantity, rupee value and USD value respectively when compared to previous year.

The details on major markets for Indian marine products are given in the Table. 3

Market-wise export compilation 2020-21 (April-February)

Q: Quantity in Tons, V: Value in Rs. Crores, $: USD Million

Country		Share %	Apr-2020 - Feb-2021*	Apr-2019 - Feb-2020	Variation	(%)
JAPAN	Q: V: $:	7.83 7.26 9.10	69800 2518.08 437.90	74073 2,783.31 399.62	-4273.20 -265.23 38.28	-5.77 -9.53 9.58
USA	Q: V: $:	25.95 41.52 40.59	231309 14408.92 1954.22	287437 16,851.90 2,417.32	-56128.34 -2442.97 -463.10	-19.53 -14.50 -19.16
EUROPEAN UNION	Q: V: $:	13.02 13.35 13.06	116026 4631.29 628.71	155768 5,754.83 823.67	-39741.41 -1123.54 -194.96	-25.51 -19.52 -23.67
CHINA	Q: V: $:	20.00 16.49 16.10	178236 5724.01 774.85	306643 9,129.79 1,307.39	-128407.54 -3405.78 -532.54	-41.88 -37.30 -40.73
SOUTH EAST ASIA	Q: V: $:	18.29 10.78 10.71	162990 3739.57 515.75	211144 4,656.38 668.14	-48154.21 -916.81 -152.39	-22.81 -19.69 -22.81
MIDDLE EAST	Q: V: $:	4.15 4.09 4.00	37010 1419.41 192.48	53489 1,926.07 276.12	-16479.53 -506.66 -83.63	-30.81 -26.31 -30.29
OTHERS	Q: V: $:	10.76 6.52 6.44	95938 2261.74 310.13	116980 2,810.52 403.08	-21041.51 -548.78 -92.95	-17.99 -19.53 -23.06
Total	Q: V: $:	100.00 100.00 100.00	891309 34703.03 4814.04	1205535 43,912.79 6,295.33	-314225.72 -9209.76 -1481.29	-26.07 -20.97 -23.53

** provisional figure*

Figure.4

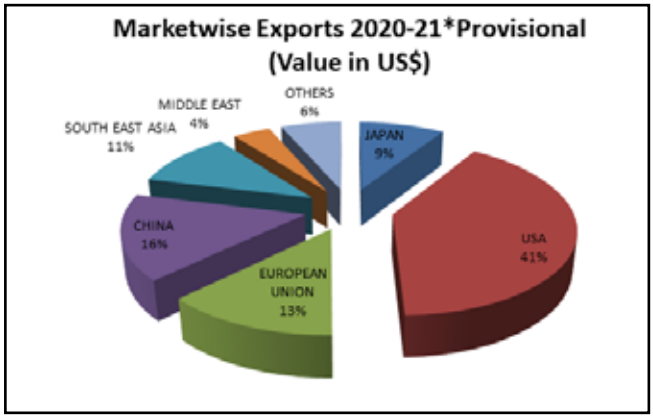
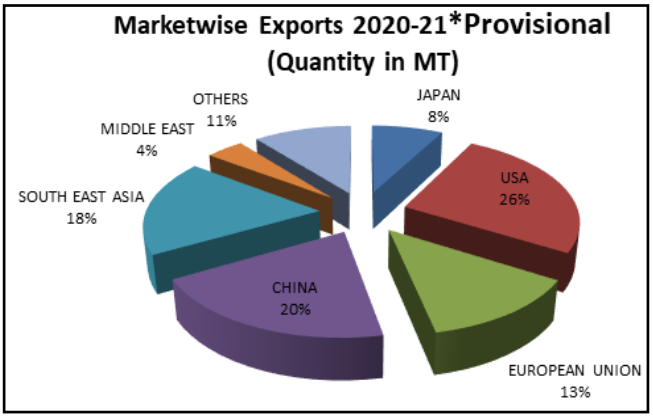


Figure.5



Major Port-wise exports

Marine products were exported through 31 different sea/air/land ports. Vizag, Calcutta, Krishnapatnam, Kochi and Pipavav, are major ports handling the marine cargo. Major Port wise export details are given in Table 4.

Port-wise export compilation 2020-21 (April-February)						
Q: Quantity in Tons, V: Value in Rs. Crores, $: USD Million						
Ports		Share %	Apr-2020 - Feb-2021*	Apr-2019 - Feb-2020	Variation	(%)
VIZAG	Q: V: $:	20.14 30 29	179551 10,277.57 1,391.60	226095 12,268.62 1,760.23	-46544 -1,991.05 -368.63	-20.59 -16.23 -20.94
CALCUTTA	Q: V: $:	11.30 13 13	100711 4,512.69 612.65	123243 5,181.16 743.31	-22532 -668.46 -130.66	-18.28 -12.9 -17.58
J N P	Q: V: $:	9.35 9 10	83328 2,949.78 494.25	128007 4,153.79 594.92	-44679 -1,204.01 -100.67	-34.9 -28.99 -16.92
KOCHI	Q: V: $:	10.48 10 9	93459 3,360.52 454.89	136382 4,582.32 655.85	-42923 -1,221.80 -200.96	-31.47 -26.66 -30.64
KRISHNAPATNAM	Q: V: $:	6.12 9 9	54520 3,186.55 432.02	91539 4,801.02 689.44	-37019 -1,614.47 -257.43	-40.44 -33.63 -37.34
PIPAVAV	Q: V: $:	17.0 8 8	151483 2,736.89 371.93	234521 4,212.77 602.51	-83038 -1,475.89 -230.58	-35.41 -35.03 -38.27
TUTICORIN	Q: V: $:	4.40 6 6	39214 2,022.23 274.27	53427 2,757.82 395.55	-14213 -735.59 -121.29	-26.6 -26.67 -30.66
CHENNAI	Q: V: $:	4.78 6 5	42606 1,912.03 259.12	48138 1,935.73 277.81	-5532 -23.70 -18.68	-11.49 -1.22 -6.73
MANGALORE/ICD	Q: V: $:	9.25 4 4	82477 1,244.22 173.50	89261 1,262.87 180.77	-6784 -18.65 -7.27	-7.6 -1.48 -4.02
KATTUPALLI/ ENNORE	Q: V: $:	2.34 3 3	20870 1,017.78 137.52	24908 1,155.22 165.76	-4039 -137.43 -28.25	-16.21 -11.9 -17.04
KAKINADA	Q: V: $:	1.06 2 2	8595 537.01 72.72	8263 491.70 70.28	332 45.31 2.44	4.01 9.21 3.47
MUNDRA	Q: V: $:	2.39 1 1	21300 466.65 63.87	17941 283.57 40.67	3359 183.09 23.20	18.72 64.57 57.03
GOA	Q: V: $:	0.78 0 0	6987 136.00 18.56	14042 273.95 39.29	-7055 -137.95 -20.73	-50.24 -50.36 -52.77
MUMBAI	Q: V: $:	0.06 0 0	568 129.25 17.64	1443 175.25 25.04	-875 -45.99 -7.40	-60.64 -26.25 -29.54

HAZIRA	Q:	0.25	2236	2640	-404	-15.32
	V:	0	109.13	142.49	-33.36	-23.41
	$:	0	14.86	20.38	-5.52	-27.09
VERAVAL	Q:	0.05	457	18	439	2465.66
	V:	0	10.24	0.69	9.55	1380.41
	$:	0	11.74	0.10	11.64	11556.22
TRIVANDRUM	Q:	0.10	888	1981	-1093	-55.19
	V:	0	33.62	106.95	-73.33	-68.57
	$:	0	4.61	15.31	-10.70	-69.92
HYDERABAD	Q:	0.06	565	1353	-789	-58.27
	V:	0	19.95	36.14	-16.19	-44.8
	$:	0	2.69	5.20	-2.50	-48.15
AHMEDABAD	Q:	0.00	24	186	-162	-87.1
	V:	0	15.98	13.67	2.31	16.87
	$:	0	2.20	1.94	0.25	13.03
MAHADIPUR	Q:	0.10	915	315	600	190.58
	V:	0	12.02	3.76	8.26	219.85
	$:	0	1.66	0.55	1.12	204.35
BANGALORE	Q:	0.02	172	166	5	3.3
	V:	0	6.74	7.64	-0.90	-11.82
	$:	0	0.91	1.09	-0.19	-17.06
TRICHY	Q:	0.01	65	2	62	2809.48
	V:	0	2.71	0.05	2.66	5115.41
	$:	0	0.37	0.01	0.36	***
HILL LAND CUSTOMS	Q:	0.03	244	329	-85	-25.81
	V:	0	2.47	0.94	1.54	164.16
	$:	0	0.33	0.14	0.19	143.91
PORBANDAR	Q:	0.00	20	0	20	***
	V:	0	0.73	0.00	0.73	***
	$:	0	0.10	0.00	0.10	***
HALDIA	Q:	0.01	56	1025	-969	-94.58
	V:	0	0.24	56.89	-56.66	-99.59
	$:	0	0.03	8.06	-8.02	-99.6
MADURAI	Q:	0.00	1	42	-40	-97.02
	V:	0	0.02	1.69	-1.67	-98.57
	$:	0	0.00	0.24	-0.24	-98.63
DELHI	Q:	0	0	14	-14	-100
	V:	0	0.00	0.16	-0.16	-100
	$:	0	0.00	0.02	-0.02	-100
PORT BLAIR	Q:	0	0	15	-15	-100
	V:	0	0.00	1.10	-1.10	-100
	$:	0	0.00	0.16	-0.16	-100
CALICUT	Q:	0	0	17	-17	-100
	V:	0	0.00	0.28	-0.28	-100
	$:	0	0.00	0.04	-0.04	-100
SURUT (INHZA)	Q:	0	0	26	-26	-100
	V:	0	0.00	0.58	-0.58	-100
	$:	0	0.00	0.08	-0.08	-100
GHOGADANGA	Q:	0	0	197	-197	-100
	V:	0	0.00	3.99	-3.99	-100
	$:	0	0.00	0.57	-0.57	-100
Total	Q:	100	891309	1205535	-314226	-26.07
	V:	100	34703.03	43,912.79	-9,209.76	-20.97
	$:	100	4814.04	6,295.33	-1,481.29	-23.53

**MPEDA HO Module ported data, April 2020- February 2021: Provisional export figure*

INSTITUTE OF THE MONTH: CIBA

भाकृअनुप
ICAR

CIBA

Steering the brackishwater aquaculture growth towards sustainability, food security and economic driver's contributing to livelihood support

INSTITUTE of the MONTH

INSTITUTE OF THE MONTH: CIBA

CIBA Headquarters, Chennai

The outbreak of Coronavirus disease 2019 (COVID-19) and lockdown have adversely impacted the brackishwater aquaculture sector.

But unlike other sectors, aquaculture quickly revived and attained its momentum in the last quarter of this fiscal year 2020-21, showing the resilient nature of this important sector.

Indian Council of Agricultural Research (ICAR), New Delhi, Central Institute of Brackishwater Aquaculture (CIBA) is the nodal agency for research and development of brackishwater aquaculture in the country.

ICAR-CIBA, playing a pivotal role in the development of brackishwater aquaculture in the country, hopes that this sector affected by the COVID-19 will get into the compensatory phase with the production and export revenue. CIBA, a synonym for brackishwater aquaculture research, has rapidly assessed the impact of COVID-19 on the sector in terms of seed production and supply, farming, processing and marketing and economic and employment loss- using the social media tools such as CIBA-ShrimpApp.

The study also revealed that, during the COVID- 19 pandemic, when most of the production sector was drastically impacted by the lockdown and associated hindrance in logistics, the entire aquaculture industry is in the process of revival, as govt has exempted the aquaculture operations from lockdown restrictions. The sector retained its momentum proving the resilient nature of aquaculture, contributing towards food security, employment and prosperity of the population.

CIBA, headquartered in Chennai, is mainly focusing on the technology backstopping of the sector for its goal of achieving sustainable brackishwater aquaculture for food, employment, and prosperity.

"As CIBA has marked thirty years of useful research and development in the brackishwater aquaculture sector, focusing on crucial questions to develop strategies and technologies for sustainable aquaculture, we are proud in taking the responsibility of steering the brackishwater aquaculture industry towards sustainability, as well as contributing towards food security and livelihood.

Currently, brackishwater sector in this country is centered on shrimp farming with exotic pacific white shrimp, and CIBA realizes the risk of complete dependence on single species. As CIBA understand that this single species focus is not a sustainable one in the long run, our priority is on the diversification of brackishwater aquaculture with different candidate species of shellfish and finfish.

Diversification of species would enable the judicious and responsible utilization of the brackishwater resources with broad stakeholder participation," said Dr. K K Vijayan, Director, CIBA.

"In this direction, CIBA has made commendable progress in the multi-disciplinary areas of brackishwater

farming, covering captive seed production, feed development, farming system development, disease diagnostics and health management, genetics and stock characterization, climate-smart aquaculture, community engagements using social science tools and policy interventions. Cumulatively, these R&D interventions from CIBA have opened up new diversified farming initiatives and strategies to support the ongoing shrimp and finfish farming. Our larger goal is to work towards the development and expansion of brackishwater aquaculture in the country, both horizontally and vertically, with a sustainable approach. It is encouraging to see the tremendous support from the farmers, industry people, and government agencies for our efforts to promote sustainable brackishwater aquaculture".

In the technology backstopping front, CIBA made a breakthrough in the seabass breeding technology in the early nineties, followed by grow-out technology in the ponds and cage rearing, though it took more than a decade to get its way through the farming sector. In the recent past, it started yielding the results with its untired efforts on customization of the farming technology, with stockable size seeds, and cost-effective indigenous formulated feed for all the life stages of this premium brackishwater fish. Now seabass is being farmed in both east and west coast in diversified rearing systems such as ponds, cages and RAS. Around 1000 tones of seabass are being produced and brought to the domestic market. A special focus for promoting seabass farming has been given to the recently launched Central Government flagship program - Pradhan Mantri Matsya Sampada Yojana (PMMSY), hopefully that would give a new momentum for brackishwater finfish farming in the country.

Species diversification is the most crucial factor in the sustainable development of aquaculture.Hence CIBA has a special focus on the breeding and development of hatchery seed production for the important native species of finfish and shellfish to add more species in the brackishwater farming basket, so that farmers will have a choice to select the species according to local conditions and market demands. Our efforts are not limited only to hatchery technology; CIBA also developed technologies on the critical inputs such as cost-effective and quality desi formulated feeds and farming technologies and presenting to the stakeholder as a holistic package of practices. These efforts resulted in proven technology packages for the seed production and farming of Milkfish, Pearlspot, Grey Mullet, Mangrove Red Snapper, Mystus catfish, Hilsa and few brackishwater ornamental fishes. This has opened up new avenues and given increased confidence to the farmers and policymakers and given new hope and direction for expanding the brackishwater aquaculture for increasing fish production by judiciously utilizing the untapped resources.

"Though aquaculture is possible in all types of water resources, such as marine and inland freshwaters, the limitations of these sectors in terms of infrastructure inputs for marine farming and multi-stakeholder demands for freshwater resources need to be thought off. In the future aquaculture development, the scope of expansion of brackishwater aquaculture is significant, with 1.2 million ha of resources, where only 12-15% is estimated to be used; hence the potential for horizontal expansion is enormous, with cost-effective infrastructure options and zero demands for brackishwater.

Aerial view of the state of the art finfish and shrimp hatchery complex at Muttukadu, Tamil Nadu

Pilot-scale feed processing infrastructure of CIBA for making formulated pelleted feeds for farmed fishes and shrimp

Further, the inland saline areas to the tune of about 8.0 million ha are available in states such as Haryana, Rajasthan, Uttar Pradesh, Maharashtra, and Gujarat, where surface and sub-soil saline water also can be explored for farming with the use of brackishwater resilient finfish and shellfish species.

Brackishwaters, which is otherwise considered as a zero-economic resource (not used in agriculture, drinking or construction), are ideal for aquaculture today and expansion in the future due to their biodiversity richness, high productivity and negligible footprint on potable water and carbon emission" Dr. Vijayan said.

As an added advantage, the high tolerance of brackishwater flora and fauna for extremes of the water quality makes them more appropriate for farming under controlled conditions. In addition to the food production, coastal aquaculture can generate huge employment opportunities in diversified fields across coastal India, contributing to the coastal folk's nutrition and livelihood security. As a part of agriculture, aquaculture is considered as a high climate resilient activity, which can tide over pandemic situations and economic catastrophe.

For CIBA, prioritized research, human resource development and capacity building are key objectives. To achieve all these objectives, routine farmer interactions, imparting of hands-on, need-based training on various aspects of the aquaculture, technology demonstrations and service supports etc are Important activities of this institute.

The pandemic and lockdown affected all these activities to a greater extent during the first few months of 2020 (from April to June, 2020). "Realizing the importance of our presence and services, we transformed ourselves to the changing situation, and we started working on all the possible modes starting 4th May 2020. Strictly adhering to the COVID guidelines issued by the Government of India, we started functioning and conducted meetings and training through virtual platforms from the office and home.

We produced feeds and seeds with the available infrastructure, staff, and other resources and managed to back up our farmers and other stakeholders in all the possible ways to support and sustain them in the farming. To some farmers, we helped them get their inputs and to some, we helped them to sell their produce by arranging logistics in difficult situations," he said.

The major outcomes of CIBA's recent research works

Breeding of grey mullet in captivity

In a breakthrough, CIBA has successfully bred the Grey Mullet (Thirutha, Madavai), a high-valued commercial brackishwater fish, for the first time in the country, in line with Government of India's push on increasing fish production, under the blue revolution mission. In the CIBA's mission on species diversification and enriching the species basket, this omnivorous species with high market demand has much hope to the farmers, along with the recently added hatchery and farming technology of herbivorous milkfish. These two native fishes can complement each other to drive the Indian blue revolution initiatives forward.

Breakthrough in breeding and seed production of mangrove snapper, another potential candidate to Indian brackishwater farming basket.

In July 2020, a breakthrough was achieved in breeding mangrove red snapper at the fish hatchery, MES, ICAR-CIBA, Chennai, for the first time in this country. Red snapper is a high-value food fish with a premium price in the market, that attains table size within a short period of 6 months; the refinement of technology will open up a new avenue in the brackishwater farming sector.

Whole-genome assembly of Indian white shrimp, *Penaeus indicus*

After the nationwide farming demonstration of shrimp *P. indicus* as a complimentary native of Indian white shrimp species to vannamei, the whole genome with a length of 1.93 GB, nearly 80% of total length, was deciphered, and it is almost close to completion, with bioinformatic analyses. This genome sequence is found to be the best among the crustaceans, including the recently published *Litopenaeus vannamei* genome. This would contribute significantly towards our effort in the flagship program on stock improvement and domestication of Indian white shrimp.

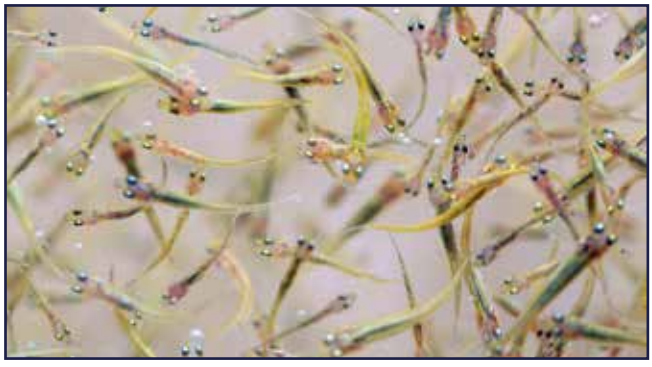
ICAR-CIBA developed and commercialized an indigenous functional aquarium feed "kalorfishPlus":

Considering the potential of the ornamental fish industry and the dominance of Indian aquarium trade by imported feed, CIBA developed aquarium feed with optimum nutrients and functional properties such as enhancement and less nutrient leaching as an import substitute. The feed is branded as "kalorfishPlus" and commercialised, and made available to aquariculturists.

Harvest of seabass farmed using formulated pelleted feed in compact open water cages

Indian white shrimp: a native shrimp species which could be a substitute for Pacific white-leg shrimp

Captive bred green chromide (Etroplus suratensis) for generations: a potential brackishwater fish having both food and aquarium importance



CIBA, a pioneer in the breeding of milkfish in India under captive conditions

Seabass – a high vale farmed seafood proven to be ideal for family farming models in brackishwater

Captive-bred Silver moony (Monodactylus argentius), a premium brackishwater ornamental fish

Comparison of farmed Indian white shrimp and Pacific white leg shrimp

Disease Issues

CIBA-PARACIDE for treatment of parasitic infestations in food and ornamental fishes.

Parasitic infestations are a challenging issue in achieving optimal production in both food and ornamental fish farming. CIBA has developed an anti-parasitic formulation, CIBA-PARACIDE, for oral application. CIBA-PARACIDE is effective in the treatment of *Argulus* spp., *Caligus* spp., *Lernanthropsis* spp., *Lernaea* spp. in Asian seabass, pearlspot, grey mullet, rohu, catla, gold fish and koi carp.

CIBA developed an indigenous vaccine against viral nervous necrosis (VNN) infecting Asian seabass

Viral nervous necrosis (VNN) is an acute viral disease affecting more than 120 species of marine, brackishwater and freshwater fish causing up to 100% mortality in larval and juvenile fishes. ICAR-CIBA has developed a vaccine against VNN. This vaccine can be used to immunize broodstock and fingerlings to prevent VNN outbreaks and vertical transmission of the virus.

Besides research in brackishwater aquaculture, human resource development, capacity building, skill development is one of the prime mandates of the institute. CIBA regularly conducts training programme for farmers and other stakeholders of the sector in areas of hatchery technology, seed production, feed processing and feed management, disease prevention and its management, soil and water quality testing and maintenance. These programmes are designed in such a manner of 60 per cent practical sessions and 40 per cent theory sessions and are being conducted at CIBA HQ Chennai, MES Muttukadu, KRC Kakdwip and NGRC Navsari. In addition to these regularly scheduled trainings, need-based training programmes on specific thematic areas for State Department Officials, Entrepreneurs and other stakeholders are also organized.

CIBA also organizes off-campus short training programmes in aqua farmers fields as a part of skill development-based field demonstrations. HRD Unit of CIBA takes care of the Educational Activities of Aquaculture Students, who are permitted to pursue their higher studies on various disciplines from recognized Universities. The institute provides all the laboratory and field facilities for their experiments and CIBA Scientists acts as guiding faculty for getting their Post Graduation and Doctoral Degree. CIBA Extension Programmes are multi-faceted like ICT based CIBA Shrimp App, Farmers Field School, field demonstrations, organization of training programmes, participation in exhibitions, writing of popular articles in regional languages in magazines and newspapers,

Cost-effective indigenous shrimp feed Vanami plus

CIBA Paracide – an indigenous drug formulation for external fish parasites

CIBA Nodavac-R - an indigenous vaccine for VNN virus infecting fish

TV and Radio programmes etc.,"Along with species diversification, farming system diversification is one of the prime mandates of CIBA considering the species diversity and diverse feeding habits of the candidate species of brackish waters. Though majority of the shrimps are reared in pond based rearing system, considering the biological requirement species, resource availability and its judicious utilization and energy use, CIBA developed, tested and demonstrated diversified farming systems such as cages, RAS, improved pond based farming, biofloc based farming, IMTA and poly farming systems across the nation intending to increase the seafood production and double the farmers income," said Dr. K K Vijayan.

CIBA has a vision and plans for the horizontal expansion of the brackish water aquaculture considering the underutilized resources and the increasing demand for nutritionally rich seafood for the man's platter. Our efforts are supported with an experimental field station at Muttukadu, a backwater zone of the Bay of Bengal, and two strategically placed regional research centers. One at Kakdwip (CIBA-KRC), famous for the delta region called the Sundarban, in West Bengal and another at Navsari (CIBA-NGRC), Gujarat, in the west coast. The plan would be developing partnership with the state governments, other govt agencies and private sector, where CIBA would be able to provide technology backstopping.

Launching of the Deep Sea Survey Programme

India launches deep sea survey programme for marine mammals

CIFNET, FSI, MPEDA and CMFRI officials during Flag off ceremony of FSI MFV Lavanika

The United States has been one of the most important seafood markets of India for the past few years. India has exported 41,564 MT of wild caught marine products worth Rs. 2, 298.09 Cr (USD 329.73 million) to the US in 2019-20. For this reason, any change in the US' seafood trade norms will impact India's marine exports. Recently, the US has come out with a new regulatory programme under the Marine Mammal Protection Act (MMPA), which will come into force by January 2023.

As per the provisions of MMPA, the exporting countries must develop an appropriate regulatory programme comparable in effectiveness to the USA for reducing marine mammal by-catch and shall submit comparability findings before the deadline of 1st November 2021.

FSI MFV Lavanika

Shri .K.S Srinivas IAS, Chairman MPEDA, in MFV Lavanika

Shri. K.S Srinivas IAS, Chairman MPEDA & Dr. A Gopalakrishnan, Director, CMFRI in MFV Lavanika

Shri. K.S.Srinivas IAS, Chairman MPEDA flagged off the sailing along with Dr. A Gopalakrishnan, Director, CMFRI, Dr. L Ramalingam, Director General, FSI.

Sensing the urgency of the situation and its serious impact on our seafood trade with the US, MPEDA has entrusted CMFRI for initiating the study on the "Assessment of marine mammals stock and by-catch of marine mammals and sea turtles". The stock of marine mammals will be estimated based on the Visual Surveys – by the way of estimation of marine mammals abundance through explanatory cruises & Line Transect sampling and Acoustic surveys and also through passive acoustic monitoring along the Line Transect survey using towed hydrophone array.

MPEDA, CMFRI and FSI jointly launched the deep sea survey programme on 22nd February 2021 by using the FSI MFV Lavanika at FSI-MED Jetty, Ernakulam District, Kerala. Mr. K.S.Srinivas IAS, Chairman, MPEDA flagged off the survey vessel along with other dignitaries including Dr. A Gopalakrishnan, Director, CMFRI and Dr. L Ramalingam, Director General, FSI.

This marine mammal survey would facilitate conservation and protection of marine mammals, uninterrupted export of the seafood and enhancing the livelihood of Indian fishers.

Marine Fish Landings: Mackerel tops the list of highest caught fishery items

Dr. Joice V. Thomas & Dr. Afsal V.V. MPEDA-NETFISH

NETFISH collects the details of boat arrivals and marine fish landings occurring at selected major harbour/landing centres in the 9 coastal states of India and a database on this is being maintained to facilitate the Catch certification scheme of MPEDA. The number of boat arrivals and the quantity of various fishery items landed at these harbours are collected on a daily basis by the Harbour Data Collectors. This report gives the species wise, harbour wise and state wise trend of marine landings at 95 harbours during the month of February 2021.

I. ESTIMATION OF FISH LANDINGS

Marine fish landings reported from 95 selected harbours in February 2021 totalled 59679.21 tonnes, of which the Pelagic finfish resources contributed the highest share of 46% (27236.13 tonnes). It was followed by the Demersal finfishes with 31% share (18464.82 tonnes), Crustaceans with 12% share (7453.75 tonnes) and Molluscs with 11% share (6524.52 tonnes) (Fig.1).

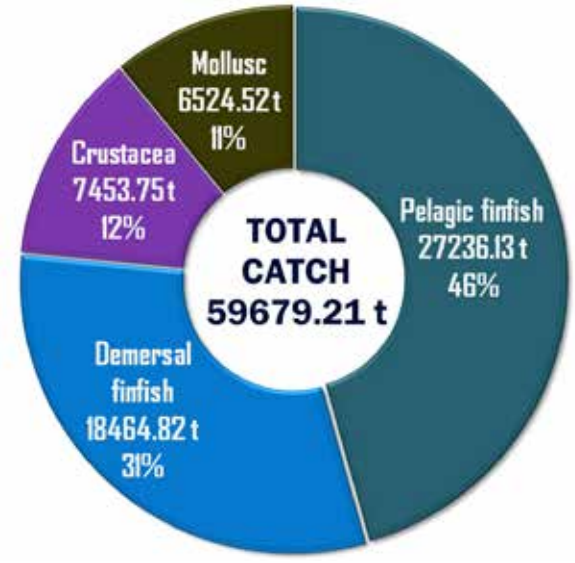


Fig.1. Catch composition of marine landings recorded in February 2021

Landings of about 270 species of marine fishery items were recorded from the harbours, among which the highest five contributors were *Rastrelliger kanagurta* (Indian mackerel), *Nemipterus japonicus* (Japanese threadfin bream), *Katsuwonus pelamis* (Skipjack tuna), *Johnius* Spp. (Croaker) and *Lepturacanthus* Spp. (Ribbon fish) (Table 1).

Table. 1 Major fish species landed during February 2021

Sl. No:	Common name	Scientific name	Qty. in tonnes
1	Indian mackerel	*Rastrelliger kanagurta*	4818.00
2	Japanese threadfin bream	*Nemipterus japonicus*	2738.79
3	Skipjack tuna	*Katsuwonus pelamis*	2607.14
4	Croaker	*Johnius* Spp.	2031.25
5	Ribbon Fish	*Lepturacanthus* Spp.	1962.13

Whereas, considering various groups of fishery items landed, the top five contributors were Tunas, Coastal shrimps, Indian Mackerel, Croakers and Squids which together formed 38 % of the total catch (Fig 2).

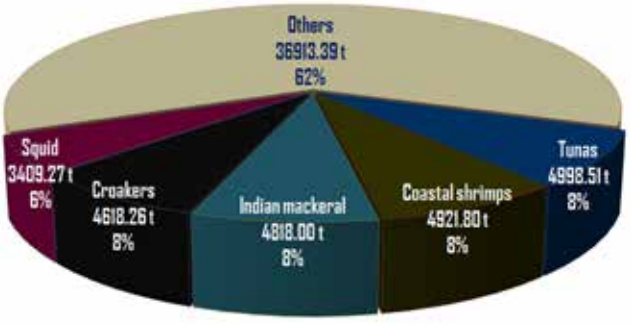


Fig. 2 Major fishery items landed during February 2021

Table 2 presents the total catch quantity of various categories of fishery items recorded during February 2021. Among the Pelagic finfish resources, Tunas & Indian mackerel were the major contributors whereas among Demersal finfishes, the major contributors were Croakers & Japanese Threadfin breams.

About 66% of the Crustacean catch was comprised of different species of Coastal shrimps, among which the highest landed species were *Parapenaeopsis stylifera* (*Karikkadi* shrimp) (18%) and *Metapenaeus dobsoni* (*Poovalan* shrimp) (12%). Squids and Cuttle fishes were the major Molluscan varieties landed during the period.

Table 2. Category-wise landing of various fishery items during February 2021

FISHERY ITEM	QTY. IN TONNES	% OF TOTAL CATCH
Pelagic Finfishes		
Tunas	4998.51	8.38
Indian mackerel	4818.00	8.07
Anchovies	3349.93	5.61
Ribbon fish	3160.25	5.30
Scads	2595.72	4.35
Lesser sardines	1590.09	2.66
Shad	1186.26	1.99
Bombay duck	1173.72	1.97
Indian oil sardine	1111.96	1.86
Seer fish	942.25	1.58
Sailfish	347.68	0.58
Barracudas	279.03	0.47
Mahi mahi	273.68	0.46
Swordfish	256.59	0.43
Mackerel	199.76	0.33
Trevally	157.07	0.26
Marlins	132.09	0.22
Herrings	130.66	0.22
Needlefish	124.51	0.21
Mullets	110.13	0.18
Indian salmon	104.26	0.17
Cobia	62.64	0.10
Queen fish	61.85	0.10
Flying fish	50.50	0.08
Milk fish	7.70	0.01
Sea bass	7.37	0.01
Half beaks	3.54	0.01
Wahoo	0.21	0.00
Pompano	0.19	0.00
Total	27236.13	45.64

Demersal Finfishes		
Croakers	4618.26	7.74
Japanese threadfin bream	2738.79	4.59
Catfishes	1808.76	3.03
Lizard fish	1579.32	2.65
Sole fishes	1142.53	1.91
Reef cods	1074.85	1.80
Pomfrets	1016.44	1.70
Sea breams	755.35	1.27
Bullseyes	623.84	1.05
Moon fish	487.30	0.82
Goat fishes	484.20	0.81
Leather jacket	390.57	0.65
Sharks	320.44	0.54
Pony fishes	222.73	0.37
Eels	193.57	0.32
Rays	184.25	0.31
Snappers	178.55	0.30
Rabbit fishes	174.52	0.29
Flat head	121.40	0.20
White fish	107.74	0.18
Indian threadfin	48.99	0.08
Perches	28.45	0.05
Emperor bream	22.58	0.04
Halibut	20.42	0.03
Silverbelly	20.23	0.03
Threadfish	19.39	0.03
Silver biddies	14.09	0.02
Whitings	12.85	0.02
Jobfish	12.72	0.02
Trigger fishes	11.92	0.02
Sweet lip	9.37	0.02
Groupers	7.17	0.01
Surgeonfish	6.82	0.01
Parrot fish	3.83	0.01
Sickle fish	1.66	0.00
Spade fish	0.74	0.00
Pony fish	0.21	0.00
Total	18464.82	30.94
Crustaceans		
Coastal shrimps	4921.80	8.25
Deep sea shrimps	1569.29	2.63
Crabs	926.38	1.55
Lobsters	36.28	0.06
Total	7453.75	12.49
Molluscs		
Squid	3409.27	5.71
Cuttlefish	2825.77	4.73
Octopus	287.97	0.48
Whelk	1.51	0.00
Total	6524.52	10.93
TOTAL CATCH	**59679.21**	**100.00**

Harbour-wise landings: The total landings reported from each of the selected harbour during the month are given in Table 3. Of the 95 harbours, the New Ferry Wharf harbour in Maharashtra recorded the maximum fish landing, to the tune of 5399.71 tonnes (9%). It was followed by the

Porbandar and Okha harbours in Gujarat with 4061.52 tonnes (7%) and 3368.09 tonnes (6%) respectively. The least quantity of landing was reported from Jagathapattinam harbour in Tamil Nadu (11.47 tonnes).

Table 3. Harbour-wise catch quantity & boat arrivals during February 2021

State	Harbour	Catch Quantity (tonnes)	Boat arrivals (nos.)
West Bengal	Petuaghat Deshpran	1315.50	431
	Digha Sankarpur	1102.69	399
	Namkhana	926.40	286
	Raidighi	843.31	271
	Fraser Ganj	695.11	379
	Kakdwip	340.84	222
	Soula	268.02	121
Odisha	Paradeep	1521.63	321
	Balaramgadi	639.96	288
	Bahabalpur	363.69	149
	Dhamara	281.31	103
	Balugaon	114.36	487
Andhra Pradesh	Visakhapatnam	1209.75	325
	Nizampatnam	460.49	132
	Kakinada	433.55	219
	Vodarevu	350.43	410
	Machilipatnam	271.72	141
	Pudimadaka	138.35	102
Tamil Nadu & Pondicherry	Chennai	1781.65	393
	Nagapattinam	1246.18	491
	Karaikal	1013.02	336
	Tharuvaikulam	955.85	224
	Thengaipat-tinam	572.65	451
	Colachel	263.25	175
	Yanam	241.97	169
	Pazhayar	210.91	432
	Pondicherry	164.16	162
	Poompuhar	80.48	300
	Tuticorin	80.43	246
	Cuddalore	80.35	371
	Mudasalodi	62.32	231
	Chinnamuttom	56.01	294
	Kodiyakarai	51.89	391
	Rameswaram	49.40	139
	Mandapam	38.82	173
	Mallipatnam	26.74	187
	Pulicat	22.91	426
	Kottaipatnam	13.53	84
	Jagathapathi-nam	11.47	84
Kerala	Thoppumpady Cochin	1892.89	386
	Sakthikulan-gara	1479.32	919
	Munambam	1064.48	704
	Neendakara	622.03	595
	Beypore	526.71	362
	Vypin	321.69	209
	Chellanam	165.91	355
	Puthiyappa	136.05	102
	Azheekkal	131.63	274
	Kayamkulam	128.63	159

	Ponnani	98.25	229
	Cheruvathur	64.66	215
	Thangassery	58.74	243
	Mopla Bay	45.72	274
	Munakkadavu	36.34	163
	Thottappally	32.29	156
	Vaadi	30.18	278
	Chettuva	18.09	116
	Koyilandi	16.93	168
	Vizhinjam	16.52	260
Karnataka	Malpe	1884.43	914
	Honnavar	1867.05	458
	Mangalore	1595.49	689
	Amdalli	277.99	164
	Karwar	262.67	352
	Belekeri	179.75	107
	Bhatkal	165.34	318
	Gangolli	159.85	409
	Tadri	129.10	173
Goa	Malim	1001.00	432
	Cutbona	864.00	253
	Vasco	244.28	189
	Chapora	30.42	289
Maharashtra	New Ferry Wharf	5399.71	815
	Sasoon Dock	1775.10	560
	Ratnagiri	1444.55	423
	Sakharinate	351.13	224
	Harne	350.92	610
	Satpati	336.13	181
	Arnala	303.49	190
	Alibagh Koliwada	177.56	335
	Uttan	136.96	79
	Versova	113.85	120
	Onni Bhatti Dabhol	104.71	297
	Malvan	98.78	390
	Taramumbari Devgad	60.97	358
	Vasai	60.59	64
	Dahanu	33.34	160
Gujarat	Porbandar	4061.52	1631
	Okha	3368.09	959
	Veraval	3073.68	1983
	Mangrol	2174.58	1564
	Vanakbara	1304.80	776
	Jafrabad	751.56	290
	Kotada	173.97	86
	Chorwad	173.80	635

State-wise landings: Among the 9 coastal states, Gujarat with a share of 25% reported the highest marine landings during February 2021, which was to the tune of 15082.00 tonnes (Fig.3). Maharashtra took the second position with a contribution of 10747.77 tonnes (18%). Tamilnadu & Pondicherry together held the third position with a total landing of 7023.98 tonnes (12%). The least marine landing during the period was reported in Goa, with 2139.69 tonnes (4 %).

Fig.3 State-wise fish landings (in tonnes) during February 2021

II. ESTIMATION OF BOAT ARRIVALS

In February 2021, a total of 34189 nos. of boat arrivals were recorded from the 95 harbours. State wise figures for the month (fig. 4) shows that the highest number of boat arrivals occurred in Gujarat (23%) and then in Kerala (18%) and Tamil Nadu & Pondy (17%). The harbour wise details of boat arrivals are given in table 3. The highest recording was from Veraval (1983 nos.), Porbandar (1631 nos.) and Mangrol (1564 nos.) harbours in Gujarat. The Vasai harbour in Maharashtra is the last in the list with only 64 nos. of boat arrivals.

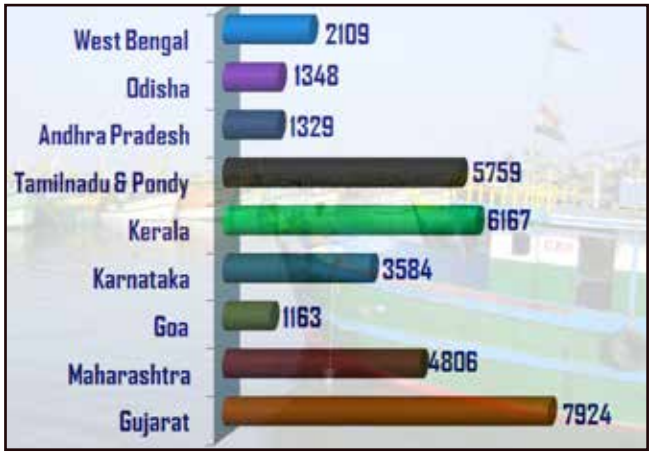


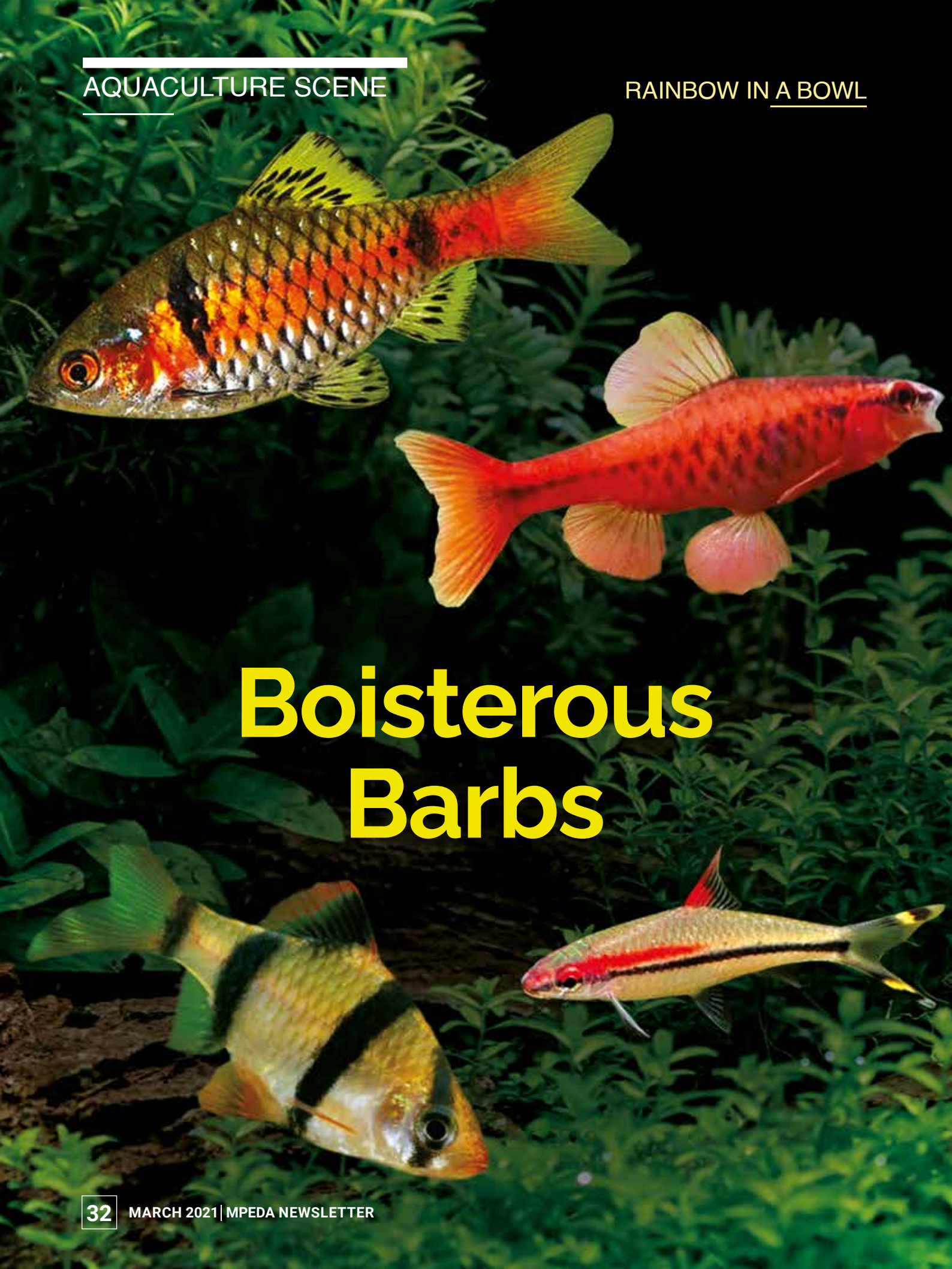
Fig.4 State-wise boat arrivals (nos.) during February 2021

Summary: In February 2021, a total of 59679.21 tonnes of marine fish landings and 34189 nos. of boat arrivals were reported from 95 major fish landing sites of India.

A dip by around 9500 tonnes was observed in the catch landing, when compared to January 2021 and the number of boat arrivals had registered a decrease by more than 3700 numbers.

The Pelagic finfishes continued to be the major contributors to the total landings and the Indian mackerel maintained its 1st position of the most landed fish species for the month. However, the Tunas had registered as the most landed fishery item for the month.

As in the previous month, the state of Gujarat and the New Ferry Wharf harbour in Maharashtra continued in the first position in terms of total quantity landed. In the case of number of boat arrivals, the Gujarat state and the Veraval harbour in the state continued in the prime position with most number of boat arrivals.



Boisterous Barbs

V. K. Dey

V K Dey has over three decades of experience in diverse sectors of seafood industry in Asia-Pacific region. He was the Deputy Director of MPEDA and then associated with INFOFISH, Malaysia. As part of INFOFISH, he was involved in several studies related to seafood industry in the Asia-Pacific region and beyond, including setting up of Aqua-technology Park for ornamental fish. MPEDA has published Living Jewels, a collection of his articles on ornamental fish.

Barbs, members of the Cyprinidae family, comprise more than 400 species in their entire range, which extends from Africa, Asia and Europe to Central China, the Philippines and the East Indies. Barbs are not recorded from Australia and South America.

About 150 species of barbs are of ornamental value, comprising mostly wild caught varieties. The majority of them are omnivorous, thus accounting for their wide geographical distribution. In all species of barbs, the body is covered with relatively large scales while the head is without scales. Most of the barbs prefer soft water with neutral pH and are egg layers.

They are active and peaceful and the majority of them can be bred in captivity. The eggs of the barbs are spawned at random among or above aquatic plants and either sink or stick to the plants. The eggs usually hatch within 2 to 3 days and the young ones then hang vertically from the plants or other objects. The young ones are nourished by the contents of their yolk sac. Some barbs lay their eggs on the muddy substrate. Many of the barbs are very attractive and popular among hobbyists as they are hardy, and easy to breed in aquarium conditions. Barbs require high dissolved oxygen levels, hence they cannot be crowded. The other water parameters required are pH 6.5, hardness 10 dGH and temperature, 18° – 22°C.

Tiger barb (*Barbus tetrazona*), Rosy barb (*B conchonius*) and Cherry barb (*Puntius titteye*) are the most common barbs in the aquarium industry. The Tiger barb, a native of Sumatra and Borneo in Indonesia, has a laterally compressed body about 6 cm long. The basic colour of the body is silvery-white with a brownish upper part of a green sheen. The tiger barb is characterised by four bluish black vertical bands running across the body. The dorsal fin has a black base with a reddish fringe while the pectoral fin is reddish and the snout has a reddish tinge. The red pigmentation is less prominent in the female.

The wild form is known as a black variety. Today, several varieties of tiger barbs are cultured through cross breeding. Black pigmentation is completely reduced in the gold variety and the fish is orange-gold in colour with four white coloured bands while the moss green variety has a deep green coloured body with four dark bands. There is a mutant variety called ghost, wherein the tiger barb has become 'transparent' so that blood vessels in the gills and internal organs are visible. Black, gold and moss green varieties of ghost are also now available in the market.

The Rosy barb is another popular aquarium fish which originates from West Bengal, India. It is red (male) and yellow (female) in colour with black spots near the rear and on the dorsal fin. Rosy barbs are schooling fish. The red or rosy colour intensifies during spawning. Sexing is easy. Females are often the smaller of the pair and wider. Aquarists and commercial breeders are culturing many very colourful variants of Rosy barb today. The Cherry barb, a native of Sri Lanka, is a peaceful loner fish that does not prefer to school with its own kind. During spawning, the male becomes bright red.

Wild caught varieties of barbs includes Sophores barb (*P sophore*), Terry barb (*P terio*), Tic-Tac-Toe barb (*P ticto*), Shalini barb (*P shalynius*), Denison barb (*P denisoni*), Aruli barb (*B arulius*), Melon barb (*P melanampyx*), Sahyadri barb (*P sahyadri and P narayini*) etc. Attempts are being made to breed a few varieties of wild barbs in captivity such as melon barb and denison barb. While breeding in captivity has been successful in melon barb, breeding of denison barb has ended up with spawning problems.

MPEDA, NCDC join hands for promotion of export-oriented fisheries

Shri. K. S Srinivas IAS, Chairman MPEDA and Shri. Sundeep Kumar Nayak, Managing Director, NCDC exchanging the MoU in the presence of Dr. M Karthikeyan, Director and Shri. K. S Pradeep IFS, Secretary MPEDA.

The Marine Products Export Development Authority (MPEDA) and the National Cooperative Development Corporation (NCDC) has signed a Memorandum of Understanding (MoU) for the promotion of export-oriented capture and culture of fisheries and allied sectors. Both the organizations will synergise their programmes to boost export-oriented fisheries and bring better value to the stakeholders. The MoU was signed by Shri K.S. Srinivas IAS, Chairman, MPEDA and Shri Sundeep Kumar Nayak, Managing Director, NCDC at Kochi, Kerala on 22nd February 2021.

Signing the MoU, Mr. Srinivas said both the parties have identified ample scope for working jointly in the interest of export promotion of marine products for bringing better value to the stakeholders through a variety of activities, including export focus, in line with the policies of the government.

Some of the areas jointly identified but not limited to, are mentioned below:

a) MPEDA & its Societies (NETFISH, NaCSA & RGCA) and NCDC will jointly formulate programmes to provide technical knowhow to cooperatives to upscale infrastructure created for primary production and post harvest management in the marine products export sector.

b) MPEDA and its societies shall share a list of all clusters in various states with NCDC who may approach the clusters for achieving scale and aggregation with export orientation. MPEDA would facilitate exports by the cooperatives assisted or identified by NCDC.

c) MPEDA & its Societies and NCDC would jointly

work towards capacity development of various stakeholders.

d) MPEDA & its Societies and NCDC would jointly come towards organizing outreach programs, awareness programs and workshops for stakeholders.

e) MPEDA & its Societies and NCDC would jointly work together to showcase to the Indian and Global Market, the products, technologies, processes, knowledge and services by the stakeholders through a variety of modes as may be identified by them from time to time.

f) MPEDA & its Societies and NCDC would jointly work together to achieve the goal of Doubling the Farmers' Income as set out by the Government.

g) MPEDA & its Societies and NCDC will jointly work together and make all out efforts toward achieving the export target sets by the government.

h) Expenses towards implementation of aforementioned areas and cooperation will be met by NCDC and MPEDA & its Societies through respective enabling provisions of their financial assistance schemes.

Both the parties also agreed to the setting up of a Joint Coordination Committee (JCC) composed of representatives from MPEDA and NCDC. The terms of reference of this Committee would be to plan, monitor and oversee the activities under this MoU in accordance with the schemes and programmes of the parties.

JCC will meet at least once in a quarter and periodically monitor and review the progress.

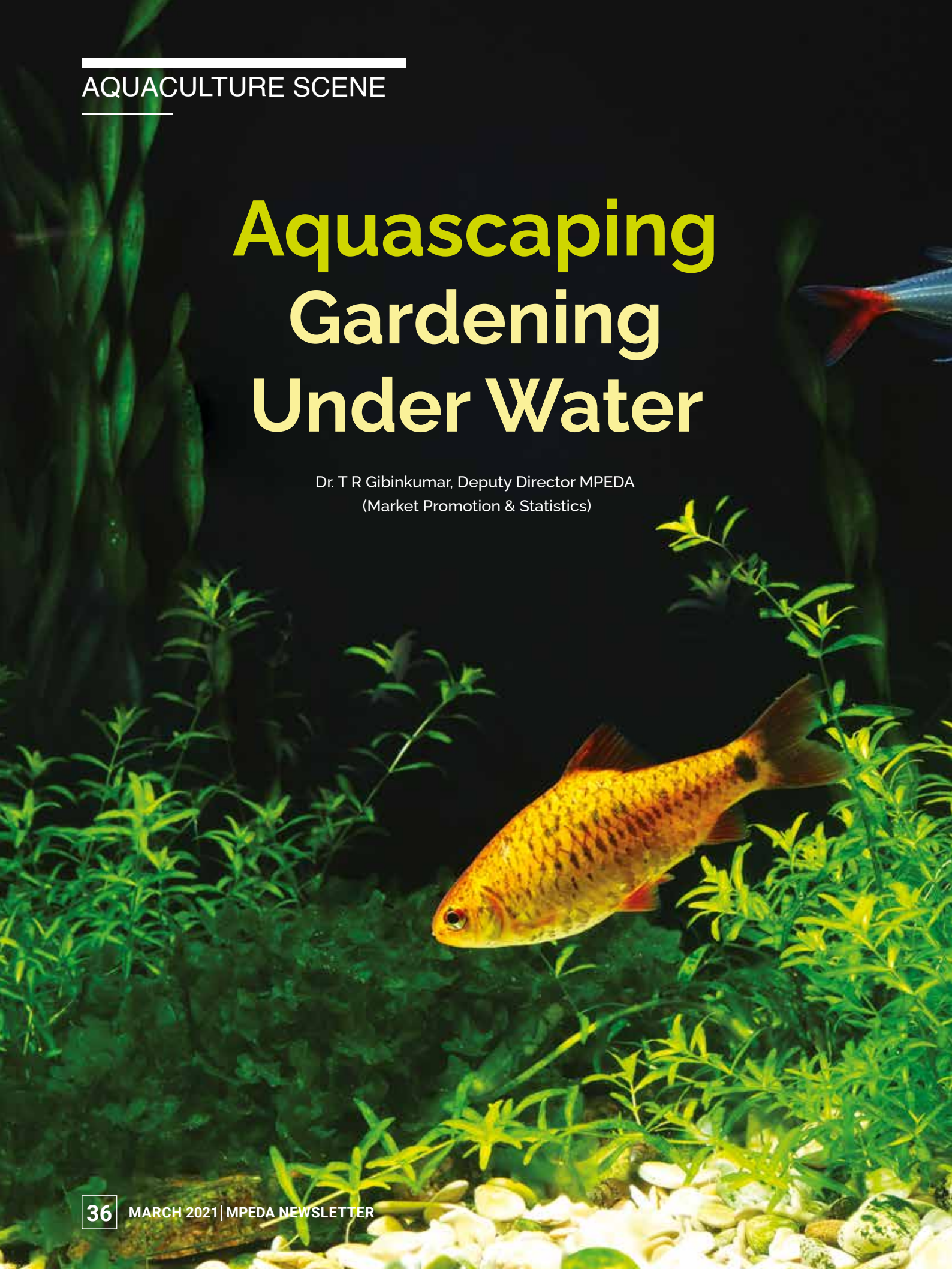
MPEDA and NCDC will nominate Nodal Officers for managing and implementing the decisions of JCC and the objectives of this MoU.

About NCDC

NCDC is a development finance institution set up by the Govt. of India for planning and promoting programmes for the production, processing, marketing, storage, export and import of agricultural produce, foodstuffs, industrial goods, and livestock on cooperative principles.

Aquascaping Gardening Under Water

Dr. T R Gibinkumar, Deputy Director MPEDA
(Market Promotion & Statistics)



Aquascaping is the craft of arranging aquatic plants, as well as rocks, stones, cavework, or driftwood, in an aesthetically pleasing manner within an aquarium. In other words it is easily described as gardening under water. Aquascape designs include a number of distinct styles, including the garden-like Dutch style and the Japanese-inspired nature style. Typically, an aquascape houses fish as well as plants, although it is possible to create an aquascape with plants only, or with rockwork or other hardscape and no plants. Aquascaping is done in both freshwater and marine aquariums.

Aquascape

Many aquarists believe that the art of aquascaping began in the 1930s in the Netherlands following the introduction of the Dutch style aquascaping techniques. With the increasing availability of mass-produced freshwater fish keeping products and popularity of fish keeping following the First World War, many artists began exploring the new possibilities of creating an aquarium that didn't have fish as the main attraction.

Although the primary aim of aquascaping is to create an artful underwater landscape, the technical aspects of tank maintenance and the growth requirements of aquatic plants are also taken into consideration. Many factors must be balanced in the closed system of an aquarium tank to ensure the success of an aquascape. These factors include filtration, maintaining carbon dioxide at levels sufficient to support photosynthesis underwater, substrate and fertilization, lighting, and algae control.

Major Components of an Aquascape

While some aquarists maintain aquaria with minimal or no decoration, these are often

breeding tanks or tanks for growing out fry. Most fish, however, do not show their best colours and behaviour when kept in bare tanks, where they feel exposed.

Live vs. Artificial Plants

Plants serve two main functions in the aquarium: aesthetics for the aquarist and habitat for the fish. If you are happy with plastic plants, your fish will be too. Live plants will remove some wastes from the water, but dead leaves add to the bioload. Artificial plants don't reproduce, but they also don't grow and change your aquascape over time like live plants will. Live plants will be preferred by your fish if they are herbivorous and for a fish that like to eat plants will find the artificial ones a very poor substitute!

Aquascape with drift woods

Coral

Live coral and other invertebrates are the basis of a reef aquarium, and keeping such creatures alive and healthy can be an extremely rewarding experience. There are also many artificial corals that are extremely lifelike, enabling you to decorate a marine aquarium without the high-tech equipment necessary to keep reef animals alive. These artificial corals can be safely used in freshwater tanks as well, if you are so inclined.

Other Decorative Items

A variety of natural objects and artificial ornaments can bring beauty to your aquarium and habitat to your fish. Natural or fake, fish take security in and around these items. Rocks are the common decorative item used for aquascaping. Many fish enjoy hiding in caves and crevices in rock structures.

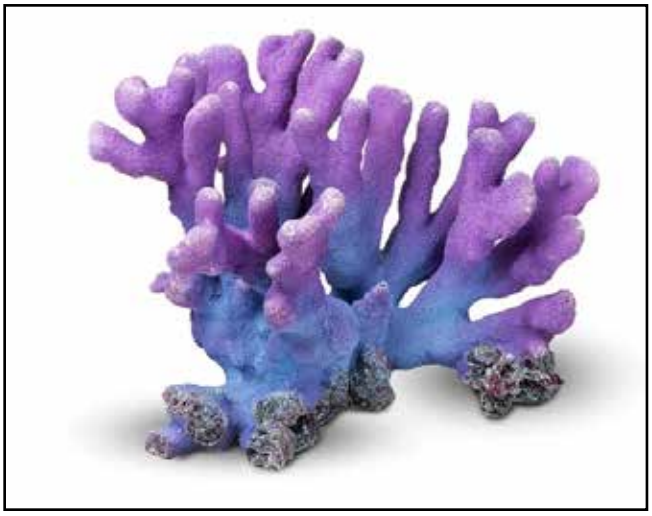
Non-soluble rocks do not alter the water chemistry and include slate, shale, quartz, and others. Soluble rocks like coral rock, limestone, and lava rock slowly dissolve in the water, raising pH and hardness. These are great for marine setups or high-pH freshwater systems.Driftwood is also commonly used by aquascapists. Like some rocks, driftwood will leach substances (often resins) into the water, but in this case they soften the water and lower the pH.

Boiling of driftwood before using in tanks can reduce the leaching of resins in to the system. A few species of catfish require wood in their diet and will graze on driftwood. Different kinds of artificial Ornaments resembling both rocks and driftwood are available in plastic imitations, but there are thousands of more fanciful decorations available as well, many of which include holes and caverns in which fish can hide. Everything from fairyland castles to sunken ships to human skulls

Drift wood

Gravels

Artificial plants



Coral

are available for those who like a less natural-looking, more personalized aquascape.

Gravel

Only a few types of fish require a substrate, such as species that bury themselves in the sand. Most people, however, prefer the look of sand or gravel. While many hobbyists insist on natural gravel, there are gravels available in a rainbow of colors, including some neon hues. Your fish will not care which you choose; there are, however, several factors you should keep in mind when choosing your aquarium's substrate.

There are soluble and insoluble sands and gravels. Crushed coral and crushed limestone will dissolve, raising the hardness and pH, as well as increasing the buffering capacity of the water. These are used in marine setups and with fishes like African Rift Lake cichlids. Insoluble quartz or granite are inert and can be used in any system.

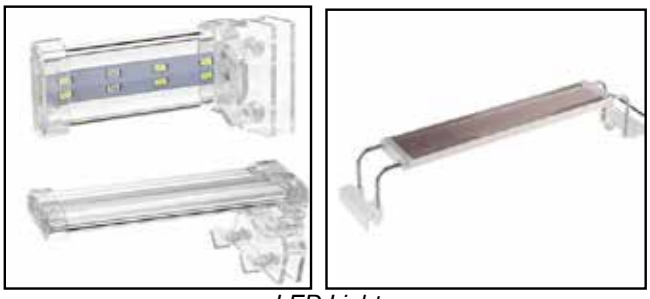
Sand is preferred by a few species of sand-sifting fishes, and some aquatic gardeners like sand for their planted tanks. But in general, a medium-grain gravel is best for your aquarium. Fine sands can develop anaerobic (low-oxygen) zones that can be dangerous, and coarse gravel will trap uneaten food and other debris in the large spaces; small fish can even become entrapped.

Many aquarium gravels are now sealed with epoxy. This waterproof coating eliminates the dust normally associated with gravels, and it ensures that the gravel is inert and will not leach chemicals into the water. Such substrates can be used in any type of setup.

Maintenance of Aquascapes

In addition to design, freshwater aquascaping also requires specific methods to maintain healthy plants underwater. Plants are often trimmed to obtain the desired shape, and they need be positioned inconspicuously with thread or lead weights. Most serious aquascapers use aquarium-safe fertilizers, commonly in liquid or tablet form, to help the plants fill out more rapidly. Some aquarium substrates containing laterite also provide nutrients.

It is also necessary to support photosynthesis, by providing light and carbon dioxide. A variety of lighting systems may be used to produce the full spectrum of light, usually at 2–4 watts per gallon (0.5–1 watts per litre). Lights are usually controlled by a timer that allows the plants to be acclimated to a set cycle.Depending on the number of plants and fish, the aquascape may also require carbon dioxide supplementation. This can be accomplished with a simple homemade system, using a soda bottle filled with yeast, warm water, and sugar, and connected to an air stone in the aquarium, or with a pressurized CO_2 tank that injects a set amount of carbon dioxide into the aquarium water.Algae (including cyanobacteria, as well as true algae) is considered distracting and unwanted in aquascaping, and



LED Light

Power Filter with sponge *Canister filter*

CO2 System *Fertilizers*

is controlled in several ways. One is the use of animals that consume algae, such as some fish (notably cyprinids of the genera *Crossocheilus* and *Gyrinocheilus*, and catfish of the genera *Ancistrus*, *Hypostomus*, and *Otocinclus*), shrimp, or snails, to clean the algae that collect on the leaves. A second is using adequate light and CO2 to promote rapid growth of desired plants, while controlling nutrient levels, to ensure that the plants utilize all fertilizer without leaving nutrients to support algae.Although professional aquascapers often use a considerable amount of equipment to provide lighting, filtration, and CO2 supplementation to the tank, some hobbyists choose instead to maintain plants with a minimum of technology, and have reported success in producing lush plant growth this way.

This approach sometimes called the "natural planted tank" can include the use of soil in place of aquarium gravel, the elimination of CO2 apparatus and most filtration, and limited lighting. Instead, only a few fish are kept, to limit the quantity of fish waste, and the plants themselves are used to perform the water-cleansing role typically played by aquarium filters, by utilizing what fish waste there is as fertilizer.

Recommended Fish for Your Aquascape Aquarium

When it comes to aquascaping, getting the right type of fish is a delicate choice, because there are many factors that need to be taken into consideration. There is no specific rule, but due consideration to be given to their behavior, breeding cycles, swimming habits and so on. As a thumb rule, big fishes that would disturb the aquascape settings need to be avoided.

Herbivorous fishes that tend to eat and uproot plants must not be kept in aquascapes. Fishes that build nests by digging the substrate, like many cichlids also will spoil the settings. The most common types of fish are small and usually schooling (tetras, rainbow fish, gouramis and others) because they have nice bright colours and they make the tank look bigger.

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Role Of Different Microbial Community for Sustainable Development Goals In Biofloc Technology

[1]G. Ganesh*, [2]O. Gopi Krishna, [3]Md. Saleha
[1]Ph.D research scholar, college of fishery science, Muthukur, Andhra Pradesh, India
[2]Research scholar, college of fisheries, Rangeilunda, Odisha, India
[3]VFA, Krishna dist, Andhra pradesh, India.
*Email: gugulothuganesh007@gmail.com

Introduction

Biofloc is a waste treatment system at its best way of converting organic matter to useful nutrients for fish consumption. It is developed to enhance environmental control over production. Moreover intensification in aquaculture must be practiced for cost-effective production in some places where there is a limited land and water resources. The high stocking density production of fish typically requires wastewater treatment facilities. The nutrient utilization should be more efficient by re-utilizing the nutrients from unconsumed feed, the digestion and metabolic processes of feed, if not they will be toxic to fishes in the form of ammonia which alters the water quality indirectly affecting growth and health of fish in ponds. The safety range of ammonia nitrogen (NH3-N) should be below 0.8-2.0 mg N/L in tanks for growth of fish. The quality of feed required for the fish is more expensive to the farmers. Limiting the expenses more efficiently for feed and resources in aquaculture business would be more profitable to farmers.

Aquaculture as a food producing industry yields better opportunities to reduce poverty, hunger, malnutrition and helps to increase the economic growth. The lack of nutrients that engender malnutrition can be eliminated by consuming fish which is rich in vital macro and micronutrients. Indian fisheries are increasingly contributing to the nutritional security of the country. According to annual reports of the Department of fisheries, India's production of fish during 2018-2019 is estimated to be 13.75 *mmt*, of which nearly 70% (9.58 *mmt*) is from inland sector and rest is from marine sector. Of the 9.58 *mmt* from the inland sector, about 50 % of total production is from culture fisheries. It is estimated that India's population holds a share of 17.7 % in world population according to UN data and holds only 2.5 percent of the world's land area and 4 percent of the world's freshwater resources at its disposal. In India very few aqua-farmers are producing the fish using advanced culture techniques like Biofloc, RAS (Recirculatory aquaculture system), Raceways, IPAT (intensive pond aquaculture technologies) or IPRS (intensive pond aquaculture systems), Cage cultures, mono-sex culture and Aquaponics. There is a need for sustainability in aquaculture practices over the country for the production of well organized and cost-effective techniques for human utilization and conserving the water bodies with less or zero environment pollution and well being in-terms of socio-economic indices. Biofloc technology mainly portrays the importance of Heterotrophic bacteria, which metabolize carbohydrates and consume inorganic nitrogen (principally ammonia $NH4^+$), into useful microbial mass for fish nutrient utilization. It is a low water exchange system with high stocking densities. The heterotrophic bacteria in water reduces ammonia levels through assimilation when providing bacteria with required amounts of carbon source in water like molasses, jaggery, starch etc.

Biofloc Setup with Circular Tanks

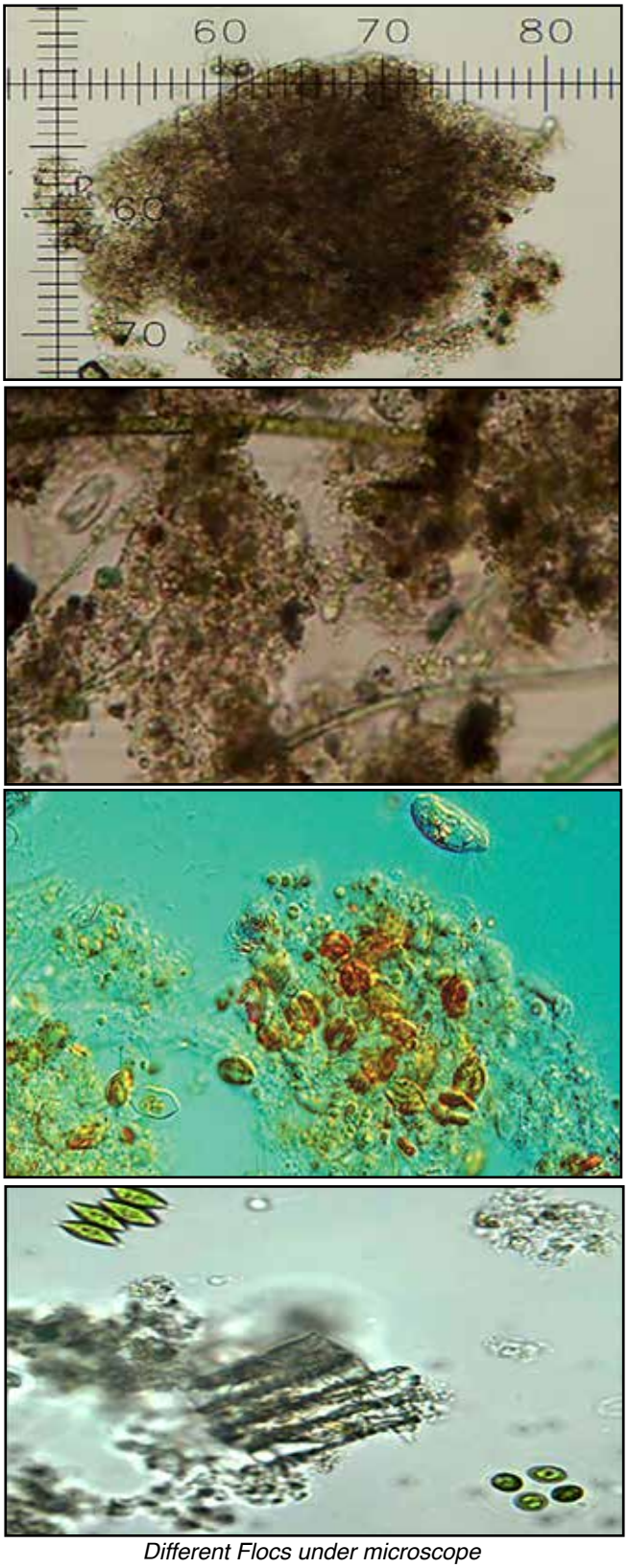
Tilapia culture in Biofloc Setup

Basics about BFT

Biofloc technology (BFT) is as an environmentally sustainable aquaculture technique based on in-situ microorganism production with zero or minimum water exchange (0.5%-1% per day) The microorganisms used in this technology are capable of maintaining water quality for growth of fish and lowers the FCR by intake of nitrogen for generating microbial protein reducing supplementary feed utility. In BFT continuous water movement and aeration is required for the formation of macro aggregates of floc rich in protein-fat. The culture media of biofloc is done in the laboratory by using commercially available multi strain probiotics providing them with vigorous aeration and required carbon source for the multiplication of floc which takes approximately 2.5 hours. The number of bacteria in biofloc ponds can be between 106 and 109/ml of floc plug which contains between 10 and 30 mg dry matter making the pond a biotechnological industry. Nitrifying bacteria can be grown in stand-alone tanks at high concentration and then added to rearing tanks before stocking. BFT can be operated indoors in lined or tanks where the bacteria alone can control water quality and outdoors in lined shrimp ponds or raceways where algae + bacteria takes control of water quality and for the stabilization of biofloc we should standardize carbon to nitrogen ratio as 12-20:1. The water quality parameters like DO, pH, total ammonia nitrogen, total hardness and alkalinity are adjusted to the safety range for growth and health of fish.

Types of microbial community in BFT

Microorganisms play a key role in the success of biofloc technology. The conversion of ammonia released by fish into a useful reutilized form with good protein was done by the activity of phytoplankton, heterotrophic, and nitrifying bacteria. The other microorganisms like fungi, ciliate, rotifers, copepods and nematodes have complementary roles in the recycling of Organic matter.



Different Flocs under microscope

a) Microalgae: In the outdoor biofloc systems, algae can be used for reducing the ammonia levels, but algae requires a good light intensity to multiply. However, if the climate is cloudy there is a chance of ammonia spike in biofloc systems with algae. The divisions of microalgae reported in biofloc cultures are Chlorophyta, Chrysophyta, and Cyanophyta. They use the solar energy to produce chemical energy (carbohydrates), which is used in their metabolic process. Several factors can contribute to the nutritional value of microalgae, including its size and shape, digestibility, biochemical composition, and bioactive compounds as enzymes, vitamins, antioxidants, etc. Microalgae nutritional values are 30–40% protein, 10–20% lipid, and 5–15% carbohydrate.

b) Heterotrophic bacteria: It cannot produce sugars like autotrophs for their survival. Although, they utilize sugar, alcohol, and organic acids as energy sources from the environment but exist in specialized species capable of decomposing cellulose, lignin, chitin, keratin, hydrocarbons, phenol, and other substances. This community can minimize ammonia accumulation in the water column through incorporation as bacterial biomass which is protein-fat rich nutrient for fish consumption. To increase the heterotrophic bacteria levels in biofloc the required C:N ratio should be maintained by adding carbon sources like molasses, jaggery, Acetate, Cellulose, Corn flour, Dextrose , Glycerol and Glucose , Molasses, Sorghum meal, Tapioca , Wheat flour etc. The microbial floc with heterotrophic bacteria can be consumed by fish. It is a supplementary source of protein available 24 hours daily for fish consumption. It is suspected that heterotrophic bacteria help in disease management against harmful bacteria in BFT.

c) Nitrifying bacteria: Chemoautotrophs which get energy source from oxidative conversion of toxic ammonia (nitrogen compounds) into nitrate. In aquaculture, ammonia is a major deciding factor for growth, health of fish including the DO, pH, alkalinity etc. In this BFT, the nitrogen dynamics are utmost important for recycling of ammonia. There are 2 types of bacterial community which convert ammonia to nitrite (eg: Nitrosomonas, Nitrosococcus, Nitrosospira, Nitrosolobus, and Nitrosovibrio) and nitrite to nitrate (eg: Nitrobacter, Nitrococcus, Nitrospira, and Nitrospina). There are several drawbacks to continually adding organic carbon to control ammonia. However, this pathway encourages the production of bacterial community, which accumulates and If not controlled, it impacts on gill clogging. Demand for the oxygen will be increased when concentration of the bacterial community increases and it should be supported by providing vigorous aeration for respiration and to keep the bacterial community in suspension.

d) Fungus: It is reported that some strains of yeast *Rhodotorula* sp. has been found in BFT. Yeasts and molds are unicellular microorganisms which are widely distributed in freshwater and marine waters. It is reported that the nutritional composition of fungus in BFT was 25–37% of protein, 21–39% of carbohydrate, and 4–6% of lipid. The main carbon source for fungus is from hexose sugars.

e) Zooplankton: They are heterotrophic plankton present in water bodies. Protozoan is one of the relevant microorganisms present in BFT. Protozoan along with bacteria plays a major role in recycling of water. Ciliates are the largest group of protozoans in nature. These ciliates are given to juvenile aquatic animals as feed which is having a nutritional composition like moisture (86.66%), protein (56.66%), fat (36.66%), carbohydrate (1%), and ash (4%). Rotifer belongs to metazoans which are having cilia around their mouth. The rotifers are the group of organisms that probably have been replaced for artemia as exogenous natural food in larval culture of crustaceans and fish. The nutritional composition of *Brachionus rotundiformis* is carbohydrate (15.9–22.7%), lipid (21.4–24.12%), protein (45.7–61.3%), and ash (4.5–4.6%). There are a wide varieties of zooplankton which can be used in BFT like copepods, cladocerans which are providing good nutritional value for fish consumption along with some heterotrophic bacteria.

Conclusion:

Biofloc technology will enable aquaculture to grow toward an environmentally sustainable and friendly approach towards biosecurity without disease outbreak in the shrimp or fish industry. This technology could result in higher productivity with less impact to the environment. Consumption of microorganisms in BFT reduces FCR and consequently costs in feed. BFT brings an obvious advantage of minimizing consumption

and release of water, recycling in situ nutrients and organic matter. Microbial community is able to rapidly utilize dissolved nitrogen leached from shrimp/fish feces and uneaten food and convert it into microbial protein, maintaining the water quality. The physical, chemical, and biological interactions that occur into the biofloc systems are complex; further studies can elucidate specific phenomena and their possible applications to other biotechnological fields. Biofloc technology is still in its infant stage. A lot more research is needed to optimize the system.

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Farmer's Meet & Buyer-Seller Meet organized in Kolkata

The Kolkata Regional Division of the Marine Product Export Development Authority (MPEDA) organized a Farmers' Meet on 'Eco-friendly and Sustainable Mud Crab Aquaculture and Buyers-Seller Meet' on 6th February 2021 at Chaltalaya village of Purba Medinipur District in West Bengal. The meet was attended by 50 crab farmers from East Midnapore district and registered exporters from various companies in the region.

Mr. Darshan Lal Dhondiyal, Assistant Director, MPEDA, welcomed the participants. Mr. Archiman Lahiri, Deputy Director, MPEDA, explained the latest trends and market opportunities for mud crab exports and soft shell mud crab.

He also discussed the importance of the export market of soft shell mud crab and elaborated on exports of live crab from Kolkata. Dr. Anup Mondal, Project Manager and in-charge of Aquaculture Genetics and Pathology Lab, RGCA-MPEDA, who was the Chief Guest at the Meet, gave a detailed presentation on mud crab aquaculture and soft shell crab production technology.

He further explained the fattening, culture and hatchery technology to the farmers. Mr. Gourav Surya Dey, Chairman of Kanthi Crab prawn Krishi Producer Company Ltd and Mr. Amalesh Chatterjeee, Project Coordinator and Advisor, Kanthi Prawn Krishi Producer Company Ltd were also present at the meet.

After the technical presentation, exporters interacted with farmers and discussed various business development models.

Dr. Anup Mandal, Project Manager delivering the talk on the Mud Crab Farming

a view of the audience

Shri. Darshan Lal, Assistant Director delivering the Welcome address

Shri. Archiman Lahiri Deputy Director ,explaining about the soft shell crab farming practices in South 24 Parganas in the Sundarbans.

Testimonials

1. Puja Export House (MPEDA Highest Export Performance under Category-III; Live Fish Exports other than Ornamental fishes for the year 2018-19)

(Proprietor)

We are very glad to say this Kherjuri program is too good. This kind of program has not happened ever. Such events give us new awareness and also teach us a lot of things.

2. Calcutta seafood's Pvt Ltd

Ms. Lachmi Chakrabarti
Head - Quality Assurance
Elque Group

It was really a much awaited platform set up by MPEDA – Kolkata, to accelerate the production as well as Export of Mud Crab emphasising on the Soft Shell Crab from this region. We, representing Calcutta Seafoods Private Limited, are honoured to be a significant part in this knowledge sharing and facilitating program. This has been truly a successful and focused event that has ended with so many new openings and options of Primary production facilities for us.Hope we will definitely be able to explore and utilise this opportunity given by MPEDA – Kolkata towards achieving our goals. Wish a grand success and best wishes to MPEDA – Kolkata for such dynamic endeavours in the coming days.

3.Chetana International

Mr. Rajat Adhikary
Designation: Marketing Manager

We are very grateful to you for arranging this meeting. In this meeting, we met many new business associates directly to get our products. We would love to attend such meetings in the future.

4.Baidya Fish Traders

Mr. Ananta Kumar Baidya
(Proprietor)

We all enjoyed it very much and learned so many technical things through this programme. We are interested to procure the raw materials from their side if they can fulfil our requirement.

5. Maa enterprise

Mr. Asis Saha
(Proprietor)

We are very glad to attend this programme. The programme is very important to enhance our business as well as product flow for the export.

Aquatic Animal Disease Diagnostic Laboratory (AADDL) opened at MPEDA's Multispecies Aquaculture Complex

Mr. S. Suhas IAS, District Collector, Ernakulam inaugurating the AADDL at MAC, Vallarpadam

With an aim to assure the quality of the seeds being supplied from the Multispecies Aquaculture Complex (MAC) at Vallarpadam in Kochi and to extend disease diagnostic service to farmers along the West coast, an Aquatic Animal Disease Diagnostic Laboratory (AADDL) has been set up by MPEDA at the MAC at a cost of Rs. 1.27 crore.

Mr. S. Suhas IAS, District Collector, Ernakulam inaugurated the lab on 25th February 2021 in the presence of Mr. K. S. Srinivas IAS, Chairman, MPEDA & President, RGCA.MPEDA, through its R&D arm Rajiv Gandhi Centre for Aquaculture (RGCA) has initiated the functioning of MAC during December 2018 with an aim to diversify the aquaculture through the continuous supply of seeds of GIFT (Tilapia), Black Tiger shrimp, Asian Seabass and Pompano. Since then, MAC has supplied 15.2 million seeds of different species to 4725 beneficiaries in the state of Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat and Goa. Within a period of 2 years, MAC became the most dependable source of quality seeds in Kerala.

The Laboratory is equipped with all modern equipment including RT-PCR for molecular diagnosis and for microbiology and water chemistry analysis. It is an exclusive laboratory for diagnosing diseases of cultured shrimp/fish.

From L-R: Dr. Jaser M.Iqbal,Indo American Hospital, Vaikom; Dr.T.G.Manojkumar, Project Manager, MAC; Dr.S.Kandan, Project Director, RGCA; Mr. K.S.Srinivas IAS, Chairman, MPEDA &President, RGCA;Mr. S.Suhas IAS, District Collector, Ernakulam; Mr. K.S.Pradeep IFS, Secretary, MPEDA; Dr. M. Kathikeyan, Director, MPEDA; Mr. B.Sreekumar, Former Secretary, MPEDA

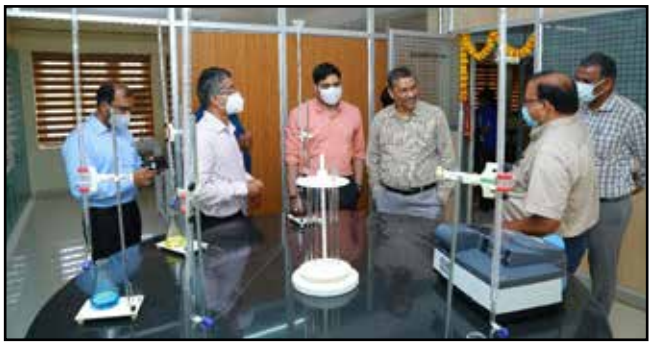
At present, MPEDA-RGCA is operating an exclusive disease diagnostic laboratory at RGCA headquarters in Sirkali, Tamil Nadu, which is the first NABL accredited Aquaculture Pathology Laboratory in the country. With this new laboratory in Kochi, MPEDA aims to extend fast and reliable disease diagnosis service to aquaculture farmers along the West coast also.

Dignitaries visiting various facilities in the laboratory

The Aquatic Animal Disease Diagnostic Laboratory in the MAC facility will extend the disease diagnostic services at affordable rates. Presence of around 16 viral diseases of shrimp/ fish including all OIE listed diseases like WSD, AHPND, NHP, infection with IMNV, IHHNV, TSV, YHV, MrNV , EUS, infection with RSBI- Iridovirus, VNN and other major diseases such as EHP and infection with TiLV (Tilapia Lake Virus) etc. and other bacterial, fungal infections can be detected upto trace level in minimum time.

Dignitaries visiting various facilities in the laboratory

The Laboratory is equipped for molecular detection of the major shrimp/fish pathogens such as White spot syndrome Virus (WSSV), Infectious Hypodermal and Haematopoietic Necrosis virus (IHHNV), Vibrio parahaemolyticus with toxin gene causing Acute Hepatopancreatic Necrosis disease (AHPND), Enterocytozoon hepatopenaei (EHP), Infectious Myonecrosis Virus (IMNV), Monodon Baculovirus (MBV), Hepatopancreatic Parvovirus (HPV), Yellow Head Virus (YHV), Taura syndrome virus (TSV), Hepatobacter penaei (NHP-B), Covert Mortality Nodavirus (CMNV), Shrimp Haemocyte Iridescent Virus (SHIV), Viral Nervous Necrosis (VNN), Red Seabream Iridovirus, Tilapia Lake Virus (TiLV).



Mr. K. S. Srinivas IAS, Chairman, MPEDA & President, RGCA and Mr. S. Suhas IAS, District Collector, Ernakulam visiting various facilities in the AADDL lab at MAC

Dr. M. Karthikeyan, Director, MPEDA, showing GIFT brooders to Mr. S. Suhas District Collector, Ernakulam.

Inside view of the Lab

Release of brochure on MAC activities & Lab

Mr. Alex Paitakulam, Farmer's representative, speaking during the occassion.

Mr. George, farmer sharing his farming experience

Chairman, MPEDA showing the packed seeds of GIFT and explaining the fish seed packaging procedure to Mr. S. Suhas, District Collector, Ernakulam.

Planting of coconut seedling at MAC, Vallarpadam by Mr. S. Suhas IAS, District collector, Ernakulam.

Distribution of square mesh cod ends for trawl fishing boats

Shri. G Pramod Kumar, General Manager TUFROPES Pvt. Ltd.distributing the square mesh

Readymade square mesh cod ends sponsored by Tufropes Pvt. Ltd., a leading fishing net manufacturer in India, were distributed to 10 trawl fishing boats in Vypin fishing harbour in Kochi, Kerala.

Square mesh cod ends are helpful for sustainable fishing as it allows juvenile fishes to escape. In addition to this, it will consume less fuel compared to the conventionally used diamond mesh cod ends.

Cluster of fishing boats

NETFISH has formed a cluster of ten fishing boats at this fishing harbour in order to improve fish quality by practicing chill killing and hygienic fish handling practices on board. Fishers are encouraged to adopt sustainable fishing methods also.

Tufropes has developed readymade square mesh cod ends so that fishers can buy and use this in trawl fishing. The readymade square mesh cod ends were distributed by Mr. G. Pramod Kumar, General Manager, Tufropes Pvt. Ltd. during a function presided over by Dr. Joice V. Thomas, CEO, NETFISH at Vypin, Kochi on 18th February 2021.

Dr. Joice. V. Thomas NETFISH CEO doing presidential address

Mr. Vinod A.K., Senior Sales Manager, Tufropes Pvt. Ltd., Mr. Santhosh N.K., State Coordinator, NETFISH, and boat owners Mr. Alias and Mr. Gilroy spoke on the occasion.

Audits by MPEDA's Field Offices to ensure adherence to COVID-19 guidelines

The officials of the Regional Divisions of MPEDA in Veraval, Vizag, and Kochi inspected seafood plants to ensure adherence to COVID-19 guidelines.

Officials from MPEDA's Regional Division at Veraval inspected M/s. Aftab Exports, M/s. Deepmala Marine Exports, M/s. Favourite Exports, M/s. USK Foods, M/s. KR Seafood Pvt. Ltd., M/s. King Fish Exports, M/s. HH Marine, M/s. Aftab Marine Exports and M/s. New Faizan Foods during the month of March.

It was found that the units were fully aware of COVID-19 guidelines and have been properly implementing the same at their facilities as well as in all their operations.

Officials from the Regional Division of Vizag visited M/s. Sandy Bay Sea foods India Pvt. Ltd., M/s. Danica Aqua Exports Pvt. Ltd., and M/s. Igloo Frozen Foods Pvt. Ltd. During the visit, they observed that the units are complying with the guidelines, right from temperature monitoring, social distancing and sanitization, visual observation and reporting of symptoms, to provision of quarters and canteen facilities to workers to avoid social contacts.

Officials of Kochi Regional Division inspected M/s. RF Exports. During the visit, it was found that the above said unit was fully aware of COVID-19 guidelines and properly implemented them at their facility. They have been taking steps to step up awareness among all workers and staff as per the guidelines.

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Fisheries' college to modernise its aquaculture farm using AI

The College of Fisheries Mangalore is all set to modernise its aquaculture farm at Yekkur at an estimated cost of ₹7.9 crore under the Rashtriya Krishi Vikas Yojana (RKVY). A unique feature of the modernisation will be the application of artificial intelligence (AI) while developing the ultra modern aquaculture units.

Minister for Fisheries, Ports and Inland Water Transport S. Angara performed the 'bhoomi pooja' (ground breaking ceremony) for constructing the units on the premises of the college.Professor and Dean A. Senthil Vel said the college will tie-up with the National Institute of Technology-Karnataka (NITK) at Surathkal for introducing AI technology in aquaculture. The private sector has applied AI technology in aquaculture in a small way. But it has been rarely tried out in the government sector.

"It will be a first-of-its-kind collaboration in the country where a premier engineering institute will have a tie-up with the fisheries sector," he said. The use of AI technology will help reduce manpower to manage the aquaculture farm. "We will have quality check at every stage," he said and added that the use of AI will be like an automation in managing the farm.

Prof. Vel said that all types of fresh water fish, crabs, molluscs, ornamental fish, aquaponics and plants will be developed and conserved in the demonstration plots in the farm. Endangered species will be developed, conserved and handed over to the forest wildlife section. The college will also build a 'Matsyapriyadarshini' canteen at the entrance. It has also placed two model fishing boats at the entrance. Those are used old boats repaired and painted.

Prof. Vel said that many unused and abandoned fishing boats thus can be re-used. They can also be kept in the premises of educational institutions, gardens, malls and hotels to attract the modern generation to farm/fishing related activities. The college has identified about 20 to 30 such boats. They are 30 ft to 35 ft long, 6 ft to 9 ft wide and 3 ft to 5 ft tall. If the old boats are re-used after repairs timber can also be saved, he said.

-www.thehindu.com

Aquaculture infra set to get major boost

While the existing eight government aquaculture laboratories in Andhra Pradesh are expected to be upgraded by March-end, 27 more integrated facilities for research in the sector are likely to begin operations in the later half of this year.

The same is part of infrastructure development for the effective implementation of three Acts passed in 2020: Andhra Pradesh State Aquaculture Development Authority (APSADA) Act, AP Aquaculture Seed (Quality Control) Act, and AP Fish Feed (Quality Control) Act. The primary objective of the three Acts is to safeguard the interest of aqua farmers, streamline the process of acquiring licence and other permissions, and ensure that the quality of seed and feed meets international standards.

"Quality is paramount to ensure that no aqua export gets rejected on the pretext of quality, presence of antibiotics beyond permissible levels, and delay in the processing of permissions," P Koteswara Rao, head of the State Institute of Fisheries Technology, Kakinada told TNIE. There were 14 issues which used to consume time, and were reportedly the reasons for the delay in the issuance of licences. "Now, all those loopholes have been plugged. Specific time has been allocated for issuing the licences and permission for aquaculture registration, and to seed and fish feed factories. When the time for a particular service elapses, the permission or licence, if not reissued already, will be deemed to have been given," he explained. In the past, there were several complaints of corruption in the procedure. Lack of any legal provision used to force the farmers or entrepreneurs to seek police help or take a legal recourse. However, the newly-introduced legislations will ensure legal actions are initiated in case of irregularities.

"Action can be initiated against those who provide inferior seed or feed when there is proof that quality standards were not adhered to. The existing labs and the ones to come up will take care of these issues. Random sample testing, apart from acting on the complaints, will be done," Koteswara Rao explained. Nearly 60 per cent of the input in aquaculture, be it freshwater or brackish, are seed and feed. The quality checks are expected to bring down the cost by 10 to 15 per cent even as there is an increase in production by 15-20 per cent.

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Could an Indian breakthrough lead to a Grey Mullet farming boom?

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Indian aquaculture producers receive the country's first batch of hatchery-produced Grey Mullet

The first commercial-scale hatchery-produced Grey Mullet to have been produced in India have now been sent out to fish farmers in three states.The Grey Mullet *(Mugil cephalus)* fingerlings were produced by the ICAR-Central Institute of Brackishwater Aquaculture, Chennai functioning under the aegis of Indian Council of Agricultural Research. Grey mullets are commonly called “Madavai” in Tamil, “Thirutha” in Malayalam and “Kathiparega or Mala” in Telugu. They feed primarily on detritus and benthic micro-algae, are efficient converters of primary productivity into quality fish protein.

According to a press release from ICAR-CIBA the fish fetch Rs. 350 to Rs. 500 per kilo, while fast growth rates and omnivorous feeding habits make them a popular fish for brackish water aquafarmers. The mullet is also an ideal candidate species for polyculture and integrated multitrophic aquaculture systems. A production of up to 3.5-4 tonnes per hectare, per crop can be achieved at a benefit cost ratio of about 1.9. The first batches of fingerlings were distributed to farmers in Andhra Pradesh, Tamil Nadu and Kerala. These will be raised in their respective farms and developed into F1 broodstock, which will be brought back to CIBA hatchery for further breeding and seed production. These initiatives towards species domestication may make a wider breeding window of grey mullet available and the process of induced maturation less challenging. CIBA has already standardised seed production of brackish water food fish species; Asian seabass, Milkfish, Pearlspot and Whiskered catfish.

“CIBA looks forwards towards scaling up of Grey Mullet seed production in partnership with enterprising farmers and state governments as we take another step towards a diversified and sustainable brackish water aquaculture sector. Representative from the industry, aquafarmers, fisheries scientists have welcomed the breakthrough, as another sought after farmed fish, which can be farmed in brackish water, freshwater and marine has been added to Indian aquaculture species basket,” the press release concluded.

-www.thefishsite.com

Kerala to launch online fish delivery portal

Public sector Kerala State Coastal Area Development Corporation has launched Parivarthanam, to deliver seafood to the consumers' doorstep, and set up a dedicated portal.

The initiative has been launched with a view to improving the socio-economic conditions of coastal communities by forging closer links with industry and enhancing the livelihood skills of the youth along the coastline, an official spokesman said.

Sheik Pareeth, Managing Director of the Corporation, said Kerala has a long tradition of processing seafood to Scandinavian quality, but its benefits have been denied to home consumers. 'We seek to change this scenario and redirect the processing technology towards the home market and establishing a quality supply chain to deliver fish to homes," said Roy Nagendran, Team leader. A series of preliminary meetings have been held already with traditional fisher societies in Kollam and boat owners have expressed keen interest in participating with the initiative.

Parivarthanam will ensure that fish sourced either from catch or drawn live from the farms meets ICAR-CIFT (Central Institute of Fisheries Technology) standards. Every fish product and seafood unit will carry the quality stamp of CIFT, India's leading research centre in fishing and fish processing.

High-tech surveillance systems will monitor the temperature of fish all through the supply chain till delivery, ensuring freshness and food safety. Producers in Kollam, Pathanamthitta and Alappuzha will be made an integral part of this and encouraged to become entrepreneurs. The project also envisages a range of value-added products that include dry fish, pickles and marinated fish. Besides delivering fish to homes, Parivarthanam also focuses on skill development and job creation for college dropouts and Gulf returnees who lost their jobs from the pandemic. Preference will also be given to the kin of women fish vendors whose livelihoods are threatened by aggressive private players.

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FAO Members endorse Declaration for Sustainable Fisheries and Aquaculture

The 34th session of FAO's Committee on Fisheries (COFI34) ended its week-long meeting on 5th February 2021, with its Members endorsing the first-ever Declaration for Sustainable Fisheries and Aquaculture, urging stronger action to combat illegal, unreported and unregulated (IUU) fishing, and stressing the importance of recovering from impacts of the COVID-19 pandemic.

The Declaration outlines a global vision for fisheries and aquaculture, while highlighting the sector's essential contributions in the fight against poverty, hunger and all forms of malnutrition. This is central to efforts to implement the 2030 Agenda and make agri-food systems more inclusive, resilient and sustainable, a global concern that will be discussed at the UN Food Systems Summit, in September.

In her closing remarks on the last day of COFI34, FAO Deputy-Director General, Maria Helena Semedo, said fisheries and aquaculture were of critical importance for global agri-food systems transformation."We all share a common goal - the sustainable management of our valuable aquatic resources," Semedo said. "This is vital to having better production, better nutrition, a better environment and a better life for all so that, together, we can achieve the Sustainable Development Goals." The Declaration builds upon existing international instruments aimed at promoting sustainable fisheries and aquaculture around the world, such as the landmark FAO Code of Conduct for Responsible Fisheries, recognizing successes since the endorsement of the Code and identifying new and urgent priorities.COFI34 marked the 25th anniversary of the Code with a High-level Special Event. Since its adoption in 1995, the FAO Code of Conduct for Responsible Fisheries has been the main instrument for developing international agreements, guidelines and tools to ensure the effective conservation, management, utilization and production of living aquatic resources.

In 2018, global fisheries and aquaculture production (excluding aquatic plants) reached an all time record of nearly 179 million tonnes. Overall capture fisheries, with 96.4 million tonnes represented 54 percent of the total, while aquaculture, with 82.1 million tonnes, accounted for 46 percent.The 2020 State of World Fisheries and Aquaculture (SOFIA) report estimates that total fish production is set to increase to 204 million tonnes in 2030, up 15 percent from 2018, with aquaculture's share growing from its current 46 percent to 53 percent. Aquaculture has been the fastest expanding food production sector globally over the last decades, growing at an average of 5.3 percent per year since the turn of the century.

-www.fao.org

Using echo-sound to estimate biomass in aquaculture

Reliable methods for estimating the biomass of fish in a cage remain a challenge in aquaculture. The most common approach involves taking on-site samples – a costly, time-consuming and inaccurate method. More reliable methods are needed so that fish farmers can better manage their stock.

As part of the EU-funded PerformFISH project, researchers from SINTEF Ocean in Norway and the Hellenic Centre for Marine Research (HCMR) in Greece are testing the use of echo-sounder technology. This relies on regularly transmitting an acoustic pulse and analysing the return signal after it has bounced off one or several targets. Time intervals between transmission and reception, as well as signal intensity, are analysed. This is a similar approach to the one used in sonar systems. It is already used in fish finders for commercial or recreational fishing and is now being applied more and more to aquaculture. However, the aquaculture context poses new challenges.

As Dr Walter Caharija, lead researcher from SINTEF Ocean explains: "In the open water, echo-sounding technology is used to find shoals of fish. They might give some estimate of the size of a shoal, but it's the location that's more important. In aquaculture, fish farmers already know where their fish are located but it is important to know the density of fish in the cage. In a 3D marine environment, with hundreds of fish swimming in all directions, it is difficult to get a good head count!" The research team is conducting trials to understand how echo-sounders interact with the layers of fish that are found in a typical aquaculture cage. The main challenge is to account for a shadowing effect: some fish are hard to detect because they are hidden behind other fish in the cage.

The researchers have conducted experiments using two small test cages, each containing a known number of fish. They placed the cages at different distances from each other and from an echo-sounder, and then measured the echogram results produced from the interaction of the echo-sounder with the fish. By comparing these raw echogram results to the real fish density in the cages, the team can calibrate the tool so that it will provide a reliable estimate of fish density for fish farm managers.

Dr Caharija continued: "We are making exciting progress and I am looking forward to developing this further. We are building a foundation from which we are learning how to utilize an echo-sounder to better estimate biomass in a production net pen. Together with HCMR, our partner from Greece, our next steps will involve further data analysis and refining our methods before we move to more concrete dissemination and exploitation plans."His colleague, Espen Eilertsen, added: "Kongsberg Maritime, a renowned echo-sounder provider and manufacturer, is showing great interest in our PerformFISH activities and we are having a mutually beneficial and productive dialogue."

-www.thefishsite.com

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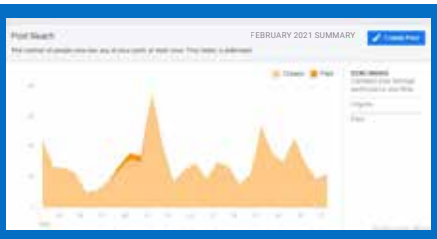

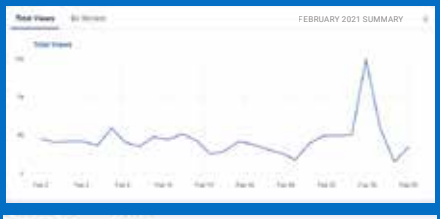

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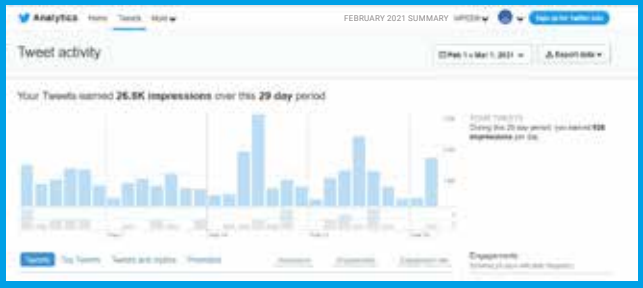

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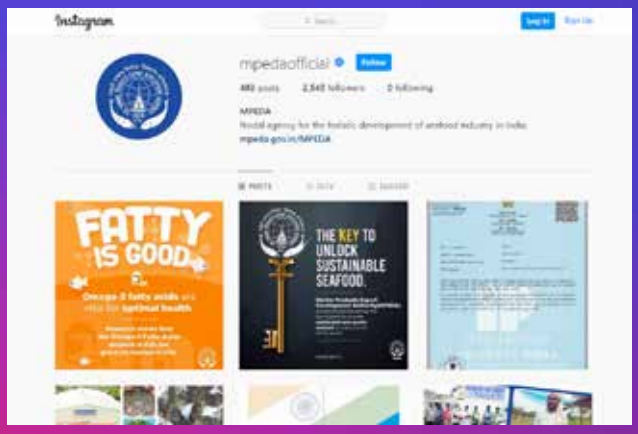

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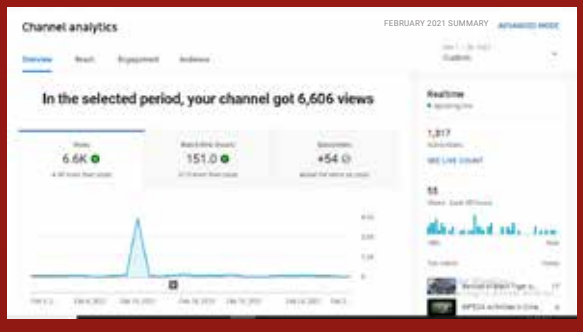

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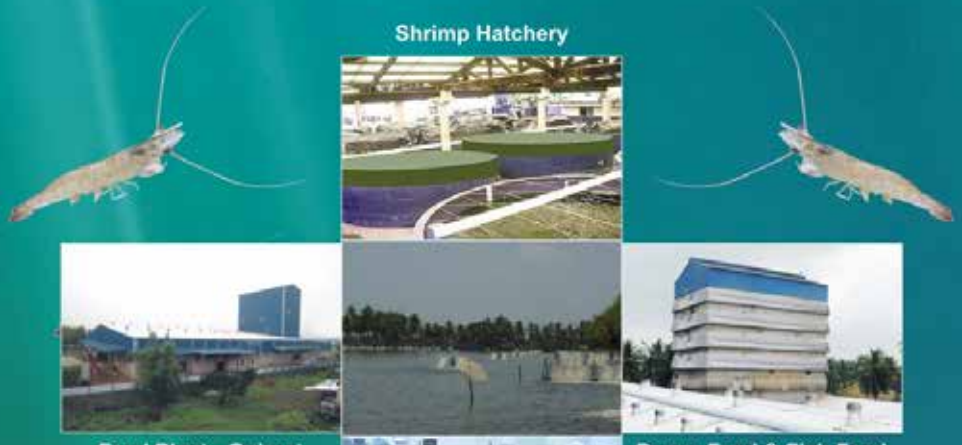

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