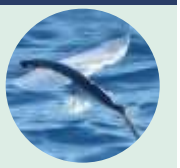
COLLEGE OF FISHERIES, MANGALURU
Karnataka Veterinary, Animal and Fisheries Sciences University, Bidar, Karnataka, India
Volume 3, Issue 2
July 2021

Flying Fish

Beyond horizon...



Message from

Prof. Dr. R. Ramesh

Director of National Centre for Sustainable Coastal Management, (MoEF & CC), Anna University Campus,Chennai

India has a coastline of more than 7500 km with diverse sensitive ecosystems such as coral reefs, mangroves, tidal mudflats, estuaries, lagoons, marshes and vegetated wetlands. The country is one among the 17 mega-diverse countries in the world. About 5.33% of the world's marine diversity accounting for 15,000 coastal and marine species have been reported from India. This rich repository of biodiversity is found spread across the eastern and the western coastal plains and their waters as well as in the island territories in the Bay of Bengal and Arabian Sea. India's coastal districts occupy about 3,94,147 km^2 of land area with a population of over 200 million people living in a variety of settlements that range from tiny fishing hamlets to mega cities and following diverse occupations.

Coastal Marine Spatial Planning (CMSP)

CMSP is a public process of analyzing and allocating the spatial and temporal distribution of human activities in coastal and marine areas to achieve ecological, economic and social objectives and promote sustainable development. The CMSP group has been tasked with the preparation of action plans to introduce a framework for MSP in coordination with stakeholder Ministries/ Departments and driven by the nodal Ministry/ Department identified for the group.

India's opportunities on the coast

(a) Marine Fisheries

India has 2.02 million km^2 Exclusive Economic Zone (EEZ) and 0.5 million km^2 continental shelf. Though the potential yield of conventional and non-conventional fishery resources along India's coast are 5.31 million metric tonnes (MMT) and 1.85 MMT respectively, India's marine fish production in 2019 was only 3.56 MMT consisting mainly of the conventional resources from the EEZ. Hence, India can increase landings of both conventional and non-conventional resources to boost economic development from domestic and overseas trade.

(b) Aquaculture

Shrimp farming dominates brackish water aquaculture along the coastal region with major candidate species being Pacific white shrimp, black tiger shrimp and the Indian white shrimp. Farmed shrimp production touched 0.7 MMT in 2019, of which 87% was exported earning a foreign exchange of Rs.35,000 crores. There are 39,705 registered shrimp farms with total farm area of 61,044.89 ha (CAA, 2020). However, only 15% of the potential aquaculture land area has been used so far. Apart from shrimp, other farmed species include crab, lobster, seaweed, pearl oyster, Cobia, mussel, oyster and marine ornamental fish.

(c) Shipping and Trade

Over 95% of India's trading by volume and 70% by value is through maritime transport, largely through the 12 major ports and 212 notified non-major ports. Key cargo include iron ore, food grain, finished fertilizer and coking coal. In Financial Year 2020, major ports in India handled 704.82 MMT of cargo traffic accounting to Rs. 163 billion. India is among top 20 maritime countries with a total fleet strength of 1243 ships and has 28 major shipyards. India is also home to one of the largest ship-breaking facilities in the world accounting for 33% of the total scrapped tonnage in the world. Growth drivers here include low labor cost, availability of skilled workforce, robust domestic demand and a growing steel industry in the country.

(d) Travel and Tourism

In 2018, India was globally the third largest in terms of investment in travel and tourism with an inflow of USD 45.7 billion. However, the Covid-19 pandemic has significantly impacted the tourism industry. While domestic tourists are expected to drive the tourism growth during the immediate post-pandemic years, inflow of international tourists are expected to generate a revenue of over USD 59 billion by 2028. Eight beaches have the Blue Flag tag currently and 100 more beaches are targeted in the next three years to boost coastal and island tourism.

(e) Energy

i.Oil and natural gas

One third of the global energy requirements are currently met by oil and gas. India has 26 sedimentary basins covering an area of 3.36 million km^2. Geological surveys and drilling of wells is being done to explore oil and gas finds in India. About 46 and 61% respectively of recoverable reserves of crude oil and natural gas are in offshore regions. The Government of India notified reforms in exploration and licensing policy in 2019.

ii.Renewable Energy

Indian renewable energy sector is the fourth most attractive renewable energy market globally. India was ranked fifth in wind power, fifth in solar power and fourth in renewable power installed capacity in 2019. The GoI is aiming to achieve 227 GW of renewable energy capacity by 2022. The major options of renewable energy derived from coastal and marine resources include offshore wind, solar farms, floating solar photovoltaics, ocean thermal energy conversion, wave energy and tidal energy.

IN THIS ISSUE

This issue highlights the activities, programmes and events undertaken by staff and students of the Collegeof Fisheries, Mangaluru during the quarter **from April to July 2021.**

CONTENTS

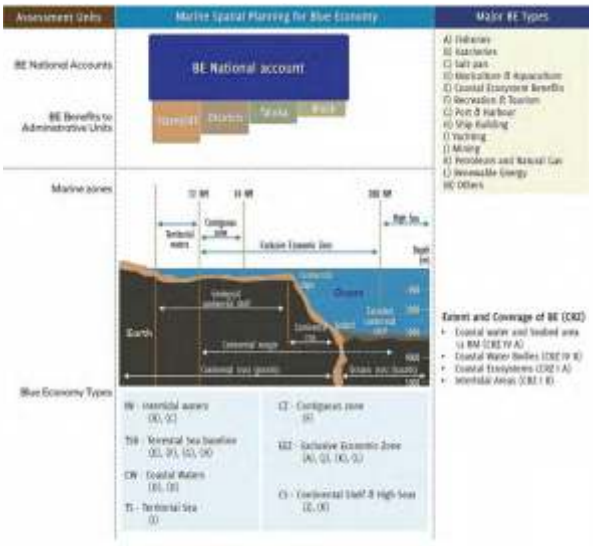


Figure 6-1: Assessment Units for Blue Economy

(f) Salt

India is the third largest salt producing country in the World. There are about 11,799 salt manufacturers engaged in production of common salt extended in 6.09 lakh acres area. The top sea-salt producing states in India are Gujarat, Tamil Nadu, Andhra Pradesh and Maharashtra. Gujarat contributes 76% of India's total salt production. The average yearly salt export of India is 5 MMT with an additional 3.4 to 4 MMT depending on demand.

(g) Coastal infrastructure

The major industrial cities of India located along the coast are Surat, Mumbai, Kochi, Thoothukudi, Chennai, Visakhapatnam and Paradeep. Key industrial activities established along the Indian coast include petrochemicals storage and refining, ship-building and ship-breaking, power plants, food processing and other ancillary industries. Coastal infrastructure includes extensive seawalls, breakwaters, cyclone shelters, jetties and associated structures related to ports and harbours, thermal and nuclear power plants, desalination plants, naval bases and support structures. Plantations and coastal agriculture/ horticulture are extensive along the coast. The sea is also the repository of treated as well as untreated wastes.

I am happy to know that CoFM has prepared a report on Rapid Assessment of Blue Economy Potential of Karnataka with the assistance of World Bank. I have examined the report and found it very comprehensive with several innovative and potential areas. Based on the report GoK has formulated the coastal vision group and is exploring possibilities for investment. In this process Karnataka will be one of the first states to implement Blue Economy in the country.

Best Regards,

Date: 13.09.2021
Place: Chennai

R. Ramesh 13/9/2021
R. Ramesh

Health, Environment and Fisheries

Assessing Impact of Sand Removal in the estuarine stretches in and around the Mangaluru Coast, Karnataka

Dakshina Kannada district of Karnataka is home to three major rivers such as Netravathi, Gurupura (Palguni), and Shambhavi which are perennial rivers and flow westwards and join the Arabian Sea. Major parts of these rivers are covered under the Coastal Zone Regulation (CRZ). The local communities who are residing on the banks of these rivers mainly depends upon the fishing, sand collection, and limestone shell collection. They have a practice to remove the sandbars for the free movement of fish and navigation of boats in the river channels. In the recent times, the local community have experienced floods along these rivers due to the river bank erosion, river bed degradation, river buffer zone encroachment etc. The water quality drastically deteriorated in these rivers due to sand removal activities.

The college conducted a bathymetry survey using portable echo-sounder and sediment water samples collection in these rivers. Analysis of the bathymetry provided the variation of depth and high depth locations in the rivers. Suspended sediment concentration has been estimated and calculated for the sediment transport in the riverine systems. The suspended sediment concentration was minimal (0.24-0.58 mg/l) in the rivers and lead to the less transportation of the sediment into the Arabian Sea. Analysis of survey data clearly indicated that some of the locations have deepened (8 to 25 ft) due to activities such as removal of sandbars and sand mining along the banks of the rivers. The removal of sand observed more depth of around 20 ft at some locations in the Netravati and Gurupura (Palguni) rivers and were identified as potential impact locations for the ecology and biodiversity of the riverine system. There is a high probability of riverbank erosion and flooding at these locations including loss of benthic fauna.

This study indicate that the causes of riverbank erosion, river flooding and degradation of the water quality is due to the sand removal activities in an unscientific way. The study recommendes to protect and conserve these riverine systems by controlling the mining activities. It also suggested that the removal of sandbars in the riverine systems should follow the rational scientific methods and to make the channel free for fishermen boats and public transportation by boats. The authority should implement stringent regulations to protect and conserve the riverine systems as per the CRZ notification.

Employing Multi-Purpose Support Services (SAGARMITRA) under Pradhan Mantri Matsya Sampadha Yojana (PMMSY)

The Department of Fisheries Engineering and Technology, College of Fisheries was sanctioned of Rs 54 lakh for the implementation of project entitled “Multi-Purpose Support Services (SAGARMITRA)” under PMMSY scheme for the period of 2020-21. The Government of Karnataka nominated the College of Fisheries as a nodal agency for the implementation of this programme. It is envisaged to engage a total of 40 Sagarmitras and deploy one Sagarmitra per marine coastal fishing village in Dakshina Kannada, Udupi and Uttara Kannada Districts. The primary role and responsibilities of Sagarmitras are to act as the first person of contact for any marine fisheries related demands/ services of fishers, to create awareness among the local fishers on various schemes and programmes and to promote participatory management of fisheries resources, hygienic handling of fish, personal hygiene, healthy living and working conditions, sustainable utilization of fisheries resources and relevant regulation including Code of Conduct for Responsible Fisheries, importance of ocean and coastal ecosystem conservation, prevention of Illegal, Unreported and Unregulated fishing etc., to disseminatee information on weather forecast, Potential Fishing Zone, natural calamities, to promote women empowerment through alternative livelihood, post-harvest and marketing activities, to compile information/data on daily fish production, fishing vessels including their entry and exist, fish price and marketing information and to provide such data to the government. Thus, PMMSY not only provides employment to the youth but also can enhance the fish farmers' income and judicious utilization of fisheries resources.

Government of Karnataka have Agreed to Implement Two Project in the college under (NABARD) funding

Two Projects proposals (i.e. 1. Development of fish and other food products & processing hall and 2. Establishment of central laboratory) from the College of Fisheries were submitted in May 2021. The first Project is for uplifting the fisher community by training and involving them in the production of various value added fishery products and thereby improving their socioeconomic life. This will be a boost to the more than 3 lakh people involved in the fishing and associated activities along the coast of Karnataka. The range of products includes fish pickle, prawn pickle, fish/prawn chutney powder, retort pouched ready-to-eat fish in curry/oil/masala, ready-to-eat fish sausage, fried fish cutlet, fish finger, cleaned and dressed fresh frozen fish products and battered and breaded products like cutlet, fish finger, fish balls etc. which will be prepared by the communities after training. The College of Fisheries is intended to offer training, machinery, space and manpower as part of MFSc and PhD hands on training programs. All the products produced will be marketed through cold chain, super markets, state government agencies like KFDC, Matsyafed etc. or products can be exported.

The second project proposal envisages to establish a highly sophisticated central laboratory in College of Fisheries to test/analyse seafood quality parameters along with water samples to assist the concerned producers and exporters in the field for producing safer food and realize better returns. The marine fish production in the state of Karnataka during 2019-20 was 3.93 lakh metric tonnes (mt). Of these 1,41,980 mt worth Rs.1,886.43 crore was exported from the State in the same year. Karnataka also has 5.65 lakh ha. of freshwater sources consisting of ponds, tanks and reservoirs. The aqua farmers’concern is to optimize

the growth rate, increase the yield, control the mortality as well as to prevent pathogens. At times it has led to the indiscriminate use of various unauthorized chemicals which have affected the quality of shrimps and caused recurring disease problems. According to Sea Food Exporters Association of India, EU has rejected many Indian seafood consignments for the presence of the veterinary drug residues, heavy metals and harmful microbiological contaminants above the prescribed levels. This incurs huge economic loss to our nation. The initial screening and certification of quality of fish and fishery products shall significantly reduce rejection levels and boost the exports. Keeping in view of the above, there is an urgent need to test and monitor the levels of above-mentioned hazardous chemicals and microbiological contaminants before shipment. As there is no approved centralized laboratory in the region to facilitate aqua-farmers, fish/food processors and researchers, establishment of central laboratory in the College of Fisheries will aid production and distribution of high quality and safe seafood in domestic and international market.

Impact assessment and Disaster Management Studies for establishing solar panels off Mangaluru Coast

M/s iDeCk Ltd. which is a consulting firm under Government of Karnataka for Solarin Blue Energy Private Limited have proposed to establish floating solar panel off Mangaluru coast around 9 km away at a depth of 20 m. The panels will be installed by attaching floating buoys and anchored at the floor of the sea bed. The panels will produce electricity which will be taken through cables and linked to the main grid. The above installation attracts Coastal Regulation Zone notification, 2011 which permits the installation of facilities for generating power for non-conventional energy resources subject to clearance on certain documentation. In connection with this, the College of Fisheries was assigned to carry out the studies relating the email dated 23.07.2021 from iDeCk Ltd.; a) information on biological entity of the area- in the coastal waters, sea bed and shore area; b) information on benthic geomorphology of the area; c) information on vegetation and coastal geomorphology; d) fishing data of the proposed site area; e) currents and waves patterns and prepare shoreline management of the area. The study noted the following observations:

- Laying cables in proposed site is permissible since the land use plan of the proposed site at the onshore area is in CRZ II.
- Establishing photovoltaic floating structures for generation of renewable energy (in this case electricity) is a permissible activity under CRZ notification but with permission.
- Benthic laying of cable and anchoring are permissible but shall be ensured that the cable and the structures below do not affect the fishing communities and the necessary permissions from the port authorities may be obtained.
- The project proponent is needed to obtain necessary permission from the ports department to prevent fishing in 5 km radius along the proposed site since trawlers and traditional boats operate in the region during fishing seasons.
- Measures were prepared to mitigate large waves breaking on the solar panel
- Precautionary measures for preventing Bio facilities have been prepared
- Disaster management plan for the project has been proposed.

Activities

Fishco's Family - Recipe Corner

Squid Ghee Roast

Ingredients:

- 400 grams squid rings cleaned
- 1/2 tablespoon coriander seeds
- 1/2 teaspoon cumin seeds
- 1/2 teaspoon fennel seeds
- 10 whole black pepper
- 7-8 dry Kashmiri red chilies
- 3-4 hot red chilies as per your heat preference
- 1 inch ginger
- 5-6 cloves of garlic medium size
- 1/2 teaspoon turmeric powder
- 1/2 lime squeezed to juice and pips removed
- 1/2 teaspoon pepper powder
- 2 tablespoon ghee or more if you prefer
- 3-4 springs of curry leaves or go generous
- 1/2 tablespoon jaggery powder

Recipe by:
Mrs. Roopa N.S.
CoF, Mangalore

Method:

1. Dry roast the spices (coriander seeds, cumin seeds, fennel seeds, black pepper, Kashmiri chilies and red chilies) in a pan.
2. Grind it to paste along with ginger and garlic. Add turmeric powder, lime juice, and salt to this to make masala paste.
3. Marinate the squid rings in a portion of masala paste.
4. Fry the remaining masala paste in ghee. Add the marinated squid rings into the fried masala paste and cook. Be careful not to overcook the squid to avoid rubbery texture.
5. Add curry leaves and jaggery to complete the dish.

Fisheries Research Publications

1. Abhiman, P. B. and Garima. 2020. Vaccination of *Catla catla employing* Biofilm of *Aeromonas hydrophila* to enhance its immunity. *J. Krishi Vigyan.* (Special Issue): 304-308.10.5958/2349-4433.2020.00123.3
2. Baliga, P., Malathi, S. and Girisha, S.K. 2021. Genome-wide identification and analysis of chromosomally integrated putative prophages associated with clinical *Klebsiella pneumoniae* strains. *Curr. Microbiol.* 78: 2015-2024.https://doi.org/10.1007/s00284-021-02472-2
3. Baliga, P., Puneeth, T. G., Malathi, S., Girisha, S.K., Ramesh K.S., Udyavara, V. and Venugopal, M.N. 2021. Bacterial communities associated with *Penaeus vannamei* Boone, 1931 surface and its rearing water in biofloc culture system. *Asian Fish. Sci.* 34: 34-46.https://doi.org/10.33997/j.afs.2021.34.1.004
4. Baliga, P., Puneeth, T.G., Malathi, S., Girisha, S.K., Ramesh K.S., Udyavara, V. and Venugopal, M.N. 2021. Community Changes in *Penaeus vannamei* Boone, 1931 surface and rearing water during Enterocytozoon *hepatopenaei* infection. *Asian Fish. Sci.* 34: 168-180.https://doi.org/10.33997/j.afs.2021.34.2.006
5. Meshrama, M.M., Mridula, R., Rajesh, K.M. and Suyani, N.K. 2021. Morphological measurements, length weight relationship and relative condition factor (Kn) of Obtuse barracuda *Sphyraena obtusata* (Cuvier, 1829) from South-eastern Arabian Sea. Ind. J. *Geo-Mar. Sci.*50(6): 480-488.http://nopr.niscair.res.in/handle/123456789/57710
6. Nithin M.S., Girisha, S.K., Kushala, K.B., Chandan, D.V., Puneeth, T.G., Naveen Kumar B.T., Vinay, T.N., Suresh, T., Sahoo, L. and Ramesh, K.S. 2021. Novel lytic bacteriophages (AhFM4 & AhFM5) as biocontrol measures against multidrug resistant biofilm producing *Aeromonas hydrophila* (AhZ1K). *Aquaculture.* 544:737106. https://doi.org/10.1016/j.aquaculture.2021.737106
7. Poojary, S. R., Naveen Kumar, B.T., Prakash Patil, Abhiman, P.B., Shankar, K.M., Deepti Manjari Patel and Ramesh, K.S. 2021. Studies on development and antigen expression of biofilm cells of *Vibrio anguillarum* for oral vaccination in aquaculture. Indian *J. Anim. Res.*55(1): 46-51.https://arccjournals.com/journal/indian-journal-of-animal-research/B-3927
8. Rajesh, K.M., Mridula, R. and Prathibha, R. 2021. Length-weight relationships of ten small pelagic fishes along the coastal waters of Karnataka, Southeastern Arabian Sea, India. *Egypt. J. Aquat. Biol. Fish.*25(3): 1045-1057.https://ejabf.journals.ekb.eg/article_187989.html
9. Rakesh, K., Murthy, H. S., Ananda, M. G., Prasad, M. B., Rathore, S. S., Shivani D. G.and Mamun, M. A. A.2021. Effect of dietary supplementation of leucine and vitamin combination on growth and survival in Indian Major *Carp,Labeo Rohita.* J. Exp. Zool. India 24(2): 1125-1130.
10. Suyani, N.K., Mridula, R., Rajesh, K.M., Meshrama, M.M. and Vandana, K. 2021. Morphometry, length-weight relationship and relative condition factor of red-toothed trigger fish Odonus *niger.J. Env.Biol.* 42(4): 1026-1032. http://www.jeb.co.in/index.php? page=abstract&issue=202107_jul21&number=15
11. Mohan Maloth, Varadaraju S, Jayaraj EG, Ganapathi Naik M, Shashidhar H Badami and Jaya Naik,2020, Designing and fabrication of different types of aerators in commercial aquaculture, Journal of Entomology and Zoology Studies 2020; 8(1): 1268-1272
12. Mohankumar K C, Varadaraju S, Gajendra, Harsha Nayak, Naveen Kumar B T and Divya V, 2021, Suitability of soil and water quality parameters for *Litopenaeus vannamei* culture along Dakshina Kannada and Udupi Districts, *Journal of Experimental Zoology. India* Vol. 24, No. 2, pp. 1143-1157, 2021

Fun Facts - *Lionfish*

Kingdom : Animalia
Phylum : Chordata
Class : Actinopterygii
Order : Scorpaeniformes
Family : Scorpenidae
Genus : Pterois
Species : P.volitans

- Lionfish are found in warm marine waters of the tropics at water depths from 1 to 300 feet on hard bottom, mangrove, seagrass, coral, and artificial reefs (like shipwrecks)
- They are mainly a solitary species and courting is the only time they aggregate, generally one male with several females
- Female Lionfish are sexually mature and will release eggs when they reach 7 to 8 inches in length, or approximately one year old.A female Lionfish can shockingly release between 10,000 and 30,000 unfertilized eggs every 4 days year around i.e. approximately 2 MILLION eggs per year
- Lionfish are now one of the top predators in many coral reef environments of the Atlantic and are considered to be invasive to non-native regions
- Lionfish are active hunters who ambush their prey by using their outstretched, fan-like pectoral fins to slowly pursue and "corner" them.
- Lionfish have 18 venomous spines that are capable of penetrating human skin and delivering a very painful but not fatal sting

Staff and Student News

Superannuation

Dr. K.S Ramesh, Professor and Head (Department of Aquatic Animal Health Management, CoFM) superannuated on 31.07.2021. CoFM wishes him a happy retired life!

Obituary

CoFM deeply mourns the sad demise of former student **Mrs. Shamili Yadav** and expresses deep condolences to her bereaved families.

Dean's Desk

I thank the Department of Fisheries, GoK for considering the college with regard to implementation of 2 important NABARD funded projects. These two projects will assist in improving the livelihood of the local communities. I also thank Infrastructure Development Corporation (iDeck) for signing a MoU with the college for developing projects relating to fisheries, environment, food processing and climate change. I am also happy to inform you that the college has taken up several initiatives in the implementation of PMMSY schemes along with the Department of Fisheries. I welcome Ms. Madonna, Assistant Professor into the flying fish team

I will be extremely happy to receive comments and suggestions at the below given feedback email.

We're on the Web! www.cofm.edu.in
Suggestions and feedback to newsletter@cofm.edu.in

College of Fisheries, Yekkur, Kankanady P.O.
Mangaluru - 575 002, Karnataka, India
Tel No: 0824 - 2248936/ 2249256/57/58/59

For E-newsletter scan the QR code

Editorial Team: Dr. Malathi Shekar, Dr.Abhiman B., Mrs. Vandana K., Ms. Swathi, Mr. Srinath, Dr. Madonna T. Thachil