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Fisheries sector has always occupied a vital place in the socio-economic development of India. Being an affordable rich source of protein, fish is one of the healthiest options for mitigating nutritional deficiency as well as ensuring food security for not only India’s heartland but for the entire world. India ranks 2nd in terms of aquaculture fish production globally and is the 4th largest exporter of seafood products, exporting to 123 countries. The country is looking at a new era of opportunities in the fisheries & aquaculture sector with a 63% increase in production in the last 8 years. These have been attainable due to the relentless efforts of all stakeholders involved, especially our fishers & fish farmers.

The sector has been instrumental in providing livelihood and employment to more than 28 million people along the value-chain. A well-developed fisheries sector will help in the reduction of wastage, improving value addition, ensuring better returns to the fishers & fish farmers, promoting employment as well as increasing export earnings. As the world population in ever-increasing, this sector shall play a very crucial role in providing affordable and nutritional food to a large segment.

Shri Parshottam Rupala
Union Minister of Fisheries, Animal Husbandry & Dairying, Govt. of India
With the sector witnessing an average annual growth rate of 8-9% during the last 8 years, Government of India is cognizant about the potential of this sector and has been taking many initiatives to bring economic revolution through the Blue Revolution (Neel Kranti to Arth Kranti). These initiatives have been the pillars of the strong ecosystem being provided for the development of the sector and making this sunrise sector investor friendly.

- Pradhan Mantri Matsya Sampada Yojana (PMMSY) – highest ever investment of INR 20,050 crore for enhancing production to 22 million tones and increasing export earnings to INR 1,00,000 crore by 2024-25. The interventions in the scheme have been adequately developed to cater to multi-pronged aspects in terms of people, process and technology which are the 3 important pillars of continued growth and change. These 3 pillars comprise of various aspects across the chain: sustainable production practices; adequate processing infrastructure creation; target marketing for end consumer; inclusive policies and ample regulatory frameworks for adoption.

- Fisheries and Aquaculture Infrastructure Development Fund (FIDF) for providing concessional finance to eligible entities with fund size of INR 7,522.48 crore. So far, proposals worth INR 6,228.92 crore have already been received from eligible entities including States and UTs.

- Kisan Credit Card for concessional credit boost to fishers and fish farmers.

- Matsya Setu App with species & subject wise online course modules to enable the farmers and entrepreneurs to learn technologies, farm management practices etc. at their convenience.

The Department of Fisheries is also making continuous efforts to improve ease of doing business, promote further investments and resolve issues faced by our fishers, fish farmers, producers, processors and exporters. This will help to maintain steady growth as well as boost production, enhance value-addition and exports of fish & fish products with a phenomenal performance by our export stakeholders, increasing marine exports by over 90% since 2014-15, giving a boost to the foreign exchange. Assistance is being provided by Department’s Project Development Cell (PDC), supported by Invest India, the National Investment Promotion and Facilitation Agency of Govt. of India. The PDC is proactively connecting with the State Governments, UT Administrations, foreign missions, fisheries and fish farmers, processors, exporters and all relevant stakeholders to understand interventions required for holistic development of Indian fisheries sector, technological collaboration, requirement of infrastructure and utilities amongst others.

Under the dynamic leadership of Hon’ble Prime Minister Shri Narendra Modi, we are committed to take path-breaking measures towards becoming Atma Nirbhar, ‘Vocal for Local’ and spreading brand India from Local to Global. To achieve these, concerted efforts will be required from all stakeholders. Therefore, I urge everyone to come forward, participate in the initiatives of my ministry and help us develop this precious sector in India.
India has abundant water resources in both inland and marine sectors with ecosystems spanning from the pure Himalayan waterways to the vast Indian Ocean; the Indian fisheries industry is supported through India’s distinctive biosphere. This thriving sector plays an important role in the Indian economy and supports the creation of livelihood, food and nutritional security. The sector also serves as the primary source of income for a sizable portion of the nation’s economically impoverished people.

Dr. Sanjeev Kumar Balyan  
Hon’ble Minister of State of Fisheries, Animal Husbandry and Dairying
The Indian Government has been committed to transforming the Indian Fisheries sector, being at the forefront and bringing about India’s Blue Revolution. While concurrently ensuring the socio-economic security of fishermen, fish farmers, and other stakeholders, the Government of India is pursuing transformative reforms aimed at the overall growth of the fisheries industry. Given the significance, the Department of Fisheries was established in February 2019 to support the sector’s growth, consistent and targeted attention. Accordingly, in June 2019, a separate Ministry of Fisheries, Animal Husbandry, and Dairy was established.

The tremendous growth of the sector has been fuelled by the industry that has leveraged the policies introduced by the ministry hereafter. Pradhan Mantri Matsya Sampada Yojana (PMMSY) has been widely accepted by the industry and other stakeholders, achieving over 57% of its overall target. I am delighted to share that the Ministry has also released a dedicated fund, Fisheries and Aquaculture Infrastructure Fund (FIDF) to provide interest subvention for the creation of fisheries infrastructure facilities both in marine and inland fisheries sectors and augment fish production across the country.

The fisheries sector of India is on a growth trajectory and there is no limit to the sector’s growth in creating employment and livelihood to promote India’s blue economy and create a sustainable and lucrative future for the sector.
As the world population is set to cross 10 billion by the turn of the century, food and nutritional security and sustainability form the centre-stage of global concern. The Fisheries being a proven, affordable source of high-quality protein and nutrition could play a major role in meeting this challenge. The Fisheries sector has been a major contributor to foreign exchange earnings and supports the direct and indirect livelihood of 28 million people, most of whom are small and marginal fish farmers. Thanks to the series of reforms and initiatives taken under the leadership of Prime Minister Shri Narendra Modi in last eight years, India globally ranks 2nd in aquaculture production, 3rd in total fish production with 16.25 MMT and 4th in fisheries product exports, amounting to USD 7.76 billion during FY 2021-22.

The ministry has undertaken several steps to improve fish production, exports with a strong focus on infrastructure development in the last eight years. Through the launch of its pioneering schemes, Pradhan Mantri Matsya Sampada Yojana (PMMSY) and Fisheries Infrastructure Development Fund (FIDF), the sector is consistently receiving support from the Government of India in realizing its true potential. The sector envisions to increase the farmers’ income through enhancement of production and productivity, improving the quality and reduction of waste, encouraging “more crop per drop” and converting “waste lands into wealth lands”.

MOVING TOWARDS A BLUE REVOLUTION

Dr. L Murugan
Hon’ble Minister of State of Fisheries, Animal Husbandry and Dairying
Our efforts to create a conducive environment for the development of the sector can fructify with collaboration from all corners of the country, with a special focus on new opportunities and technologies, to combat sudden disruptions in supply chain. The increased collaboration and effective partnerships between the Government and the private sector shall yield in futuristic results and stupendous growth. Cumulative effort of all stakeholders is instrumental in achieving accelerated growth of the fisheries sector, and together, we shall endeavour to work towards a sustainable and steadfast growth of the sector.

I take this opportunity to congratulate all the fishermen and fisherwomen, industrialists, policymakers, wishing them success and manifold growth in the Fisheries and Aquaculture Sector.
As a civilisation, India has had a unique relationship with its bounteous waterbodies and their manifold products with an 8,000-kilometre coastline, and a vast network of rivers. India has historically been a maritime civilization. In fact, our ancient scriptures and literature speak of the ocean’s gifts, including marine life. In 2014, our Hon’ble Prime Minister Narendra Modi called for a ‘blue revolution’ to transform India’s fisheries sector.

Since then, the fisheries sector has shown tremendous growth. India is now the second largest aquaculture producer and the fourth-largest exporter of fish and fisheries products in world. From 2014-21, the fisheries sector has raced more than 8 per cent growth each year, and to propel it even further, the government has pledged more than INR 30,000 crores under various schemes and programmes including the Blue Revolution Scheme, Fishery and Aquaculture Infrastructure Development Fund (FIDF) and Pradhan Mantri Matsya Sampada Yojana (PMMSY). India is determined to achieve the target of marine exports worth INR 1 lakh crore by 2025 through result-driven contributions from all stakeholders and concerted efforts in developing its niche subsectors such as seaweed, ornamental and cold-water fisheries.

Now India’s G20 presidency presents a unique opportunity to highlight the importance of the blue economy, especially for the Global South. The oceans play an important role in human livelihoods by providing the various ecosystem services on which the coastal community depends. The value of the blue economy’s natural capital is estimated to be around USD 25 trillion. The fisheries and aquaculture sector has adopted a unique growth trajectory and this booming economic growth is primed to translate onto the investment landscape in India.

Invest India has been a critical partner, in association with relevant ministries and state governments, in promoting India as a global destination for investments and ease of doing business in the fisheries and aquaculture sector. From supporting India’s expanding start-up ecosystem to harnessing the power of innovation, Invest India is the execution arm of various key initiatives of the Government of India such as National Single Window System, Start-up India, AGNiII – Accelerating Growth of New India’s Innovations, Project Monitoring Group, amongst others. Being unanimously elected as the President of the World Association of Investment Promotion Agencies (WAIPA) has been critical in strengthening India’s position as a global destination for business.

The first edition of this magazine gives a comprehensive overview of the booming fisheries sector in India with views from the Hon’ble Minister of Fisheries, Animal Husbandry and Dairying, and other key stakeholders of the Department of Fisheries. My compliments to the team for this wonderful guide to India’s vast fishing and aquaculture industry.
The Inland waters of India have a huge potential to provide the country with substantial food security and nutrition to offer a sustainable future to its growing population. Inland fisheries offer opportunities along the entire value chain, from production and value addition to marketing; given the potential of the resources, there is immense scope for vertical integration and horizontal expansion in form of increase in fish yield and expansion of inland aquaculture into ever-larger areas.

India has had the highest ever fish production in 2021-22 at 162.48 lakh tons with the inland fisheries and aquaculture production witnessing a 56 fold increase since 1950. During this period, inland fisheries has emerged as a major contributor, with the inland fish production doubling in the last 8 years to 121.12 lakh tons in 2021-22.

While inland fisheries and aquaculture have increased in absolute terms, we are on our path to harness its true potential. India has vast and diverse inland fisheries resources that are both underutilized and possess the prospect of unmatched growth. The increase in fish seed production presents opportunities to augment production along with inclusive growth with a magnificent achievement in the endeavour of doubling aqua farmers’ income. In some regions, inland recreational fisheries are significant in generating income and supporting livelihoods.
The Government of India, while recognizing the importance and potential of the fisheries sector, launched its flagship scheme, Pradhan Mantri Matsya Sampada Yojana (PMMSY), in September 2020 with highest ever investment in the fisheries sector, to drive the sustainable and responsible development of the Fisheries sector while ensuring socio-economic development of the fishers, fish farmers and associated stakeholders. To increase output, PMMSY envisions a comprehensive strategy that incorporates capacity expansion, technological infusion, and efficient resource management for enhancing the productivity of inland fisheries. The sector has been propelling huge scope in new avenues with approval of 5864 Fish Retail Markets and Fish Kiosks, 1792 ornamental fish rearing integrated ornamental fish units amongst numerous others.

Tanks and ponds contribute to the maximum share of total fish production and are predominantly utilized for culture-based fishery. In the last 8 years marine products exports have increased by 90.6% to INR 57586 crore in 2021-22, the government is committed to contributing to the department’s growth by developing not only export markets but focussing on increasing the local demand.

With a vision to further enhance and catalyse the potential of inland fisheries towards sustainable development of the sector and to cater nutritional needs of millions of people in the future, various allied areas are being strengthened through the sanctioning of Aquatic Inquiry Laboratory, a Disease Diagnostic Laboratory, a Mobile Quality Testing Laboratory, fish kiosks, ice plants/cold storage, fish feed mills/plants, fish transport facilities and enterprise units under PMMSY. In order to realize the full potential of India’s Inland Fisheries, coordinated efforts of all the stakeholders is essential in providing the necessary impetus for augmenting production through resource optimization, technology infusion, and capacity building.

It is imperative to reiterate here, that the several stakeholders and their contribution provide a conducive support system to investors in India, with opportunities in scaling up and diversification. We are committed to increasing investments and taking the sector to its zenith.
Marine Products Export Development Authority (MPEDA)

Strategies and action plan for enhancing seafood exports

Dodda Venkata Swamy
MPEDA Chairman
During the financial year 2021-22, India exported 13,69,264 MT of Seafood worth US$ 7.76 Billion which is all time high exports by value. USA and China are the major importers of Indian seafood. Frozen Shrimp continued to be the major export item.

**Export Performance Comparison**

The Sector performed extremely well during 2021-22.

- **19.12%** increase in terms of quantity
- **31.71%** increase in terms of ₹ (Indian Rupee) value
- **9.36%** increase in unit value
- **30.26%** increase in terms of US dollar value

**Major items exported**

- **Frozen Shrimp**
- **Frozen Fish**
- **Dried items**
- **Frozen Squid**
- **Live items**
- **Chilled Items**
- **Frozen Cuttlefish**
- **Ready to-Cook**
Seafood export projections by 2025

World trade of seafood is growing at a CAGR of 4%, assuming the same growth rate, the world trade in 2025 is estimated to be US$ 265.61 billion. If India retains the same share of 4% in the world trade, by 2025 our export would be US$ 11 billion. Various initiatives and strategic interventions are being taken towards enhancing the exports and meeting the initially aimed target of export of US$ 17.8 billion by 2025. Projected seafood exports by 2025 is captured below at different CAGRs, supplemented by initiatives and action plans on investments.

Projected seafood export by 2025

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<th>Year</th>
<th>Total</th>
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<td>2007-08</td>
<td>6071.94</td>
<td>2234.35</td>
<td>3837.59</td>
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<td>2008-09</td>
<td>7358.08</td>
<td>2771.69</td>
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<td>2009-10</td>
<td>8337.28</td>
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<td>2011-12</td>
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<td>2013-14</td>
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<td>4641.61</td>
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<td>2014-15</td>
<td>13165.61</td>
<td>4915.27</td>
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<td>2015-16</td>
<td>14219.9</td>
<td>5215.27</td>
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<td>2016-17</td>
<td>15274.27</td>
<td>5542.71</td>
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<td>2017-18</td>
<td>16339.67</td>
<td>5879.22</td>
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<td>2018-19</td>
<td>17405.13</td>
<td>6215.77</td>
<td>11189.36</td>
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<td>2019-20</td>
<td>18471.69</td>
<td>6552.32</td>
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<td>2020-21</td>
<td>19539.4</td>
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<td>2021-22</td>
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<td>21674.71</td>
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<td>22742.36</td>
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<td>2024-25</td>
<td>23809.96</td>
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CAGR 20%

With CAGR of 10%
india’s export targeted at Rs.76,000 Cr.
Limitations
A brief of production and market related issues that affected the trade during 2020-21

Stagnation/decrease in landings
Loss of fishing days due to Covid-19 and inclement weather especially along the coast affected the fishing operations.

Post harvest losses & lower unit value owing to poor infrastructure & handling
Due to inadequate on board cold chain infrastructure in fishing vessels as well as in the harbours / landing centres a lot of catch is wasted, affecting the quality and unit value realization in the domestic as well as export market.

Stagnation of shrimp culture area and productivity
At present, around 1.58 lakh Ha area is used for shrimp farming with an average productivity of 5 MT/ha/year. MPEDA has identified a potential area of 5.00 lakh Ha suitable for coastal shrimp farming especially in states like Gujarat, Odisha, Tamil Nadu, West Bengal and Andhra Pradesh. Adoption of Better Management Practices (BMPs), biosecurity measures and advanced technologies can propel the unit area production to 7 MT/ha/year across India. States like Gujarat and Andhra Pradesh have already achieved such production levels.

Low proportion of value addition
Though countries like Vietnam, China, and Thailand etc. are making big strides in export of value added marine products through processing of their own raw material and reprocessing of the imported raw material, the share of value-added products in volume in India’s exports is just 10% compared to 66% of Thailand or 38% of China or 26% of Vietnam.

Non Tariff Measures
Certain market regulations effectively act as an impediment for smooth trade and export of seafood. The presence of antibiotic residue and related increased import sampling frequency and biosecurity regulations associated with shrimp viruses such as WSSV affects the export of farmed shrimps to various countries. The other non-tariff measures include the ban on wild shrimp export, inspection of consignments for Covid-19 nucleic material and ban on dry fish export to various countries.

Dependency on single species
92% of India’s farmed shrimp production is contributed by a single species Litopenaeus vannamei, commercially known as Pacific Whiteleg shrimp. Other shrimp species produced are Penaeus monodon (Black Tiger) and P. indicus, which are produced in lesser quantities. In addition, freshwater prawn / scampi (Macrobrachium rosenbergii) is also produced in our country. Dependence on a single species for production and export trade is very precarious as disease occurrence can wipe out the production affecting the trade.

Lack of brand image for Indian Seafood
Indian seafood as mostly exported in raw frozen form which undergoes reprocessing and repacking abroad. Hence, the level of branding at individual exporter level is quite limited. There is a need to create and propagate a generic branding exercise for Indian seafood tagging major international events & festival seasons utilizing the reach of visual and digital / social media.
Strategies to combat non-tariff measures

BIOSECURITY ISSUES

- RGCA: Part of the National Surveillance Programme for Aquatic Animal Diseases (NSPAAD) operated by NBFCR
- NaCSA: encouraging cluster farming by farmers with small farm holdings, establishment & operation of Aqua One Centres (assesses the water quality parameters, disease diagnosis)
- Surveillance program warrants more disease diagnostic labs to help the farmers and capacity building on Best Management Practices (BMPs).

SUSTAINABILITY:

As more countries are introducing non-tariff barriers, it has become the need of the hour to comply with the associated regulatory requirements and equip our fishing sector.

COMPLIANCE WITH CERTIFICATION under Section 609 of US Public Law 101-162:

The Import Restriction on Indian Wild caught shrimp in USA due to the fishing methods (allegedly affecting sea turtle population) has caused an annual trade loss of 2500 cr. The National Marine Fisheries Service (NMFS) of USA has observed the overall risk of the marine mammal by-catch in Indian fishery, as ‘High’. It was required to assess the stock of marine mammals in the Indian EEZ to ascertain the comparability of the measures taken in protecting the marine mammals from fishery related injury / mortality in defining a fishery as ‘export’ or ‘exempt’ as per US regulations. MPEDA has assigned CMFRI, a study on Marine Mammal Stock assessment.

FISHERIES AND AQUACULTURE CERTIFICATION

MPEDA launched a scheme named “SHAPHARI” which roughly translates to pure fish in Sanskrit. The objective of the scheme is to produce residue free shrimp by ensuring Better management Practices (BMPs) in the value chain, thereby enhancing market access and market value.

CATCH CERTIFICATE:

Catch certificate means that the catch does not comprise of items sourced from Illegal, Unreported, Unregulated (IUU) fishing. Under the catch certificate system, MPEDA issues approx. 7500 catch certificates annually.

COMPLIANCE WITH MMPA Act (Marine Mammal Protection) of USA; under Section 609 of US Public Law 101-162:

The National Marine Fisheries Service (NMFS) of USA has observed the overall risk of the marine mammal by-catch in Indian fishery, as ‘High’. It was required to assess the stock of marine mammals in the Indian EEZ to ascertain the comparability of the measures taken in protecting the marine mammals from fishery related injury / mortality in defining a fishery as ‘export’ or ‘exempt’ as per US regulations. MPEDA has assigned CMFRI, a study on Marine Mammal Stock assessment.

TRACEABILITY

MPEDA enrolment satisfies traceability validation as per US Seafood Import Monitoring Programme (SIMP). It does online enrolment of Hatcheries and Farms with geo tagging & UID. So far more than 75,000 farms and 405 hatcheries have been enrolled by MPEDA.
EXPORT PROMOTION

MPEDA is addressing the emerging consumer concerns related to quality, conservation and sustainability, effectively keeping buoyant the merits of Indian seafood in the highly competitive global market through effective promotion. The outreach plan to promote Indian Fisheries shall encompass the following:

TRADAFAIRS
On an average, an increase of 25-30% in exports can be envisaged through targeted promotion campaigns that comprise international fair participation, trade delegations, road shows, advertisement campaigns, slotting in supermarkets etc.

FREE TRADE AGREEMENTS
Proper reviews of trade agreements for the benefit of seafood trade from India to different markets, addressing tariff related and origin criteria related issues will go a long way in enhancing the export of marine products.

TRADEPROMOTIONOFFICES (TPOS)
The TPOs of MPEDA play an effective role in the brand promotion campaigns besides encouraging tie ups with reputed buyers for Joint Ventures on value addition, over and above their liaising role with Government authorities, and interventions through active trade promotion campaigns.

MARKETRESEARCH
For in-depth information on a targeted market, mainly utilized to penetrate and strengthen the position into prospective and existing markets.

BRANDPROMOTION
Publicity, Advertisement, press releases will highlight India's potential and capabilities in the seafood sector and promote Indian Seafood Brand globally. There is a need for export promotion, visit of buyers/ experts etc., to enhance trade relationship in addition to advertorials and advertisements.

BUYERSELLERMEETS
MPEDA organizes BSMs in the form of webinars & events providing opportunities to Indian exporters for one-to-one interaction with buyers.

WAY FORWARD AND ACTION PLAN
The seafood export can be enhanced and the target of Rs. 1.00 lakh Crore seafood export target can be achieved through coordinated efforts of Central and State departments, promotional and development bodies, regulators and stakeholders through concerted efforts to create policies to enhance production addressing the constraints and effectively implement the interventions at the field level.

The uniqueness of India’s fisheries and aquaculture realms play a significant role in formulating the branding campaign of Indian seafood to strike the right chords of customer preferences.
Fisheries and Aquaculture is India’s “sunrise sector”, offering the highest return amongst all agricultural and allied sectors, and is a key driver in the economic prosperity of rural and coastal areas. Through coordinated and cooperative efforts from the public and private sectors, India’s fisheries sector has made remarkable advancements toward modernization and sustainable economic growth over the past few years. What makes it significantly differentiating in the economy is that not only it serves employment to the people directly involved in it, i.e., around 16 million fishermen but also indirectly through a variety of allied industries. Today, India is the third largest in overall fish production and sixth in terms of marine capture fish production. Owing to the Government of India’s commendable efforts, the fisheries sector has demonstrated an outstanding marine products export worth USD 7.76 billion. This sector has the potential for immense growth with a vast coastline of over 8000 kms and a significant network of rivers. India’s productivity per hectare is expected to increase by 5 MT/hectare by 2024 - 25 through constant development to adapt and compete in the ever-changing world and cooperation from the various stakeholders involved in unlocking the true potential of the sector. Fish, being an affordable and rich source of animal protein, is one of the healthiest options to mitigate hunger and nutrient deficiency.

The government is focused on creating much-needed prosperity in the Indian fishing sector and in order to address the infrastructure requirement, the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying launched the Fisheries and Aquaculture Infrastructure Development Fund (FIDF) and a flagship scheme Pradhan Mantri Matsya Sampada Yojana (PMMSY) for sector’s growth and development. The Government of India has also taken a niche initiative, focusing on facilitating the Inland harbours for enhancing the livelihood of thousands of fishermen dependent on fishing alongside the Ganga and Brahmaputra. Additionally, the government has provided the Kisan Credit Card (KCC) for fishermen, fish farmers, Self Help Groups (SHGs), joint liability groups, women groups, etc. to assist with the sector’s needs for working capital and short-term credit.

Technology is key for a robust fisheries sector and plays a catalytic role in the emerging transformation of fisheries production and trade. Mechanization is one of the focus areas to accelerate this growth. Although the contribution of the Indian Fisheries and Aquaculture sector in the economy has significantly improved in terms of production and export in the last 70 years, the share of the value-added product remains less than 10%. This underlines a high potential in enhancing value-added exports, resulting in higher prices for fishermen and fish farmers. The Government of India understands the strategic importance of the fisheries sector for its economy. To further strengthen it, a series of policy initiatives are being taken to keep up with the ever-changing and dynamic global scenario. Moreover, many community outreach activities and capacity building programs have been organized to sensitize the general public about the importance of fish as a good that plays a fundamental role in not only providing nutrition but also boosting the economy. With continued support being provided to the stakeholders, adapting better technological practices to ensure quality production and strong forward and backward linkages that can instigate domestic demand - India can soon be the global leading economy in the fisheries sector.
Union Minister of Fisheries and Animal Husbandry Shri Parshottam Rupala launched a unique coffee table book as a part of the ongoing celebration of 75 glorious years of India’s Independence, under the campaign Azadi Ka Amrit Mahotsav. The recipe book is a highlight of the diversity of fish within the domestic water bodies and the fish culinary heritage of the country that signifies the diverse cooking and eating styles across the country.

**Opportunities in the Sector**

**Fish & Seafood - a collection of 75 gourmet recipes**

**Ornamental fish breeding/rearing in tank/ponds**

*Barilius vagra* is a promising ornamental indigenous species found in the Himalayan region is brought under the ambit of the Ornamental Fish Breeding Programme.

**Inland fisheries sector**

56-fold increase in Inland Fisheries and Aquaculture production in the last 8 years.

- **0.19 Mn** Rivers & Canals (km)
- **2.41 Mn** Tanks & Ponds (ha)
- **3.15 Mn** Reservoirs (ha)
- **1.24 Mn** Brackish water (ha)

**Opportunities in Marine Fisheries**

Seaweed farming and value addition

Deep Sea Fishing Vessels to harness the potential of India’s Blue Economy

The annual marine fishery potential of the EEZ is estimated at 5.31 million tonnes (excluding the non-conventional resources) of which the pelagic resources form more than 50% of the total marine fish landings of the country.
Launched in the year 2018-2019

Fisheries and Aquaculture Infrastructure Development Fund

Objectives

- Create and modernize capture & culture fisheries infrastructure
- Create Marine Aquaculture Infrastructure
- Create and modernize Inland Fisheries Infrastructure
- Reduce post-harvest losses and improve domestic marketing facilities through infrastructure support
- Bridge the resource gap and facilitate completion of ongoing infrastructure projects.

Achievements under FIDF

14 Fishing Harbours of various States/UTs have been approved for development/upgradation under FIDF

Details of 14 fishing harbour proposals approved under FIDF
### Andhra Pradesh

<table>
<thead>
<tr>
<th>Fishing Harbour</th>
<th>Name of the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>Uppada in East Godavari</td>
</tr>
<tr>
<td></td>
<td>Vodarevu in Prakasham</td>
</tr>
<tr>
<td></td>
<td>Machilipattinam in Krishna</td>
</tr>
<tr>
<td></td>
<td>Nizampattinam in Guntur</td>
</tr>
</tbody>
</table>

### Gujarat

<table>
<thead>
<tr>
<th>Fishing Harbour</th>
<th>Name of the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modernization of Existing</td>
<td>Navabandar</td>
</tr>
<tr>
<td></td>
<td>Madhavdi</td>
</tr>
<tr>
<td></td>
<td>Veraval - Phase 2</td>
</tr>
<tr>
<td></td>
<td>Porbandar - Phase 2</td>
</tr>
<tr>
<td></td>
<td>Sutrapada</td>
</tr>
</tbody>
</table>

### Tamil Nadu

<table>
<thead>
<tr>
<th>Fishing Harbour</th>
<th>Name of the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>Tharangampadi, Nagapattinam</td>
</tr>
<tr>
<td></td>
<td>ThiruvottiyurKuppam, Tiruvallur District</td>
</tr>
<tr>
<td></td>
<td>Azhagankuppam, Villupuram District</td>
</tr>
<tr>
<td>Modernization of Existing</td>
<td>Arcottuthurai, Nagapattinam District</td>
</tr>
<tr>
<td></td>
<td>Mudhunagar, Cuddalore</td>
</tr>
</tbody>
</table>
Pradhan Mantri Matsya Sampada Yojana
Launch date: 10th September 2020

Objectives

- Increase the fish production to 220 lakh metric tons by 2024-25.
- Sustained average annual growth of around 9% in fish production.
- Increase in the contribution of GVA of fisheries sector to the Agriculture GVA to 9% by 2024-25.
- Export earnings to to Rs.1 lakh crores by 2024-25
- Enhance Average annual productivity in aquaculture from the present national average of 3.3 (2019-2020) tons to 5 tons per hectare
- Reduce Post-harvest losses from 20-25% to 10%.
- More than double the domestic fish consumption to approximately 12 kg/capita per annum.
- Generate 55 lakhs employment opportunities across the supply and value chain

Achievements till December 2022

- Spectacular growth of fish production at 10.34% in the year 2021 - 22 against 3.77% in 2020 - 21.
- Substantial increase in seafood exports of India with an average annual growth rate of 14% in the least 10 years.

INVESTABLE OPPORTUNITIES

**Oceanic Tuna**
The fishery resource potential of oceanic tuna in the Indian EEZ is 213,000 tons with estimated composition of yellowfin at 54 per cent, skipjack at 40 per cent and Big-eye at 6 per cent.

**Brown Shrimp**
The brown shrimp *Metapenaeus monoceros*, a commercially important high-value species in India, is distributed across the world from the eastern Mediterranean, the east coast of Africa, Madagascar, Tanzania, Red Sea, all along the coasts of India, Sri Lanka, Pakistan, Malaysia, Straits of Malacca, Indonesia to Australia and Japan.
### Technology infusion in Inland Fisheries

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pond area for inland aquaculture</td>
<td>14417.83 HA</td>
</tr>
<tr>
<td>Re-circulatory Aquaculture Systems (RAS) Units</td>
<td>5000 NOS</td>
</tr>
<tr>
<td>Pond area under Saline-alkaline culture</td>
<td>1815 HA</td>
</tr>
</tbody>
</table>

### Technology infusion in Marine Fisheries

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep sea fishing vessels</td>
<td>426</td>
</tr>
<tr>
<td>Up-gradation of existing fishing vessels</td>
<td>1,027</td>
</tr>
<tr>
<td>Sea cage for fish culture</td>
<td>1,556 NOS</td>
</tr>
<tr>
<td>Marine Finfish hatcheries (small and large)</td>
<td>10</td>
</tr>
<tr>
<td>Pond area under brackishwater aquaculture</td>
<td>1,325 HA</td>
</tr>
<tr>
<td>Brackishwater hatcheries</td>
<td>13 NOS</td>
</tr>
</tbody>
</table>

### Post-Harvest Infrastructure Facilities

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice plant/cold storages sanctioned</td>
<td>351</td>
</tr>
<tr>
<td>Fish feed mill/plant</td>
<td>540</td>
</tr>
<tr>
<td>Units of refrigerated fish transportation facilities</td>
<td>17,535</td>
</tr>
<tr>
<td>Fish retail market</td>
<td>185</td>
</tr>
<tr>
<td>Fish kiosks including ornamental kiosks</td>
<td>5682</td>
</tr>
<tr>
<td>Value added enterprise units</td>
<td>19</td>
</tr>
</tbody>
</table>

### Fishing Harbors and fish landing centres

![Fishing harbors and fish landing centres](image)
### Aquatic Health Management

- **21** Mobile centres and testing labs
- **14** Disease diagnostic centers & quality testing labs
- **4** Aquatic referral labs

### Development In North-East Regions

- **160** NOS. Hatcheries
- **2,633.80** HA Integrated Fish Farming
- **146** Re-circulatory Aquaculture System (RAS) Units
- **460** NOS. Ornamental Fisheries units
- **428** NOS. Biofloc units
- **3,153.2** HA Construction of new ponds
- **5** Brood banks
- **106** Nos. Feed mills

### Ornamental Fisheries

- **1,670** NOS. of Ornamental fish rearing units
- **127** NOS. of Integrated Ornamental fish units (breeding and rearing)

### Coldwater Fisheries

- **982.6** HA area of new pond
- **26** Trout hatcheries
- **3,149** new raceway units
- **63,731** NOS. Nos. of RAS units

### Additional Information

- **14** Disease diagnostic centers & quality testing labs
- **4** Aquatic referral labs
- **106** NOS. Feed mills
- **5** Brood banks
- **428** NOS. Biofloc units
- **3,153.2** HA Construction of new ponds
- **982.6** HA area of new pond
- **26** Trout hatcheries
- **3,149** new raceway units
- **63,731** NOS. Nos. of RAS units
### Fisherfolk Welfare

- **5,323 NOS.** Replacement boats and nets for fisherfolk
- **6,77,462** Livelihood and nutritional support for fishers’ families
- **72 NOS.** Extension and support services (Matsya Seva Kendras)

### Other important Activities

- **2,489 NOS.** Sagar Mitras
- **3** State of Art Wholesale Markets
- **12** Integrated Modern Fish Landing Centres
- **1** Integrated Modern Coastal Fishing Village
- **22 RESERVOIRS.** Integrated Development of Reservoirs
- **1** Integrated Aquapark

### INVESTABLE OPPORTUNITIES

- Rajasthan, Haryana, Punjab and Uttar Pradesh are the potential states for salinewater aquaculture.
- Gujarat, Odisha and West Bengal are the potential states for brackishwater aquaculture.
GreenGrahi is an agri-tech/ climate tech company turning pre-consumer food waste into high quality protein and oil using insect bioconversion process for the aquafeed industry. It’s on a mission to turn 4 trillion pounds of food waste back to food. In the last few months, they have successfully conducted trials, producing insects in an adequate environment with optimal health and nutrition quality. Currently they are building a pilot production facility to run feeding trials with aquafeed industry, and agri and fisheries R&D institutes. The founders - Siddharth and Shivali - have a deep passion to solve world’s food wastage and food insecurity problem. Together, they create a unique blend of technical and business background to solve this complex issue threatening the sustainable growth of humanity.

Siddharth is an MBA from Kellogg School of Management, USA and B.E from BITS Pilani, India. With over 7 years of work experience consulting and operating businesses, he has first-hand experience on how to successfully grow and run a business. So, at GreenGrahi he oversees strategy, business development and finances. Shivali is a Masters in Environmental Studies and Resource Management from TERI University, India and a Humboldt Fellow, Germany. With over 8 years of work experience in consulting, technology, and engineering food waste management facilities in India, Germany, and USA she leads the operations, technology, and marketing at GreenGrahi.

The dynamic duo has made immense progress over the past year, bringing their insect bio-conversion technology closer to market. After winning several innovation competitions in India and the US, Siddharth and Shivali foresee 2023 being a breakout year for their startup. Having received strong interest from the aquaculture industry, they plan to close their seed round so that they can soon start to scale up their R&D plans to develop India’s first industrial scale facility. Their goal is to scale their manufacturing so that ultimately their insect-based feed can serve as a viable alternative for major feed companies and fish farmers.

Future of Aquaculture Feed

By the year 2050, the demand for animal protein is projected to double because of the rising population and improving standards of living, but with a third of our crops and 90% of our fish already exploited, we cannot meet this demand with current solutions. On the
Evolving fisheries and aquaculture ecosystem in India

I am pleased with the focus and support that fisheries and aquaculture ecosystem is being given in India. The sector is evolving rapidly because of an excellent support system created by public as well as private stakeholders. PMMSY is a transformational scheme that will accelerate the holistic development of the sector. It has policies and incentives to support stakeholders right from a small-scale fish farmer wanting to sell and market his/her produce to innovators working on creating novel solutions for the sector. Fish farmers, academicians, entrepreneurs, policy makers, and large industries are super passionate and helpful, and second their interests are aligned. So, they are collectively working to take the sector forward and fix any issues that are hampering the growth.

As an entrepreneur in the agri-biotech sector, I’m seeing a great interest from the national and international VCs to support entrepreneurs trying to create new solutions for the agri/aqua sector in India. India has proved its might in creating SaaS solutions for the world, now it’s time for entrepreneurs to take India’s Agri and allied sector to new heights.

contrary, a third of food i.e. 69 million tonnes is wasted between farm and fork every year, amounting to economic losses of more than $15 billion/year. Most food waste in India actually takes place upstream, between farms & the city. Around 50% of the food waste which is inedible ends up into dumpsites where it has adverse economic, environmental and social repercussions on local people & the natural ecosystem. In a world where hunger and malnourishment are on the increase, unacceptable levels of food loss and waste call for urgent action.

At Greengrahi, we take a circular approach by harnessing the nutritional value from agro food waste residues/ side streams (such as wheat straw, cutting and pruning waste, spent grains) and turn it into insect protein, insect oil and frass (high quality fertilisers) using insect bioconversion technology. As Insects are not accepted as a food for human nutrition in India, we turn food waste into animal feed i.e insect meal, oil and fertilizer, that plays a crucial role in India’s food security.

Feed costs represent majority of total costs of aquaculture farming industry. Because of climate change and increasing demand, feed costs have increased by upto 25% in the last 5 years alone. Such volatility affects livestock producers’ profits and their ability to buy feed, especially small-scale farmers. Consequently, fish farmers need alternatives that are both effective and affordable. Insects have always been a natural part of the diet of aquatic species (fish, shrimp). At Greengrahi, we use Black Soldier Fly to create sustainable and natural form of protein to develop fish feed. The BSF larvae are reported to have health promoting effects due to bioactive compounds and anti-microbial properties. Multiple studies have been performed with partial (50%) or total replacement of fishmeal (FM) by BSF meal in aquafeed, clearly validating it for its nutritional quality.

At a global scale, climate change and sustainability are massive concerns that need to be addressed at every level. India’s major export markets such as EU and USA have already commenced tightening up their regulations as major producers and retailers have set ambitious targets to reduce carbon footprints and further lower the environmental impact of aquaculture. India’s aqua export industry needs to align itself with the same principles to stay relevant and competitive in this new marketplace. Another challenge that’s limiting the growth is the limited supply of high-quality fish meal which is a primary ingredient for aquafeed. As we are aware that fish meal is seasonal, susceptible to climate change, and limited in quantities. These factors make it difficult for the aquaculture industry to accurately forecast the fishmeal’s supply and plan their own production. Fishmeal’s higher prices, especially in the off season, leaves the aqua industry with razor thin margins that don’t encourage reinvestments in the sector.

Evolve fisheries and aquaculture ecosystem in India

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Shivali Sugandh
Co-Founder
About JMJ:

In 2006, JMJ had modest beginnings, a modest idea, a modest initial investment of Rs. 50,000, two ambitious founders, and a contract factory. Since that time, JMJ has expanded to become the seafood processor of choice for all its clients globally. Over the course of 17 years, the company's modest yearly turnover of a few lakhs has increased to 5 million USD with 130+ workers.

They are currently expanding their operations within India on the retail space under their product brands HookCatchTM and “BlanchesTM; expanding the value chain by maximum raw material utilisation; minimal waste while being sustainable; and nurturing their strong customer base domestically & internationally with product diversity of over 220+ exclusive & impressive products. Previously, they were a seafood processor to the developed markets like across the world in primary value addition.

“Success is not a lottery; success does not come overnight, it’s an empire built over time with one brick placed into a wall in a consistent and steadfast manner.”

SHANE GOMES
Chairman
With the goal of becoming a household name for seafood in India and abroad, futuristic, creative, and technology-driven retail ideas that include catering to Indian, Asian, and Continental Cuisines have been developed.

With a concentration on Yellow Fin Tuna & Sword Fish as its major products, JMJ Seafoods Private Limited, an Indian seafood processor and exporter with two decades of experience, has maintained its position as a leading player in the industry. JMJ always believed in technology and its role in business, which has been the backbone of growth at “JMJ”.

Role of Technology in the Development of Fisheries and Aquaculture Sector

After two young boys with laptops entered the Indian harbours 17 years ago to launch a seafood export business, everyone made a spectacle of them, claiming they couldn’t run a seafood business while using laptops.

After 17 years, JMJ is now one of India’s top exporters of fresh seafood. The importance of introducing technology and technological breakthroughs into any organization is emphasized in this narrative.

Vision for 2023

Their flagship products, Blanches™ & HookCatch™, will soon be available at all of India’s leading shops. The Carl’s Kitchen™ will be distributed throughout India, with Chennai serving as the launchpad and the rest of the country as their playground. Carl’s is working to transform how fish is eaten both domestically and abroad. By doing this, they can guarantee that the future generation receives natural protein that is nutritious, sustainable, and healthy.
About Megaa Moda

Mr. Yogesh Gupta, a Fellow Chartered Accountant, is also an All-India Rank Holder and a businessman by profession. He has a vast experience in international trade in the past 22 years that has enabled his export business to grow from zero to over 200 crore in the Marine Sector.

Over the past decade, Megaa Moda Private Limited has established itself as one of India’s leading processors of frozen seafood under its brand names “MEGAA” and “MEGAA DELIGHT”.

The company’s product range offers varieties of fish, Black Tiger Shrimp, Vannamel, Scampi and Sea Caught Shrimps in value-added forms such as Headon-Shellon, Headless-Shellon, Easy Peel, Peeled & Deveined and Peeled & Un-Deveined. These value-added products are being exported to countries like China, Japan, Vietnam, Thailand, Malaysia, Singapore, Korea, USA, Canada, Mexico, UAE, Mauritius, Brunei, Germany, France, Netherlands, Belgium, etc. The delectable products offered by the Company have already occupied shelf space in leading retail stores and online delivery portal.

Megaa possesses all the required national as well as international certifications like US Food & Drug Administration (USFDA), Best Aquaculture Practices (BAP), Brand Reputation through Compliance Global Standard (BRCGS), Global Aquaculture Alliance, ISO 9001:2015, JAS-ANZ, SEDEX and AEO Indian Customs which endorses its quality of facility and products.

Megaa is eyeing to enter retail space in European Countries and the USA to expand its reach to end consumers. The Company has opened its subsidiary in the USA in 2022 in the name of “Box Foods LLC” to increase its presence in the US market. The Company is in the process of adding other frozen items to its portfolio like Basa Fish, Hilsa Fish, Bhetki Fish, and Ready-to Cook/Fry Products.

The Company aims to enhance its forward linkage through e-commerce platforms and B2C both in the domestic as well as international market. Through agreements with major Indian retail chains, the company envisions building its retail and e-commerce consumers and gain access to the enormous market for “pre-cooked” and “ready-to-fry” products. It is also looking to raise fresh funding from Series B Investors to embark on a new phase of development along with the addition of stock keeping units and phase-wise appointment of distributors in all the regions.
Emerging Trends and Opportunities

Due to the significantly faster rate of growth in frozen food demand, particularly in the wake of the COVID pandemic, the outlook for the frozen food industry is highly promising. There is an unmet demand that will lead to consumers buying as payback. A cycle of ups and downs will always exist for food supplies.

Challenges in the Industry and Recommendations

Although India exceeded $5828 million in shrimp exports, with an increase of over 31% in the same period last year, the lack of vessels and containers is a key issue in logistics since it extends shipment times and causes delays in turnaround. The fisheries sector was severely impacted by a significant increase in freight cost in 2021–22. It took some time for buyers to absorb these increased freight costs and interest burden.

Moreover, there are trade barriers with certain countries hampering export and initiatives can be taken to remove such barriers in order to facilitate trade in various countries.

Role of FFPOs

FFPOs are empowering small and marginal farmers by providing them with adequate resources, inputs and access to markets. FFPOs are receiving financial assistance under the Pradhan Mantri Matsya Sampada Yojana that has helped improve their produce management as well. Farmers are now using reefer vans and insulated cargos to preserve fish and thereby reducing waste. Their product packaging has also improved significantly. FFPOs are also helping farmers by empowering them with better negotiating power.

Future of fisheries and aquaculture in India

Climate change is affecting the distribution and productivity of fisheries and aquaculture. Aquaculture, being the world’s fastest growing food production system, is growing at 7% annually. The Government’s focus on the fisheries sector is enabling the growth and development of Fisheries sector in India. India has huge potential for expansion of its export volumes by developing adequate infrastructure and adopting new production technologies.
About Pearl City

From starting the first business at the age of 18 to acquisition of a data analytics company, it has been a journey of growth and experiences which further continued to investments across the sectors and countries.

Pearl City Marine Products Pvt Ltd was established in 2015 in Tamil Nadu by a group of professionals who are robust in the business of manufacturing of fishmeal and fish oil. Mr. Abu Baker, Mr. Abu Tahir and myself, Hiras have been the main promoters of the company and have established a superior quality fish meal and oil manufacturing plant. In 2017, we acquired 50% of Sanchari Marine Products Pvt Ltd, another fishmeal manufacturing company in Tamil Nadu, making us one of the leading fishmeal manufacturers in India.

At Pearl City, our vision is to be one of the leaders in the global fisheries industry and we plan to diversify ourselves into fish feed, omega-3 extraction, fish processing, freezing, and aquaculture in the near future. As part of our diversification plan, we started a processing plant in Kerala for freezing fish a in early October 2022. We also plan to expand our fishmeal production facilities to other states in India.
Emerging Trends and Opportunities

Fish Meal, being high in protein content is a nutrient-rich feed ingredient that is used as food content in aquaculture, poultry and animal rearing. The global fishmeal & fish oil market was valued at USD 8.87 billion in 2019 and is expected to reach USD 15.8 billion by 2027 at a CAGR of 8.8%. Hence, there is always a very high demand for fishmeal globally. As there is also a high demand for fishmeal locally, we sell 90% of our total production within India to meet the local demand. There are many technological advancements in this field and we always try to innovate and adapt to new technologies to get better results. We manufacture superior quality Fish Meal and Fish Oil in our modern and fully mechanized state-of-the-art Fish Meal and Fish Oil plant situated on the coast of Tuticorin, the heart of fisheries industry in South India.

Challenges in the Industry and Recommendations

One of the challenges for the industry is the lack of availability of quality raw materials. The main reason is that fishermen do not have adequate facilities to store and sell raw fish at the harbour. Another challenge persisting is the increasing cost of raw fish that can be solved by capping marine fish prices during the peak season since this is faced by several stakeholders in addition to fish meal companies.

Role of FFPOs

Integrating of Fish Farmer Production Organisations (FFPOs) will help small-scale fishers and aqua farmers throughout the value chain. Successful implementation and management of this initiative will accelerate the growth of the fisheries and aquaculture sector in our country.

Future of fisheries and aquaculture in India

India is the third largest producer of fish in the world, contributing 8% of global fish production. However, the GVA contribution of fishing and aquaculture is still lower compared to other related sectors. India has a lot of potential to contribute more to this sector. Growing domestic and international demands provide opportunities for high-income growth for fishermen and aqua farmers. India’s aquaculture is indeed growing faster than the global average. Aquaculture production in India has grown at an exceptional rate of 7.59% annually, which is higher than the global average of 5.23%. At this pace, India will soon become the largest producer of fish globally.
About The Company

Suryo Udyog Limited (SUL) commenced operations in the seafood business in 1978 and gradually expanded into a fully integrated shrimp value chain, consisting of hatcheries, corporate farms, network of farmers and processing units. The group also diversified into various other businesses such as colour televisions, textiles, packaging, media and hotels. A big setback for the company came in the late 90s during the outbreak of the White Spot Virus (WSSV) which was a lot more damaging due to negligible export market for small size shrimps. In 2006, I graduated from George Washington University, Washington DC and joined the family business. By 2008 we restarted export operations, while hatchery and farmer financing operations were yet to start. Within two years the timing was great when supply and demand were high due to EMS outbreak in SE Asia.

Our vision is to be a pioneer in developing aquaculture value chains, not only in shrimps but in other species as well. Within the shrimp value chain, we aim to be early adopters of new technologies and ensure that it is adopted in scale by the entire sector. We would particularly like to focus on aggregating smallholder farmers into SHGs/FPOs/Societies and then give them access to finance and good advice. Our mission is to usher in a blue revolution in Odisha so that it creates sizeable job opportunities making it the seafood capital of the world, a pioneer in farming and processing seafood products.

Currently we are actively looking for suitable partners that have new technologies and capital so that we can collaborate using our aquaculture assets, professional team, network across the industry and high brand value.

Emerging Trends and Opportunities

However now we are facing a challenging situation once again, disease outbreaks, processing overcapacity, stagnant demand are some of the major issues we are currently facing.

I believe, every problem is an opportunity. So currently there are plentiful great opportunities. Roughly 20% of the crops do not survive due to disease outbreaks. So just in Odisha this amounts to almost Rs. 1000 crores lost due to diseases. One emerging trend is disease diagnostics is the early detection method pioneered by this Australian startup Genics. As of now to avail their services one needs to send samples by courier to Australia and then get their results. Apart from detection technologies we also need to promote high quality health care products.

The backbone of the shrimp value chain is the farmer. For the farmer, this is not your average cash crop, one can almost categorize it as an MSME unit itself. The traditional finance options available to the farmer are through feed and input dealers, which is a very high cost for finance. Traditional financial units such as banks and NBFCs will be very reluctant due to poor domain
knowledge and low-ticket size. Perhaps aggregating smallholder farmers into FPOs and then handholding the FPOs till they are commercially ready would be one way to go. Active involvement of civil society organizations both domestic and international should be discussed that will provide much needed finance and staff support but credibility that in turn might fetch a higher price in the export market.

Sustainability is no longer a buzzword and if our products are not sustainable, they are not marketable. One way would to be to work with Seafood Watch at the state level and see if we can achieve a “Yellow” or “Green” rating from the existing “Red” rating of avoid shrimps from India. Given the growth trajectory of Vannamei farming in the first few years, a lot of new processing capacity was added to the industry. However now we are in a state of excess processing capacity. The government should start looking at other species and promote the development of the value chain for these species. Currently 3 main species have sufficient scale to explore processing. These would be Tilapia, Pangasius and Indian Major Carps. Establishing multi species hatcheries is also a step in the right direction.

**Focus on Exports – Challenges and Opportunities with Recommendations**

Our biggest challenge is that we are not competitive with products from Vietnam, Ecuador and Indonesia. A big source of this weakness is that we do not have FTAs with major markets such as USA, Canada, EU and China. Apart from that exports to EU are subject to more testing compared to shrimps from other countries. The biggest cost component for shrimp is shrimp feed. Ecuador has access to GMO soya, and the transit cost is minimal, they have access to world class Peruvian fishmeal with low transport costs. Hereby in India, we are destroying our captive wild resources and further weakening this sector. We should also wholeheartedly embrace new feed alternative technologies such as Algal Oil and Insect Meal. Infrastructure is another major issue. Farming requires a lot of energy. It is in India’s and the planet’s best interest that this source of energy comes from electricity as opposed to diesel. However, the unfortunate truth is that 90% of farmers in Odisha rely on expensive diesel for their operations.

I have already written about disease management above. But please keep in mind that this is a pandemic. These require not only funds, but also technical support. The state fisheries department in partnership with industry bodies should brainstorm and chalk out disease mitigation strategies. The stakeholders need to invest in more genetic programs. There is a domestication of Black Tiger project, but we are yet to see the popular results. Apart from that a genetic breeding program for Vannamei is the need of the hour. Ecuador after the outbreak of WSSV embarked on a breeding program that gave more emphasis to survival as opposed to growth traits, perhaps India needs to start something similar.

Given the reshoring opportunities that have opened from China, India has the potential to become a seafood processing hub. For this a more actively involved government and private intervention is required so that a beachhead is established for the private sector to flourish.

MPEDA has a body called National Center for Sustainable Aquaculture (NaCSA), that have formed societies across India. We need to finance a project where these societies are strengthened and become robust FPOs (Farmer Producer Organisations). This way the government can demonstrate how aggregation can lead to access to formal finance. These organizations should also be encouraged to achieve third party certifications such as ASC and BAP.

**Future of Fisheries and Aquaculture in India**

The future of fisheries and aquaculture is very bright in India. We need active involvement from the central and state government and all allied stakeholders, in order to truly usher in a Blue Revolution.

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Aditya Dash
Managing Director
Rising Tide commenced its operations in 2014 with revenue of INR 1 Cr with a vision of integrating the aquaculture farmer into the ecosystem for the development and growth in the entire value chain, benefitting the fish-farmer and playing the larger role in catering need of growing population. Rising Tide’s growth journey can be attributed, ironically to Covid-19, with revenues doubling ever since. We have been able to achieve our revenue of the previous financial year within six month of this financial year and are on course to cross the 150 crore mark.

Our vision for the future relies on sustainability and growth by inclusion. This vision is imperative for the industry as a whole to level Ecuador, who, as a nation, has surpassed India in shrimp farming in the current fiscal year despite its fractional landmass as compared to India.

Opportunities and trends shaping the Aquaculture Industry

The technological growth in the sector was relatively stagnant for a large part of the earlier decade, but that has drastically changed over the last 5 years.

The theological advancement in aquaculture farming, real time data collection from ponds through IOT devices, automated feeding devices along with machine-assisted harvest systems have found their way into the Indian aquaculture space. Growth of Agri tech companies within the country has helped the advancement along with the considerable investment by the government in infrastructure and transportation have contributed to the ease of procuring from a farm in Gujrat and producing the said product in Andhra Pradesh.
Our company is working on a platform to integrate aqua farmers within West Bengal so that they get aid in terms of inputs, technology, capital, post-harvest services and the ability to market their product and get the best available prices so that they aren’t restricted to selling only to a local agent but are aware of the price and value of their product in the entire country and in the international market.

**Highlights**

High cost of capital for aqua farmers seems to be the major issue since neither do they have access to banks and NBFCs nor do they have access to crop insurance. This forces them to borrow capital from the unorganised sector at exorbitant rates of interest and a crop failure is more than likely to cause great damage to their endeavour, especially due to no crop insurance. With the introduction of PMMSY and the growth of start-ups within the space combined with the support from the Government, the industry is positive of support and steadfast growth of the sector.

**Evolving fisheries and aquaculture ecosystem in India**

India is one of the leading countries in aquaculture production and has the ability and potential to address the global demand for aquaculture given the resources and land area at our disposal. With effective policy and investment in the right direction by the right people, we can surely be the outright leader in the sector. If we are able to champion our farmers and those involved in fishing and allied activities, the rest will definitely fall into place. The emphasis must be on human resources, technology and infrastructure.

**Role of FFPOs**

Integration of FFPOs is a great initiative that can help educate all the stakeholders on technology, options available and best practices. It helps stakeholders to come together and form systems that allow the collective to grow rather than focus on individual growth. This sort of cooperative effort saw the dairy sector grow by leaps and bounds in India and ultimately lead to better quality of the produce, waste reduction and considerably better practices. The FFPO initiative will foresee similar results if it can be integrated in a similar manner.
About The Waterbase Limited

The Waterbase Limited has been a pioneer in shrimp Aquaculture for nearly 30 years, contributing significantly to the sector’s growth by imparting knowledge, nurturing talent and playing a pivotal role in transforming the lives of the stakeholders. The Waterbase Limited was incorporated in 1987 as India’s first fully integrated aquaculture company, providing all requisite inputs for a successful and sustainable aquaculture. While being manufacturer of shrimp feed, animal healthcare products and processing & exports of shrimp, Waterbase has also established a hatchery to supply health post larvae to fish farmers.

The Waterbase Ltd. is promoted by the Karam Chand Thapar Group, a diversified Indian conglomerate with business interests in Logistics, Real estate, and Aquaculture. KCT Group was founded in 1929 by the late Karam Chand Thapar, who is often regarded one of the founding fathers of Indian industry and commerce. The Group has a long and proud history of doing business in India.

Vision

Our Company is committed to developing new technologies and imparting best practices for the growth of the sector and its contribution to the Indian Economy, through the company’s pioneering efforts in innovation and creating sustainable solutions in the entire value chain of “Farm to Fork” to attain market leadership. We look to maximize stakeholder value by consistently exceeding customers’ expectations and achieving operational excellence.

Ramakanth V. Akula
CEO
**Trends, Opportunities and challenges**

With the wild catch dwindling, Aquaculture is the only source to meet the ever-growing demand for nutritious seafood. The sector is replete with innumerable opportunities in every vertical of the value chain that are imperative to the sustainable growth of the sector. Technology ought to play a paramount role in supporting the sector and fuelling its growth trajectory.

Integration of FFPOs would assist in reducing wastage, boost production and help in cost optimisation. This would go a long way in realising the objectives envisaged by the government to make the FFPOs viable and self-sustainable.

**Evolving fisheries and aquaculture ecosystem in India**

The Government’s thrust on fisheries, in the past few years has yielded exceptional results. Concerted efforts are required to create the right ecosystem to promote investments in technology, innovation and commercialization across the value chain and focus on R&D (BMC, NBCs) towards offsetting import dependency of broodstock, feed additives etc. Our PM’s vision of Atmanirbhar Bharat is aligned with the Make in India vision and our sector is imperative to India’s growth story.

**Integration of FFPOs**

Integration of FFPOs would assist in reducing wastage, boost production and help in cost optimisation. This would go a long way in realising the objectives envisaged by the government to make the FFPOs viable and self-sustainable.

1. **Diversification of Species:** Depending only on Vannamei shrimp will not augur well for our growth. We should look at alternatives like SPF Black Tiger and develop local species like Indicus.

2. **Defend Cost structure:** We should defend our cost structure to remain the top exporter. We should increase productivity to lower the cost of production by adopting new technology and best practices.

3. **Disease management and Diagnostics:** Technology should be used for disease surveillance and disease management. Diagnostics play an important role in crop protection and increasing in productivity. We should invest in more laboratories to help farmers screen for pathogens, viruses and soil and water testing at affordable rates.

4. **Driving Domestic Demand:** A sizeable domestic demand shall act as a hedge when the international demand is volatile and thus ensures farmers interests are protected. We have to exploit the latent demand for seafood that exists in large parts of India. Issues around awareness, availability and affordability should be tackled to drive the domestic demand.

IOT and AI are used to improve productivity in shrimp farming and technology adoption will further aid in disease surveillance, optimizing cost and in intensification. Auto feeders, RAS and Biofloc are amongst other technologies offering tremendous opportunities and scope for growth.

**Feed**

Going beyond the realms of meeting the energy requirements of shrimp, feeds are being formulated to resist diseases, achieve faster growth, and keep the pond bottom clean. Functional feeds to address the disease issues during the culture period offer a huge opportunity. It is an industrial need to formulate different feeds for high and low saline areas and low as well as high-density farms.

India is the second largest producer of aquaculture but lower productivity, frequent disease outbreaks, high production costs are impacting farming tremendously. It is therefore, well understood that there is a need to overcome these challenges through following interventions:
Gujarat is predominantly a marine fish producing State as it accounts for a significant share in India’s marine fish production. The state also aims to become a leading freshwater fish producing state in the country.

The state has performed exceptionally well in domestic and international exports showing significant growth in the foreign export earnings. The state contributed to more than 19% of India’s fish export by exporting 2.28 lakh MT of fish valued at INR 4254.21 Cr during FY 2020-21. China, Japan, European Union, and the United States of America are amongst the top importing countries.
Opportunities

The state offers tremendous scope for enhancing fish production by developing the Indian fisheries sector owing to its massive, endowed resources and enhancing socio-economic development. The Gujarat coast in the northern Arabian Sea is recognized as the most biologically productive region due to the demersal nature of fisheries resources and high trophic level. Shrimp has the largest share in inland fish production followed by Indian Major Carp (IMC) such as Rohu, Catla and Mrigal. Gujarat is the most productive state in terms of white legged shrimp farming with productivity of 7.9 tonnes/ha. The state is also known for high productivity of 3.12 tonnes/ha of P. monodon.

The state possesses a huge potential in inland water resources in the form of reservoirs, ponds and tanks, and brackish water areas that can be utilized through horizontal diversification and intensification of composite fish culture. Opportunities are also available in seaweed production. Diversification of the potential markets to augment fish export is also one of the potential areas.

Various schemes of marine fisheries, brackishwater aquaculture, inland fisheries and welfare schemes have been introduced by the Gujarat state government. Assistance is provided for the purchase of electrical equipment, setting up processing plant, cold storage, processing plant upgradation and purchase of value-added machinery and solar dryers, establishing fish markets, registration of fish boats, providing license for fishing, purchase of GPS, etc under marine fisheries scheme.

Gujarat signed the Tripartite Memorandum of Agreement (MoA) for availing the initial concessional finance. Tripartite MoA is executed among the concerned (loan availing) State Govt, NABARD and Department of Fisheries (DoF), Govt funding the State Projects under FIDF by NABARD. Projects approved in June 2020 under FIDF are development of fishery harbour at Navabandara, Madhwa, Veraval – Phase 2 and Sultrapada. Total project cost of 1354.92 cr with a project restricted subvention of 750 cr have been approved.

In Gujarat, under PMMSY by Department of Fisheries, Government of India, during 2022-2023, total project cost of INR 28653.23 lakh has been approved, investment of INR 90800 lakh has been envisaged, INR 8041 lakhs has been allocated implementation of Centrally Sponsored Scheme component. During 2020-2021 and 2021-2022, total project cost of INR 45289.19 lakhs has been approved.

Gujarat is endowed with abundant water resources, so for further increasing fish production, the state needs to capture untapped inland resources for more highly demanded frozen fish production with enough focus on the development of infrastructural facilities. With the assistance of certain schemes by the state and central, Gujarat aims to develop the fisheries sector in both marine and inland sectors for socio-economic development of fishermen.

| Freshwater Fish Varieties: Indian Major Carps which include Rohu, Catla, Mrigal, exotic carp like Grass Carp, catfish, mullet, murrels, prawn, hilsa etc. | 12. |
| Marine Fish Varieties: Bombay Duck, Ribbon fish, squid, shrimp, Croakers, Carangids, Yellow fin Tuna, cuttlefish, sharks, callo (anchovy), Hilsa, Wolf herring, Scomberomorus (Atlantic Spanish Mackere), crabs, black and silver pomfret. | 11. |
| Gujarut contributes 19.84% (quantity wise) and 9.73% (Value wise) to the international export of fish products. | 10. |
| Gir Somnath district contributes to 40% of total marine fish production of the state. | 9. |
Indian fisheries sector comprises of unique ecosystems in and around the country. It has been providing livelihood to more than 28 million people directly and indirectly. With the record production of 16.25 million tons and average year on growth of 8%, India has become the second largest aquaculture producer globally. However, the true potential of the sector is yet to be achieved.

While Department of Fisheries, Government of India has been taking various crucial initiatives including launching of an umbrella scheme Pradhan Mantri Matsya Sampada Yojana (PMMSY) – to bring about Blue Revolution through sustainable and responsible development of fisheries sector in India; Fisheries & Aquaculture Infrastructure Development (FIDF) – to achieve a sustainable growth of 8-9%, in a move to augment the country’s fish production to the level of about 20 million tonnes; a dedicated Project Development Cell (PDC) has also been constituted under the Chairmanship of Joint Secretaries of the Department. This PDC is being supported by the members of Fisheries Team of Invest India – with prime objective to attract investments, create awareness about various initiatives of the department, gather industry inputs for improving doing business in the sector etc.

Members of the Fisheries Team at Invest India are dedicated towards development of the fisheries and aquaculture sector by providing necessary handholding support to all stakeholders across the entire value-chain. The team has been conducting frequent outreach activities to gather relevant inputs required for holistic development of the sector.

A roundtable interaction with the representatives from Embassies of Denmark, Iceland, Japan, Morocco, Norway, Singapore, South Korea, Vietnam and Marine Products Export Development Authority (MPEDA) for ‘Partnerships in Exploring Growth Opportunities in the Indian Fisheries Sector’. The interaction was chaired by Shri Sagar Mehra, Joint Secretary, Department of Fisheries, Govt of India and focused on symbiotic growth through collaborations for the holistic development of Indian Fisheries and Aquaculture Sector.
Industry engagements

The Fisheries team has been connecting with all relevant stakeholders i.e., FFPOs, producers, processors, exporters etc. for handholding their investment interests, issues (if any) in a structured manner. Outreach activities are being conducted through one-on-one interactions, conducting roadshows, participating in events / workshops etc. Members of the Fisheries team recently visited Kolkata (West Bengal); Ahmedabad & Veraval (Gujarat), Mumbai (Maharashtra) and Bhubaneshwar (Odisha) to interact with fishers & fish farmers, FFPOs, processors, cold chain providers, exporters, concerned State authorities and other relevant stakeholders in these regions to understand specific investment interests, gather industry wide issues & recommendations to overcome the same, create awareness about various Government initiatives etc. The inputs / investments / issues received through the discussions held with companies and relevant stakeholders are being facilitated by the team under the support and guidance of Senior Officials of Department of Fisheries, Govt. of India.

One of the prime objectives of the PDC is to create awareness about various initiatives of the department. In this regard, the team participated in promotional events, workshops etc. to connect with various stakeholders and amplify the outreach.

Recently, the Fisheries Team participated in a session on ‘Policy interventions, Convergence with Make in India program on promoting business and technological innovations in Indian Fisheries Cold Chain Sector under “Make in India” program: Policy interventions, Convergence with Make in India program and other recommendations. Members also connected with various startups, innovators and academicians.

Department of Fisheries along with the National Fisheries Development Board organized an event on World Fisheries Day on 21st November 2022 in Daman wherein the fisheries team organized a panel discussion with stakeholders from the value chain on exploring growth opportunities in the Indian Fisheries Sector followed by a question & answer session. The team exhibited the roles and responsibilities of the Project Development Cell and Invest India through a stall and interacted with various stakeholders including processors, fish farmers, research institutions etc. during the event.

Fisheries team of Invest India actively participated in the Matsyiki Karyashala 2022 held at Brilliant Convention Center, Indore on 24th September 2022 and presented state specific opportunities along with role of Invest India in attracting investments into the state. During the event, members of the team also interacted with representatives of Foreign Missions, Apex National and State Cooperative Institutions to discuss about possible areas of collaborations.

Discussions with State/ UT Governments

Members of the fisheries team are also connecting with Fisheries Departments of States and UTs to understand areas of collaboration, interventions required, promote investments etc. On 11th November 2022, the PDC under the chairmanship of Shri Sagar Mehra, Joint Secretary Department of Fisheries Govt. of India held an interaction with Himachal Pradesh, Jammu & Kashmir, Ladakh, Sikkim and Tripura to understand the current scenario of State / UT specific fisheries sector, support required in terms of technological interventions, investment promotion, creation of infrastructure, capacity building etc. The Fisheries Team as part of DOF PDC will be implementing the identified action points.
Ms. Naema Miftah as panelist at the session on “Policy interventions, Convergence with Make in India program”
One of the prime objectives of the Project Development Cell (PDC) is to create awareness about various Government initiatives and reforms. In this regard, the team participates in promotional events, workshops etc. and collaborates with relevant stakeholders to amplify the outreach.