

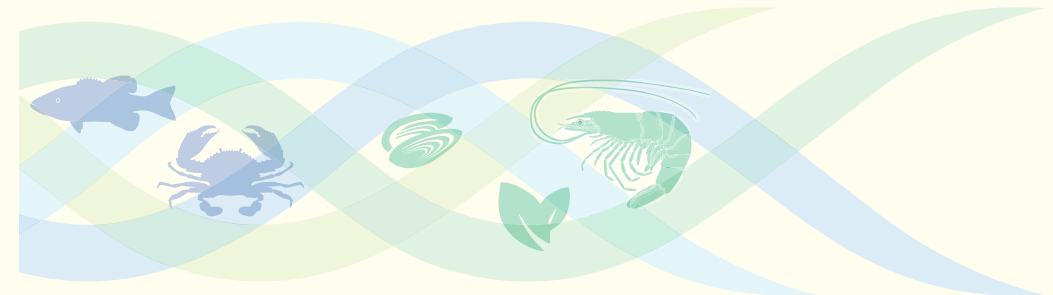


Fostering aquaculture Start-ups: 2019

24TH JAN 2019
CHENNAI, INDIA



BRAQCON
STARTUP
MEET 2019



ICAR- Central Institute of Brackishwater Aquaculture
(Indian Council of Agricultural Research)
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Our Existing Clients



FOREWORD

Providing nutritious food to millions of people added every year is the most crucial task faced by planners in many developing countries. Healthy food including the Recommended Dietary Allowance (RDA) of protein is first in agenda to have an active population. Climate change, unpredictable rainfall and poor freshwater availability, protein production from plant and animal sources are limited in scope. Three-fourth of the globe is ocean and lot of brackishwater resources like brackish water lakes and estuaries, lagoons, and canals are available for fish culture in India and other developing countries. Most of these resources do not have alternative/ competing resource use option. Inland saline soil is also another unexploited production resource where many marine species are finfish, and selfish can be cultured to provide low-cost animal protein to poor with less expense, time and carbon footprint. Aquaculture is growing consistently with a growth rate of more than 10% and can ensure protein supply at a cheaper cost to the growing population. Aquaculture is also efficient in feed conversion compared to poultry, pork or cattle.



Aquaculture is practiced in India for the last three-four centuries in Kerala, and West Bengal following traditional systems of culture in Pokkali and bhery culture. This system also self-sufficient low input and low output aquaculture system which is locally available resources as inputs and the limited output is intended for consumption by the local communities. As our population is increasing, the new scientific technologies and disruptive innovations are very much essential to increase the supply of fish from aquaculture sector. Introduction of exotic Specific Pathogen Free (SPF) vannamei broodstock in India has increased the output of aquaculture to about 5 lakh tonnes in 2017, from a lakh tonne in 2008, proving that technology is the key for future.

I hope this booklet with ICAR-CIBA technologies of startup entrepreneurs will be useful to users to understand the technology, commercialisation upscaling process and its practice infield for the benefit of entrepreneur and the sector.

Chennai
10-01-2019

K.K. Vijayan
K.K.Vijayan



FOSTERING AQUACULTURE START-UPS : 2019

ICAR-Central Institute of Brackishwater Aquaculture
75, Santhome High Road, M.R.C. Nagar, Chennai-600 028

Institute Technology Management Unit (ITMU) Team



Edited by

T. Ravisankar, P.K. Patil, R. Geetha, S. Vinoth, C.V. Sairam and K.K. Vijayan

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10-01-2019

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AGRI-BUSINESS INCUBATOR

ICAR-CENTRAL INSTITUTE OF BRACKISHWATER

AQUACULTURE (CIBA), CHENNAI

ICAR-CIBA is the nodal research organization for brackishwater aquaculture development in the country. The brackishwater aquaculture generates about Rs. 31500 crores of foreign exchange and is very vibrant commercial activity. Demand by the sector for supply of quality seed, feed, chemical/biological products, diagnostic and analytical kits is tremendous. Hence entrepreneurs - startups to large corporates regularly approach CIBA for the technological support.

Business Planning Division (BPD) under National Agricultural Innovation Project (NAIP), sanctioned in second phase, during 2013-14 was productively run by ICAR-CIBA. There was a tremendous increase in business promotion activities and revenue from technology commercialization rose from Rs.5 lakh in 2011-12 to Rs 25 lakhs in 2017-18. It proposed to developed Agri-Business Incubation center (ABI) at ICAR-CIBA, Chennai

The specific objectives of ABI are:

- To liaise between entrepreneurs and scientists for promotion of using innovative technologies
- To handhold entrepreneurs for converting their own proof of concept/ innovations to a successful enterprise using infrastructure and expertise available at ICAR-CIBA or elsewhere in NARS.
- To facilitate commercialization of Institute's technologies and liaise with other entities and scientific institutions for joint technology/product development
- To enhance all round human resource skill of would-be entrepreneurs for aquaculture related business

The ICAR- CIBA technologies and services are of four major categories:

1. Process development like development of fish breeding protocols and practices,
2. Formulation of new feed and improvements in indigenous feed technology;
3. Product development automatic feeders, solar powered equipment etc
4. Capacity building & training; and
5. Technical services like disease diagnosis, soil and water testing, consultancy services

The institute serves multiple stakeholders and need of the aquaculture sector but effective interface between Institute and individuals/ firms and other entities in the form of Agri-Business Incubation center is playing an important role for promoting partnerships with entrepreneurs/start- ups. The ABI is working specifically be involved in following activities:

- A. Strengthening the process of commercialization of technology
- B. Handholding small and medium enterprise to develop business
- C. Skill upgradation
- D. Development of bankable projects for entrepreneurs
- E. Consultancy services to the industry, NGO, etc.
- F. One-stop-center for technology exposure to the entrepreneurs, industry

START-UP INDIA: BRACKISHWATER START UP INITIATIVE

R. Geetha, C.V. Sairam, S. Vinoth and T. Ravisankar
Agri Business Incubator, ICAR-CIBA, Chennai

Start-up India is a flagship initiative of the Government of India, intended to build a strong ecosystem for nurturing innovation. Start-ups in the country will drive sustainable economic growth and generate large scale employment opportunities. As an initiative under Indian Council of Agriculture Research (ICAR) start-up India programme, a sector specific programme for brackishwater aquaculture is being launched at Central Institute of Brackishwater Aquaculture (CIBA). Major thrust areas planned to be promoted in the business ecosystem are:

- Making all relevant information available at one place and in single instant and Handholding the information requirements of the client's
- Facilitating Funding Support and for availing incentives and
- Industry-Academia Partnership for Incubation of start-ups.

Organizing Start-up festivals to showcase the innovations of the institute and opening the collaboration platforms in the area of aquaculture is the first step in the start-up India programme. To galvanize the start-ups ecosystem in agriculture especially in brackishwater aquaculture this programme is being organized at CIBA, Chennai.

Objectives

- To initiate regular communication and collaboration within the start-ups community
- Encourage active participation of academia, investors, industry and other stakeholders.
- Provide a platform to showcase their ideas and work with a larger audience comprising of potential investors, mentors and fellow Start-ups.

Main components of the programme

- Entrepreneurship promotion among start-ups
- Pre-incubation training to potential start-up entrepreneurs in various technology areas in collaboration with various academic institutions having expertise in the field.

Major benefits to start-up entrepreneurs

- Compliance regime based on self-certification
- Single point of contact for start-up ecosystem
- Simplifying the start-up process
- Facilitating Patent protection & availing start-up rebate on patent fees
- Exposure to Credit Guarantee Fund operation system
- Details of exemption from Capital Gains Tax
- Details of tax exemption for start-ups
- Details of relaxed norms of public procurement for start-ups
- Knowledge about faster exits for start-ups

COMMERCIALIZATION OF BRACKISHWATER AQUACULTURE TECHNOLOGIES BY ICAR - CIBA

Commercialization of technology is one of the best indicators for evaluating the success of Research and Development efforts. Further, the Public-Private Partnership (PPP) mode of technology utilization ensures increased productivity and income to the farmers through widespread technologies developed in a shorter time. Seed, feed and health technologies developed viz., seabass and milkfish seed production, vanami plus and Poly plus(feed), WSSV kit, CIBASTIM, CIBAMOX products are few examples of successful technology commercialization by ICAR-CIBA. Till date, total technologies commercialized by ICAR-CIBA was 17, including feed (8), health (7) and hatchery (2). It revealed that farmers were the primary beneficiaries (49%) of these technologies followed by companies (32%) and institutes (13%). Technology commercialization was higher in Tamil Nadu (23%), followed by Kerala (19%), West Bengal (16%), Andhra Pradesh (13%), Maharashtra (10%), Gujarat (7%) and Odisha (6%). The economic impact of WSSV kit was estimated to be Rs. 3347 crores. WSSV kit generated 60 lakh person days direct employment and 11 lakh person days by forward and backward linkages in shrimp production, and it saved 85,059 tonnes of shrimp production.

“Brackishwater aquaculture for food, employment and prosperity”



ICAR-CENTRAL INSTITUTE OF BRACKISHWATER AQUACULTURE

Agri Business Incubator-Start up Idea Competition @ BRAQCON-2019

24th January, 2019, 2pm - 5pm

Business idea:		
Project details:		
Budget required:		
Budget head	Details of items	Amount (Rs. in lakhs)
Capital:		
Recurring		
Total		
Expected product:		
Benefits to Society:		
Proponent details		
Name	Mobile & E mail:	Address
Qualification	Experience in this field:	

Organized and Hosted by



Society for Coastal Aquaculture and Fisheries (SCAFI)
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सत्यमेव जयते
Department of Industrial Policy & Promotion
Ministry of Commerce & Industry
Government of India

#startupindia

STARTUP INDIA KIT

Starter Kit for budding entrepreneurs,
visionaries and dreamers!

Dated: 26 February, 2018

Benefits from Startup India

Startup India recognition benefits

✔ DIPP Recognised

- ▶ IPR Benefits
- ▶ Relaxation in public procurements norms
- ▶ Self-Certification under Labour & Environment laws
- ▶ Fund of funds for startups
- ▶ Faster exit for startups

✔ IMB Certified

- ▶ Tax Exemption for 3 years
- ▶ Tax Exemption on Investment above Fair Market Value

Startup India Hub

✔ Resources

- ▶ Learning and Development Program
- ▶ Government Schemes
- ▶ State policies for startups
- ▶ Pro bono Services
- ▶ Knowledge Bank
- ▶ Tools and Templates
- ▶ Market Research Reports
- ▶ Networking & Forum Discussions

✔ Ecosystem

- ▶ News
- ▶ Events and Competitions

✔ Facilitation and Handholding

Glossary

- ▶ Definitions and terms

WHAT IS A STARTUP?

As per the revised notification (G.S.R. 501 (E)) published on 23rd May 2017, an entity shall be considered as a Startup:

- ✔ If it is incorporated as a private limited company (as defined in the Companies Act, 2013) or registered as a partnership firm (registered under section 59 of the Partnership Act, 1932) or a limited liability partnership (under the Limited Liability Partnership Act, 2008) in India; and
- ✔ Up to seven years from the date of its incorporation/ registration; however, in the case of Startups in the biotechnology sector, the period shall be up to ten years from the date of its incorporation/ registration; and
- ✔ If its turnover for any of the financial years since incorporation/ registration has not exceeded Rupees 25 crores; and
- ✔ If it is working towards innovation, development or improvement of products or processes or services, or if it is a scalable business model with a high potential of employment generation or wealth creation.

Provided that any such entity formed by splitting up or reconstruction of a business already in existence shall not be considered a 'Startup'.



“Never dream of becoming something, if you dream, dream of doing something.”

Shri Narendra Modi
Hon'ble Prime Minister of India

For any queries please call us on **1800115565** or drop us an email at **dipp-startups@nic.in**

Startup India Benefits

Get DIPP Recognised!

Startups can apply and get recognized by Department of Industrial Policy and Promotion and avail the benefits mentioned below. To get your startup recognized click on the following link:

 <http://bit.ly/2zaTxvp>



7,500+
Startups
Recognised

IPR Benefits

To promote awareness and adoption of IPRs by Startups and facilitate them in protecting and commercializing the IPRs, Startup India provides access to high quality Intellectual Property services and resources, including:

- ✦ **Fast-tracking of Startup patent applications:** The patent application of Startups is fast-tracked for examination and disposal
- ✦ **Panel of facilitators to assist in filing of IP applications:** A panel of Facilitators is responsible for providing general advisory on different IPRs as also information on protecting and promoting IPRs in other countries.
- ✦ **Government to bear facilitation cost:** Central Government bears the entire fees of the facilitators for any number of patents, trademarks or designs that a Startup may file, & Startups only bear the cost of the statutory fees payable.
- ✦ **Rebate on filing of application:** Startups are provided an 80% rebate in filing of patents vis-à-vis other companies. This helps them pare costs in the crucial formative years. 50% rebate is also provided in filing of Trademarks vis-à-vis other companies.

Want to protect your innovative idea? Visit the below link to contact the IPR facilitators!

 <http://bit.ly/2kEnlBP>

 **1,200+**
Applicants Received
Fee Benefits

 **1,000+**
IPR
Facilitators

Relaxation in Public Procurement Norms


DIPP recognised Startups can now get listed as Sellers on the Government of India's largest e-procurement portal – Government e-Marketplace! They are entitled to avail exemption on:

For any queries please call us on **1800115565** or drop us an email at **dipp-startups@nic.in**


- ✦ Prior Turnover and Experience requirements
- ✦ Earnest Money Deposit requirements



Get recognized and click on the below link to get listed as a seller and avail the benefits!

 <http://bit.ly/2FnlvVL>

Know more about the government tenders from the below link.

 <http://bit.ly/1Bny8Me>

Self-Certification under Labour and Environment Laws

To reduce the regulatory burden on Startups thereby allowing them to focus on their core business and keep compliance cost low, Startups are allowed to self-certify their compliance under 6 Labour and 3 Environment laws for a period of 5 years from the date of incorporation.

To apply for labour law certificate, access the Shram Suvidha portal on the below link:

 <http://bit.ly/2vAVVr0>



23 States Complied for
Offering Self-certification to Startups
Under **6 Labour Laws**

In respect of 3 Environment laws, units operating under 36 white category industries (as published on website of Central Pollution Control Board) do not require Environment clearance under 3 Environment related Acts for 3 years.



36 Industries Classified as
White Categories, Where Startups will
not Require **3 Environmental
laws'** Clearances

Fund of Funds for Startups

To provide equity funding support for development and growth of innovation driven enterprises, the government has set aside a corpus fund of 10,000 crores managed by SIDBI. The Fund is in the nature of Fund of Funds, which means that the Government participates in the capital of SEBI registered Venture Funds, who further invest in Startups.

To contact the various AIFs for funding support, follow the below mentioned link:

 <http://bit.ly/2qYnBDL>



INR 900 Cr.+ Committed to
22 VC Firms
400+ Cr. invested in **97** startups

Faster Exit for Startups

MCA has notified Startups as 'fast track firms' enabling them to wind up operations within 90 days vis-a-vis 180 days for other companies. An insolvency professional shall be appointed for the Startup, who shall be in charge of the company for liquidating its assets and paying its creditors within six months of filing an application in this regard.

For MCA guidelines on winding up, click on the below link:

 <http://bit.ly/2p97CG8>

IMB Certified

The Inter-Ministerial Board validates the innovative nature of the business for granting tax related benefits and is constituted by representatives from DIPP, DBT, DST and MEITY. Startups incorporated on or after 1st April 2016 can apply for tax benefits and such innovative applications are then moderated by the Inter Ministerial Board before granting the the certificate of eligibility. To apply for tax benefits, click on the following link

 <http://bit.ly/2zaTxvp>

Tax Exemption for 3 years

The profits of recognised Startups that are granted an Inter-Ministerial Board Certificate are exempted from income-tax for a period of 3 years (out of a block of 7 years). This fiscal exemption is aimed at facilitating growth of business and meeting the working capital requirements during the initial years of operations



86 Startups Received

Tax Benefits

Tax Exemption on Investment above Fair Market Value

If a Startup, having certificate from the Inter-Ministerial Board Certificate, receives any consideration for issue of shares that exceeds the face value of such shares, then the aggregate consideration received for such shares as exceeds the fair market value of the shares is exempted from tax.

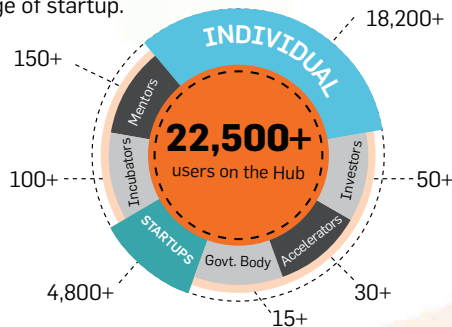
“Startup is the process which starts with a new thinking and commitment to do something different.”

Shri Suresh Prabhu
Hon'ble Minister of Commerce and
Industry, Government of India

For any queries please call us on **1800115565** or drop us an email at **dipp-startups@nic.in**

Startup India Hub

Welcome to Startup India Hub - a one-stop platform for the entire startup ecosystem! We exist to guide you through your entrepreneurial journey with resources curated according to your industry of choice, location and stage of startup.



Resources

Learning and Development Program

Start with an idea, end with a business plan!

The website hosts a variety of courses which broadens the vision of budding entrepreneurs and guides them through the journey of their Startup venture. The program covers lessons on key areas of starting up by 40+ top founders of India in an extensive 4-week program. Not just that, upon completion of the course, the apprentice receives a certificate acknowledging their effort and certifying their learnings in the program.

Start your free course today from the following link:

 <http://bit.ly/2faciqU>



1.9 Lac + People Availed the Course
8200+ Completed the Course

Government Schemes

Many government departments are working to promote entrepreneurship in India. Startup India has collated various schemes from various ministerial bodies at one place to facilitate and save your time from jumping between websites!

Explore the various government schemes here:

 <http://bit.ly/2rvwfwa>


For any queries please call us on **1800115565** or drop us an email at **dipp-startups@nic.in**



State Government Policies

Startup India presents to you a list of 17 state government policies who offer benefits to Startups! Startups and entrepreneurs across these states can access the policy documents, website links and contact details of the respective nodal agencies.

Know more about these policies from the following link:

 <http://bit.ly/2xpisk>

Pro-Bono Services

In our endeavor to make starting up easy for startups, we bring you the best of some relevant services out there in the market free of cost, only for you. We have collaborated with leading corporates, the likes of Amazon Web Services, Zoho, Vakil search and others to bring you these services. Whether you want to build an app, use cloud credits or get cloud telephony services, everything here is free of cost for you.

Avail these Pro-Bono Services here:

 <http://bit.ly/2yWi7wD>



\$2,00,000+ worth Cloud Credits dispersed to startups!



4000+ apps created for the startups!



200+ entrepreneurs used Zoho One!

Knowledge Bank

Registering a company is not a cake walk if you do not know the legalities. Startup India provides a knowledge bank detailing the requirements for starting a business in India; be it registering a company, filing IPRs, complying to tax policies or understanding the investor landscape in India! Startup India has got you covered and you do not need to spend time surfing the internet or gain information from disintegrated sources!

To access the knowledge bank, click here:

 <http://bit.ly/2t1kvyH>

Tools And Templates

So that you can focus on what is really important to your business, we have a wide range of templates ranging from lease agreements to employment contracts available to you free of cost. You'll need less than two minutes to customize this for yourself using our document builder, read more about it here:

 <http://bit.ly/2ByInmM>

Market Research Reports

We understand the depth of knowledge you would require about your industry to scale new heights. We bring to you the latest market research reports by leading publishers such as Tracxn, Inc42 and NASSCOM. These are available for your perusal here:

 <http://bit.ly/2BZiSu3>

Networking And Discussion

All members of the startup ecosystem – Startups, investors, mentors, incubators, accelerators and government bodies can connect with each other on this platform. The platform provides the eco system stakeholders with the opportunity to discuss – express and opine on the forum through discussion threads – blogs and one to one messaging.

Ecosystem

News

We understand the importance of cross-pollination of ideas and with that in mind, we provide you up to date news on the latest happenings in the eco system. You can check this section here:

 <http://bit.ly/2p9n1q9>

Events and Competitions

Find out about all the Start-up related events relevant to you and a plethora of opportunities in the form of competitions with partners ranging from Private institutes to government ministries. Read all about it here:

 <http://bit.ly/2C0I6bm>

Facilitation and Handholding

Startup India provides bespoke handholding to startups on various aspects such as policy advocacy, regulatory support, investor connect etc. Facilitation gamut can be segregated into two fragments

1) Basic Facilitation

Basic Facilitation addresses queries such as policy clarifications, policy feedback, technical issues and other basic queries. These queries are addressed through various medium such as Call centre, Startup India Team, social media handles (e-mail, twitter, Facebook) and virtual hub

2.) Full Facilitation

Full facilitation addresses queries such as business plan advisory, incubator applications, financial advisory, regulatory advisory and government connects. A dedicated facilitation officer is assigned to each case for providing a detailed handholding to each Startup

Drop us an email at **dipp-startups@nic.in** for handholding and facilitation support.

For any queries please call us on **1800115565** or drop us an email at **dipp-startups@nic.in**

Glossary

Accelerator: An accelerator takes a set amount of seed equity from a number of young startups in exchange for capital and mentorship. Accelerators will bring a cohort of start-ups in what is typically an on-site program which lasts for three to four months.

Angel Group: An angel group is a network of angel investors who invest collectively in small startups or entrepreneurs. They typically invest in angel, seed, and sometimes Series A rounds.

Angel: Angel rounds are the first round a company may go through. Angel investors, friends, and/or family may invest in an angel round to get a new company off the ground.

Corporate Venture Capital: A Corporate Venture Capital firm is an arm of a corporation, where the investment funds come from the corporation, providing capital to invest in innovative start-up companies.

Convertible Note: A convertible note is an 'in-between' round funding to help companies hold over until they want to raise their next round of funding. You will typically see convertible notes after a company raises a Series A but does not yet want to raise a Series B.

Corporate Venture Capital: A Corporate Venture Capital firm is an arm of a corporation, where the investment funds come from the corporation, providing capital to invest in innovative start-up companies.

Co-Working Space: A co-working space is a company that provides a shared working environment for teams working typically for different employees, typically in an office. No equity is taken from companies that work in a co-working space.

Debt Financing: Debt financing rounds are where firms will lend money to a company. In exchange, a company will promise to repay the principal as well as added interest on the debt.

Equity Crowdfunding: Some funding platforms will allow their user base to invest in companies in exchange for equity. Companies allow investors to invest typically small amounts of money in exchange for equity. Syndicates are formed to allow an individual to take a lead on evaluating an investment, and pooling funding from a group of individual investors.

Family Investment Office: A Family Investment Office is a fund of an ultra-high-net-worth investor family. They typically do one-off investments.

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Fund of Funds: A Fund of Funds is an investment strategy where firms will hold a portfolio of other investment funds rather than investing directly in bonds, stocks, or other types of securities.

Funding Platform: A Funding platform is an online service that represents companies that are seeking investment. Through the platform, investors are able to buy equity in exchange for capital.

Government Office: A government office may invest in startups in their municipality, district, state, or country. They may or may not take equity in companies in exchange for capital and/or mentorship.

Grant: A grant is when a company, investor or government agency will give capital to a company and does not take equity in a company.

Hedge Fund: A Hedge Fund is a private investment partnership that invests for wealthy individuals or institutions. They will typically invest in private equity rounds, or late stage venture rounds (Series D or beyond).

Incubator: An incubator brings in an external team to manage an idea that was developed inside the incubator. An incubator will also take a larger amount of equity in contrast to accelerators.

Initial coin offering (ICO): ICO is an unregulated type of crowdfunding via use of cryptocurrency as capital. In an ICO, a percentage of the newly issued cryptocurrency is sold to investors in exchange for legal tender or other cryptocurrencies such as Bitcoin.

Investment Bank: A bank that purchases newly issued shares and resells them to investors. When they do invest directly in companies, it will typically be in Post-IPO Equity or Private Equity rounds.

IPR: A right that is had by a person or by a company to have exclusive rights to use its own plans, ideas, or other intangible assets without the worry of competition, at least for a specific period of time. These rights can include copyrights, patents, trademarks, and trade secrets.

Micro-VC: A micro-VC invests in startups and typically has a fund size less than \$100M. Micro-VCs are a type of Venture firm that focuses on early stage seed and Series A investments.

Non-Equity Assistance: A non-equity assistance round is when a company or investor provides office space or mentorship and does not get equity in return.

Non-Equity Program: A non-equity program invests mentorship, office space and/or goods and services. They do not receive equity. They might have corporate sponsors, who are able to engage with the startups in the program.

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Post-IPO Debt: Post-IPO Debt round takes place when firms loan a company money after they have already gone public. Similar to debt financing, a company will promise to repay the principal as well as added interest on the debt.

Post-IPO Equity: Post-IPO Equity round takes place when firms invest in a company after they have already gone public.

Private Equity Firm: A private equity firm is an investment management company. When they do invest in startups, it is typically in the private equity, or later stage venture rounds (Series C and beyond).

Private Equity: A private equity round is led by a private equity firm or a hedge fund typically and is a late stage round. It is a less risky investment and the rounds are typically upwards of \$40M+.

Product Crowdfunding: A product crowdfunding round is where a company will provide its product in exchange to raise capital. This kind of round is also typically completed on a funding platform.

Round: A round is a general term for a funding round used when no other funding type seems appropriate.

Secondary Market: Secondary market rounds are when stocks are sold in a company from a shareholder rather than purchasing stock directly from the company. This can happen before a company goes public, and is rarely announced or publicized.

Secondary Purchaser: A Secondary Purchase is a purchase of stock in a company from a shareholder rather than a purchase of stock directly from the company. This can happen before a company goes public, and is typically not publicized.

Seed: Can range between \$10K-\$2M, though larger seed rounds have become more common in the last ten years. Seed rounds are one of the first rounds of funding. They typically come after Angel rounds (if applicable), but before any of the Series rounds.

Startup Competition: Startup Competitions are held by a variety of companies, government offices, and firms. The prize for many startup competitions will be capital with no equity component.

Technology Transfer Office: An office typically a part of a company, university or governmental organization which is dedicated to research which has potential commercial interest.

University Program: Many universities have programs dedicated to entrepreneurship. Their services range from supporting entrepreneurs with capital or mentorship.

For any queries please call us on **1800115565** or drop us an email at **dipp-startups@nic.in**

Venture Capital: Venture Capital firms invest in startups at a variety of stages, ranging from seed to Series A and beyond. Venture Capital firms take equity in exchange for capital, seeking to invest in firms from the earliest stage Series A, through to later stages as the company grows. Venture firms typically lead only a single round, and cede to other investors for the next round, to avoid conflicts of interest in pricing the next round.

Venture Debt: Venture Debt firms provide capital in exchange for a loan (plus interest) to be paid back at a later date.

Venture: A Venture round encompasses our Series A, B, C, D, E, F, G, H rounds. You can select a more specific Series by selecting 'Venture' under 'Funding Type'.

Series A-B are funding rounds for earlier stage companies and can range anywhere from \$1M-\$20M.

Series C funding rounds and onwards are for later stage and more established companies and can range anywhere from \$10M+.



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 31 %

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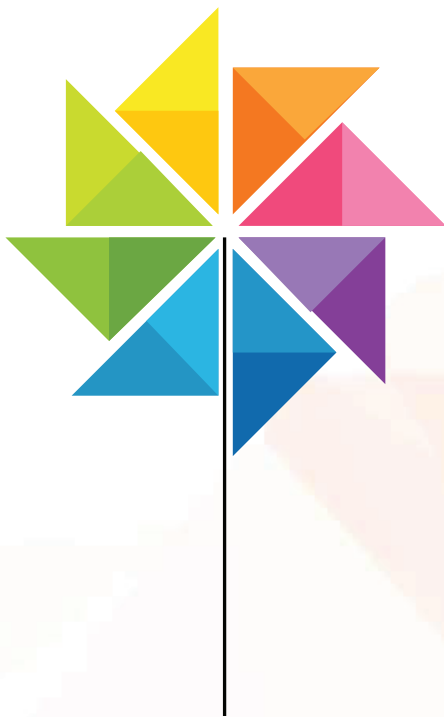
MAHARASHTRA

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Successful
Entrepreneurs
of ICAR - CIBA



Shri. Anil Sashidharan
Director



TECHNOLOGY TRANSFER OF INDIGENOUS SHRIMP FEED

Jass Ventures Private Limited was registered at Registrar of Companies Ernakulam on 19 November, 2012 and is categorised as Company limited by Shares and an Non-govt company.

The indigenous shrimp feed technology was transferred to Jass ventures pvt.Ltd. by ICAR-CIBA,



JASS VENTURES PVT LTD

Anamika, S-17, Santinagar, Tiruppanithura,
Ernakulam, Kerela- 682301. Mobile : 9447353273
jassventures@gmail.com



Dr. Ravi Chandra Beeram
Managing Director



TECHNOLOGY TRANSFER OF COST- EFFECTIVE DESI SHRIMP FEED: VANAMI^{PLUS}

Revelations Biotech is technology driven company focusing on development of novel biologics, Aquaculture products, diagnostics, therapeutics and X-ray structure guided drug design. Revelations was founded by Dr Ravi Chandra Beeram, who brings immense research experience in genetic engineering and molecular discovery.

The Technology of Cost-effective desi shrimp feed-Vanami^{plus} was transferred by ICAR-CIBA



REVELATIONS BIOTECH PVT LTD.

LSI, ICICI Knowledge park, Genome Valley,
Turkapally, Shameerpet, Hyderabad - 500 078
+91 9000890421 | info@revelationsbio.com



NEW BIO SCIENCE CO.

Mrs. B.Aarthi
Managing Director



Leading manufacturer of UNIQUE range of aquaculture inputs, nutritional supplements, immune stimulating agents etc., for shrimp and fish culture operations. Most of our products sourced from natural materials like, beneficial microorganisms, plants and other natural substances. Our marketing network in major aquaculture states of the provide technical and social services to stakeholders through conducting awareness programs and standard practices for economically profitable and environmentally sustainable aquaculture in the country.

The CIBAMOX™- WATER PROBIOTIC TECHNOLOGY was transferred to New Bio Science company by ICAR-CIBA



NEW BIO SCIENCE CO.

Plot No. P-107/1, 8th Main, KSSIDC, Hebbal Industrial Estate
Mysuru, Karnataka, 570016
nbsienceco@gmail.com, www.nbscience.com

Shri. A. Baburaj
Managing Director



MODULAR SYSTEM BASED SEED PRODUCTION TECHNOLOGY OF PEARLSPOT (*Etroplus suratensis*)

Fish farmer adapted the innovative seed production of pearlspot fish under the guidance of ICAR-CIBA using the modular pearlspot breeding unit.

The modular system based seed production technology was transferred to Shri. Baburaj by ICAR-CIBA



**Pandit Deen Dayal Upadhyay Antodaya
Krishi Puraskar- 2016**

SHRI. A. BABURAJ
Kadalundi Village
Dist. Kozhikode, Kerala



Dr. Pazhani Muthu



Research based organizations in biology needs strong focus and rapid turnaround while maintaining uncompromised quality. We position our self a novel product development company and manufacturing organization in biopolymer, agriculture and crop management, molecular biology and immunology. In addition, our recent focus and collaborations have associated as in to aquaculture disease diagnostics and probiotics. With the positive note we progress further to envision our ultimate goal of making good to great company.

The WSSV kit was commercialised to Aura Biotech by ICAR-CIBA

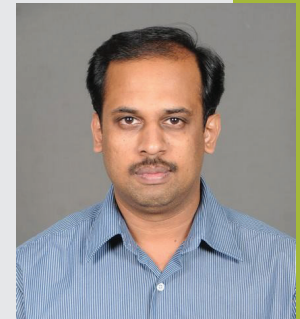


AURA BIOTECHNOLOGIES PRIVATE LIMITED

Survey No: 270/1, Plot No: 1&2
Galaxy Road, Ayyanambakkam
Chennai-600095



Dr.K.Sudhakar
General Manager



We embrace and foster the concept of eco-friendly, sustainable products for agriculture and aquaculture. The power of bio-technology can improve the crop yields for the future development of food production sector in the country. We conduct socially responsible research and provide eco-friendly technologies for socially acceptable agriculture. As an end-to-end solution provider we support education of farmers, consultancy services and timely delivery of the products.

The CIBASTIM technology was transferred to Rajshree Biosolutions by ICAR-CIBA



RAJSHREE BIOSOLUTIONS LLP

No.59, Thaneer Pandal Road
Coimbatore - 641 004, Tamil Nadu, India
www.rajshreebiosolutions.com



Sri Kajal Kumar Roy
Managing Director



We are the leading feed manufacturer of cattle, poultry, fish and shrimp feed. Specialized Scientifically formulated nutritionally balanced shrimp and fish feed manufacturers (sinking and floating feed). We also supply low cost quality feed for poly culture operations catering the nutritional requirements of different species of aquatic animals.



Manufacture unit:-

NRG FEEDS
P.S.- Arambagh
Dist.-Hooghly
Pin -712413

In case of any customer complains:
Please call our customer care no.
9609218460
Email: nrgfeeds@gmail.com
Website: nrgfeeds.com

In Collaboration With CIBA



CIBA



ICAR - Central Institute Of Brackishwater Aquaculture
75, Santhome High Road, R.A.Puram, Chennai - 600 028



Mohan A. Reddy
Senior Technological Manager



SHARAT INDUSTRIES LIMITED (SIL)

Sharat Industries Limited (SIL) Established in 1990 is in the aquaculture business in shrimp hatchery, farm, feed mill and processing plant focusing on *Penaeus vannamei*.

Through the efforts of its efficient management and able team, SIL has sustained itself for more than two decades in the ever so fluctuating field of aquaculture in India. The company has a youthful and experienced work force that constantly tries to innovate and deliver results by adopting the best practices in the field.

The CIBAMOX™ - water probiotic technology was transferred to Sharat industries by ICAR-CIBA

Mr. S. Prasad Reddy
Chairman & M.D (CMD)

SHARAT INDUSTRIES LIMITED

Flat No.4, 3rd Floor, Pallavi Apartments, No.57/11, Old No:29/TF4, 1st Main Road,
HDFC Bank Compound, R.A. Puram, Chennai - 600 028
stm.sharatindustries.com / <http://www.sharatindustries.com>

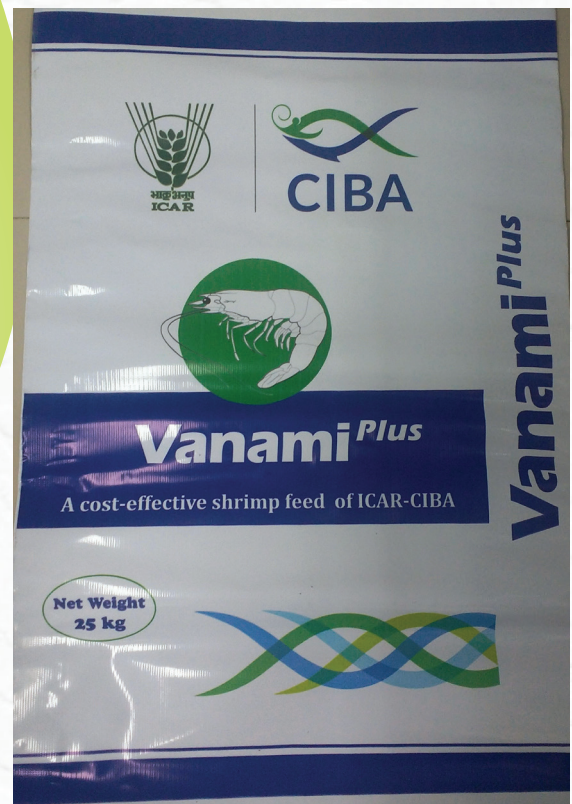
Mr.Karuna Raju



SHRIMP FEED DEVELOPMENT PRODUCTION AND PROCESSING

ICAR, Central Institute of Brackishwater Aquaculture (CIBA), Chennai Signed a MOU with Mr. Karuna Raju, Sai aqua feeds, an entrepreneur from Bapatla, Andhra Pradesh for the technology transfer on indigenous shrimp feed production.

The Technology of shrimp feed-Vanami ^{plus} was transferred to Sai aqua, Bapatla by ICAR-CIBA



SAI AQUA FEEDS

505, Gayatri Prince , Bapatla, Guntur Dist.
Andhra Pradesh 9440703033
saiaquafeeds@gmail.com



TECHNOLOGIES
OF ICAR - CIBA



ICAR-CIBA - a nodal R&D agency working in brackishwater aquaculture for the past three decades with a vision of environmentally sustainable, economically viable and socially acceptable aquaculture technologies. System interventions, technology backstopping and policy inputs, contributing to economic benefits of the sector which has already recorded annual export revenue of ₹ 20,000 crores, apart from domestic consumption.

CIBAMOX

ICAR-CIBA



In intensive shrimp aquaculture practices, the build-up of toxic nitrogenous metabolites leads to stress, poor growth, increased susceptibility to infections and loss of production. Maintaining optimum environmental parameters will help higher production and economic returns. To mitigate the deteriorating environmental quality in aquaculture ponds, ICAR-CIBA has developed a formulation for management of ammonia, with safe and natural microbial consortia, selected through our arduous effort in R&D.

The Technology

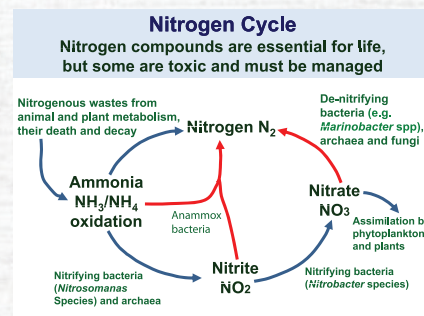
- Innovative combination of autotrophic ammonia, nitrite oxidizing and heterotrophic denitrifying bacterial consortia from brackishwater environments.
- Microbes have been selected based on their fast growth, high yield and enhanced detoxification efficiency under standard conditions.
- Mass production protocols were economised and standardised.
- Multiple field trials conducted in shrimp ponds at various locations of Gujarat, Andhra Pradesh and Tamil Nadu proved the efficiency of microbial consortia in reducing ammonia and total ammonia nitrogen.

Technology Benefits

- Developed with indigenous microbes isolated from local brackishwater environment, hence it works best in Indian shrimp farming systems.
- Effectively removes nitrogenous wastes from aquaculture ponds with salinities ranging from 15-45 ppt.
- Regular application of the product will keep ammonia, nitrite and nitrate levels below the maximum permissible levels and enhance aquaculture productivity.
- Mass production facility may be established with investment of about ₹ 5,00,000 and cost of production can be below ₹ 100/l.

Services Offered

- Detailed Project Report.
- Advisory services to establish mass production unit.
- Sourcing of equipments, chemicals and supplies.
- Transfer of technology on non-exclusive basis.
- Training on propagation/mass production of microbes.





Shrimp Farming at Kakdwip Research Center, West Bengal

AQUATIC ANIMAL HEALTH AND ENVIRONMENT DIVISION

ICAR-Central Institute of Brackishwater Aquaculture (CIBA), Chennai

The Aquatic Animal Health and Environment Division has scientists with all relevant specialities and expertise in Microbiology, Virology, Pathology, Parasitology, Biotechnology, Molecular Diagnostics, Soil and Water Chemistry, Environment and Aquaculture. The Division has well established facilities for carrying out cutting edge research in molecular biology in addition to diagnostics, prophylactics and health management in brackishwater aquaculture. The advanced facilities have been established with dedicated efforts of scientists and funding support from the ICAR, the National Agricultural Research Project (NARP), the World Bank, the National Agricultural Technology Project (NATP), the All India Network Project on Fish Health (AINP), the Consortia Research Platform on Diagnostics and Vaccines (CRP-D&V), the National Innovations in Climate Resilient Agriculture (NICRA), the Department of Biotechnology and National Fisheries Development Board. A well designed wet lab is also in place for carrying out live aquatic animal experiments and evaluating the Koch's and River's postulates.



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INDIGENOUS SHRIMP FEED TECHNOLOGY

ICAR-CIBA

Feed being a critical input in shrimp farming, this not only determines the growth performance of the shrimp, but also a key factor related to the cost of shrimp production and sustainability. In the beginning, the Indian shrimp farming sector was completely dependent on imported feeds. No single public or private entity was having the technology to manufacture pelleted sinking feed for shrimp. Visualizing this as a critical obstacle, ICAR-CIBA developed, tested and commercialized an indigenous feed manufacturing technology as pioneer in India.

Highlights of the expertise/technology

- Compressed pelleted feed using ring die pelletizers.
- Indigenous machinery.
- Technology package involves establishing the feed mill, formulation, periodical auditing of the formula, the process of feed manufacturing, and evaluation of the processed feed.
- Uses low cost locally available ingredients.
- Cost effective customizable formulation.
- Optimum in meeting the processing needs and shrimp nutrient requirements.
- For all the life stages of shrimps in different particle sizes.
- Extensively field tested and demonstrated.



Transfer of technology and commercialization

- The feed technology was transferred to M/s Bismi Feeds Ltd., Tamil Nadu, on non exclusive basis. Bismi Feeds built a feed mill with capacity of 1 tonne/hour and 3000 tonnes/ annum with a total investment of ₹ 2.5 crores. The feed was officially launched on 11-10-2008 and distributed to the farmers.
- From the year 2008 to 2011 they have produced around 7200 tonnes of feed and paid ₹ 3.64 lakhs as royalty to ICAR-CIBA @ 5paise / kg feed sold.



Impact of the technology

- In the beginning only six feed companies existed in India with overseas technology. Presently there are more than 25 organised shrimp feed mills and 15 small feed mills with installed capacity of 9 lakh tonnes/annum, worth ₹ 6500 crores.
- Though CIBA technology was able to meet only 2 to 3% of the total needs at that time, it very much served as a benchmark for pricing as well as to compare the performance of the other commercial feeds available in the Indian market.
- To cater to the fishmeal demand for shrimp feeds, hi-tech fishmeal plants increased from 12 numbers in 2008 to > 40 numbers in 2015 with total production capacity of 1.2 lakh tonnes worth ₹ 1000 crores. They convert low value fish and fish trimmings into a valuable fishmeal, which was otherwise used as fertilizer.

Services Offered

- Detailed Project Report including sourcing of equipment, chemicals and reagents.
- Training of technical personnel.
- Transfer of technology on non-exclusive basis.

Sources

- Prawn feed plant at Perunthottam inaugurated; <http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/Prawn-feed-plant-at-Perunthottam-inaugurated/article15320688.ece>
- CIBA Shrimp Feed; http://krishi.icar.gov.in/PDF/com_tech/Fisheries.pdf

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SHRIMP LARVI *Plus*

ICAR-CIBA

Larval feeds are currently imported and costing ₹ 1500 to 3000/kg. ICAR-CIBA has developed cost effective indigenous larval feed of superior quality. These feeds are import substitutes, saving valuable foreign exchange for the country.



The Technology

- Contains 55% crude proteins and 12% lipid.
- Ingredients with high digestibility.
- Enriched with optimal EPA and DHA.
- Micro-particulate size of 200-300, 300-400 and 400-500 μm .
- Spheronized feed 300 and 500 μm .
- Tested in commercial *vannamei* hatcheries; performance at par with imported feeds.

Technology Benefits

- Substitute for expensive multi-national brands.
- Cost for setting up manufacturing unit : about ₹ 2 crores; cost of production 60% more economical than other leading brands.

Services offered

- Detailed project proposal.
- Sourcing of machineries and ingredients.
- Transfer of technology on non-exclusive basis.
- Training for 3-5 technical people for 5-7 days.





CIBA's pilot scale Feed Mill at the Muttukadu Experimental Station, Chennai.

Technology Transfer

Marine Technologies (Maritech), Chennai.



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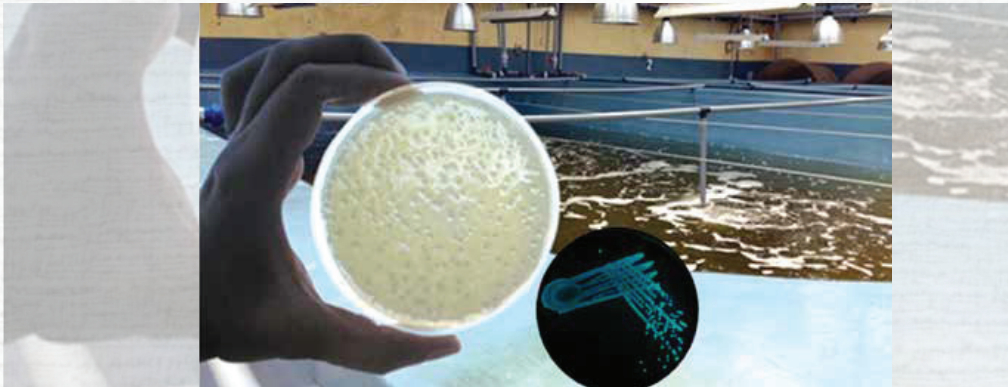


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LUMI Phage

ICAR-CIBA

Despite following Better Management Practices (BMPs), luminescent bacterial disease (LBD) caused by bacteria belonging to *Vibrio spp* are known to cause considerable economic loss to shrimp hatcheries the world over. Use of antibiotics to control vibriosis in aquaculture pose issues of tissue residues and antibiotic resistance, and hence the development of alternative safer technologies using biocontrol agents has become necessary. ICAR-CIBA has developed a safe and effective technology using bacteriophages for biocontrol of luminescent bacterial disease in shrimp hatcheries. Bacteriophages, or phages in short, are viruses that selectively infect and kill bacteria.



The Technology

- Developed using bacteriophages capable of selectively infecting and killing luminescent bacteria of *Vibrio* species.
- Bacteriophages have been selected from a pool of over 35 phages having lytic activity against over 350 luminescent bacterial isolates.
- Culture conditions optimized for yield of 10^{12} cfu/ml of bacteriophages in 18 hrs in pilot scale fermenter.
- Contains consortia of four bacteriophages having broad spectrum anti-vibrio activity.

Technology Benefits

- Works both as prophylactic and therapeutic
- Can be stored at 4°C for a year without losing titres.
- Compatible to use along with probiotics.
- Self-replicating, hence low dose sufficient
- Can kill pathogenic vibrios hiding in biofilms.
- Completely organic and absolutely safe.



AQUATIC ANIMAL HEALTH AND ENVIRONMENT DIVISION

ICAR-Central Institute of Brackishwater Aquaculture (CIBA), Chennai

The Aquatic Animal Health and Environment Division has scientists with all relevant specialities and expertise in Microbiology, Virology, Pathology, Parasitology, Biotechnology, Molecular Diagnostics, Soil and Water Chemistry, Environment and Aquaculture. The Division has well established facilities for carrying out cutting edge research in molecular biology in addition to diagnostics, prophylactics and health management in brackishwater aquaculture. The advanced facilities have been established with dedicated efforts of scientists and funding support from the ICAR, the National Agricultural Research Project (NARP), the World Bank, the National Agricultural Technology Project (NATP), the All India Network Project on Fish Health (AINP), the Consortia Research Platform on Diagnostics and Vaccines (CRP-D&V), the National Innovations in Climate Resilient Agriculture (NICRA), the Department of Biotechnology and National Fisheries Development Board. A well designed wet lab is also in place for carrying out live aquatic animal experiments and evaluating the Koch's and River's postulates.



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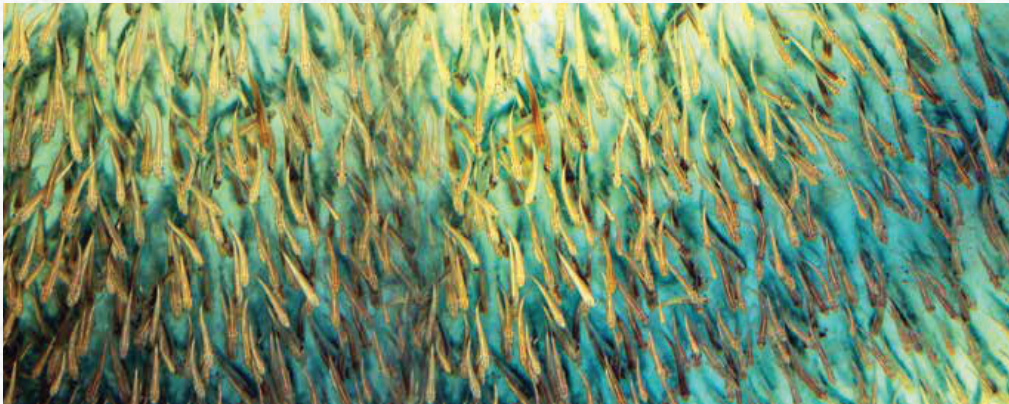
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BREEDING, SEED PRODUCTION AND FARMING OF MILKFISH ICAR-CIBA

Milkfish (*Chanos chanos*) is an important finfish that can be farmed in brackishwater and pens both as mono and polyculture mode. Being a herbivore, the fish can consume benthic algae, lablab, phytoplankton and detritus matter present in the culture system and thereby reduce the consumption of pellet feed and thus the production cost can be reduced. With supplementary low protein pelleted feed the fish can attain 500 gm body weight in 6 months culture period. Lack of hatchery seed production technology has limited the expansion of milkfish farming in the country. For the first time in the country, ICAR-CIBA has developed comprehensive technology package for captive breeding and seed production of Milkfish.



The Technology

- Captive breeding of Milkfish has been standardized for hatchery.
- Farmers can culture the fish in pond or pens and yield production of 4-5 tonne/ha at a cost of ₹ 70-80/kg with a farm gate sale price upto ₹ 150/kg.
- Culturing a few Milkfish in shrimp farms will develop green water and improves water quality.

Technology Benefits

- One more fish species made available for farming by supplying hatchery produced Milkfish seed.
- Unused shrimp hatchery owners and farmers can benefit from this hatchery.
- Availability of hatchery produced seeds will ensure supply of quality and uniform sized seed.

Services Offered

- Detailed Project Report.
- Advisory services to establish hatchery, nursery or farm.
- Transfer of technology on non-exclusive basis.
- Training on breeding, nursery rearing and farming for 3-5 technical people.





Harvested Milkfish haul at Kakdwip Research Centre, ICAR-CIBA

Technology Transfer

- Aditya Fish Hatcheries, Andhra Pradesh



The Muttukadu Experimental Station of ICAR-Central Institute of Brackishwater Aquaculture, Chennai

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MODULAR SYSTEM BASED SEED PRODUCTION TECHNOLOGY FOR PEARLSPOT ICAR-CIBA

Pearlspot (*Etroplus suratensis*) is a delicacy in some of the Indian states like Kerala. Due to its omnivorous feeding habit, farming of this fish does not need huge investment. This fish can be cultured in fertilized pond with green water system and low cost/farm made feed. Low fecundity of pearlspot makes the expansion of its culture challenging. ICAR-CIBA has developed innovative low cost model for backyard breeding and seed production of pearlspot.



The Technology

- Reducing parental care, increase the breeding frequency in pearlspot under controlled conditions.
- Easy breeding and seed collection methods have been established.
- Cost effective modular and portable breeding system can be established at any place.
- Increased number of seed production per breeding cycle by using a single pair of parents .

Technology Benefits

- Low input cost, can be easily adopted by small and medium scale aqua farmers and self-help groups as homestead activity.
- Regular income can be generated by attending as part-time activity.
- Pearlspot seed can be sold not only for farming purposes but also for aquarium purpose.

Services Offered

- Detailed Project Report.
- Advisory services to establish hatchery, nursery or farm.
- Sourcing of machineries and other resources.
- Transfer of technology on non-exclusive basis.
- Training on operation and breeding protocol for 3-5 technical people.





Hatchery produced Pearlsplit juveniles at the Muttukadu Experimental Station, ICAR-CIBA

Technology Transfer

- Mr. Bijoy K. B. Kerala
- Mr. A. Baburaj, Kerala



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' β NOVA' VNN DIAGNOSTIC KIT ICAR-CIBA

Viral nervous necrosis (VNN) is a serious viral disease of finfish affecting more than 70 fish species worldwide including India. The disease is transmitted both vertically and horizontally, causing mortality up to 100% in larval and juvenile stages. Early diagnosis is the key for successful control of the disease. ICAR-CIBA has developed sensitive, user friendly and cost effective RT-nested PCR kit for the early diagnosis of VNN. The kit is a substitute for imported technology in terms of cost effectiveness and easy availability.



The Technology

- Kit developed based on the amplification of the coat protein gene.
- Developed based on indigenous technology.

Technology Benefits

- Kit offers a rapid, specific and sensitive diagnosis of the disease.
- Efficiently detects both clinical and sub-clinical infections.
- Detects disease in both wild and culture fishes.
- The kit is the first of its kind indigenously developed in the country.

Services Offered

- Detailed Project Report.
- Advisory services to establish production unit.
- Sourcing of machineries and chemicals.
- Transfer of technology on non-exclusive basis.
- Training for 3-5 technical people for 5-7 days.



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POLY *Plus*

ICAR-CIBA

Polyculture of finfish is a traditional low input activity in India. Commercial feeds are expensive to use in the polyculture system. Use of cost effective feed will increase the production and productivity from these traditional farming sectors.



The Technology

- Suitable low cost feed for polyculture.
- Developed using locally available ingredients.
- Use of fish meal reduced to 10%.
- Shelf life of about 2 months.

Technology Benefits

- Productivity upto 4764 kg/ha, FCR 1.32 (325 days).
- Being used by farmers of Sundarbans, West Bengal.

Services Offered

- Detailed Project Report.
- Transfer of technology on non-exclusive basis.
- Training on manufacturing feed for 3-5 technical people.





Harvested brackishwater fishes and shrimp from polyculture farming



The Kakkdip Research Centre of ICAR-CIBA Central Institute of Brackishwater Aquaculture, West Bengal.

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SEED PRODUCTION AND FARMING TECHNOLOGY OF ASIAN SEABASS ICAR-CIBA

India being a tropical country with rich biodiversity of aquatic species and water resources, it is necessary to diversify the farming of fish species for judicious utilization of resources. Seabass is a fast growing, high value carnivorous fish ideal for farming in wide range of salinities. While its standard table size is 500 gm to 3 kg, it can grow to a size of 2 meters long and 60 kg weight. Equating its biological and culture potential, ICAR-CIBA made a breakthrough

Highlights of the expertise/technology

- Year round seed production.
- A hatchery capacity of 5 million fry/ annum can be constructed with Rs.200 lakhs fixed investment and another ₹ 40 lakhs for operation expenses. In 8 to 10 cycles, an income of ₹100 Lakhs/ annum can be realized under normal conditions.
- Package of practices for breeding, larval rearing, nursery rearing, grow-out farming and market information.
- Unique package for rearing in ponds, cages, tanks and recirculating aquaculture systems.
- Suitable practices for polyculture, monoculture, Integrated Multitrophic Aquaculture (IMTA) and intensive farming in cages.
- Exclusive indigenous feed technology for all the life stages of seabass.
- Extensively field tested and demonstrated.



Transfer of technology and commercialization

- In the year 1999 seed production technology was transferred to RGCA, under the Marine Products Export Development Agency (MPEDA).
- In the years 2012 and 2013, Hatchery technology was transferred to Sankar Rao Hatcheries, Andhra Pradesh and M/s Suryo Foods, Odisha, respectively.
- Nursery rearing and grow-out farming techniques of seabass was extensively transferred to several small farmer groups and entrepreneurs in all the maritime states.

Impact of the technology

- ICAR-CIBA and the technology recipient RGCA and MPEDA together produced about 4 million seabass seeds /annum.
- Farming takes place extensively in West Bengal, Odisha, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka and Maharashtra in a total area of 4000 to 5000 ha. Including freshwater regions with an estimated production to the tune of 6000 to 8000 tonnes, worth ₹ 200 crores.
- About 20,000 people are directly employed in various farming activities, and another 10,000 people are involved in allied sectors.



Services Offered

- Detailed Project Report including sourcing of equipment, chemicals and reagents.
- Training of technical personnel.
- Transfer of technology on non-exclusive basis.

Sources

- Risk analysis on Introduction of L. vannamei in India 2007, ICAR-CIBA and ICAR-NBFGR.
- CIBA e-Publication series No.19; <http://www.ciba.res.in/Books/ciba0597.pdf>.
- ICAR-CIBA signed MoU with Sai Aquafeeds, Andhra Pradesh in 2015.

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IMPACT OF CIBA'S INTERVENTION ON INTRODUCTION AND FARMING OF VANNAMEI SHRIMP IN INDIA

ICAR-CIBA

Before the year 2008, shrimp aquaculture centered around the black tiger prawn as the single preferred species, and the sector was struggling with the devastating WSSV disease which caused huge economic loss. Farmers wanted to import SPF *vannamei*. In 2009, GOI (DAHDF) decided to import selectively bred SPF *vannamei* from the western world.

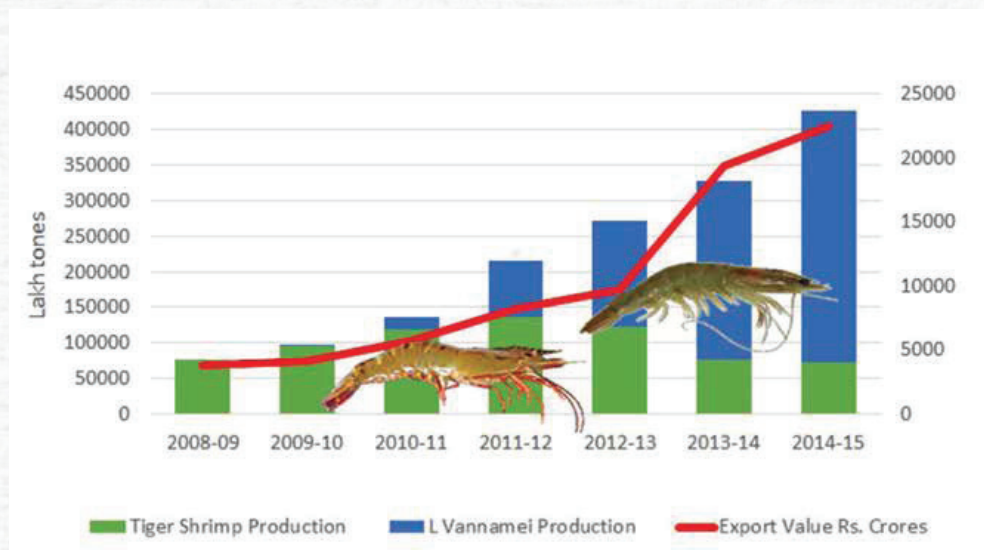
Role of ICAR-CIBA

- Risk and impact analysis jointly done with ICAR-NBFG.
- Framed the import guidelines and BMP's.
- Technical support for creating the quarantine facility.
- Invalidated the outbreak of EMS in India, and helped to achieve a present production of about 3.35 lakh tonnes with an export value of ₹ 20,000 crore.
- Referral laboratory for screening OIE listed pathogens and involved nationwide surveillance of shrimp diseases.
- Developed an indigenous shrimp technology Vanamij^{plus}
- Continuing research related to water and soil quality (water and soil health card), intensification (biofloc based nursery) etc.
- Developed FAQ's with answers and an Android based mobile app (Vanami Shrimpapp) for *penaeus vannamei* farming knowledge transfer.



Impact of the *vannamei* introduction in India

- Farming area increased from 283 ha in 2010 to 50,000 ha in 2015.
- Shrimp export increased from 1.3 lakh tonnes in 2010 to 3.73 lakh tonnes in 2015.
- Export earnings increased from ₹ 4000 crores in 2010 to ₹ 20,000 crores in 2015.
- There are 276 hatcheries, 14 nauplius rearing centers and 24 hatchery consortia.
- 160,000 people directly and 350,000 people indirectly employed in farms and hatcheries.



Services Offered

- Detailed Project Report including sourcing of equipment, chemicals and reagents.
- Training of technical personnel.
- Transfer of technology on non-exclusive basis.

Sources

- Risk analysis on introduction of *L. vannamei* in India 2007, ICAR-CIBA and ICAR-NBFGR.
- CIBA e-Publication series No.19; <http://www.ciba.res.in/Books/ciba0597.pdf>
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VANAMI^{Plus}

ICAR-CIBA

Feed cost is the major ingredient in the grow out culture of *vannamei* shrimp. Commercially available feeds are expensive. ICAR-CIBA has developed a cost effective indigenous feed using locally available ingredients. This is a boon for small and medium shrimp farmers.

Features of the technology: Vanami^{Plus}

- Scientifically formulated quality feed for *vannamei* (35% Protein & 6% Fat).
- Formula cost of ₹ 55-65.
- Increases the profit margin for farmers by 15-20%.
- Tested and evaluated extensively in farmer's ponds.
- FCR of 1.2-1.5.
- Eco-friendly feed with better soil and water quality.
- Customizable technology for small, medium and large scale operations.
- Suitable for corporate entrepreneurs, farmer clusters and co-operative societies.
- Capital investment for the feed production unit is ₹ 50 - 150 Lakhs based on the infrastructure and production target.



Vanami^{iPlus} Technology transferred/Commercialized

- ICAR-CIBA has entered into MOUs with 6 stakeholders in Andhra Pradesh, Gujarat, Kerala, West Bengal and Orissa to set up such production units.
- Recently, one of the clients, Sai Aqua Feeds, Andhra Pradesh launched their Vanami^{iPlus}.



Impacts of the Vanami^{Plus}

- Currently, the installed capacity of the feed processing plants is 10,000 tonnes/ annum which can cover a farming area of 1500 ha.
- Though the Vanami^{Plus} taken up by the clients covers a very small portion of the feed demand, it is serving as a benchmark for pricing as well as to compare the performance of other commercial feeds available in the sector.
- Worth of feed produced ₹ 65 crores/annum.
- About 900 people are directly employed and 1500 people are indirectly employed.
- Trickle-down effect is expected to benefit the farmers to the tune of 1500 Cr/annum @ 10% of saving in the cost of production.



Sources

- New shrimp feed at low cost developed; <http://infofish.org/v2/index.php/128-new-shrimp-feed-at-low-cost-developed>
- Indigenous shrimp feed to help farmers save 20% cost; <http://timesofindia.indiatimes.com/city/chennai/Indigenous-shrimp-feed-to-help-farmers-save-20-cost/articleshow/53218517.cms>
- <http://www.icar.org.in/en/node/12370>

Services offered

- Detailed Project Report.
- Advisory services to establish feed analytical laboratory.
- Sourcing of machineries and ingredients.
- Transfer of technology on non-exclusive basis.
- Training for 3-5 technical people for 5-7 days.

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WATER QUALITY KITS

ICAR-CIBA

Maintenance of water quality parameters in optimum level is critical for successful aquaculture operations. It is essential to monitor pH, dissolved oxygen (DO) and the toxic metabolites like ammonia and nitrite which are critical for the survival of aquatic animals. During the culture, knowing the concentration of essential minerals like calcium and magnesium in pond waters helps in avoiding unnecessary application of minerals and reducing the cost of production. Different kits have been developed for detection of these parameters in aquaculture ponds and related aquatic environment. Regular monitoring of these parameters in hatcheries and grow-out farms will help in taking up immediate measures for preventing the economic loss.



The Technology

pH & DO Kit

- Kit for the analysis of pH and Dissolved Oxygen.
- Range of measurement: pH 2 to 9.

AmNi Kit

- Kit for the analysis of ammonia and nitrite in water samples.
- Range of detection - 0.1 to 5 ppm (mg/litre).

CMH Kit

- Kit for the analysis of calcium, magnesium and total hardness in pond waters of varying salinity 0 to 40 ppt (gm/litre).

CBA Kit

- For the analysis of carbonate, bicarbonate and total alkalinity in different source and pond waters.



Technology Benefits

- Higher accuracy and sensitivity.
- Less requirement of water sample.
- Increased shelf life of the reagents.
- Cost effectiveness.
- Wider range of detection and can be used in freshwater, brackishwater and coastal waters.
- Useful for regular monitoring of water parameters in hatcheries and grow-out cultures.
- User-friendly and can be used in the laboratories and field.



Services Offered

- Detailed Project Report including sourcing of equipment, chemicals and reagents.
- Training of technical personnel.
- Transfer of technology on non-exclusive basis.

Technology Transfer

M/s. Fisherman's Private Limited, Itarsi, MP.

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WSSV NESTED PCR KIT 2.0

ICAR-CIBA

White spot disease is a devastating viral disease in shrimp and causes 100% mortality in a short span of time. This disease has caused huge economic loss to the tune of USD 1.0 billion annually since 1994 across the shrimp farming nations of the world. There is no cure for this disease. Prevention through early detection and strict biosecurity is the only measure so far. CIBA has developed an early detection kit and method using PCR based molecular techniques.

Features of CIBA WSSV Kit

- Indigenously developed.
- Cost effective, sensitive and user friendly.
- Detects as low as 10 virus numbers.
- Results could be obtained in 5-6 hrs.
- CIBA keeps improving the kit.



WSSV kit Technology transferred/Commercialized:

Commercialization

- Bangalore Genei Pvt Ltd, Rs.1,10,000 with 10 % royalty.
- Aura Biotechnologies Private Limited, Chennai.

WSSV Nested PCR Kit ^{2.0}

- The kit has been developed based on nucleocapsid protein gene VP289 of WSSV
- Internal control in the form of decapod β -actin gene has been incorporated to eliminate false negative reactions
- Package size : 50 reactions and 100 reactions kits.



Services Offered

- Detailed project report including sourcing of equipment, chemicals and reagents.
- Training of technical personnel.
- Transfer of technology on non-exclusive basis.

Sources

- Cost effective detection kit for shrimp disease launched;
<http://pib.nic.in/archive/releases98/lyr2002/rmar2002/21032002/r2103200230.html>
- Improved nested PCR for White Spot Syndrome Virus;
http://www.ciba.res.in/stuff/WSSV%20kit_EOI.pdf

Technology Transfer

- M/s. Bangalore Genei Pvt. Ltd, Bangalore

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INDIAN WHITE SHRIMP FARMING TECHNOLOGY & PROPAGATION (*Penaeus indicus*)

Shrimp farming is the face of Indian brackishwater aquaculture which plays crucial role in socio-economic and nutritional security of coastal community and form a major share in seafood export earnings of the country. Being a lucrative profession, shrimp culture attracts many progressive farmers to venture commercial scale culture. However, viral disease recurrent outbreaks such as WSSV in farmed shrimp *P.monodon* lead to production loss of shrimp culture in India. This decline of shrimp production led to the introduction of alternative exotic SPF shrimp species, *Penaeus vannamei* (Pacific white shrimp) for commercial culture. In India rapid expansion of culture of *P. vannamei* in many parts of India without proper scientific management practices once again resulted in outbreak of many emerging diseases like running mortality syndrome, EMS, EHP, slow growth syndrome. In this backdrop the Indian white shrimp, an endemic to Indian coast is one of the alternative species that has undergone standardization of breeding and hatchery seed production and farming using formulated diet.



The Technology

- ❖ Complete package of technology for year round seed production in industrial scale
- ❖ Existing shrimp hatcheries can be modified for disease free white shrimp seed production
- ❖ Modern disease diagnosis and screening protocols can be applied
- ❖ Package of farming practices for larval rearing, nursery and intensive farming
- ❖ Unique package of region specific rearing models such as polyculture with other fin fishes such as mullet, milkfish, pearl spot and other penaeid shrimps.
- ❖ Exclusive indigenous feed technology for all the life stages from larvae, starter grow-out and finisher.
- ❖ Cost effective grow-out feed technology using locally available ingredients.
- ❖ Captive broodstock development and domestication of the species for SPF stocks is in initial process.

ICAR- CIBA Initiative on Multilocation Demonstration of *P.indicus*

- ❖ Excellent growth potential of 15g-20g ABW in 90-100 days of culture on par with other commercial penaeid species
- ❖ Density dependent growth pattern is observed in a period of 4 months
- ❖ Production of 3-5 tons/ha was achieved at a moderate stocking density of 25-40 nos/sqm with 90% survival.
- ❖ A FCR of 1.2-1.5 was achieved with CIBA feed (Protein: starter-36%, grower-34%)
- ❖ Easy to domesticate and breed
- ❖ Genetic divergence between different stocks from Indian coast was established.
- ❖ Various eco-based culture techniques for high density culture have been evaluated.
- ❖ Has similar market demand and pricing as other penaeid shrimp including Pacific white shrimp *P. vannamei*.



Services offered

- ❖ Detailed project report including sourcing of Equipment, chemicals and reagents
- ❖ Training of technical personnel
- ❖ Transfer of technology on non-exclusive basis



Sources

- ❖ Chennai institute to study white shrimps; <http://www.deccanchronicle.com/150916/nation-current-affairs/article/chennai-institute-study-white-shrimp>.

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BIOFLOC BASED SHRIMP NURSERY TECHNOLOGY

Shrimp aquaculture is the economic face of Indian aquaculture and one of the fastest growing food producing sectors. Indian shrimp industry had a phenomenal growth with the introduction of exotic species *Penaeus vannamei*, reaching 5.66 lakh tonnes of production in 2017-18 and accounting for 41 % of the quantity and 68 % in value (Rs. 30,880 crores) of total sea food exports (MPEDA, 2018). ICAR-Central Institute of Brackishwater Aquaculture, Chennai has been conducting Frontline Demonstrations on Biofloc based Nursery rearing Technology for Pacific white shrimp *Penaeus vannamei* in different parts of the country with support from the Department of Biotechnology, Govt. of India. this innovative eco-based technology helps in sustainable production through the conversion of waste to microbial floc as natural food within the culture system, ensuring sustainable income. Nursery system has several advantages such as optimization of farm land, increase in survival, enhanced growth performance, protective response of shrimp, uniformity of size and reduction in the farm grow-out period, and reduction of cannibalism. CIBA has developed BFT and demonstrated the technology in the field with SOP (Standard Operating Procedure).



The Technology

- ❖ This technology ensures good survival of 90 to 98 % and juveniles reaching a size of 300 to 600 mg when stocked at a density of 3000 to 8000 PLs/m³.
- ❖ Nursery rearing phase extends for 3-4 weeks and can reduce the culture period in the grow-out phase by 20-30 days. It improves productivity, natural food, FCR, economic gain; and reduced costs (15-20% lower cost of production).
- ❖ The farmer trainees and other stakeholders who came for exposure visit witnessed the system and pond stocking of the nursery reared juveniles.

Advantages of Nursery rearing technology

- ❖ Optimization of farm facilities provided by the high stocking densities in nursery phase to achieve more profitability.
- ❖ Diurnal changes (pH, O₂, CO₂) during nursery is reduced to give better performance.
- ❖ Better nutrition by continuous consumption of high nutritious feed under autotrophic or in heterotrophic system
- ❖ Better grow-out performance as compensatory growth phenomenon proved.
- ❖ Immunity stimulates under these systems thus giving healthy animals.
- ❖ It improves productivity, natural food, FCR, economic gain; and reduced costs (15-20% lower cost of production).
- ❖ Heterotrophic bacteria can reduce toxic metabolites (NH₃-N, NO₂-N) in the nursery.
- ❖ Easier management and eco-friendly approach (reduced protein requirement, fish meal usage and water/nutrient discharge).
- ❖ Increased protein utilization as the proteins utilized twice, Enhance digestion (with enzymes and growth promoters).
- ❖ More diverse aerobic gut flora reducing pathogenic bacteria (Vibrios) with probiotic intervention.

SOP for nursery rearing

SOP for nursery includes nursery design and construction, bio-security, suitable species, stocking (SD depending on system), culture management practices, feed management and carbon addition strategies, water quality management (zero/minimal water exchange), sludge removal etc.,

Effective management of BFT based culture

1. Proper Pond/system management (crop holidays-sediment removal-ploughing-drying)
2. Proper maintenance of autotrophic/heterotrophic organism
3. Healthy PL Free from diseases (WSSV, EHP, IHNV AHPND etc.)
4. Water activation or maturation and microbiota balance
5. Waste management through sludge removal/syphoning/In situ bioremediation
6. Customized biofloc/probiotics-based farming (in feed and/or water)
7. Avoid overfeeding, excess use of chemicals and built up of vibrio
8. Encouraging functional feed and zero tolerance for antibiotics
8. Proper aeration management
9. Avoidance of all type of stressors



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ECONOMIC IMPACT OF CIBA TECHNOLOGIES

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Economic Impact of the WSSV Kit

The WSSV kit was commercialized in 2002 and was in the market till 2008 with a market share of 10 per cent. Because the WSSV disease is lethal, it is assumed that the use of the CIBA WSSV kit has saved 10% of the farm area. Therefore, production during this period and impacts are calculated based on this assumption. Cost reduction per test was around Rs 300 compared to international kits. So assuming a total PCR test of 30,000 per crop in the sector, the cost saving at 10% is worked out. One hectare of shrimp farming gives 60 man days of employment; therefore, each hectare of aquaculture area saved is attributed to employment of 1,100 man days saved. The monetary value per man day at market rates is assumed to be Rs. 300. Due to the WSSV kit, 85,059 tonnes of shrimp production was saved with a cost saving of Rs. 2.66 Cr. Cost reduction on seed testing was estimated to be Rs. 6.3 Cr. Direct employment generated by shrimp production was 60 lakh man days and employment generated by forward and backward linkages in shrimp production was 11 lakh man days. Consequently, the value of employment generation was estimated to be Rs. 3,338 Cr. Overall, the economic impact of the WSSV kit was estimated to be Rs. 3,347 Cr.

Economic Impact of CIBASTIM

CIBASTIM was commercialized in 2002 and was in the market till 2013. Per year, 10,000 litres of CIBASTIM was produced and the dosage that was recommended was 2 litres/ha, that is, 5,000 hectares was covered with this product. Trials revealed that the use of CIBASTIM led to 10% yield increase and therefore, the economic impact is calculated based on this. One hectare of shrimp farming gives 60 man days of employment. Therefore, each hectare of aquaculture area saved results in employment of 1,100 man days saved. The monetary value per man day is assumed to be Rs. 300 at the prevailing market rate. Due to CIBASTIM, 89.5 lakh tonnes of shrimp were saved with a cost saving of Rs. 499 Cr. Further, direct employment generated by the shrimp production sector was 5.37 lakh man days, and employment generated by forward and backward linkages in shrimp production was 98.5 lakh man days. Thus, the value of employment generation was estimated to be Rs. 295 Cr. Overall, the economic impact of CIBASTIM from 2013-2015 was estimated to be Rs.795 Cr.

Economic Impact of Vannamei Introduction

P.vannamei was introduced in 2009 and is in cultivation till date. Vannamei production in India has shown steady increase with production figures of 4.06 lakh tonnes (81 %) over 59,116 hectares during 2015-16. The vannamei farm area and production during this period have been enumerated and impacts are calculated based on this. One hectare of vannamei farming gives 60 man days of employment. Therefore, each hectare of aquaculture area saved is attributed to employment of 1,100 man days saved. The monetary value per man day is assumed to be Rs. 300 at prevailing market rates. Shrimp production following introduction of vannamei is said to have increased up to 8.5 lakh tonnes valued at Rs. 48 Cr. Direct employment generated in farms engaged in vannamei production was 511 lakh man days, and employment generated by forward and backward linkages in shrimp production was 93 Cr man days. Thus, the value of employment generation was estimated to be Rs. 28,125 Cr. Overall, the economic impact of vannamei introduction from 2009-15 was estimated to be Rs.28,175 Cr.

AQUASTAT INDIA 2018

R. Geetha, T. Ravisankar, C.V. Sairam, S. Vinoth and K.K. Vijayan
Social Sciences Division, ICAR-CIBA, Chennai

ICAR-CIBA has compiled Braquastat, the first statistical compendium on brackishwater aquaculture in India. It consists of information about various aspects of aquaculture, viz.,

- The global and Indian scenario of brackishwater aquaculture, production and trade statistics
- Per capita availability of fish
- Utilization pattern of fish.
- National fisheries resource profile
- Inland water resources, brackishwater area
- Area developed and area under culture.
- Details of registered farms and their water-spread area
- Region-wise processing and storage plants with their capacity
- State-wise details on the area
- Production and productivity
- Monthly per capita consumption of fish and shrimp



This statistical data book will provide updated information about the brackishwater aquaculture sector in India.

It also enumerates / highlights

- CIBA technologies & their benefits
- milestones of technology development and success stories of CIBA technologies.
- impact analysis for major CIBA technologies
- economic loss due to major diseases
- doubling of farmers income and
- review for World, India, and states

This compilation will be immense useful to the planners, researchers, academicians, scholars, extension and development personnel, traders and other stakeholders in brackishwater aquaculture for ready reference for making decisions. The data sources were FAO fishery statistics, Department of Animal Husbandry, Dairying & Fisheries, Ministry of Commerce, Director General of Foreign Trade, Marine Products Export Development Authority, Coastal Aquaculture Authority and various fisheries department websites/fisheries development corporations.

ICAR-CIBA Technology Landscape Timeline



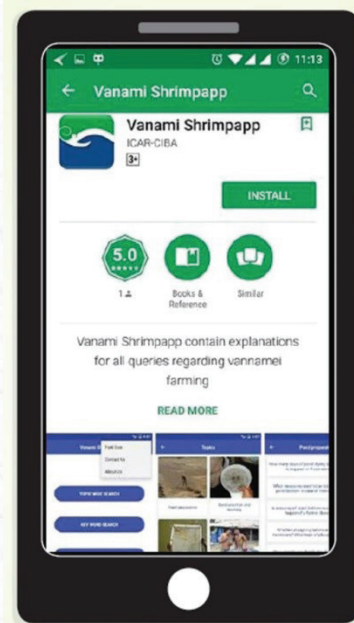
ICAR-CIBA'S VANAMI SHRIMPAPP - A MOBILE APP ON PACIFIC WHITE SHRIMP (*Penaeus vannamei*) FARMING

Access to internet and smartphone penetration in rural areas, facilitated the use of mobile phones for technology communication and facilitates interaction among the research-extension-farmer-inputs-diagnostics-services and market. Shrimp farmers afford smartphones and Indian coastal states have adequate telecommunication infrastructure to access information through mobile phones. ICAR-CIBA has developed and launched an Android based mobile app - “*Vanami Shrimpapp*” for dissemination of technical information and interaction with the stakeholders of shrimp farming sector. *Vanami Shrimpapp* works offline and it is free of cost.

VanamiShrimpapp is the first mobile app on shrimp farming in the country and has been regularly followed by more than 5000 farmers across the globe. *Vanami Shrimpapp* is an innovative communication channel which provides technical support to the shrimp farmers, entrepreneurs and extension personnel and connects them with the scientific community. The app is comprehensive and provided with several modules as listed below.

- BMP Module:
- Input calculators:
- Disease Diagnosis (Probabilistic):
- Shrimp farm risk assessment module:
- Update and advisories:
- Govt. regulations:
- FAQ Module:
- Post a query:

Since its recent release, *VanamiShrimpapp* has been extensively used by the farmers and extension workers across the countries (India, Indonesia, Vietnam, Brazil, Peru, Mexico, Ecuador, and USA) and appraised with a Google performance rating of 4.6 out of 5.0. This app has been developed based on the extensive farm surveys conducted with shrimp farmers of all the coastal states of India. However, the same content may be applicable to the vannamei farming in entire Southeast Asian countries and elsewhere in the tropical belts of the globe.



List of seed technologies

- Breeding and Nursery rearing of grey mullet in west coast
- Partnership farming in brackishwater
- Multi species hatchery at Muttukadu Experimental Station (MES),CIBA
- Culture demonstration of Pacific White shrimp (Penaeus Vannamei)
- Adoption of milkfish and seabass grow out culture Model
- Technical assistance for seabass nursery
- Demonstration of Indian white shrimp (Fenneropenaeus indicus)
- Pond based broodstock development, breeding and nursery rearing of grey mullet in west coast
- Farming for adoption of pearl spot seed production and nursery rearing
- Hatchery production of high health seeds of penaeid shrimp and hatchery rearing of fin fish
- Artemia production using brine
- Satellite Asian seabass nursery
- Eco friendly and Innovative penaeid shrimp production technology
- Consultancy service for shrimp hatchery establishment
- Shrimp hatchery establishment
- Seed production of mud crab.
- Asian seabass hatchery
- Seabass Production

List of feed technologies

- Fish/shrimp feed Processing and Production
- Shrimp feed processing and production
- Low fishmeal feed technology transfer
- Shrimp larval feed demonstration
- Cost effective shrimp and fish processing technology

- Feed plant and machineries and stocks of raw materials
- Seabass feed production
- Organic shrimp feed demonstration and farming technology
- Shrimp feed production
- Shrimp larval feed demonstration

List of health/environment technologies

- Improved PCR kit for detection of White Spot Syndrome Virus (WSSV)
- Evaluation of natural product for its Antiviral activity
- Development of biodynamic preparation for application in shrimp aquaculture
- CIBASTIM Technology on Exclusive basis
- Development of probiotics and disinfectants
- CIBASTIM Technology
- Commercialization of pH and DO Kit
- Sale of bacterial strains (CIBABA-1)
- Commercialization of Micro- brackishwater

Collaborative research programmes

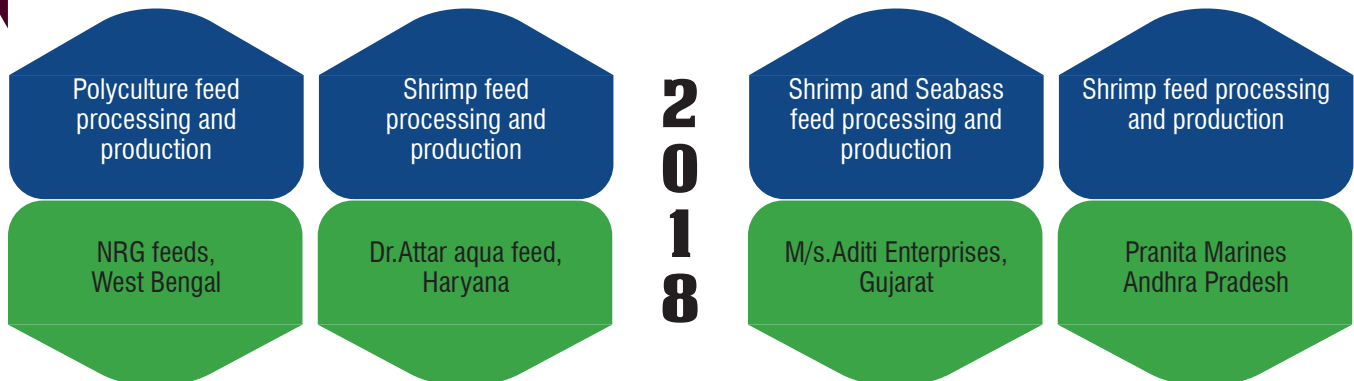
- Tamil Nadu Fisheries University, Nagapattinam
- Mangrove Foundation, Mumbai
- Gujarat Institute of Desert Ecology, (GUIDE), Gujarat
- Centre for Bio separation technology, VIT, Vellore, Tamil Nadu
- Development of brackishwater aquaculture with Shri S. Suresh babu, Ernakulam, Kerala
- IIT, Chennai
- Seafood Exporters Association of India (SEAI), Kochi, Kerala
- Collaborative research on milk fish culture with Aditya fish hatcheries, Andhra Pradesh

Technology Transferred to Various Clients

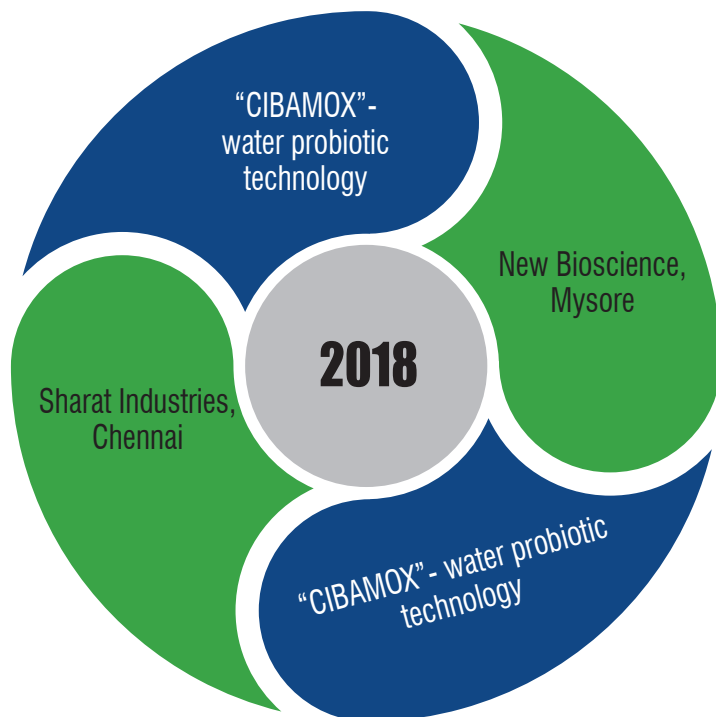
SEED PRODUCTION TECHNOLOGIES



FEED TECHNOLOGIES



HEALTH TECHNOLOGIES / PRODUCTS



COLLABORATIVE RESEARCH PROGRAMME

2018

- TANUVAS, Chennai
- Mangrove cell, Mumbai
- KCT group, Kolkata
- Hi-tide sea farms, Nagapattinam
- Department of Fisheries, Gujarat
- NIOT, Chennai
- Ecofriendly and innovative Penaeid shrimp production with M/s.Venkateswara farms, Andhra Pradesh
- Modular System of Pearlsport seed production and Nursery Rearing Model s with Shri. R Keerthiram , Kerala
- Eco Friendly Shrimp Feed technology with The Water Base Ltd, Chennai
- Ecofriendly and innovative Penaeid shrimp production with M/s. Laxmi Narayan Feeds, Odisha

Glimpses of ITMU Activities





