

IFFCO's 'SAGARIKA' for Climate Resilient Sustainable Agriculture - A collaborative effort between IFFCO - APPL – CSIR / CSMCRI



VISUAL OVERVIEW OF THE MARINE ALGAE FARMING OPERATIONS



Livelihood creation - 1000+
Reverses Ocean Acidification
Seaweed is pesticide and fertilizer free - 100% Organic

Natural Carbon Sink
Protects the coral reefs

Outlook of Seaweed Industry

Emphasis by PM – Narendra Modi on the importance of seaweed cultivation in India



“**Scientific** intervention and technologies hold the key to improving productivity in Indian agriculture... We now need to focus on a Blue Revolution... fisheries... ornamental fishes and seaweeds... We need greater research and promotion of coastal seaweeds... Coastal seaweeds have great potential for human health care and agriculture... We should work on scientific methods of seaweed agriculture. Seaweeds are important raw materials... and can play a significant role in improving crop productivity...”

Shri Narendra Modi, Honourable Prime Minister of India, July 29, 2014 at the 86th Foundation Day of the Indian Council of Agricultural Research (ICAR), New Delhi.

Seaweed is a sunrise industry catering to commercial requirements of many industries such as Food, Feed, Pharma & Chemicals, Cosmetics, Biofuels, Biofertilisers, Biostimulants etc.



“**Seaweed** cultivation neither requires land nor irrigation water nor any fertilizer; instead it yields fertilizers, which will be used in land-based crops.”

Dr. ARJ Abdul Kalam, Former President of India

Seaweed Sap

Enhances agricultural sustainability & productivity



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Outlook of Seaweed Industry

Globally seaweed industry is the fastest-growing of all aquaculture sectors, with an annual growth rate of 10 % and a turnover value of US \$ **13.3 billion** (FAO).

The goal set by the Department of Fisheries for FY 2020-25 is **11.2 Lakh MT** of Fresh Seaweed Production in India which is envisaged to be achieved under Pradhan Mantri Matsya Sampada Yojana (**PMMSY**) during next 5 years.

Seaweed based bio stimulants account for 40 % of Indian bio stimulant market (~Rs 2,200 crores projected to reach **8,500 crores** by 2030 @ 15 % CAGR).

75 % of the seaweed based bio stimulants sold in India are imported & sourced from cold water seaweed species.

Potential Products from Seaweeds



Food Additives
Hydrocolloids



Organic Agri- Inputs
Bio- stimulant
(Sagarika)



Animal Nutrition



Organic Chemicals



Nutraceuticals



Edible Packaging

Collaborative efforts between IFFCO – APPL – CSIR-CSMCRI

- IFFCO realised there was dearth of credible seaweed extract based products of reliable origin in bio stimulant market.
- In the year **2016**, IFFCO- APPL- CSIR- CSMCRI collaborative efforts led to development and introduction of indigenous seaweed extract based biostimulant product named as 'Sagarika (28.8 % w/v) in liquid and granular form.
- Pre commercial scientific evaluation trials of biostimulant was undertaken by scientific institutions and agricultural universities on different crops across India.



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CENTRAL SALT & MARINE CHEMICALS RESEARCH INSTITUTE
वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

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- Sagarika has been manufactured by utilising patented sap extraction technology (US Patent No. 6,893,479; Indian Patent No. 224,938) of Central Salt and Marine Chemical Research Institute (CSMCRI), a constituent laboratory of Council of Scientific and Industrial Research (CSIR), Government of India CSIR – CSMCRI for developing indigenous products.



- Technology has been awarded “CSIR Award for Science & Technology Innovation for Rural Development (CAIRD)” for the year 2012 by CSIR, Ministry of Science & Technology, Government of India



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'Sagarika' Production & other Technical Details

Developed from tropical red and brown marine algae species cultivated by fishermen families in **Palk Bay area across Mandapam coast of Tamil Nadu.**

Protocol developed for planting seaweed through natural **tissue culture technique.**

Increase in availability of planting material will ensure Indian fishermen to take more seaweed cultivation.

Commercial production of seaweed has become successful since last one decade.

With **45 rafts per farmer** & a harvest of **260 kg per raft** with harvest cycle of 45 days, a farmer can earn more than **Rs 15,000/- per month.**

Increase in seaweed extract based business has given hope to seaweed cultivators for sustained business and better income.

'Sagarika' Production & other Technical Details

- IFFCO – APPL has created production capacity of **40 lakh litres of Sagarika liquid and 2.0 lakh MT of Sagarika granule.**
- Sagarika granule as basal application and liquid as **seed priming, soil and foliar application**, through **drip –fertigation** has performed extremely well in both high value and staple crops.

Inclusion of seaweed based biostimulants in FCO, GOI would scale up the biostimulant business

Farmers of the country have applied **8 lakh litres of liquid** and **60,000 MT** of granular Sagarika during last 4.5 years.

Farmer **Affordable price**, earlier farmers were forced to purchase low quality, costly products of foreign origin.

It is emerging as an input for **Organic and Commercial farming**

SAGARIKA has also led to improvement in crop immunity and tolerance to various abiotic stresses.

Input for **Climate Resilient Agriculture.**

Way Forward- Seaweed Business

- Sagarika success story is best example of how collaborative efforts between industry and premier research institutions can be a boon for the farmers of the country.
- Diversification into animal feed, fishfeed etc is being undertaken. Green house methane (GHG's) emission by animals can be reduced by incorporating seaweed in cattle feed.
- Seed Banks, FPOs, seaweed villages for cultivation and policy support leading to increase in biomass production will further open market avenue for other products.
- Huge import substitution potential exist in seaweed biostimulant market with increase in indigenous production of seaweed based biostimulants