

THE SEAWEED INITIATIVE



ICCSIR

**INDIAN CENTRE FOR CLIMATE AND SOCIETAL IMPACT
RESEARCH**

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ICCSIR

Unique consortium of Excel Industries Ltd, Pidilite Industries Ltd and Mamata Group

Lab to study climate evolution and its impact on the rural sector and determine sustainable solutions

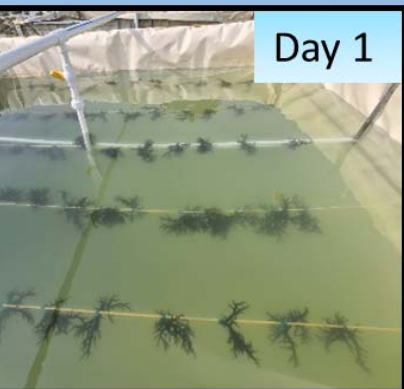
Engaged in research and development of the entire seaweed eco-system

Land-based cultivation of *Kappaphycus alvarezii*, *Gracilaria dura* and *Ulva lactuca* on pilot scale

Tissue culture lab for the micro-propagation of high-quality seed material

FD for prodn of *Monostroma* sp. & seed hardening of *Gracilaria dura* jointly with CSMCRI & TIFA

SHORE TANK FACILITY (5 KL)



SHORE TANK FACILITY (150 KL)



THE DILEMMA

Economic growth demands an increase in primary per-capita energy consumption

Global consensus to deep emission cuts, leading to net zero by 2050

Inability to meet this dual challenge would mean either compromising on development or failing to realise the net-zero target timeframe or both

Paris Pact for People and Planet affirmed the goal: No country should have to choose between fighting for poverty reduction or fighting for the planet

Commitment by developed countries to provide USD 100 b in finance pa to fight climate change & global warming, caused by Carbon Dioxide, Methane & Green House Gases

THE SOLUTION

MARINE MACROALGAE

- Absorbing CO₂ from atmosphere to photosynthesize in the presence of sunlight
- Removing excess nutrients (fert, herbicide, fungicide run-off) from the seawater
- Reducing global demand for arable land, fertilizer and freshwater for irrigation
- Providing positive socio-economic impact by generating additional employment, sustainable livelihood opportunities (especially for women) - formal model to establish local SHG or federation of SHGs - paying regular daily wages to the laborer, even though cultivation cycles restricted to about 8 months only - commit purchase fresh biomass - intrinsic advantages to companies is the opportunity to leverage SHG members' rights to access the waterfront and to harvest wild produce
- Contributing to the blue revolution & to UN SDG # 1, 2, 8, 10, 11, 13 and 14

Cultivable species of Seaweed in India



Kappaphycus alvarezii



Gracillaria edulis



Turbinaria sp



Sargassum wightii



Gelidiella acerosa



Gracillaria dura

SHG - TRAINING & SKILL DEVELOPMENT



SOURCE OF RAW MATERIAL FOR PHYCOCOLLOIDS

Rhodophyta

K-Carrageenan is commonly used

- as a food ingredient

- in the cosmetics industry

- in the pharmaceutical and nutraceutical Industries

- as a formulation for agri-inputs & bio-stimulants

- Animal Feed Supplements (reduces enteric methane formation in ruminants)

- Biofuels

Phaeophyta Carrageenan is used as a bio-plastic packaging material

SOURCE OF RAW MATERIAL FOR PHYCOCOLLOIDS

Phaeophyta

Alginate / Alginic Acid derived from various species of Sargassum; used

in formulation of plant bio-stimulants

in the pharmaceutical industry (biomedical applications)

in the textile industry for fabric printing & dyeing,

in wastewater/effluent treatment to absorb heavy metals & enhance microalgal growth

as edible jelly because of gelation properties

SOURCE OF RAW MATERIAL FOR PHYCOCOLLOIDS

Chlorophyta

Ulvan polysaccharide and Sulphated galactosan, derived from *Ulva lactuca* and *Monostroma* respectively, are used as food & food additives

Caulerpa algae used in salads and has anti-bacterial properties

STAGES OF OFFSHORE CULTIVATION

Seed culture (culture of thalli, in vitro tissue culture, Spore shedding

Seedling of tertiary fast-growing branches

Farm Management

Harvesting of the grown propagule as crop

Processing including Extraction & Formulation

POLICY FRAMEWORK INTERVENTIONS REQUIRED

Seed material

Seed bank

Seaweed policy for commercial-scale cultivation

Zoning, site selection & mapping

Offshore leasing

Coastal belt - site leasing

Ind. managed R&D institutes

Financial incentives