

# Seaweed for a Resilient and Empowered Community: The experience of ILO ISEC Project

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National Dissemination Event on Advancing Seaweed Sector in Bangladesh

April 22, 2025

Dhaka, Bangladesh



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A group of women, mostly wearing colorful headscarves, are gathered around a wooden frame outdoors. They are focused on handling and processing seaweed. The background shows a natural setting with trees and a clear sky. A semi-transparent dark blue box with white text is overlaid on the upper right portion of the image.

From October 2024 to April 2025, INNOVISION Consulting worked for ILO to undertake a series of interventions to address the issues of climate vulnerability, occupational health and safety, decent work practices, women and youth empowerment through systemic interventions in the Seaweed value chain and market systems in Cox's Bazaar, Bangladesh. This presentation highlights the experience of the project and defines the scope for future for our conversations to begin.

# Innovision

Innovision Consulting is an international advisory and management consulting company. Our research, technical assistance, project management, and capacity development services support international development partners, multinationals and start-ups, national private sector, not-for-profit organizations, and government agencies to facilitate sustainable and inclusive growth.

Over the last 16 years, we have undertaken more than 470 projects in 21 countries in Asia and the Pacific, the Middle East, and North Africa (MENA), West Africa, and Southern Africa. Our works primarily focus on SDG 17 - Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Innovision has long-standing partnerships with both Swisscontact and SDC.



21 Countries | 157+ Clients | 450+ Projects | 1.5mn~ beneficiary households

# Background of the Project

The ISEC project aims to economically empower local communities in Cox's Bazar through gender-sensitive skills development linked to employment and self-employment in high-growth sectors.

It adopts a "leaving no one behind" approach, focusing on challenges faced by women, youth, ethnic and religious minorities, and persons with disabilities.

Targeting youth aged 18 to 35, the project includes approximately 42% women among its beneficiaries.

The project takes a public-private partnership approach, involving government, public agencies, business owners, and labor representatives.

Collaborating with ILO, BRAC, and UNDP a2i, The project addresses the needs of economically vulnerable groups through scalable solutions

The project aligns with national policies and aims to enhance employability for NEET youth, women, and persons with disabilities through market-driven interventions.

# Why Seaweed?

## Seaweed: A Climate Solution

Absorbs CO<sub>2</sub> - 30 times faster than land plants  
Reduces ocean acidification  
Convertible to biofuel, bio-stimulant, and bio-plastic

## Climate Resilience

Resilient to climate impacts, unlike shrimp farms  
Sustainable and profitable alternative

## Women Empowerment

Low entry barrier- well-suited for  
women's income generation

## Decent Working Practices

Transitioning from informal to structured farming systems  
through safe handling and post-harvest hygiene  
Scope for women's entrepreneurship

# Why Seaweed?

The global seaweed market is projected to reach USD 18–24 billion by 2033–2035

(World Bank, 2023)

Indicator	Value
Size of coastal area for favorable production in Bangladesh	25,000 km <sup>2</sup>
Annual biomass (raw)	~5,000 metric tons
Annual dry production	~97.5 tons
Agar imports (2022)	33 tons; US\$475,000
Global market size	US\$6.5–15B; CAGR 2.3–8.7%
Govt. mariculture allocation (2020–2030)	TK 34 crore (~US\$4M)

Source: Rapid Market Analysis of the Seaweed Value Chain in Cox's Bazaar ILO, 2024

# Strategic Constraints & Sectoral Challenges

## Core Market Constraints



- Informal, unregulated production
- Limited farming practices
- Seed reliance on wild sources
- Technical skills gaps
- Climate sensitivity

## Supporting Function Constraints



- Limited seed retention facilities and a lack of nurseries
- Weak market linkages
- Lack of processing infrastructure and technology adoption
- Limited access to formal credit

## Rules & Regulations Constraints



- Exclusion from standards and policy agenda
- No export certification
- Limited data of marine zoning
- Limited collaboration between academic institutions and govt. research institutes
- Inconsistent training and limited reach
- Inconsistent training and limited reach

# Demand Side Analysis

## Global Market

Market Size: **US\$6.5–15 billion annually**

Global production (2019): **34.7 million tons**; US\$14.7B first-sale value

Top producers: *China, Indonesia, Korea, Philippines*

CAGR forecast: **2.3%–8.7%** over next decade

Key products: *Agar, Carrageenan, Alginate*

## Regional Market

**Asia-Pacific: Largest market (63% share of total market)**  
*(Source: Seaweed Market Size, Share, Trends and Forecast by Environment, Product, Application, and Region, 2025-2033, IMARC, 2024)*

# Demand Side Analysis

## Bangladesh Market

Annual production: ~97.5 tons (dry weight), mostly *wild-harvested species*

Consumers: *Indigenous communities* in Cox's Bazar and Bandarban

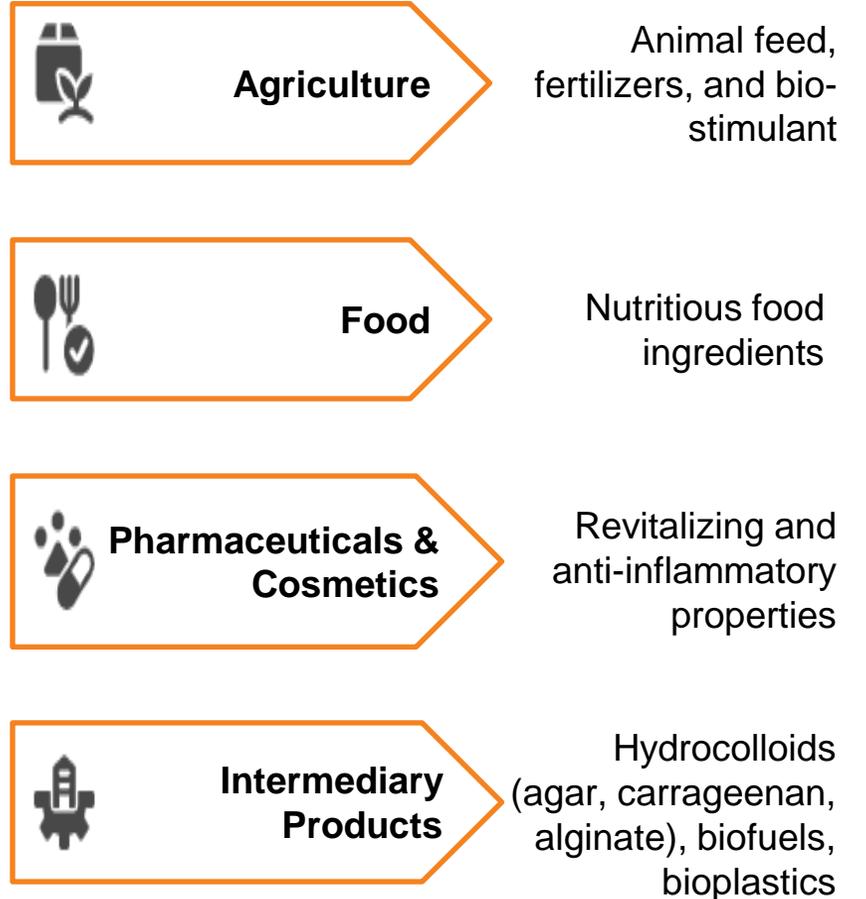
Agar imports: **33 tons worth US\$475,000** at 2022

Increasing demand, particularly for *food, cosmetics, and pharmaceuticals*

Local **women-led businesses** are developing seaweed-based products like *soups, juices, facial masks, and powders*.

**Processed seaweed** sold to tourists for *3,500 BDT/kg*, showing niche premium potential.

## Market Segments



# Supply Side Analysis

Factor	Current Status	Potential
<b>Cultivation Area</b>	Limited, small-scale	Large untapped coastal zones
<b>Species</b>	19 commercial, 3–4 farmed	Expand to more high-value species
<b>Processing Facilities</b>	Minimal, mostly raw/dried	Modern, value-added processing units
<b>Technical Knowledge</b>	Low, fragmented	Capacity building, best practices
<b>Seed Supply</b>	Lack of nurseries and limited seed retention facilities, reliance on wild nature.	Establish seed supply systems
<b>Infrastructure</b>	Inadequate seed retention support/transport services	Investment in logistics
<b>Market Linkages</b>	Weak	Stronger supply chain, market development

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# PROJECT'S CONTRIBUTIONS

# Project's Contributions

1

## **Capacity Building**

Two-phase training on cultivation, post-harvest management, and business development

2

## **Institutional Collaboration and Research**

Collaboration with institutes and international experts for guidance on seed development, site mapping, improving production methods, and global standards of diversified seaweed products

3

## **Product Development and Market Linkage**

Nutritional analysis of seaweed by BCSIR and facilitated feasibility testing for its use as fertilizer and animal feed additive  
Lead farmers connected with research institutes and potential buyers

সার হালপাতালে  
প্রযত্নে বিকল্প হিসেবে  
খাদ্য পরিবেশন করা হয়।



**ISEC** Improving Skills and Economic Opportunities for Cox's Bazar

**WINOVISION**  
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# CAPACITY BUILDING



## Purpose

Build **local capacity** for sustainable, income-generating seaweed farming

Empower **women and youth** in Cox's Bazar through inclusive livelihood opportunities

## Target Beneficiaries

Small-scale farmers, especially women and potential entrepreneurs, across **seven coastal sites**- Nunierchara-Chowfaldandi, Rezukhal-Shaporirdip, and Moheshkhali-Sonadia, **spanning four upazilas**: Cox's Bazar Sadar, Ukhiya, Teknaf, and Moheshkhali

# CAPACITY BUILDING

## Activities

Conducted a **baseline survey** and identified **271 interested** seaweed farmers

**Two-phase training** on seaweed cultivation, post-harvest management, and business development

**Practical demonstrations** on tools, techniques (long-line & raft), and **group work** on GESI awareness

Easily made **products showcased** to farmers and women during the 2<sup>nd</sup> phase of training

**Financial literacy training** for seaweed entrepreneurs, traders, and farmers

## Achievement

**Four new farming** communities are empowered with improved seaweed farming

**Trained 183** seaweed farmers, covering **67% of women** farmers' participation

Productivity gained for **floating raft**: 87 kg per 121 sq m, and **long-line**: 25 kg per 75 sq m

Introduced low-cost waste plastic bottles as **float alternatives**, cutting production costs, reducing theft risk, and promoting **sustainable practices**

Provided **training on financial literacy to 25** entrepreneurs, traders, and lead farmers from seven farming zones



Seaweed Tissue Culture

**INSTITUTIONAL  
COLLABORATION  
AND RESEARCH**

## Purpose

Advanced **seed development, product innovation, diversification, and research collaboration** in the seaweed sector

## Target

**Engagement of** research institutes, university researchers, students, seaweed farmers, market actors, and international experts to foster an inclusive and collaborative seaweed value chain ecosystem

# INSTITUTIONAL COLLABORATION AND RESEARCH

## Activities

**Facilitate the collaboration** with Government research institutes and private partners **to establish seed nurseries**

**Testing of two seaweed varieties** (Gracilaria and Ulva Lactuca) at the Bangladesh Council of Scientific and Industrial Research (BCSIR) **to assess nutritional composition**

**Scoping study** to assess market demand and customer segmentation for seaweed products, identifying key opportunities and target markets

## Achievement

Facilitates **collaboration between BARI and Modern Hatchery** to scope conversion of shrimp hatcheries into seaweed seed nurseries

Foster **collaboration with BARI and TK Group** to assess the feasibility of large-scale commercial seaweed cultivation in closed saline water bodies on private properties near the ocean

Facilitated **collaboration between BARI and ACI** to explore the integration of seaweed into **animal feed and fertilizer products**.

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# INSTITUTIONAL COLLABORATION AND RESEARCH

## Activities

**Facilitate the collaboration** among Bangladesh Agricultural Research Institute (BARI) and Chattogram Veterinary and Animal Sciences University (CVASU) to strengthen **seed development and multiplication**

Collaborate with government **research institutes and private partners** to drive the commercialization of seaweed production

**Facilitated linkages** between Bangladeshi government research institutes and Indonesian seaweed experts.

## Achievement

Extended **research opportunities** for undergraduate and postgraduate students, as well as to foster **knowledge sharing and technology transfer** between **BARI and CVASU**.

Supported the development of **quality and safety standards** for seaweed and seaweed-based products.

Strengthened **cross-border knowledge exchange and collaboration** between Local Government Research Institutes and Indonesian seaweed experts.



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- ▶ কক্সবাজার সার্বজনীন চাষের সংগ্রহোত্তর ব্যবস্থাপনা, মান সংরক্ষণ ব্যবস্থা উন্নয়ন বিষয়ক প্রশিক্ষণ
- ▶ কক্সবাজার সার্বজনীন চাষের সংগ্রহোত্তর ব্যবস্থাপনা ও লবণ বাজার ব্যবস্থা উন্নয়ন

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# PRODUCT DEVELOPMENT AND MARKET LINKAGE

## Purpose

Explore and validate the use of seaweed in **commercial products** such as fertilizers, animal feed, and food items

## Target

Engagement of agribusinesses (e.g., ACI Godrej, ACI Fertilizer), high-end hotels and restaurants, processors, and researchers to explore **market linkages and product development opportunities** in the seaweed sector.

# PRODUCT DEVELOPMENT AND MARKET LINKAGE

## Activities

To advance product development research, facilitated a **tri-party collaboration among BARI, ACI Godrej Agrovet Ltd., ACI Fertilizer**, and the project to test the feasibility of seaweed integration.

Facilitated **recipe development** by high-end hotel chefs and organized **culinary exhibitions at Hotel Seagull**, alongside providing **training to 20 entrepreneurs** ranging from upscale restaurant owners to local food cart vendors.

## Achievement

Successful **testing and validation** of seaweed integration into **animal feed and fertilizers**, leading to the development of market-ready, sustainable products and strengthened partnerships for ongoing innovation.

Increased **awareness and visibility of seaweed delicacies** and the integration of local recipes, while also **capacitating 20 local entrepreneurs** in the preparation of seaweed-based dishes.

## Purpose

Explore and validate the use of seaweed in **commercial products** such as fertilizers, animal feed, and food items

## Target

Engagement of agribusinesses (e.g., ACI Godrej, ACI Fertilizer), high-end hotels and restaurants, processors, and researchers to explore **market linkages and product development opportunities** in the seaweed sector.

# PRODUCT DEVELOPMENT AND MARKET LINKAGE

## Activities

Facilitated the linkage between **Starina's Kitchen and BARI** for the development of seaweed-based food items and showcased the products at an **exhibition held at Hotel RAMADA**.

**Mentorship to seaweed traders and entrepreneurs** across seven farming communities, with a focus on quality assurance and best practices during **cultivation and post-harvest management**.

## Achievement

Successful development and showcasing of seaweed-based food items through the **collaboration between Starina's Kitchen and BARI** at the Hotel RAMADA exhibition, leading to **increased market exposure**.

Conducted **monthly community visits** in collaboration with potential traders and food entrepreneurs.

শালা

যয়ন প্রকল্প

ISEC

Improving Skills and  
Economic Opportunities  
for Cox's Bazar



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OSH

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## Occupational Safety and Health

- Developed **training module** for farmers included Occupational Safety and Health (OSH) related information
- **180 farmers** from Nunierchara-Chowfaldandi, Sukhal-Shahpari Dwip, and Moheshkhali-Sonadia were trained on OSH
- The farmers were trained about utilizing the **common washing and drying platforms** ensuring OSH
- Farming communities from three clusters were **regularly followed up** to adhere to the OSH practices by the project officials, BARI scientists' and lead seaweed producers and traders.



**DECENT WORK**



## Decent Work

- **123 male and 60 female** participants from four sub-districts of Cox's Bazar (Cox's Bazar Sadar, Moheshkhali, Ukhiya and Teknaf) participated in discussions on fair wage, safe working environment and social dialogues.
- The project initiated the formation of **business management committees** in three clusters to manage the common washing, drying and storage platforms which will bring improved status in the **decent work environment** for the seaweed farmers of these clusters.



# CLIMATE VULNERABILITY



## Climate Vulnerability

- Participants selected in **three clusters affected by climate vulnerability** across four sub-districts of Cox's Bazar received seaweed farming training as **alternative livelihood options** for climate resilience.
- Communities supported with **improved seaweed farming** and ensuring sales of the produced seaweed.



# WOMEN'S EMPOWERMENT



## Women's Economic Empowerment

- The project targeted a maximum number of women trainees, ultimately the project were able to **train 60 female** community members as seaweed farmers.
- Promoted women as **service providers** for seaweed seed.
- Facilitated **market linkages** for small scale seaweed processors and traders.

"The biggest challenge in Bangladesh's seaweed sector is not production, but creating a stable and scalable market. While the country has favorable coastal conditions and growing interest among coastal communities in seaweed farming, the absence of structured demand—both domestically and internationally—limits the sector's growth."

*- Mostak Ahmed, BARI*

"We're excited about the potential of using locally produced seaweed as a sustainable alternative to imported feed additives. But to make this shift, the seaweed must consistently meet international standards in both nutritional quality and contamination control. If we get that right, it's a win for local producers, animal health, and the entire value chain."

*- Md Nazrul Islam  
Associate Vice President  
ACI Godrej Agrovet Private Limited*

# Before-and-After Scenario

Indicator	Before (Oct 2024)	After (Apr 2025)
<b>Farmer Engagement</b>	~100–150 individuals, mostly informal collectors	271 farmers identified; 183 farmers trained (67% women)
<b>Cultivation Method</b>	Predominantly wild collection, basic long-line methods	Initiated large-scale long-line farming and floating rafts
<b>Seed Availability</b>	No formal seed supply; full reliance on wild stock	BARI scaled-up seaweed seed R&D; started tissue culture. BORI and BFRI tissue-culture labs started operations
<b>Training &amp; Capacity Building</b>	No formal training access	183 farmers trained on improved farming, post-harvest, and business development
<b>Research Linkages</b>	Limited engagement with research institutions	Active collaboration with BARI, CVASU, and Indonesian experts
<b>Product Diversification</b>	Minimal use beyond drying and local consumption	Tested seaweed for feed/fertilizer; introduced seaweed in 03 five star hotels at Cox's Bazar
<b>Market Access</b>	No organized buyers; weak market awareness	Buyer segmentation study; linkage with traders & restaurants
<b>Gender Inclusion</b>	Women involved mainly in collection and drying	Women lead 67% of trained cohort; involved in processing & sales
<b>Policy &amp; Visibility</b>	Seaweed under-recognized in policy and market systems	Raised visibility through national dissemination and stakeholder events

# Future Scopes



## Scale-Up Opportunities

Comprehensive site selection mapping, expansion of cultivation based on the mapping, and development of off-season seed retention facility

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## Production Hubs

Establishment of aggregation centers for processing and quality control

Promotion of Integrated Multi-Trophic Aquaculture (IMTA) in Closed Saline Water Bodies Near the Ocean.

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## Seed Nursery Network

Conversion of idle hatcheries into seaweed nurseries

# Recommendations

BARI, BORI, BFRI should jointly contribute to a National Seaweed Roadmap under the Blue Economy framework of Bangladesh

Develop a sustainable model for tissue culture to scale and sustain seed supply for Ulva and Kappaphycus varieties which are valuable for food (Ulva) and carrageenan/thickening agent for dairy products (Kappaphycus)

Facilitate BSTI safety standards and certifications for seaweed products

Engage EPB for export readiness through certifications; promote domestic consumption through both institutional and retail buyers

Integrate seaweed farming into coastal livelihoods programs; empower women and youth entrepreneurs through initiatives under MoWCA, DYD and other relevant agencies

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