

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

National Consultation on Advancing the Seaweed Sector in Bangladesh


April 22, 2025

Dhaka, Bangladesh



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From October 2024 to April 2025, INNOVISION Consulting (an implementing partner for ILO ISEC project in Cox's Bazar) 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 BRAC and UNDP, 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 CO₂ - 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 ²
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

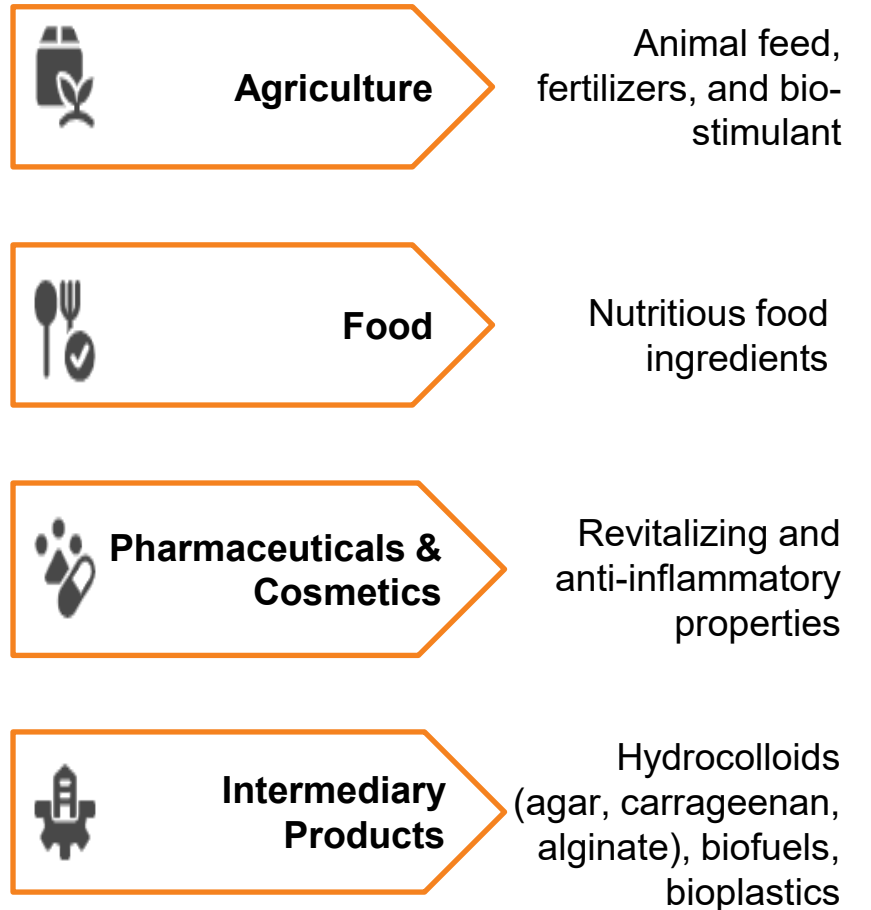
Agar imports: **33 tons worth US\$475,000** at 2022

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



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
প্রযাধের বিকল্প হিসেবে
ত খাদ্য পরিবেশন করা হয়।



ISEC Improving Skills and Economic Opportunities for Cox's Bazar

INOVISION Assistance | Project Management

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 2nd 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**.

Purpose

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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, মান সংরক্ষণ ব্যবস্থা উন্নয়ন ও লবণ বাজার ব্যবস্থা উন্নয়ন

VISION

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

শ্রমিক প্রকল্প

ISEC

Improving Skills and Economic Opportunities for Cox's Bazar

OSH

- SW কোন কোন কাজে নিয়োগ করা হবে
- কোন কোন কাজে নিয়োগ করা হবে
- খোঁজ পাবে
- স্বাস্থ্যমন্ত্রীর উপস্থিতি
- ফিটনেস টেস্ট
- স্বাস্থ্য চ্যাম্পিয়ন নির্বাচন
- খোঁজ পাবে
- SW কোন কোন কাজে নিয়োগ করা হবে
- স্বাস্থ্য চ্যাম্পিয়ন নির্বাচন
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- স্বাস্থ্য চ্যাম্পিয়ন নির্বাচন

২৫ কেজি
১০০ টাকা



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)
Farmer Engagement	~100–150 individuals, mostly informal collectors	271 farmers identified; 183 farmers trained (67% women)
Cultivation Method	Predominantly wild collection, basic long-line methods	Initiated large-scale long-line farming and floating rafts
Seed Availability	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
Training & Capacity Building	No formal training access	183 farmers trained on improved farming, post-harvest, and business development
Research Linkages	Limited engagement with research institutions	Active collaboration with BARI, CVASU, and Indonesian experts
Product Diversification	Minimal use beyond drying and local consumption	Tested seaweed for feed/fertilizer; introduced seaweed in 03 five star hotels at Cox's Bazar
Market Access	No organized buyers; weak market awareness	Buyer segmentation study; linkage with traders & restaurants
Gender Inclusion	Women involved mainly in collection and drying	Women lead 67% of trained cohort; involved in processing & sales
Policy & Visibility	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



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.



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

THANK YOU

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