

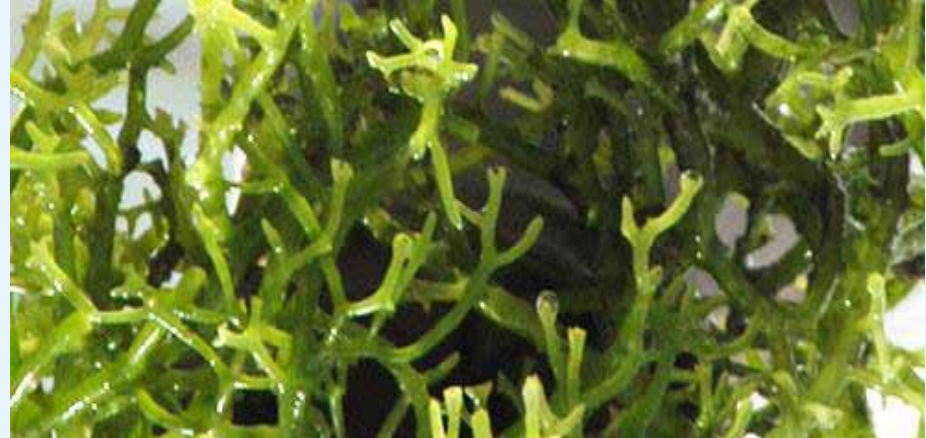
The East Asian Seas Seaweed Sector

Challenges and Opportunities

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Seaweed facts & figures

- **Seaweeds** - photosynthetic aquatic organisms that forms energy base for all aquatic organisms
- Low value commodity
- 5.47% or **USD 275 bln** of world aquaculture production
- **Three taxonomic groups:**
 - Brown* - 2,000 species of *phacophyceae*
 - Red* - 7,200 species of *rhodophyta*
 - Green* - 1,800 species of *cholophyta* (loose grouping)
- Seaweed cultivated so far: **27 species**
- Types of cultivation (EAS region)
 - Small scale farming or*
 - Industrial farming (IMTA)*



Extrapolated ecosystem services 500 mln tons of seaweed (Brummet & Hansen. 2016)

Ocean area required	500,000 km ²	Based on average annual yield of 1,000dry tons/km ² . Equals 0.03% of the ocean surface area
Protein for people and animals	50,000,000 tons	Assumes average protein content of 10% dry weight. Estimated value \$28 bln.
Algal oil for people and animals	15,000.000 tons	Assumed ave. lipid content of 3% dry weight. Estimated value of \$23bln
Nitrogen removal	10,000,00 tons	Assumes nitrogen content 2% of dry weight. Equals 18% of the nitrogen added to oceans through fertilizer
Phosphorous removal	1,000,000 tons	Assumes phosphorous content 0.2% of dry weight. Represents 61% of the phosphorous input as fertilizer
Carbon assimilation	135,000,000 tons	Assumes carbon content 27% of dry weight. Equals 6% of carbon added annually to oceans from GHG
Bioenergy potential	1,250,000,000 MWH	Assumes 50% carbohydrate content, converted to energy. Equals 1% of annual global energy use
Land sparing	1,000,000,000 km ²	Assumes 5 tons/ha carbohydrate content, converted for energy. Equals 1% of annual global energy use
Freshwater sparing	500km ²	Assumes agricultural use averages 1M3 water/kg biomass. Equals 14% of annual global freshwater withdrawals

Seaweed Production in East Asian Seas

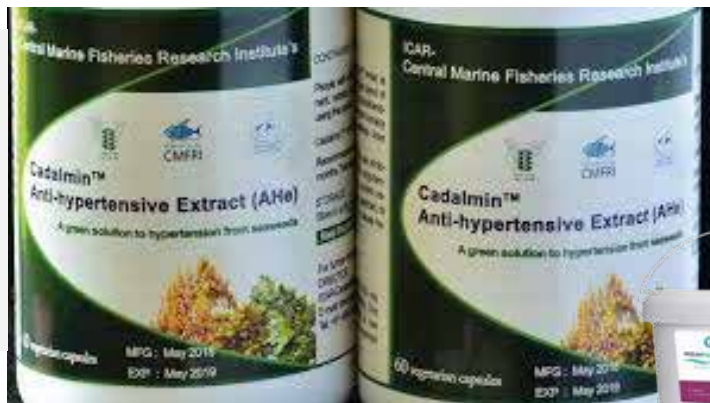
Asian countries	Total Seaweed Production (farmed and wild)		Seaweed cultivation	
	Tonnes (wet weight)	Share of world production (%)	Tonnes (wet weight)	Share in farmed and wild production (%)
China	20,296,592	56.75	20,122,142	99.14
Indonesia	9,962,900	27.86	9,918,400	99.55
RO Korea	1,821,475	5.09	1,812,765	99.52
Philippines	1,500,326	4.20	1,499,961	99.98
DPR Korea	603,000	1.69	603,300	100.00
Japan	412,300	1.15	345,500	83.80
Malaysia	188,110	0.53	118,110	100.00
Rest of Asia	42,047	0.12	23,344	55.52

Source: FAO, 2021

Social, economic and environmental benefits

- Offers simple technology and low initial capital investment
- **Source** of human food, animal feed and additives, pharma and medical fertilizer and food additives
- **Generates** jobs both in farms and in processing
- **Provides** source of livelihood for isolated coastal rural area
- **Reduces** the overexploitation of fisheries
- Promotes active role of women and children
- **Promotes** peace and stability in some places
- **Reduces** pollution and eutrophication in water through absorption of nutrients

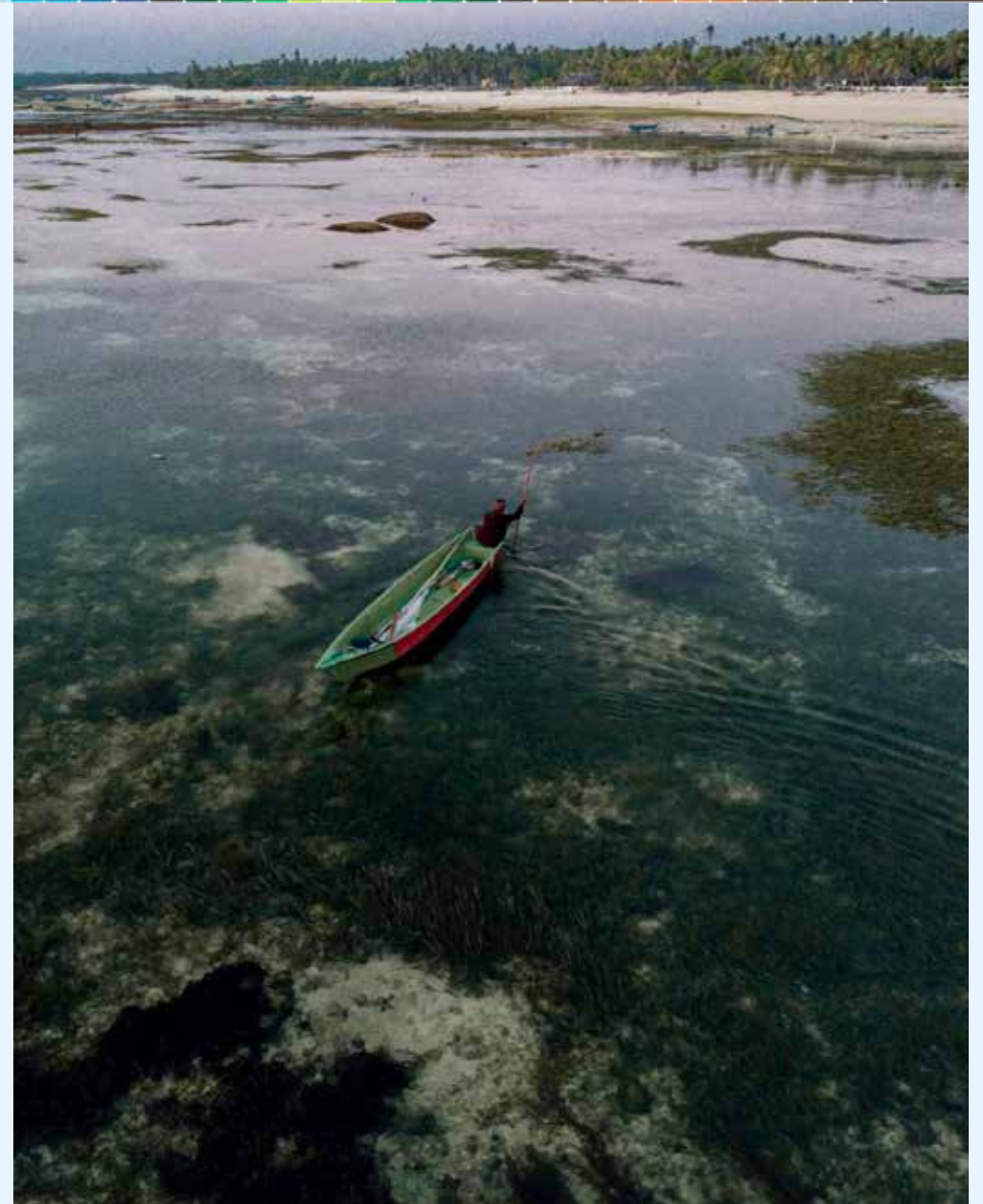






Challenges of Seaweed Cultivation

- **Insufficient supply of good quality planting materials** including disease-resistant seedlings
- **Climate change** - El Nino phenomenon and typhoons
- **Infestation of ice** - ice disease and epiphytes
- **Volatile prices** - low buying price of traders
- **Farmers switching to other sources of livelihood**
- **Inadequate compliance to sanitary and phytosanitary measures**
- **Peace and order situation** (some cases)



Examples of initiatives in the region

- **China/ Korea:** Research on biodiversity, protection and breeding of macroalgae and rehabilitation of seaweed beds and examining evidence of seaweed as carbon sink
Integrated multi-trophic aquaculture (IMTA) is widely practiced
- **Vietnam:** Seatech Energy with Greener Grazing examining the development of science and methodologies needed to initiate scalable, ocean-based farming of *Asparagopsis taxiformis* (AT)
- **Philippines/Indonesia/Malaysia:** Institutional strengthening and technical assistance to small scale farmers and SMEs, production in autonomous regions in Muslim Mindanao, Philippines/islands in Indonesia/Malaysia

Can seaweed be a driver of poverty alleviation and shared prosperity?

YES, but it needs to

- a) **CONNECT** rapidly evolving cutting edge science in the processing and use of seaweed to practical production technology
- b) **LINK** technology to investors in developing countries as well as provide micro-financing opportunities for seaweed farmers
- c) **ESTABLISH** standards of operation (**certification**) and management systems (**integrated coastal management/marine spatial planning**) to ensure that production systems remain sustainable and resilient
- d) **INVEST** in the establishment of seaweed tissue culture lab to produce good quality, disease-resistant seedlings
- e) **PROVIDE** training on best aquaculture practices (ex IMTA and small scale cultivation) and capacity building programs, including women socio-economic empowerment

Recommendations

- Provide technical assistance – policy, infrastructure, technology, engaging private sector investors, environmental requirements, climate benefits
- Establish global partnerships to share knowledge, build capacity
- South-South cooperation on seaweed sector development as part of broader ecosystems based fisheries management approach/ integrated multitrophic aquaculture
- Apply marine spatial planning/ICM mainstreaming as integral part of measures to scale up seaweed production



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