



Seaweed Farming for Industrial Applications- *A Value Chain Approach*

**International Webinar on Entrepreneurship Development on
Seaweed Business by Cooperatives
28 January 2021**

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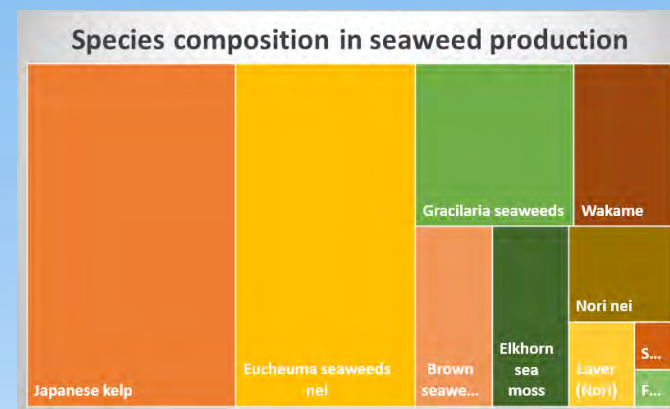
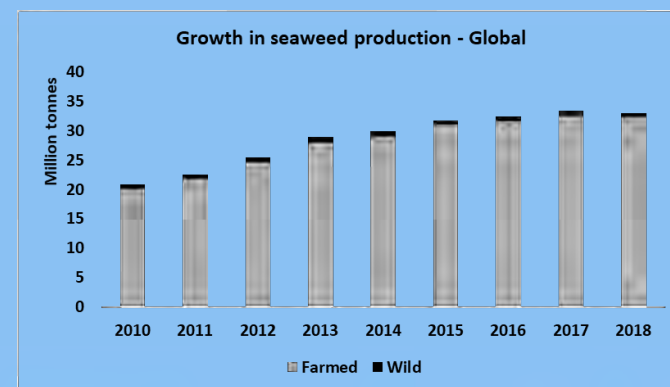


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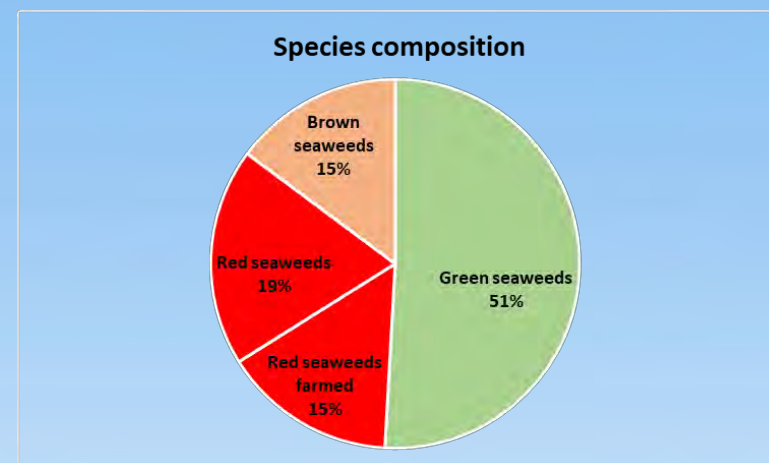
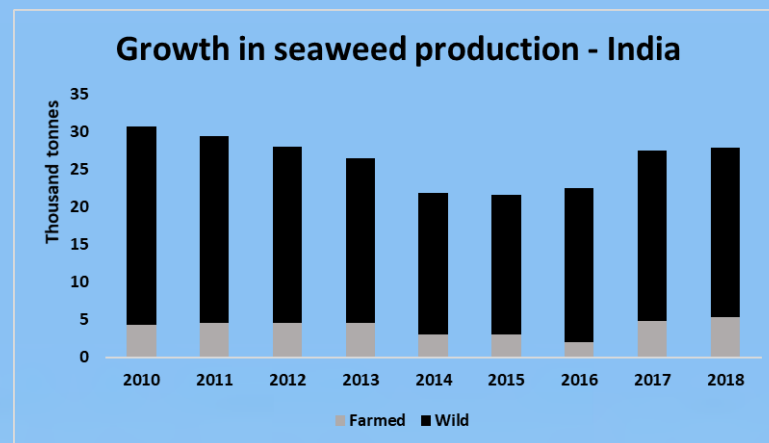
Seaweed production- Global picture

- The global seaweed production during 2010-18 reached 33 million tonnes in 2018, from about 21 million tonnes in 2010. On an average, 97% percent of the production is farmed.
- The average annual growth of production is about 4%.
- Japanese kelp, Eucheuma and Gracilaria are the top species. Together, they constitute about 70% of the production.
- Major producers: China, Indonesia and the Republic of Korea. Their contribution amounts to about 87 percent of the global production.
- Use of seaweed is booming.
- In 2017, globally, 0.48 million tonnes of seaweed valued at USD 880 million was exported. Indonesia led the global export with 21 percent market share, followed by Chile (9%) and Ireland (7%).
- Most traded commodities are lever, agar agar, red seaweeds and *Undaria pinnatifida* (brown algae).



Seaweed production- India

- Seaweed production hovered around 26 000 tonnes during 2010-18.
- In contrast to the global trend, only 15% of seaweed is farmed.
- Green seaweed makes 51 percent of the production. Red seaweed is the major farmed species.
- The production remains more or less concentrated on the coasts of Tamil Nadu and Gujarat.
- The Pradhan Mantri Matsya Sampada Yojana (PMMSY) has provisions to promote seaweed business.



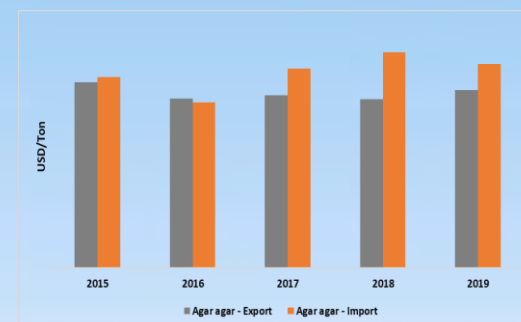
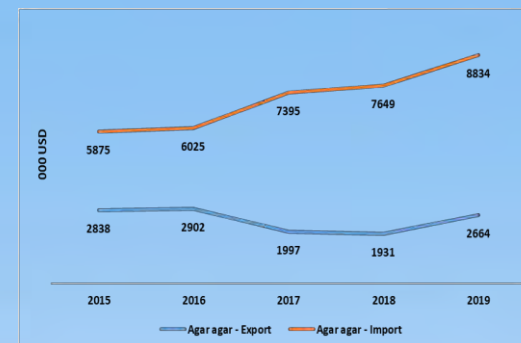
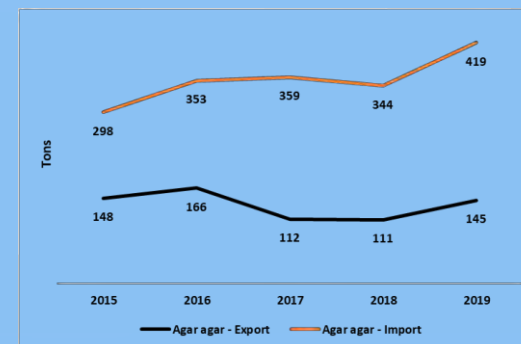


Industrial Applications of Seaweed

Hydrocolloid	Description
Agar	The two key grades of agar are produced from either gelidium or gracilaria seaweeds. Consumption of gelidium agar is focused in the pharma bacteriological plates although there is some use in food. Gracilaria agar is mainly used in food and often sold as a single ingredient for home use in Asia.
Alginate	Sodium alginate and propylene glycol alginate (PGA) are widely used in food and industrial applications. The calcium gelling reaction is used in many food applications, the classic of which is the red pimento strip in green olives. Sodium alginate is also used as thickener in sauces, syrups and toppings for ice cream.
Carrageenan	Extracted from red edible seaweeds. Widely used in the food industry, for their gelling, thickening, and stabilizing properties. Their main application is in dairy and meat products, due to their strong binding to food proteins.

Demand for seaweed products in India – *Case of agar agar*

- The chart shows *agar agar* export and import from/to India in quantity (tons), value (000 USD) and unit value realization (USD/ton).
- Data indicates there is a growing demand for seaweed products, both for trade and domestic consumption.
- India is a net importer of seaweed products.
- The unit value of seaweed products imported is usually higher than exported products.
- To sum up, there is a scope in the domestic market both for increasing production and value addition.

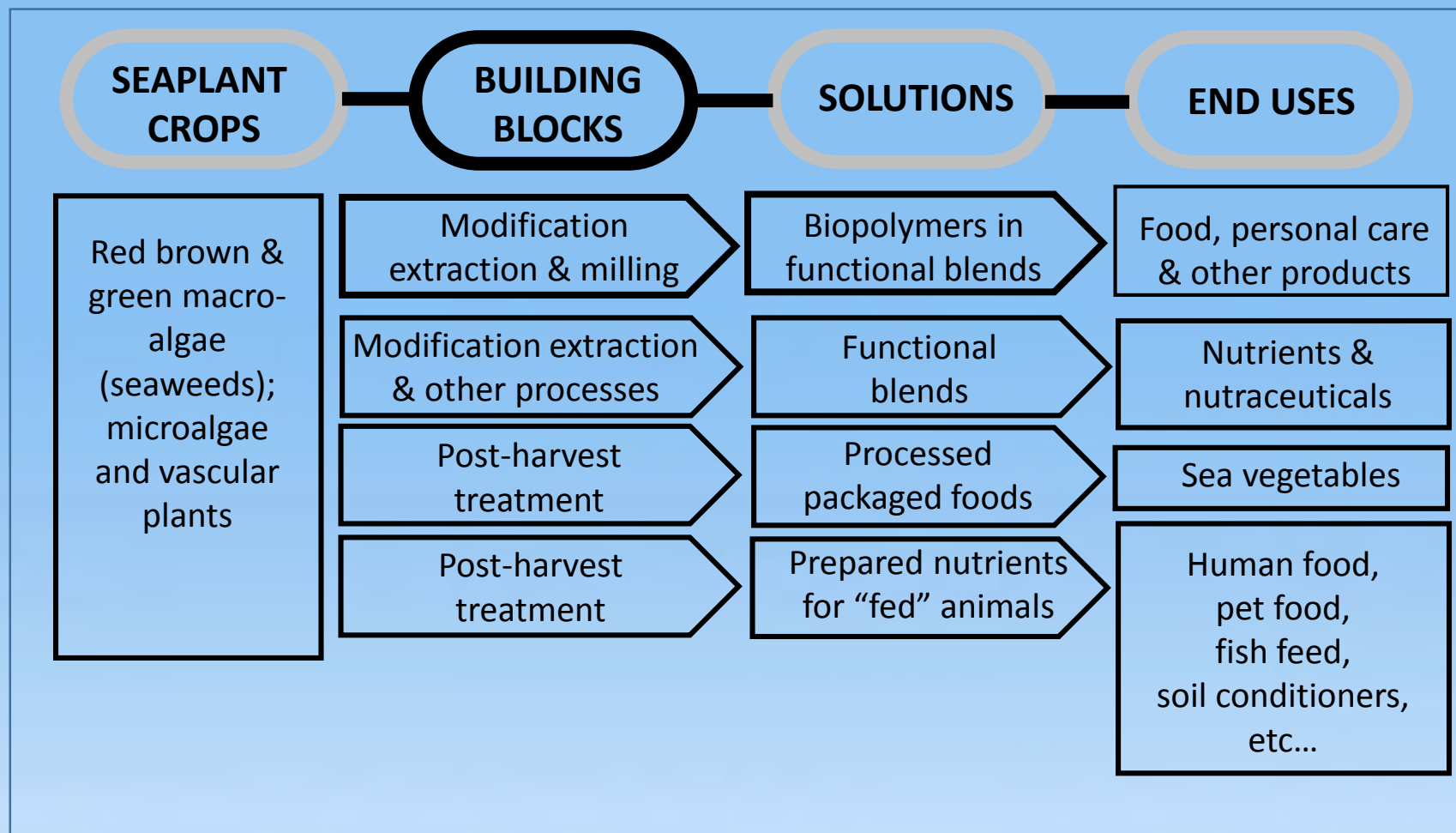


Source: ITC Trademap

Growth in downstream sectors

Sector	Projection
Pharmaceuticals	Indian pharmaceutical sector supplies over 50% of the global demand for various vaccines. Pharma Vision 2020' by the Department of Pharmaceuticals, Government of India aims to make India a major hub for end-to-end drug discovery. India also plans to set up a nearly Rs. 1 lakh crore (US\$ 1.3 billion) fund to provide boost to companies to manufacture pharmaceutical ingredients domestically by 2023.
Food processing	The Indian food processing industry accounts for 32% of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. The Ministry of Food Processing Industries (MoFPI) is making all efforts to encourage investments in the business.
Cosmeceutical	Indian Cosmetics Products Market is projected to grow at a CAGR of 4.23% during the forecast period 2020 - 2025. The cruelty-free (no animal testing), vegetarian, and vegan (no animal ingredients at all) beauty market has exploded in recent years globally and has been finding its space in the Indian market too.

The seaweed value chain



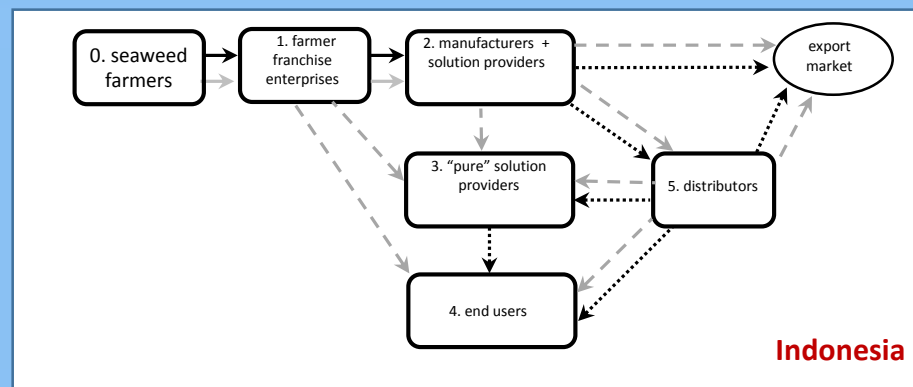


Scope for cooperatives in seaweed entrepreneurship

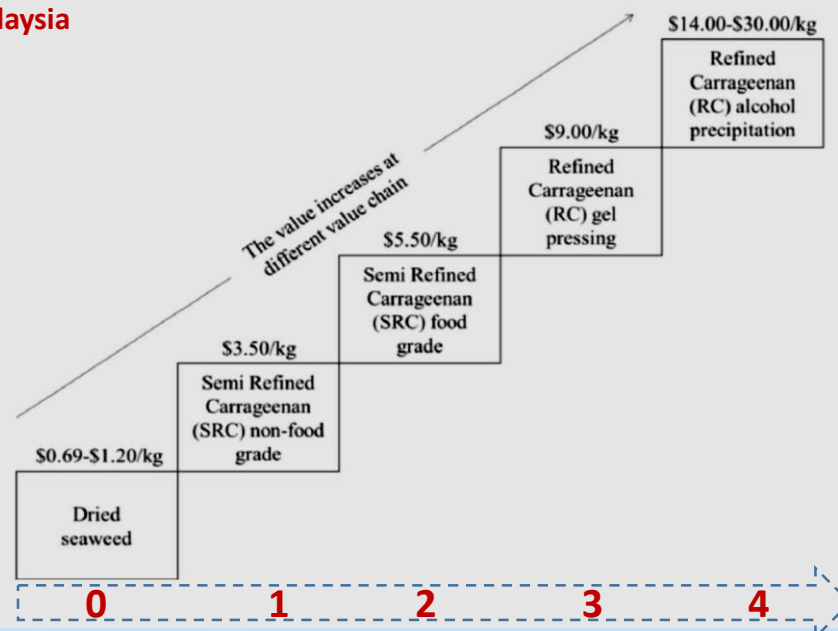
- At farming and harvesting level, seaweed is more of a labour-intensive activity.
- Labour intensity decreases but still remains substantial at washing, grading and drying stages.
- Low level of technology is required for initial processing of seaweeds.
- Through community entrepreneurship the above three stages can be brought under the production sphere of the cooperative.

Lessons from Indonesia & Malaysia- Case studies

- Currently, farmers/ harvesters sell the product at level 0.
- However, substantial value addition takes place between levels 0 to 1 (192%).
- For a profitable and sustainable cooperative there is a need to capture levels 0 to 2.



Malaysia



Ref: Neish C (2007) Assessment of the seaweed value chain. USAID Nor, A.M., Gray, T.S., Caldwell, G.S. et al. A value chain analysis of Malaysia's seaweed industry. *J Appl Phycol* 32, 2161–2171 (2020).



The road map

- Seaweed farming is receiving global attention.
- With projected growth in the upstream industries, the domestic demand is likely to increase.
- There is a scope of rural entrepreneurship in seaweed farming through cooperatives.
- However, a cooperative focussing only on production and drying is unlikely to make enough money to grow.
- The entrepreneurship will be on internalizing as much of the value chain as possible.
- At the same time, a clear Government policy will be required that *inter alia* covers identification of suitable areas, forward and backward linkages, market intelligence, knowledge and capacity building of stakeholders at different levels and finally access to finance.



Thank You!