

Harnessing the Ocean's Bounty: Coastal Communities Empowered through Seaweed Farming

Koneru Ramya^{1*} and Gadde Sri Harsha²

¹PhD research scholar, Department of Human Development and Family Studies, University of Agricultural Sciences Dharwad

²PhD research scholar, Department of Extension and Communication Management, University of Agricultural Sciences Dharwad

Corresponding Author

Koneru Ramya

Email: koneru62ramya@gmail.com



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ABSTRACT

Seaweed farming is an environmental and sustainable practice which is globally acknowledged due to its less use of resources and inputs to begin any entrepreneurship. It generates sustainable livelihoods for small-scale farmers and harvesters, reduces poverty especially in coastal region, enhances food and nutrition security, as well as deals with pollution, climate change, and the loss of marine biodiversity. The contribution of seaweed to sustainable developmental goals were diverse on the other hand it has enormous potential to expand beyond its present markets. Seaweed is used in many different fields and businesses, including food, textiles, medicine, cosmetics, fertilizers and animal feed. However, drawing appropriate economic benefit out of commercial use of seaweed is the foremost aspect to improve the revenue of fisherman's income as well as national income.

INTRODUCTION

Coastal farmers cultivate seaweed, which is an environmentally friendly and sustainable practice that is

connected to the traditional knowledge, livelihoods, and food security of rural coastal communities, especially for women and

Indigenous Peoples. Nevertheless, the true value of the seaweed business remains largely unrecognised and underestimated, despite its immense potential for growth beyond its current markets. India has the capacity to produce 9.7 million tonnes of seaweed at 342 potential sites, according to a report by the CMFRI. Yet, as of 2021, our nation had produced 34,000 tonnes of seaweed, which is only 2.5% of its actual production potential and 0.01% of the world's total production.

In India seaweed cultivation began in early 1990s with the introduction of *Kappaphycus alvarezii* in Goa, however it subsequently spread to other coastal regions of our country. The three biological groups of marine macroalgae seaweed are brown, red, and green (Sathishkumar and Kumar, 2023)}. Their benefits to sustainability are many and varied. For example, they help small farmers and harvesters make a living and may have a big effect on reducing climate change. According to several case studies, the seaweed business has been very helpful in empowering the coastal women. (World Bank, 2023a).

Seaweed production needs fewer resources and inputs to make seaweed, so it has a lower export face than regular fisheries when it first comes out. Unfortunately, seaweed is not fully recognised as a separate industry yet, as it is often mixed with fishing and other aquaculture operations. Because of this, its importance for economic growth, especially for women, might be overstated.

Uses of seaweed



On the other hand, the products that are created by seaweed farming have the potential to replace fossil fuels in industries such as the production of plastics and products for the textile industry. In addition, the capacity of seaweed farming to provide environmental services such as nitrogen cycling and carbon sequestration has the potential to improve the socioeconomic situations of coastal communities that are resilient.

As a diverse industry, seaweed farming helps achieve the Sustainable Development Goals by providing small-scale farmers and harvesters with a sustainable means of subsistence, reducing poverty, enhancing food and nutrition security, and tackling global issues like pollution, climate change, and the loss of marine biodiversity (UNCTD, 2024). Owing to its economic potential, it expands chances for employment locally, new business ventures, and income diversification. In India, under Pradhan Mantri Matsya Sampada Yojana (PMMSY), the goal set by the Department of Fisheries for FY 2020-25 is 11.2 Lakh MT of Fresh Seaweed Production during next 5 years.

Opportunity and Cooperatives

Seaweed is used in many different fields and businesses, including food, textiles, medicine, cosmetics, fertilizers, animal feed, and animal feed in China and Japan. The "medical food of the twenty-first century"—seaweed—is a superfood that is rich in bioactive chemicals, protein, minerals, vitamins, fibre, calcium, and omega-3 fatty acids. provides a rich source of raw materials for businesses that make medications, health foods, fertilisers, textiles, and pharmaceuticals. Carrageenan, agar, and alginates are all made using this.

Chemicals such as mannitol, fucoidin, laminarin, iodine, and alginic acid are commercially extracted from brown seaweeds. Seaweeds are transported in two distinct



forms: unprocessed (either fresh or dried) and processed. Carrageenan, a soluble fibre extracted from red seaweed, is a naturally present and beneficial food element that can be utilised as a substitute for sugar or salt to enhance the stability of food in organic meals. Even nutritional supplements that adhere to kosher and vegan standards, such as fish oil, which we use for its numerous health benefits, including promoting cardiovascular and cognitive health, can be manufactured using it. (Seaweed Cultivation and value chain Development in India, International webinar, 2021).

Economic benefit

The growing global market for products made from seaweed is giving coastal farming communities hope for socioeconomic advantages. They are the primary raw material for numerous industries, and seaweed farming may undoubtedly help coastal farmers by bringing in extra revenue and enhancing their standard of living. Seaweeds are a key component of animal feed, fertilizer, and food. Nowadays, a lot of enterprises rely on imported seaweed phycocolloids (agar, alginate, and carrageenan) or natural seaweed resources from other nations. Outside of the established industries, the most promising potential in this industry are in the relatively new and emerging seaweed uses. Forecasts indicate that the most potential emerging industries, including those for bio-stimulants, animal feed, pet foods, and additives that reduce methane, will reach \$4.4 billion by 2030. Textiles, biomaterials, bioplastics, dietary supplements, and alternative proteins are all examples of medium-term opportunities with a possible value of \$6 billion (World Bank, 2023a). Therefore, both the income of fisherman and the national income can be

enhanced with the appropriate implementation of seaweed farming on an appropriate scale.

CONCLUSION

For rural coastal communities notably for fisher women and indigenous people, seaweed cultivation provides an alternative means of living. The country has to get ready for commercial seaweed farming if it is to meet production goals and dominate the world's seaweed race. Investigating the further unrealized economic possibilities of seaweed will help to increase farmer incomes, so increasing the GDP of the country.

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