

# Global Seaweed Production: Data and Trends

Priyatharshni Arivoli\*, Cheryl Antony and P. Ruby

Tami Nadu Dr. J. Jayalalithaa Fisheries University,  
Dr. M. G. R. Fisheries College and Research Institute, Ponneri – 601204, Tamil Nadu, India.

Corresponding Author

Priyatharshni Arivoli

Email: priyaarivoli@gmail.com



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## ABSTRACT

Seaweed farming is one of the fastest-growing sectors in aquaculture, contributing significantly to global food, industrial, and pharmaceutical markets. Below is an overview of the current state of global seaweed production based on available data. Global Production Volume in 2020 Data- Global seaweed production reached approximately 35.8 million metric tons (fresh weight). This production is dominated by aquaculture, with nearly 97% of seaweed coming from farmed sources. The largest producers are China and Indonesia, contributing a significant share of global production. China alone accounted for more than 57% of global seaweed output.

## INTRODUCTION

### Leading Producers

**C**hina: 19 million metric tons (over 50% of global production), cultivating species like *Saccharina japonica* and *Gracilaria*.

- **Indonesia:** The second-largest producer, with an output of 9 million metric tons,

primarily growing *Kappaphycus* and *Eucheuma* for carrageenan production.

- **Philippines, South Korea, and Japan:** Other key players, especially in the cultivation of *Porphyra* (nori), *Laminaria*, and *Sargassum*.

## Types of Seaweeds Cultivated

- **Brown seaweeds (Phaeophyceae):** Used in alginate production, most notably species like *Saccharina japonica* (kelp) and *Sargassum*.
- **Red seaweeds (Rhodophyceae):** Includes species like *Kappaphycusalvarezii* and *Eucheuma denticulatum* used for carrageenan production, as well as *Gracilaria* for agar.
- **Green seaweeds (Chlorophyceae):** Such as *Ulva*, which is less commercially cultivated but gaining attention for its use in food and agriculture.

## Economic Value

- The global seaweed industry was valued at over **\$6 billion USD** in 2020. This value is expected to rise significantly, driven by increasing demand in food, cosmetics, biofuels, and other industries.
- **Carrageenan** and **agar** are two of the most commercially valuable products derived from seaweeds, widely used in food and pharmaceutical industries.

## Geographical Distribution

- **Asia** remains the hub of seaweed production, with over 90% of total global production occurring in the region.
- Other regions like **Europe**, **Africa**, and **North America** are showing growing interest in seaweed farming, although current production levels remain relatively low. Efforts are being made to scale up production, particularly in countries such as **Norway**, **Ireland**, and **the United States**, where seaweed is being explored for food and biofuel applications.

## Sustainability Initiatives

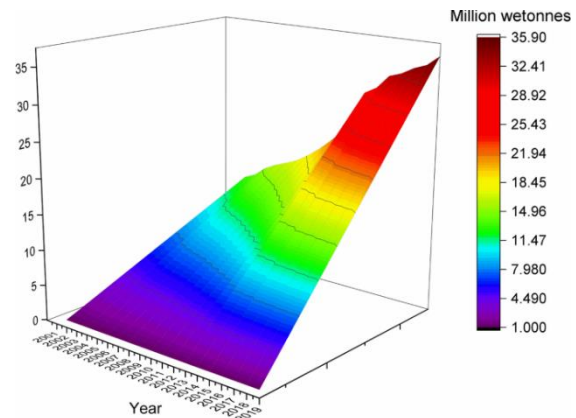
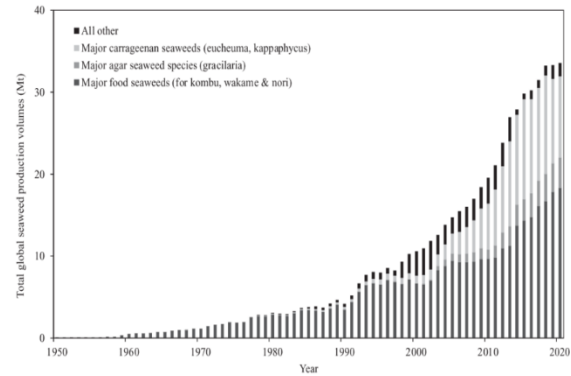
- As demand grows, there is a greater focus on **sustainable seaweed farming** practices, especially in integrated multi-trophic aquaculture (IMTA) systems, which combine seaweed cultivation with other aquaculture activities (e.g., fish or shellfish farming).
- Initiatives such as the **ASC-MSC Seaweed Standard** have been developed to ensure that seaweed farming remains environmentally and socially sustainable.

## Seaweed production

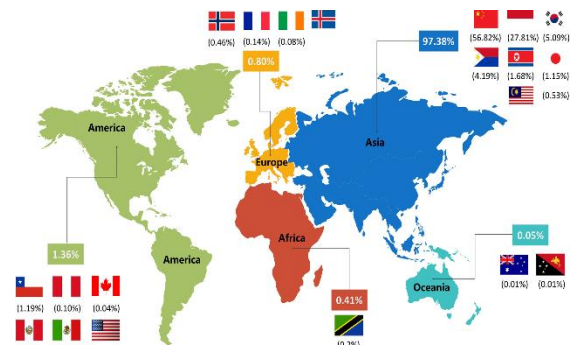
According to the Food and Agriculture Organization (FAO) data, the global seaweed output (both aquaculture and wild) has increased nearly three-fold from 118,000 tons to 358,200 tons from 2000 to 2019 (FAO, 2021). In 2019, 97% of the global aquaculture output came from artificial farming. The world's seaweed production mostly comes from the five major continents with Asia accounting for 97.38%. In Asia, 99% of seaweed is cultured artificially. In particular, China ranks first in the world in terms of aquaculture production, accounting for 56.82% of the global aquaculture. The main algae are Japanese kelp (*Laminaria japonica*), *Gracilaria* seaweeds (*Gracilaria* spp.) and nori Nei (*Porphyra* spp.). The second is Indonesia, another major seaweed farming country, which accounts for 28.6% of the global breeding. *Eucheuma* seaweeds nei (*Eucheuma* spp.) and *Gracilaria* seaweeds (*Gracilaria* spp.) are the main species. South Korea has a developed seaweed culture industry and many seaweed species, accounting for 5.09% of the world, including brown, red, and green seaweeds (excluding microalgae). Among them, Japanese kelp (*Laminaria japonica*) is the most cultured, followed by laver (*Porphyra tenera*) and wakame (*Undaria pinnatifida*). The

aquaculture in the Philippines accounts for 4.19% of the global market, mainly planting Elkhorn Sea moss (*Kappaphycusalvarezii*), accounting for more than 90% of the country. North Korea accounts for 1.6% of the global aquaculture and mainly grows Japanese kelp (*Laminaria japonica*).

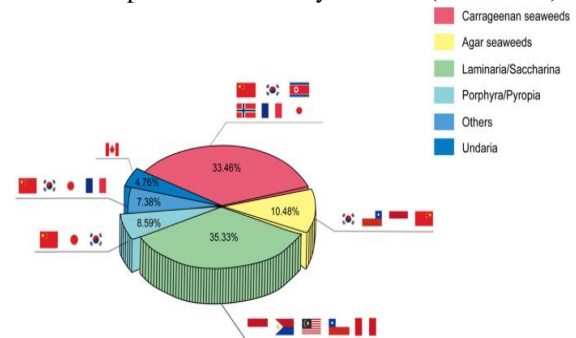
Japan accounts for 1.15% of the global seaweed production, mainly planting laver (*nori*, *Porphyra tenera*), wakame (*Undaria pinnatifida*), and Japanese kelp (*Laminaria japonica*). Malaysia accounts for 0.53% of the global aquaculture, mainly planting Elkhorn Sea moss (*Kappaphycusalvarezii*). North America accounts for 1.36% of the world's seaweed, and 95% of the seaweed in North America is obtained from natural resources. In terms of seaweed cultivation, Chile is the main producer, accounting for 0.3% of the global production, and it mainly grows *Gracilaria* seaweeds and *Spirulina maxima*, but 99% of them comes from natural riverbeds. Mexico accounts for 0.02% of the global output of raw seaweed. Brown seaweeds has been planted in recent years, but currently, 99% of brown seaweeds (*Phaeophyceae*) and red seaweeds *Nei* (*Rhodophyceae*) come from natural riverbeds. Algae are largely obtained from natural resources in the United States, Peru, and Canada. Europe accounts for 0.8% of global seaweed production. In Europe, 96% of the seaweed is obtained from natural resources. Only since 2010, artificial cultivation has been experimenting in Europe. Africa accounts for 0.41% of the world's seaweed. By 2019, the percentage of 81% of seaweed came from seaweed farming. Zanzibar accounts for 0.5% of the global aquaculture, mainly spiny *Euचेuma* (*Euचेuma denticulatum*). Oceania accounts for 0.05% of the world. 99% come from cultured seaweed. It mainly produces miscellaneous brown seaweeds.



Status and trends of world algal production from 2001 to 2019 (FAO 2021)



Seaweed production in the year 2019 (FAO 2021)



Percent seaweed aquaculture production per species and countries in the year 2019 (FAO 2021)

## Challenges and Opportunities

- **Environmental Impact:** While seaweed farming can contribute positively to carbon sequestration and nutrient recycling, large-scale operations need to be managed carefully to avoid overexploitation and habitat disruption.
- **Innovation in Farming Technologies:** Offshore farming and automated cultivation methods are being developed to increase yield and reduce environmental impact. These innovations are crucial to meet the growing demand for seaweed in food, bioplastics, and biofuels.

## CONCLUSION

The global seaweed market is expected to grow at a CAGR of over 8% from 2021 to 2027, driven by demand for plant-based food, fertilizers, and bio-based products. The expanding awareness of seaweed's environmental benefits, such as its role in reducing ocean acidification and acting as a carbon sink.

## REFERENCES

- Zhang, L., Liao, W., Huang, Y., Wen, Y., Chu, Y. and Zhao, C., 2022. Global seaweed farming and processing in the past 20 years. *Food Production, Processing and Nutrition*, 4(1), p.23.
- Adeniyi, O. M., Azimov, U., & Burluka, A. (2018). Algae biofuel: Current status and future applications. *Renewable and Sustainable Energy Reviews*, 90, 316–335. <https://doi.org/10.1016/j.rser.2018.03.067>
- Canton, H., 2021. Food and agriculture organization of the United Nations—FAO. In *The Europa directory of international organizations 2021* (pp. 297-305). Routledge.
- Chopin, T. and Tacon, A.G., 2021. Importance of seaweeds and extractive species in global aquaculture production. *Reviews in Fisheries Science & Aquaculture*, 29(2), pp.139-148.