Outcome document

National Stakeholder Consultation on Transforming Indonesia's Seaweed Sector

12 October 2026, Jakarta, Indonesia

Project webpage: https://unctad.org/project/transforming-indonesias-seaweed-sector
Event webpage: https://unctad.org/meeting/national-consultation-transforming-indonesias-seaweed-sector

1. Overview

The consultation was held under the United Nations Expertise on Demand initiative for the project "Transforming Indonesia's Seaweed Sector." It examined how Indonesia could move up the seaweed value chain and capture more value from its production. Participants noted that nearly two-thirds of Indonesia's seaweed exports remain in raw form and that much of the processing and economic value is generated elsewhere. The consultation considered opportunities in biopolymers, bioplastics, biopackaging, biostimulants and biofertilizers.

The consultation gathered 60 participants from government led by BAPPENAS and the Indonesian Ministry of Marine Affairs and Fisheries (KKP), seaweed farmers, processing companies, associations, and academia. It also included representatives of UNCTAD, UNRCO Indonesia, UNIDO, UNGC and UNDP. Participants emphasized that the assessment should strengthen existing national frameworks rather than create a parallel roadmap. They referred in particular to the Integrated Seaweed Development Action Plan and called for concrete implementation pathways, priority pilot projects, financing needs and risk assessments.

2. Global trends in downstream seaweed products and the proposed selected value chains assessment

Global demand for seaweed and seaweed-derived products is expanding rapidly, with international trade projected to grow substantially by 2030. While food applications remain the dominant market segment, emerging non-food applications, including biostimulants, fertilizers, bioplastics and bio-based packaging, present significant opportunities for value addition and sustainable industrial development. As one of the world's leading seaweed producers, Indonesia occupies a strategic position in the global seaweed economy. Several constraints limit the sector's upgrading potential, including shortcomings in the Harmonized System (HS) classification of seaweed products, limited competitiveness in higher-value downstream markets, and a strong concentration of exports in regional markets. Additional challenges, such as weak traceability systems, inconsistent raw material quality and certification-related requirements, continue to constrain access to premium international markets.

The proposed value chain assessment will assess market opportunities, policy and regulatory frameworks, trade dynamics, value chain bottlenecks and sustainability considerations, in alignment with Indonesia's national development priorities and the *Integrated Seaweed Development Action Plan (ISDAP) 2026–2030*. Preliminary analysis identified key internal constraints, including fragmented institutional mandates,

limited domestic processing and certification capacity, high compliance costs, weak quality infrastructure and continued dependence on raw seaweed exports. The value chain assessment will identify opportunities to promote downstream processing, strengthen trade competitiveness, enhance standards and certification systems, support the participation of SMEs and women- and youth-led cooperatives, and reinforce Indonesia's role within the *United Nations Global Seaweed Initiative (UNGSI)* as a platform for sustainable and inclusive value chain development.

3. Market opportunities and industrial development

Participants noted growing demand for sustainable and bio-based products, including bioplastics, bio-based packaging, biostimulants and biofertilizers. Preliminary analysis identified potential markets for end-use products in Asia, Oceania and the Americas. Participants cautioned that the market analysis depended on accurate product and production data, particularly because existing trade classifications do not always distinguish seaweed-derived products from products made from other organic materials.

Several participants emphasized that higher-value products must be commercially viable. They noted that increases in product prices should be considered together with the raw materials, chemicals, energy, water and processing required to produce them. Participants also stressed that value addition should be assessed in terms of who receives the additional value, including farmers, traders, processors, communities and the country.

Participants discussed the relationship between emerging products and the existing hydrocolloid industry. Industry representatives reported increasing raw-material, chemical, energy and water costs, as well as low utilization of installed processing capacity. One association representative cautioned that new products should not compete for the same raw materials in a way that weakens established industries. Furthermore, he indicated that current carrageenan processors would need to adapt to be able to supply inputs that could be needed for the biopolymer, bioplastic and biopacking value chains. Participants therefore proposed exploring the use of underutilised or non-food species (e.g., *Gracilaria* and *Sargassum*), producing their own seaweed output and intermediate products, cascading production, retrofitting existing facilities or investing in new ones, using processing waste to produce fertilizers and developing circular production models.

Participants also highlighted opportunities to develop the domestic market. In particular, they suggested connecting seaweed-based biostimulants with agricultural and food-production programmes and enabling qualified products to enter government procurement systems. Participants noted, however, that biostimulants compete with other agricultural inputs and that the required production and sales volumes should be carefully assessed.

4. Challenges across the value chain

Participants identified significant challenges from upstream production to downstream industrialization. Many observed that national production figures do not necessarily reflect the availability of industrially usable raw material. Quality, species suitability, consistency of supply, climate resilience, and seed quality were repeatedly highlighted as fundamental constraints. Participants noted that processor demand for specific grades of seaweed is often difficult to satisfy despite high aggregate production volumes.

Many participants also expressed concern about price volatility and the limited ability of farmers to influence market conditions. Participants noted that Indonesia remains a price taker despite being a leading producer

and that unstable prices affect both farmers and processors. One participant stressed that prices did not necessarily need to be high but needed to be stable. Several participants called for attention to how value and profits could reach farmers and improve the welfare of coastal communities.

A further challenge identified during the consultation was the geographic separation between production areas and processing facilities. Fresh seaweed used for certain applications cannot always be transported economically from production areas to factories on other islands. Participants proposed the introduction of public incentives for seaweed downstream processing closer to farming areas, including small processing units or mini-refineries, while noting the need to examine mass balance, logistics and the commercial feasibility of such models.

Upstream participants raised concerns about climate impacts, the availability of superior seedlings and the capacity to supply seedlings for larger-scale cultivation. Participants also stressed that policies should be data-based, holistic and introduced gradually to avoid shocks to farmers and existing processors.

5. Regulatory and standards issues

A major theme of the discussion concerned the absence of clear regulatory pathways for emerging seaweed products. Biostimulants do not yet have a dedicated product registration or standard and may therefore be registered under other categories. Similar licensing difficulties were reported for seaweed products intended for other uses. Participants called for regulations to be updated in line with emerging products and for clear product definitions, registration procedures and standards.

Data limitations were highlighted as another barrier. Participants noted that trade data for seaweed-derived products remain difficult to interpret because of broad and aggregated product codes. They proposed comparing and aligning national statistics, customs information and international trade data and considering applicable tariffs and other market-access requirements when assessing potential markets. Traceability, including the use of digital systems, was also identified as important for meeting market requirements, although participants noted that implementation entails costs.

Participants also identified significant gaps in testing, certification, and quality-control infrastructure. They proposed closer cooperation between industry, universities and research institutions to improve access to testing facilities and expertise. This cooperation should include the development of practical testing methods, technology transfer, quality-control procedures, personnel training and support in interpreting test results.

6. Financing and partnerships

Participants emphasized the need for public funds, grants, concessional finance and blended capital. They noted that public finance would be required to de-risk investments and support areas that private investors could not finance alone, including resilient seedlings, farmer registries, quality assurance, aggregation points, logistics and post-harvest infrastructure.

Participants also called for more appropriate financing for producers and innovative enterprises and start-ups. Existing financing instruments were described as too small for some companies seeking to move from R&D to commercial-scale production. Suggestions included stronger commercial-bank financing, support from development banks and mechanisms to reduce borrowing costs.

There was also broad support for strengthening cooperation among government agencies, industry, research institutions, development partners, and international initiatives. Participants highlighted technology transfer, international cooperation and private-sector participation as important to scaling viable business models. Some participants also proposed using existing industry associations or establishing an association for emerging downstream products to coordinate work on product definitions, standards and regulatory proposals.

7. Key recommendations

Participants proposed the following actions:

- Translate trade and production policies into actionable plans with deliverables, responsible parties and milestones, while avoiding duplicate initiatives.
- Examine cascading production, retrofitting and circular models that build on existing processing industries.
- Develop processing models closer to seaweed production areas, including small-scale seaweed refinery models.
- Establish product definitions, registration procedures and standards for biostimulants, bioplastics and other emerging products.
- Map testing needs and strengthen cooperation between industry, universities and research institutions.
- Support climate-resilient cultivation, superior seedlings and stable raw-material supplies.
- Develop suitable innovative and blended finance models for producers, infrastructure, innovative enterprises and commercial-scale production.
- Improve price stability and ensure that value reaches farmers and coastal communities.