

**Report of the First Meeting of the Seaweed Technical Working Group (1st S-TWG)
of the Blue Horizon: Ocean Relief through Seaweed Aquaculture Project
25–26 November 2025, Bangkok, Thailand**

I. INTRODUCTION

1. The First Meeting of the Seaweed Technical Working Group (1st S-TWG) was convened by the Southeast Asian Fisheries Development Center (SEAFDEC) through the Regional Project Management Unit (PMU) for the Blue Horizon: Ocean Relief through Seaweed Aquaculture Project on 25–26 November 2025 in Bangkok, Thailand. The Project is funded by the Global Environmental Facility (GEF), implemented by the World Wildlife Fund, Inc (WWF-US), serves as the GEF Implementing Agency. The Project execution is carried out by three agencies: SEAFDEC, the Bureau of Fisheries and Aquatic Resources of the Philippines (BFAR/PH), and the Department of Fisheries and Surveillance of Viet Nam (DFIS/VN). The 1st S-TWG was attended by a total of 20 participants, 10 men and 10 women, comprising of Seaweed Experts who are nominated to serve as S-TWG members from SEAFDEC Member Countries, including Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam, while Cambodia attended online. The 1st S-TWG was also attended by resource persons and observers as well as senior officials and officers from the SEAFDEC Secretariat, Training Department (TD), Aquaculture Department (AQD). The List of Participants appears in **Annex 1**.

2. The purpose of the 1st S-TWG was i) to elect the S-TWG Chairperson and agree on meeting schedules (2025-2028), ii.) to provide an overview of the Project (i.e., Project objectives, components, and expected outputs, institutional arrangement), iii) to inform Terms of References of the Seaweed Technical Working Group (S-TWG), scopes of work, roles and responsibilities, etc. iv) to provide an update on the status of seaweed aquaculture and its value chain in Southeast Asian countries, and to identify key challenges and regional priorities in promoting a Sustainable Seaweed Industry in the Southeast Asian Region, v) to develop a detailed work program for drafting Guides and identification of key outputs (Component 1), vi) to discuss and define key elements for the development of the “Guide to Promoting a Sustainable Seaweed Industry in the SEA Region” (Output 1.1.2) (scope and outline of the Guide, workplan, ToR for a consultant to assist in drafting the Guide, and vii) to establish Gender Integration in S-TWG activities.

II. OPENING OF THE MEETING

3. The representative of SEAFDEC Secretariat, Policy and Program Coordinator, *Dr. Worawit Wanchana*, on behalf of SEAFDEC Secretary-General welcomed the participants to the 1st S-TWG under the “Blue Horizon: Ocean Relief through Seaweed Aquaculture” Project. While highlighting the project’s objective and the scope, he also emphasized on SEAFDEC’s role as the lead regional executing agency, working in close collaboration with national partners, including the Bureau of Fisheries and Aquatic Resources (BFAR)

of the Philippines and the Department of Fisheries and Surveillance (DFiS) of Viet Nam, to strengthen the seaweed value chain while ensuring environmental integrity and socio-economic benefits. He noted that the establishment of the 1st S-TWG represents an important milestone in guiding the technical direction of the Project and supporting the development of key regional outputs including the Guide to Promoting a Sustainable Seaweed Industry in Southeast Asia and the Regional Principles of Responsible and Safe Seaweed Aquaculture. He expressed the appreciation to the SEAFDEC Project Management Unit, project partners, and the nominated experts and resource persons for their contributions toward achieving tangible regional outcomes. His Opening Remarks appear in **Annex 2**.

III. ELECTION OF CHAIRPERSON AND AGREEMENT ON MEETING SCHEDULE (2025-2028)

4. The Center Chief, National Seaweed Focal for the Philippines and also serve as the National Project Focal point, *Ms. Ida T. Capacio*, was unanimously elected as the Chairperson of the Seaweed Technical Working Group (S-TWG) for the Year 2025–2028,

5. In her message, *Ms. Ida T. Capacio*, conveyed her gratitude to the participants for electing her as the Chairperson of the S-TWG for the Year 2025–2028. She conveyed that the Philippines was honored by the trust of the S-TWG and affirmed her commitment to working closely with all members to support meaningful progress for the seaweed industry, particularly in strengthening the seaweed farmers who serve as the backbone of the sector.

IV. BACKGROUND, OBJECTIVES AND ADOPTION OF THE AGENDA

6. The Project Manager and Technical Advisor for the “Blue Horizon: Ocean Relief through Seaweed Aquaculture” Project, *Mr. Muhamad Nour* introduced the background, objectives, and expected outputs of the 1st S-TWG. After his presentation, the 1st S-TWG agreed on the proposed agenda, which was subsequently adopted. The Prospectus appears in **Annex 3**, and the Agenda of the 1st S-TWG appears as **Annex 4**.

V. OVERVIEW OF THE PROJECT

7. *Mr. Muhamad Nour*, provided a brief information of the project and its status. His presentation appears as **Annex 5**.

8. The representative from Viet Nam sought clarification on the two proposed nominees for the Project Steering Committee (PSC), noting that the list did not align with the country’s current government structure. In response, the Project Manager explained that, given the recent restructuring in which two departments were merged into the Ministry of Agriculture and Environment, Viet Nam may still put forward two new nominations for PSC membership. The Project, in close coordination with Viet Nam and WWF US, will determine which agencies should serve as PSC members moving forward. He further

informed the 1st S-TWG that this matter would be discussed during the First Meeting of the Project Steering Committee (1-PSC), which will be held on 27-28 November 2025.

9. In addition, the representative from Viet Nam also informed the 1st S-TWG that since the recent restructure of the provincial-level administrative unit, the project sites in Viet Nam would also change due to recent merging of Khanh Hoa and Ninh Thuan provinces. The 1st S-TWG took note of this matter. However, the Chairperson further suggested that the PM should work closely with WWF-US and seek guidance in addressing the required revisions.

10. Furthermore, the representative from SEAFDEC Secretariat, *Dr. Worawit Wanchana*, sought clarification on the status of the nomination of the PSC members from the Philippines. The Chairperson responded that the Philippines had already nominated the PSC members and the alternate PSC members subsequently submitted to WWF-US and SEAFDEC Secretariat and would present to the 1-PSC meeting.

VI. TERMS OF REFERENCE OF SEAWEED TECHNICAL WORKING GROUP

11. *Mr. Muhamad Nour*, introduced the draft Terms of Reference of the Seaweed Technical Working Group (**Annex 6**). In his presentation, he firstly presented the project description, comprises four components: 1): Regional approach and capacity for seaweed value chains in Southeast Asia; 2) Enabling Environment for Seaweed Aquaculture in the Philippines and Viet Nam; 3) Seaweed Value Chains (production, processing, and marketing); and 4) Knowledge Management, M&E, and IW Learn (regional). He informed that SEAFDEC is executing the **Component 1**, there are 4 outputs namely: the establishment of Seaweed Technical Working Group, development of Guide to promoting sustainable seaweed aquaculture in Southeast Asia, development of a regional toolkit, guide, and principles adapted from the Global Seaweed Coalition, and capacity-building activities led by SEAFDEC/AQD. In the draft ToRs, it covers the scope of works, responsibility, composition of S-TWG, etc.

12. After his presentation, the 1-S-TWG noted the establishment of the S-TWG, as one of the project activities of Component 1, which aiming to ensure regional technical collaboration, policy alignment, gender-balanced participation, and the completion of key project outputs. The 1st S-TWG took note and agreed of the ToR of S-TWG which will provide technical advice, support knowledge exchange, address regulatory and market-access challenges, and develop a detailed work plan with strategies for scalability and long-term sustainability, for submission to 1-PSC. In addition, the 1-S-TWG also noted that SEAFDEC PMU will facilitate the S-TWG meetings,

VII. UNDERSTANDING OF THE STATUS OF SEAWEED AQUACULTURE AND ITS VALUE CHAINS AT THE NATIONAL LEVEL

13. The Project Technical Specialist, *Mr. Joseph Faisan Jr*, introduced the session and requested each country to deliver a 10-minute presentation outlining the current status of seaweed aquaculture, the national value chain, key challenges and opportunities, and ongoing or planned initiatives, policies, and programs for seaweed development.

➤ **Cambodia(Online)**

14. The S-TWG member for Cambodia, Director, Department of Aquaculture Development, Fisheries Administration, Ministry of Agriculture, Forestry and Fisheries, *Mr. Thay Somony*, presented an overview of its seaweed farming activities, highlighting operations concentrated in specific coastal provinces of Cambodia. He underscored farming practices and production levels, which remain small-scale but locally significant. The major export destinations, primarily Vietnam and China, which serve as the main markets for Cambodian seaweed products. He stressed on emerging interest focuses on improving farming techniques and expanding the sector's economic potential. He pointed out that the present focused on the status of seaweed aquaculture and tracing its economic value chains across different Southeast Asian nations. He highlighted seaweed farming information from Cambodia's provinces while identifying primary export destinations such as Vietnam and China. Crucially, the Indonesian contribution went beyond production figures to emphasize important market factors, including statistics on annual product output and the necessity of adhering to strict quality assurance and certifications. His presentation is attached in **Annex 7**.

➤ **Indonesia**

15. T The S-TWG member for Indonesia, Senior Aquaculture Analyst, Ministry of Marine Affairs and Fisheries, *Mr. Lutfi Hardian Murtiono*, presented on Indonesia's seaweed industry, providing an extensive analysis of its current status, production metrics, and strategic future direction. The industry is highly developed, with significant production volumes predominantly from regions such as South Sulawesi and East Nusa Tenggara, supported by a complex value chain that includes local farmers, consolidators, and manufacturers producing refined products such as carrageenan and agar. To ensure quality, the sector operates under a robust regulatory framework that includes numerous Indonesian National Standards (SNI) for both cultivation practices and post-harvest handling. However, he highlighted major issues such as the environmental threat of pollution, widespread disease and seed quality degradation, and high price volatility impacting local farmers. Moving forward, the stated national strategy is to enhance sector efficiency, secure investment to accelerate down-streaming into higher-value products and aggressively improve the development of high-quality seedstock to ensure climate resilience. His presentation is attached in **Annex 8**.

➤ **Lao PDR**

16. The S-TWG member for Lao PDR, Fisheries officer, *Ms. Daovieng Yaibuathong*, presented an overview of the “Kai Pean” industry in Lao PDR, she highlighted that this Kai Pean is the country’s most common freshwater weed and a culturally important traditional food. Kai Pean is a freshwater filamentous green alga that grows naturally in rivers and streams during the dry season, and is especially abundant in northern provinces. It is a key resource for rural households due to its accessibility, nutritional value, and cultural significance. Kai Pean is traditionally produced using home-based, artisanal methods, particularly in Luang Prabang Province, where Phonthong District is the country’s largest producer and Nambak District is the only area engaged in small-scale export. The processing remains fully traditional, involving washing, pounding, pressing, seasoning, and sun-drying to create a “crispy, nutritious, and safe” food product. Community participation in harvesting and processing is further strengthened through the ODOP program (2022–2026), supported by Korea.

17. The industry provides important environmental benefits such as water remediation and social and economic benefits, including income generation, empowerment, and improved food security. However, she noted that the sector faces serious challenges, including environmental degradation, regulatory gaps, and barriers to scaling up due to limited technology and quality control. Government support under the national blue economy and sustainable development agenda aims to strengthen regulation, improve production standards, and support community enterprises. Future development opportunities include advanced cultivation systems, product diversification, and improved export readiness. Overall, the Kai Pean industry shows strong potential for sustainable economic development, environmental conservation, and community resilience in Lao PDR. Her presentation is attached in **Annex 9**.

➤ **Malaysia**

18. The S-TWG member for Malaysia, Fisheries Officer, Department of Fisheries Sabah, *Mr. Rendy Fazhrin Bin Sairin*, presented on Malaysia’s seaweed industry. He informed that Malaysia began cultivating seaweed as early as 1977, and efforts are currently underway to develop and implement a Seaweed National Action Plan by 2030. At present, seaweed cultivation covers 4,464 hectares and involves 1,554 farmers, with *Kappaphycus* and *Eucheuma* as the primary species. In 2024, Malaysia produced 220,246 metric tons of seaweed. He also elaborated on the ongoing seaweed projects in the country, the volume of trade. He also pointed out the issues, challenges currently being faced such as seed, quality, trade, interest of farmers, etc. His presentation is attached in **Annex 10**.

➤ **Myanmar**

19. The S-TWG member for Myanmar, Deputy Director, Aquaculture Division, Department of Fisheries, *Ms. Mya Mya Sint*, explained that the country’s seaweed resources

are found along the Rakhine, Ayeyarwady, and Tanintharyi coastal shelves, with *Gracilaria edulis*, *Eucheuma cottonii*, and *Eucheuma spinosum* as key commercial species. Seaweed culture began in 1985 with a pilot project in Rakhine State but was discontinued due to low domestic demand. Later, collaborative initiatives between the Department of Fisheries and partners including a Korean company in 2004–2005 and the World View International Foundation in 2020 revived small-scale seaweed farming in the Tanintharyi and Ayeyarwady regions. Current production involves farmer groups, local processing of *Hypnea* species into seaweed sheets, and small-scale value-added products such as cosmetics under the “sjoliv” brand. Some companies export dried seaweed and processed products like agar and carrageenan.

20. Myanmar’s seaweed sector still faces major challenges, including diseases, water and seed quality issues, grazing pressure, climate impacts, environmental concerns, market instability, limited technical capacity, financial constraints, regulatory gaps, and insufficient infrastructure. There is currently no national roadmap for industry development. To promote sustainable growth, Myanmar aims to strengthen legal frameworks, improve environmental safeguards, and expand capacity building for farmers through training, research, and reliable seed supply. Enhanced public–private partnerships are expected to improve market access and value-chain development. Pilot projects, certification programs, and strengthened quality assurance systems will help support long-term industry expansion and improve competitiveness in the regional and global markets. Her presentation is attached in **Annex 11**.

➤ **Philippines**

21. The S-TWG member for the Philippines, National Seaweed Focal of Bureau of Fisheries and Aquatic Resources (BFAR), *Ms. Ida Capcio*, presented the significant role of its seaweed industry, producing around 1.4 million tons and engaging more than 1.2 million workers, with Mindanao as the main production area. The country cultivates five major commercial species and has developed a comprehensive policy framework, including national standards, health regulations, and long-term strategic plans and roadmaps. Its value chain covers raw material production, processing through 14 commercial plants, and exports to more than 90 countries. The government emphasized interventions such as tissue-culture laboratories, R&D support programs, community-level processing facilities, and market development initiatives. Despite these efforts, the industry faces key challenges related to seedstock quality, diseases, limited funding, safety standards, and market volatility. The updated roadmap to 2031 aims to increase production by 50%, strengthen market linkages, enhance farmer capacity, diversify high-value products, and improve resilience through stronger Research and Development.

22. The discussion focused on cross-cutting regional challenges related to seedstock quality, farming techniques, resilience to extreme weather events, and market competitiveness. Viet Nam and Malaysia expressed strong concerns about seedstock

degradation after decades of repeated use, and the Philippines explained that they are operating 11 tissue-culture laboratories and developing sporulation techniques to regenerate high-quality, naturally derived seedstock. Viet Nam showed interest in technology transfer, while the Philippines clarified that it must first assess whether its production capacity has reached a commercial scale before sharing the technology regionally. Regarding strategic planning, the Philippines elaborated on how it reviews and updates its seaweed industry roadmap, while other countries questioned the feasibility of the 50% production growth target and its underlying assumptions. On farming technology, the Philippines shared its offshore circular culture structures that have survived multiple typhoons, whereas Viet Nam and Thailand noted they are not yet practicing offshore cultivation. The countries also highlighted common constraints such as a shrinking workforce, competition from shrimp farming and other higher-value industries, sub-optimal harvest timing, mass mortality due to high temperatures, and severe losses from typhoons. Finally, all countries agreed on the importance of developing shared regional training modules adaptable to national contexts and committed to further group discussions to refine principles, guidelines, and toolkits to support the seaweed sector across the region. Her presentation is attached as **Annex 12**.

➤ **Thailand**

23. The S-TWG member for Thailand, Fishery Biologist, *Ms. Nawanith Klongklew*, reported that its seaweed aquaculture industry produced about 1,000 tons worth USD 1.4 million in 2020, with growth slowing by 2024. The country imports mainly *Gracilaria* for processing and re-exports higher-value products to China, the US, and ASEAN, showing strong value-addition capacity. Thailand cultivates mainly green seaweeds such as *Ulva* and *Caulerpa lentillifera* (sea grapes) on about 64 hectares, concentrated in Petchaburi province. The value chain includes local production, food and cosmetic processing, and products like fresh seaweed, salads, and crispy snacks. Key challenges include water quality issues, climate impacts, limited farming skills, disease outbreaks, low and unstable productivity, and weak access to technology. In response, Thailand sees opportunities from growing demand for healthy and plant-based foods and is advancing policies such as GAP standards, research and breeding programs, technology transfer, and quality-control services to strengthen the sector.

24. The discussion following Thailand's presentation centered on production practices, farming technologies, institutional roles, and shared regional challenges. Indonesia inquired about the commercial scale of *Ulva rigida* cultivation, and Thailand explained that it is currently being piloted with small farmer groups in Chanthaburi and Phetchaburi, with plans to expand to other provinces such as Krabi. Participants also raised questions regarding the decline in production in 2024, which Thailand attributed to farmers shifting to other aquaculture species, while expressing optimism for a slight recovery in 2025. In term of technology, Thailand confirmed that it has not yet adopted offshore seaweed farming. The 1st S-TWG noted that, unlike most Asian countries that focus on red seaweeds, while Thailand cultivates green seaweeds and may be well positioned to

contribute to the emerging freshwater seaweed sector. Recommendations were also made for Thailand to integrate diagnostic methods to assess seaweed quality before harvest.

25. Regarding institutional roles, the Philippines sought clarification on SEAFDEC/TD's involvement, the 1st S-TWG was informed that SEAFDEC/TD is the Technical Department of SEAFDEC which focuses on capture fisheries technologies, IUU reduction, post-harvest methods, and ecosystem-based fisheries management, while aquaculture expertise resides with SEAFDEC/AQD. The 1st S-TWG also noted that it is needed a call for greater regional collaboration and adoption of innovations from outside the region, such as submersible fish-cage technologies used in Japan, which could be adapted to help mitigate storm-related losses in seaweed farming. Her presentation is attached as **Annex 13**

6.1 Viet Nam

26. The S-TWG member for Viet Nam, *Mr. Nguyen Van Nguyen*, presented the three main seaweed groups of Viet Nam, such as *Gracilaria*, *Kappaphycus*, and *Caulerpa* (sea grapes), and the significant environmental, economic, and labor challenges facing the industry. According to the presentation, *Gracilaria* production has sharply declined as farming areas were converted to shrimp ponds and industrial zones, while its very low market value discourages farmers. While *Kappaphycus* has strong potential, but current farming area has dropped below 1,000 ha, forcing processors to import raw materials from Indonesia. In contrast, *Caulerpa* is expanding and remains the most commercially active group with strong export markets. Viet Nam's value chain is dominated by small-scale farmers and middlemen, with domestic consumption rising only in recent years due to Korean and Japanese food culture. Key challenges include labor shortages, climate impacts such as high-temperature mass mortality and typhoon damage, competition with high-value sectors like shrimp and industry, and persistent seedstock problems due to low-quality or degraded seedlings. Viet Nam currently lacks a national seaweed roadmap and cultivates only a few species, with *Gracilaria* being the only native one.

27. The post-presentation discussion following Viet Nam's report centered on technological solutions for seed and labor challenges, as well as opportunities for regional cooperation. Viet Nam emphasized concerns over declining seed quality and sought insights from the Philippines on natural seedstock tracing and the sporulation-based seed production technique, while the Philippines noted that further verification of commercial readiness is needed before knowledge-sharing can proceed. Viet Nam also highlighted the increasing need for mechanization to address labor shortages and shared ongoing efforts to pilot innovative farming models such as cultivating *Caulerpa* in abandoned swimming pools and integrating *Kappaphycus* with oysters and clams in areas like Ha Long. In term of regional collaboration, Viet Nam proposed developing adaptable training modules under Output 1.1.4 for national-level use and expressed appreciation for the project's role in providing harmonized regional guidelines and tools. His presentation is attached as **Annex 14**.

VIII. DISCUSSION ON CHALLENGES AND REGIONAL PRIORITIES IN PROMOTING A SUSTAINABLE SEAWEED INDUSTRY IN THE SEA REGION

28. The discussion was divided into two groups, consisting of seaweed experts and other members. The group discussions contributed to a comprehensive assessment of major systemic challenges and immediate regional priorities required to foster a sustainable seaweed industry throughout Southeast Asia. Group discussions revealed numerous obstacles spanning the entire supply chain, including severe production limitations such as the lack of quality seedlings, insufficient manpower, and risks associated with climate change and widespread disease outbreaks. Further issues involve heavy reliance on traditional technology for post-harvest processes and a substantial deficit in crucial governmental policy and financial support for farmers. To address these weaknesses, the regional priorities focus on standardizing the industry by crafting new laws to secure dedicated cultivation areas and implementing rigorous Good Aquaculture Practice (GAP) guidelines. Successful modernization will depend on rapid improvements in technical exchange and training, alongside securing robust insurance support and promoting product diversification through enhanced downstream processing capabilities. Ultimately, the report serves as a detailed roadmap for securing the economic viability and long-term environmental sustainability of the regional seaweed sector.

IX. ESTABLISHMENT OF WORK PROGRAM AND IDENTIFICATION OF KEY OUTPUTS (COMPONENT 1)

29. *Mr. Muhamad Nour* (PM) and *Mr. Joseph P. Faisan Jr.*, (TS) respectively, presented the identification of key outputs under **Component 1**. The PM outlined four main outputs: the establishment of a regional technical working group on seaweed, the development of a Guide, the creation of regional principles, and a toolkit for safe seaweed farming, and capacity building and training for a sustainable seaweed industry in Southeast Asia. The three main topics under this Agenda are: identifying topics for inclusion in the Guide, Toolkit, and Principles; developing a work plan and capacity-building plan; and ensuring the scalability and sustainability of these guidelines in the region. The TS proposed specific discussion topics, including environmental standards, product quality and safety, operational safety, sustainable farming practices, gender equality and social inclusion, as well as governance and compliance with national laws and international standards. Their presentation appears as **Annex 15**.

9.1 Key topics in the Guide, toolkits, and Principles of seaweed

30. The 1-S-TWG sought the clarification on the differences and relationships between the Guide, Regional Principles, and Toolkits. PM emphasized that the Guide should serve as a policy guide for the entire supply chain, the Regional Principles should focus on responsibilities and safety in aquaculture, including the Toolkits, while the Toolkits are

understood as training modules and information packages. The TS highlighted that these three outputs need to work hand in hand. *Dr. Worawit* suggested providing short descriptions of the scope, type, and focus of each output to ensure all members have a clear understanding.

9.2 Discussion on work plan and program, including capacity building plan

31. Regarding Output 1.1.4 focus on capacity building, the S-TWG for Viet Nam proposed that the training modules should be adaptable for national contexts, including the involvement private sector. The TS clarified that this is a region-wide training course developed by SEAFDEC (PMU, Secretariat and SEAFDEC/AQD in close consultation with the countries other than the Philippines and Viet Nam will also be invited to participate. The modules will be publicly announced on the website; however, detailed content, such as lectures, is considered the intellectual property of experts and can only be shared upon specific request.

9.3 Discussion on scaling up and sustainability of the Guide and Principles in Southeast Asia

32. The 1-S-TWG took note and agreed that the Guide and Principles should have long-term applicability, potentially up to 10 years before revisions are needed. The scaling-up strategy includes integration into national policies, regional harmonization through ASEAN working groups, and conducting periodic five-year reviews while embedding outputs into SEAFDEC's long-term programs. Project activities will include gender-responsive indicators to ensure comprehensive impact. *Dr. Worawit* proposed changing the timeline from an annual to a quarterly schedule to align with GEF's financial cycle and avoid confusion among members.

X. DISCUSSION ON THE DEVELOPMENT OF THE “GUIDE TO PROMOTING A SUSTAINABLE SEAWEED INDUSTRY IN THE SEA REGION” (OUTPUT 1.1.2)

33. *Mr. Joseph Faisan Jr.*, presented the development of the ‘Guide to Promoting a Sustainable Seaweed Industry in the SEA Region’ (Output 1.1.2), explaining that the Guide will serve as a strategic reference for SEAFDEC Member Countries to accelerate seaweed sector growth while ensuring environmental integrity, social inclusion, and economic viability. It will outline regional principles and management measures for sustainable seaweed farming and value-chain development, support policy and standards harmonization, provide guidance on gender equity and community participation, and incorporate lessons from global experiences such as the European ‘Roadmap to Sustainably Develop the Seaweed Industry.’ The Guide will include eight sections: Introduction, Regional Overview, Conceptual Framework, Strategic Directions and Key Result Areas, Guiding Principles and Best Practices, Policy and Institutional Recommendations,

Implementation and Monitoring, and References and Annexes. He also elaborated on the detailed workplan for developing the Guide, including plans to hire a Consultant, the Consultant's Terms of Reference, the background and rationale, expected tasks and responsibilities, the implementation timeline, required qualifications, and application procedures. His presentation appears as **Annex 16**.

XI. BREAKOUT DISCUSSIONS ON GUIDE, PRINCIPLES, AND TOOLKIT INPUTS

34. *Mr. Joseph Faisan Jr.* introduced the purpose of the Breakout Session, which was to generate consolidated technical recommendations and country-level inputs to support the development of the Regional Guide for Seaweed Aquaculture in Southeast Asia, the Regional Principles for Responsible and Safe Seaweed Aquaculture, and the Operational Toolkit comprising standards, templates, checklists, and protocols. The discussions were organized into three groups, each addressing key thematic areas:

- Group 1 identified the essential components for a Regional Seaweed Guide, emphasizing harmonized governance across countries. Key elements include licensing and environmental standards, zoning farming areas, traceability systems, farmer and operator registration, routine monitoring and quality control, and stronger value chain integration. The group also highlighted the need for regionally aligned governance mechanisms, traceability, licensing and registration compliance, and insurance schemes to support risk management.
- Group 2 outlined the key principles for regional guidance, focusing on environmental, product, and operational safety, including microplastics, synthetic materials, biosafety, water quality, waste management, and on-farm safety. The group emphasized integrating climate change adaptation and biosecurity by adopting guidelines and incorporating resilience and disease-prevention measures. Gender and social inclusion were also prioritized, promoting equitable participation, technology transfer, and community support.
- Group 3 proposed practical toolkits to help farmers and regulators apply the regional guide, covering food safety, contaminants, handling practices, and practical methods for nurseries, cultivation, and harvesting. They stressed the importance of tools for biosecurity and disease control, market assessments, and high-value product development.

XII. GENDER INTEGRATION IN S-TWG ACTIVITIES

35. The Gender Focal Point of the SEAFDEC Training Department, *Ms. Jariya Sornkliang* presented the gender action plan. Her presentation appears in **Annex 17**. Her presentation focused on strengthening gender inclusivity within project frameworks by establishing clear mechanisms and tailored integration strategies. Participants emphasized

the need to finalize and update the existing Gender Action Plan, which clearly address gender issues throughout project implementation. They also highlighted the importance of developing guideline tools that consistently incorporate gender considerations.

36. A key challenge raised was the lack of balanced representation in regional meetings. Experience particularly in Indonesia shows that without explicit instructions, participant nominations tend to include mostly men, limiting women's ability to contribute to policy discussions. To address this, the project now requires official endorsement of participants to ensure women's participation and diverse input. The need for gender-focused documentation was underscored by the fact that many workers in the sector are women, youth, and in some cases children, making inclusive approaches essential for addressing vulnerability.

37. Finally, the discussion clarified how gender integration can be applied at different stages of project implementation. For new projects: conducting a gender analysis is crucial from the outset. For ongoing or already planned activities: applying a gender lens can help identify gaps and ensure that both women and men benefit equitably.

38. Gender inclusivity within project implementation across various countries. The conversation highlights the immediate need to finalize a Gender Action Plan and update project documentation to specifically address prevailing gender issues. One concern raised is the difficulty in securing active women's participation in project meetings and policy discussions without deliberate efforts, as attendance often defaults to being male dominated. Much of the dialogue centers on the practical application of integrating gender considerations, explaining that projects can be retrofitted by applying a gender lens to existing activities or by performing a full gender analysis during initial planning stage. Ultimately, *Ms. Jariya* stressed that all projects must be carefully evaluated to ensure they provide equitable benefits to both women and men.

XIII. PLENARY – CONSOLIDATION OF INPUTS AND NEXT STEPS

39. On the Consolidation of Inputs and Next Steps, the S-TWG took note, provided suggestions, and adopted as follows.

- The S-TWG Meeting elected *Ms. Ida Capacio* of BFAR Philippines as Chairperson and recommended *Ms. Mai Anh* of DFIS of Viet Nam to serve as Vice Chairperson.
- The S-TWG Meeting acknowledged the project overview presented by the PMU and endorsed the draft Terms of Reference (ToR) for both the S-TWG and the Consultant. It was further noted that the nominated members participating in this first meeting may continue to serve as national technical experts for the duration of the Project. The meeting also requested ASEAN Member States to nominate alternate seaweed experts in case the designated members are unable to participate. This measure aims to ensure continuity of discussions and maintain the necessary level of technical expertise.

- The S-TWG Meeting agreed on next steps, including the revision of the workplan and timeline for Outputs 1.1.2, 1.1.3, and 1.1.4; refinement of the breakout session outputs on the Guide, Principles, and Toolkits; and the clear definition of the roles and responsibilities of the S-TWG Chairperson and Vice Chairperson.
- The S-TWG Meeting also agreed to share the key results and recommendations from the first S-TWG meeting and to submit the draft ToR for the Consultant, together with the ToR for the S-TWG, for consideration and approval by the PSC.

XIV. CONCLUSION AND WAY FORWARD

40. On the Conclusion and Way forward, S-TWG took note, provided suggestions, and adopted as follows;

- The S-TWG Meeting agreed on the election of representative from the Philippines serving as Chairperson and Viet Nam as Vice Chairperson for the year 2025-2028.
- The S-TWG Meeting further reviewed and approved the detailed work program for Component 1, marking the endorsement of the first major phase of Project implementation.
- The S-TWG Meeting agreed that gender perspectives will be actively integrated into the Project’s work program and all related activities.
- The S-TWG Meeting also discussed the future development of the “Guide to Promoting a Sustainable Seaweed Industry in the Southeast Asian Region,” and recommended further refinement of its concept, structure, and the accompanying principles and toolkits.
- The S-TWG Meeting agreed that the PMU-SEAFDEC will consult with S-TWG Members to schedule the next meeting, and that S-TWG will review the detailed work program and provide progress updates on Component 1 semi-annually during the first two years and annually during the final two years of the Project.

XV. CLOSING OF THE MEETING

41. The representative of SEAFDEC Secretariat, *Dr. Worawit Wanchana*, expressed his sincere appreciation to all S-TWG members, observers, and partners for their active engagement and constructive contributions throughout the two-day deliberations. He expressed his appreciation and congratulations to the S-TWG members for the successful conduct of the Meeting and extended special thanks to the representatives from the participating countries, SEAFDEC Member Countries, and the resource persons from SEAFDEC/AQD. He also thanked all participants for their contributions and valuable input in support of the Project’s implementation. His Closing Remarks appear in **Annex 18**.

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Opening Remarks
By Policy and Program Coordinator, Dr. Worawit Wanchana

Distinguished delegates, esteemed colleagues, development partners, and members of the Seaweed Technical Working Group, good morning.

It is a great honor for me to welcome you to the inaugural meeting of the Seaweed Technical Working Group (S-TWG) under the *Blue Horizon: Ocean Relief through Seaweed Aquaculture Project*. On behalf of SEAFDEC, I extend a warm welcome to all participants who have traveled from across the region to join this important event.

The Blue Horizon Seaweed Aquaculture Project—supported by the Global Environment Facility (GEF) and implemented by WWF-US as the GEF Agency—reflects our shared regional commitment to advancing a sustainable, resilient, and inclusive seaweed aquaculture sector in Southeast Asia. As the lead regional executing agency, SEAFDEC, together with our national partners—the Bureau of Fisheries and Aquatic Resources (BFAR) of the Philippines and the Department of Fisheries and Surveillance (DFiS) of Viet Nam—is working to strengthen the seaweed value chain from production to market, while ensuring environmental integrity and socio-economic benefits for coastal communities.

Ladies and Gentlemen,

This meeting marks an important milestone as we formally establish the Seaweed Technical Working Group. The S-TWG will guide the technical direction of the Project and help ensure the quality and relevance of our key regional outputs, particularly the *Guide to Promoting a Sustainable Seaweed Industry in Southeast Asia* and the *Regional Principles of Responsible and Safe Seaweed Aquaculture*. These outputs must be grounded in sound science, inclusivity, and the shared experience of our Member States. The S-TWG will play a vital role in harmonizing approaches, validating technical frameworks, and fostering collaboration among ASEAN Member States, SEAFDEC/AQD, research institutions, civil society organizations, and industry partners.

Over the next two days, our discussions will enable us to collectively review the current status of seaweed aquaculture and its value chains across the region, identify common challenges, and determine regional priorities for sustainable development. We will also lay the foundation for the development of the Guide and toolkit, which will serve as key references for responsible farming practices, environmental safeguards, and quality standards. Importantly, we will ensure that gender perspectives are fully integrated into all S-TWG activities so that women and men benefit equitably from the growth of the seaweed sector.

Ladies and Gentlemen,

Allow me also to express our appreciation to our project partners—particularly WWF-US, BFAR, and DFIS—for their commitment and collaboration, and to the SEAFDEC Project Management Unit and technical team for their tireless efforts. I would also like to acknowledge all nominated experts from the Member States for your valuable insights and willingness to share lessons from your national experiences.

Together, through this Technical Working Group, we can shape a unified regional vision—one that balances productivity, sustainability, and inclusivity in seaweed aquaculture. I am confident that our discussions over the next two days will be productive and will result in concrete outputs that will guide our collective efforts toward a thriving, climate-resilient, and responsible seaweed industry in Southeast Asia.

Once again, welcome to the meeting, and I wish everyone a productive and inspiring session.

Thank you.

PROVISIONAL PROSPECTUS AND AGENDA

Background

Blue Horizon: Ocean Relief through Seaweed Aquaculture is a project funded by the Global Environment Facility (GEF) and officially endorsed by the GEF CEO in July 2022. The project has been allocated USD 6 million for implementation over a four-year period (2024–2028)¹. The institutional arrangement for the project includes WWF-US as the GEF Agency; the Southeast Asian Fisheries Development Center (SEAFDEC) as the Lead Regional Executing Agency (its Secretariat in Bangkok, Thailand hosting the Project Management Unit (PMU), the Bureau of Fisheries and Aquatic Resources (BFAR) of the Philippines and the Department of Fisheries and Surveillance (DFiS) of Viet Nam as the project executing partners in the Philippines and Viet Nam, respectively, and a Project Steering Committee.

The project comprises four components: 1) Regional approach and capacity for seaweed value chains in Southeast Asia; 2) Enabling Environment for Seaweed Aquaculture in the Philippines and Viet Nam; 3) Seaweed Value Chains (production, processing, and marketing); and 4) Knowledge Management, M&E, and IW Learn (regional). The SEAFDEC PMU will specifically carry out Component 1 and 4, which focus on the development of regional plans and principles of responsible seaweed aquaculture, including a toolkit to guide the application of the principles in developing standards of products, environmental protection, and operational safety. The outputs from Components 1 and 4 are expected to foster a harmonized approach across the region. Meanwhile, BFAR (Philippines) and DFiS (Viet Nam) will implement Component 2 and Component 3, which focus on the development of national components of seaweed aquaculture and its value chains.

Under **Component 1**, SEAFDEC will develop regional plans and principles for responsible aquaculture, including a toolkit to guide the application of these principles in product quality, environmental protection, and operational safety. This will involve creating a Regional Guide for Seaweed Aquaculture in Southeast Asia, to be adopted by the SEAFDEC Governing Council, along with a set of regional principles for responsible and safe seaweed aquaculture as a foundation for developing standards of operational, environmental, and consumer safety (adapted from the Global Seaweed Coalition). Additionally, training and capacity-building activities, coordinated by SEAFDEC/AQD, will support both the plan and implementation of these principles, helping to develop safety standards, update or create codes of practice, and update or develop best management

¹ SEAFDEC's activities will be completed within this period, while implementation in the Philippines and Viet Nam will extend to 2029.

practices. Such a regional approach will enhance the region's capacity to expand, modernize, and establish a strong role in global seaweed value chains. To support the development and implementation of the outputs under this component, a regional Seaweed Technical Working Group (S-TWG) will be constituted and formally mandated by the SEAFDEC Council. The outputs/deliverables to be supported by the S-TWG include (i) a 'Guide to Promoting a Sustainable Seaweed Industry in the SEA Region' and (ii) 'Regional Principles of Responsible and Safe Seaweed Aquaculture' with a complementary toolkit.

The S-TWG will have several key functions during project implementation:

- (1) To provide expertise and integrate the current state of knowledge on seaweed into the regional plans and standards.
- (2) To coordinate, develop, validate, and support the regional adoption of the Guide and Principles.
- (3) To represent a platform for awareness, networking, coordination, and knowledge-exchange among key authorities and organizations focused on seaweed development.
- (4) To facilitate regional technical cooperation to address specific and shared concerns.

Experts from member states and an expert from the SEAFDEC Aquaculture Department (AQD) in the Philippines will compose the membership. Experts from other organizations, particularly those with technical roles in the project, shall be invited to participate in the S-TWG forums. A Gender Action Plan (GAP) will be integrated to ensure inclusive participation, decision-making, and the impact of the S-TWG outputs.

The Project Management Unit (PMU) SEAFDEC together with executing agencies, BFAR (Philippines) and DFIS (Viet Nam) recently organized an online Inception Workshop on 14 August

2025 to bring together all key stakeholders, including SEAFDEC Member Countries, WWF-US GEF Agency, and SEAFDEC/AQD, to discuss the project's objectives, components, implementation strategies, and expected outcomes. One of the recommended action plans is to establish the Seaweed-Technical Working Group and facilitate a forum for S-TWG members to discuss the project implementation of Component 1. Therefore, in line with the project's workplan and to follow up on the recommendation from the Inception Workshop, the project will support the organization of the first meeting of the Seaweed-Technical Working Group.

Objectives of the 1st S-TWG Meeting

1. To elect the S-TWG Chairperson and agree on meeting schedules (2025-2028)
2. To provide an overview of the Project (*i.e.*, Project objectives, components, and expected outputs, institutional arrangement)

3. To inform Terms of References of the Seaweed Technical Working Group (S-TWG), scopes of work, roles and responsibilities, etc.
4. To provide an update on the status of seaweed aquaculture and its value chain in Southeast Asian countries, and to identify key challenges and regional priorities in promoting a Sustainable Seaweed Industry in the Southeast Asian Region
5. To develop a detailed work program for drafting Guides and identification of key outputs (Component 1)
6. To discuss and define key elements for the development of the “Guide to Promoting a Sustainable Seaweed Industry in the SEA Region” (Output 1.1.2) (scope and outline of the Guide, workplan, ToR for a consultant to assist in drafting the Guide.
7. To establish Gender Integration in S-TWG activities

Expected outputs

1. A clear understanding and familiarization of the Terms of Reference of the Seaweed Technical Working Group (S-TWG), and scope of works, roles and responsibilities, etc.
2. National-level updates on seaweed aquaculture and its value chain, key challenges facing the seaweed industry across member countries and compilation of regional priorities in promoting a Sustainable Seaweed Industry in the Southeast Asian Region
3. Agreed a detailed work program of key outputs (Component 1)
4. Define key elements for the development of the “Guide to Promoting a Sustainable Seaweed Industry in the SEA Region” (Output 1.1.2) (scope and outline of the Guide, workplan, ToR for a consultant to assist in drafting the Guide.
5. Gender perspectives integrated into S-TWG work program.

Target Participants

The first S-TWG meeting will invite well-balance representatives from target countries and agencies with equal representation of men and women, comprising:

1. S-TWG members comprise one nominated expert from the AMSs (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam) and a seaweed expert from SEAFDEC/AQD (11 persons)
2. SEAFDEC Gender Focal Point from SEAFDEC/TD (1 person)
3. The Project Management Unit staff (PM, TS) (2 persons)
4. Representatives from SEAFDEC Secretariat and AQD (3 persons)
5. National Focal point for BFAR (Philippines) and DFiS (Viet Nam) (2 persons)
6. Representatives from WWF-US, WWF PH, and WWF VN will be invited to participate as observers (2 persons)
7. Admin staff SEAFDEC (2 persons)

Total participants: 20-25 persons

Meeting Venue

The meeting will be held at the Solitaire Hotel in Bangkok, Thailand, from 25 to 26 November 2025.

Provisional Agenda and Timetable

Agenda 1: Opening of the Meeting

- Opening remarks by SEAFDEC
- Introduction of participants

Agenda 2: Election of Chairperson and Agreement on Meeting Schedule (2025-2028)

Agenda 3: Background, Objectives and Adoption of the Agenda

Agenda 4: Overview of the Project

Agenda 5: Terms of Reference of Seaweed Technical Working Group

Agenda 6: Understanding of the Status of Seaweed Aquaculture and its Value Chains at the National Level

- Cambodia
- Indonesia
- Lao PDR
- Malaysia
- Myanmar
- Philippines
- Thailand
- Viet Nam

Agenda 7: Discussion on Challenges and Regional Priorities in Promoting a Sustainable Seaweed Industry in the SEA Region.

Agenda 8: Establishment of Work Program and Identification of Key Outputs (Component 1)

Agenda 9: Discussion on the Development of the “Guide to Promoting a Sustainable Seaweed Industry in the SEA Region” (Output 1.1.2)

Agenda 10: Breakout Discussions on Guide, Principles, and Toolkit Inputs

Agenda 11: Gender Integration in S-TWG Activities

Agenda 12: Plenary – Consolidation of Inputs and Next Steps

Agenda 13: Conclusion and Way Forward

Agenda 14: Closing of the Meeting

A SHORT SUMMARY OF PROJECT DOCUMENT

ACHIEVEMENTS IN THE YEAR 2025

AND

PROPOSED ACTIVITIES FOR THE YEAR 2026

(based on the document for the 48th Meeting of the SEAFDEC Program Committee, 3-5 November 2025, in Malaysia)

Project ID: 202306003			
Program Category:	ASEAN-SEAFDEC ASSP and FCG Mechanism		
Project Title:	Blue Horizon: Ocean Relief through Seaweed Aquaculture		
Program Strategy No:	II	Total Period	2024–2028 ²
Lead Department:	Secretariat/AQD	Lead Country:	-
Donor/Sponsor:	GEF/WWF-US	Total Project Budget:	GEF IW allocation 6,000,000 USD SEAFDEC received grant 1,359,144 USD
Project Partner(s):	BFAR (PH), DFIS (VN)	Budget for July 2024- June 2025³:	SEAFDEC: 217,375 USD
Lead Technical Officer:	Mr. Muhamad Nour	Project Participating Countries	The Philippines and Viet Nam

PART I: PROJECT DESCRIPTION

1. Background/Introduction

Seaweed farming is becoming a lucrative business in coastal provinces - farmed as a foodstuff, with seaweed being cultivated not only as a food source, but also used for in food processing, cosmetics, and medical industries. The livelihoods of coastal

² For SEAFDEC Component and other participating countries may go beyond 2028

³ Based on 1st Year annual workplan and budget approved by WWF, covers from July 2024-June 2025, fiscal year of WWF)

communities are closely linked to the quality of water and habitat in these rich marine ecosystems. Seaweed cultivation addresses multiple environmental threats to coastal waters by absorbing excess nutrients such as nitrogen and phosphorus, thereby reducing the risk of hypoxia and converting these nutrients into valuable protein, oils, green chemical feedstock, and a range of industrial products. This process supports ecosystem services, enhances biodiversity, and contributes to carbon sequestration.

From a socio-economic perspective, seaweed farming promotes livelihood resilience for coastal communities. It can also be integrated into multi-trophic aquaculture systems, further strengthening these communities' economic stability while simultaneously providing environmental benefits that contribute to the overall health and sustainability of coastal ecosystems.

While the seaweed industry has significant untapped potential to supply high-quality, cost competitive biomass for emerging international value chains, such as producing sustainable fishmeal and oil alternatives to support the environmental sustainability of the aquaculture sector, it faces several challenges that hinder its growth. The current industry structure is marked by frequent disease outbreaks (e.g., ice-ice disease) exacerbated by climate change and the low genetic variability of seed stocks. Additionally, the widespread use (and subsequent loss) of plastics, along with the lack of standardized protocols that follow an eco-system approach, limits the ability to optimize the environmental footprint of seaweed production.

The project, *Blue Horizon: Ocean Relief through Seaweed Aquaculture*, aims to strengthen and develop seaweed value chains at global, regional, and national levels. The focus will be on the coastal and marine ecosystems in Viet Nam and the Philippines, where there is significant potential for expanding seaweed aquaculture and its associated value chains. The project is expected to deliver both environmental and socio-economic benefits. Environmental benefits include enhanced ecosystem services provided by seaweed farms, such as reducing ocean acidification, oxygenating coastal waters, mitigating eutrophication and harmful algal blooms, and improving conditions for aquatic biodiversity. Socioeconomic benefits include livelihood opportunities through higher production and quality of seaweed biomass, leading to greater profits for seaweed farmers; enhanced income-producing and trading higher-value processed seaweed products, and strengthened capacities within local communities.

These benefits are expected to be measured as follows:

- 66,000 metric tons of CO₂ emissions mitigated (based on seaweed biomass that falls off during production and ends up sequestering carbon at the ocean bottom)
- 15,000 beneficiaries benefiting from the project
- 4,400 tons of Nitrogen and phosphorus captured

2. Project in relevance to the Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2030



3. Gender Sensitivity of the Project

During the project development phase, the Gender Analysis and Gender Action Plan were conducted for the Philippines, Viet Nam, and at the regional level (a total of three Gender Analyses and Gender Action Plans) to ensure gender mainstreaming throughout the project cycle. The Gender Analysis examines the differences between men and women, their access and control over resources, and the implications for the project’s goals, objectives, outcomes, and outputs. As a result, the project is fully aligned with and supports SEAFDEC, WWF, and GEF. It will also integrate best practices and lessons learned to promote gender equity and empowerment along the seaweed value chain.

4. Project Goal, Components, Outcomes, Outputs, and Overall Implementation Plan

4.1 Project Goal, Outcomes, Outputs

The overarching goal of the Project is to “create new sustainable seaweed value chains that will deliver ecosystem services and provide socio-economic benefits to communities, particularly to households whose livelihoods depend on marine ecosystems.”

To achieve the goal, the project will be conducted in the following four components:

- **Component 1: Regional capacity building for seaweed aquaculture.** This Component focuses on strengthening regional capacity and developing strategic plans for seaweed aquaculture. It also includes participation in global seaweed coalitions to enhance regional collaboration.
- **Component 2: Enabling Environment for Seaweed Aquaculture in Philippines and Viet Nam.** This component aims to create an enabling environment for seaweed aquaculture at the national level by supporting processes to identify appropriate areas for expansion and operationalizing management plans specific to such areas, with accompanying plans and coordination mechanisms at national and global levels.

- **Component 3: Seaweed Value Chains (production + processing + marketing).**
This component requires collaborating with producers and cooperatives to pilot offshore seaweed farms as proof-of- concept sites for off-shore seaweed production. It will also test a scalable seaweed carbon credit model and expand partnerships with finance and private sectors.
- **Component 4: Knowledge Management, M&E, and IW Learn (regional).**
This component involves knowledge sharing and robust monitoring and evaluation. Activities will be monitored and communicated through multiple channels, building on existing baseline initiatives in the seaweed industry in the Philippines and Viet Nam to promote the interests of seaweed farmers, support their communities, and expand the global seaweed market sustainably.

The project will deliver several key outputs and outcomes, as described below:

Component 1 Regional capacity building for seaweed aquaculture

Outcome 1.1: Regionally adopted plans and principles to harmonize seaweed aquaculture in Southeast Asia

- Output 1.1.1 Regional Seaweed Technical Working Group, constituted and formally mandated by SEAFDEC Governing Council
- Output 1.1.2. Guide to Promoting a Sustainable Seaweed Industry in the SEA Region, endorsed by the SEAFDEC Governing Council
- Output 1.1.3 SEA Regional Principles for Responsible and Safe Seaweed Aquaculture, including a toolkit for applying principles, aligned to the Safe Seaweed Coalition
- Output 1.1.4 Training modules and information packages to support a sustainable seaweed industry in South East Asia

Component 2 Enabling Environment for Seaweed Aquaculture in Philippines and Viet Nam Outcome 2.1: Improved planning for seaweed aquaculture and capture of nutrients from the ocean

Output: Communication products, including a website to share project outcomes

- Output 2.1.1 Marine spatial planning that integrates more sustainable seaweed farming
- Output 2.1.2 National Seaweed Plan presented for adoption (VN) and National Seaweed Industry Roadmap (PH) adapted to local levels

Outcome 2.2: Robust institutional and regulatory frameworks ensure that the expansion of seaweed farming is sustainable, responsible, and equitable

- Output 2.2.1 Policy and Regulatory gap analysis and associated frameworks (e.g. Circulars; technical guidelines) to facilitate seaweed aquaculture planning, development, and management

- Output 2.2.2 An open-source Information Management System to facilitate national and provincial-level planning and management of the seaweed aquaculture sector (VN)

Component 3 Seaweed Value Chains (production + processing + marketing)

Outcome 3.1: Improved technologies and testing for seaweed value chains in PH and VN

- Output 3.1.1: Six demonstration farms to provide proof of concept of different seaweed farming options:
 - ✓ Four demonstration farms (of Eucheumatoid species) to provide proof of concept of off-the-coast or off-shore scalable seaweed businesses (based on zones identified in 2.1.2).
 - ✓ Two demonstration farms (Caulerpa sp.), one in degraded former shrimp ponds and another in an adjacent shallow nearshore area
- Output 3.1.2: Implementation of at least 2 seaweed value chain initiatives (adding value to raw seaweed in seaweed farming communities; improved propagules; transparency)

Outcome 3.2: Generating benefits from seaweed aquaculture for target communities (PH and VN)

- Output 3.2.1: Sustainable Seaweed Toolkit and training for improved production, processing, and market access
- Output 3.2.2: Seaweed farmer/cooperative support systems (value chain development and participation, business management, access to financing and other key inputs)

Outcome 3.3: Expanded collaboration with the finance sector and private sector to support seaweed value chains in the Philippines and Viet Nam

- Output 3.3.1. Development of 3-4 bankable business propositions to scale up sustainable seaweed value chain solutions tested under 3.1 and new innovative solutions
- Output 3.3.2: Investment seminars and industry and investment forums conducted in collaboration with government representatives, development partners, and the private sector, including key value chain actors

Component 4: Knowledge Management, M&E, and IW Learn (regional)

Outcome 4.1: Full participation in IW: LEARN and knowledge management/communication

- Output 4.1.1: Participation in two IW: LEARN regional meetings and one GEF International Waters Conference, delivering IW: LEARN experience notes
- Output 4.1.2: Knowledge management and communication platform and products

Outcome 4.2: Monitoring and evaluation system in place

- Output 4.2.1: Monitoring and Evaluation reports (including project progress reports, midterm evaluation, terminal evaluation)

4.2 Project overall implementation plan for Year 1-Year 4 (original project document)

The GEF CEO approved the project document for “*Blue Horizon: Ocean Relief through Seaweed Aquaculture*,” including the overall implementation plan for four years (48 months). WWF-US serves as the GEF Agency, with three (3) Executing Agencies: SEAFDEC as the regional Executing Agency and host of the Project Management Unit (PMU), the Philippine Bureau of Fisheries and Aquatic Resources (BFAR), and the Department of Fisheries (DOF) of Viet Nam as national Executing Agencies. The overall implementation structure is shown below.

	Year 1	Year 2	Year 3	Year 4
Component 1: Regional capacity building for seaweed aquaculture				
Outcome 1				
Output 1.1.1	X			
Output 1.1.2	X	X	X	X
Output 1.1.3		X	X	X
Output 1.1.4		X	X	X
Component 2: Enabling Environment for Seaweed Aquaculture in Philippines and Viet Nam				
Output 2.1.1 (PH)	X			
Output 2.1.1 (VN)	X	X	X	X
Output 2.1.2(PH)	X			
Output 2.1.2(VN)	X	X	X	X
Output 2.2.1 (PH)	X			
Output 2.2.1(VN)	X	X	X	X
Output 2.2.2 (VN)	X	X	X	X
Component 3: Seaweed Value Chains (production + processing + marketing)				
Output 3.1.1 (PH)	X	X		
Output 3.1.1 (VN)	X	X	X	X
Output 3.1.2 (VN)	X	X	X	X
Output 3.2.1 (VN)		X	X	X
Output 3.2.2 (PH)	X			
Output 3.2.3 (PH)	X	X	X	X

Output 3.3.1 (PH)		X	X	X
Output 3.3.1 (VN)		X	X	X
Output 3.3.2 (PH)				X
Output 3.3.2 (VN)				X
Component 4: Knowledge Management, M&E, and IW Learn (regional)				
Output 4.1.1		X	X	X
Output 4.1.2	X	X	X	X
Output 4.2.1	X	X	X	X

4.3 Project overall proposed budget for activities implementation for Year 1-Year 4

Component	Budget (USD)	Responsible Agencies
1	730,690	SEAFDEC
2	1,283,629	PH+VN
3	2,646,163	PH+VN
4	588,250	SEAFDEC, PH, VN, WWF-US

PART II: PROJECT STATUS AND ACHIEVEMENTS IN 2025

1. Project Summary in 2025 (as of 3 November 2025)

Since the GEF CEO endorsed the project in July 2022, the WWF GEF Agency has been working with SEAFDEC, BFAR, and DOF Viet Nam to initiate project execution. The WWF GEF Agency would provide grants separately to each executing agency. SEAFDEC and WWF GEF Agency entered into an Agreement on 26 April 2024, with the Grant Agreement effective until 31 December 2028. SEAFDEC is responsible for regional activities under Components 1 and 4, as well as the project management unit, while BFAR and DOF Viet Nam are responsible for national activities under Components 2 and 3, and contributing relevant inputs to the PMU. As of 1 July 2025, the Philippines has signed grant agreement with the WWF-US as GEF Implementing Agency, meanwhile Viet Nam is still in progress.

For activities under SEAFDEC's responsibility, SEAFDEC submitted the 2nd Year Annual Workplan⁴ and Budget of SEAFDEC to WWF-GEF Agency, covering the period from 1 July 2025 to 30 June 2026. This plan was approved by the WWF GEF Agency on 23 May

⁴ The fiscal year of the Project is 1 July-30 June of each calendar year.

2025. The 2nd Year Annual Workplan and Budget would also require approval from the Project Steering Committee (PSC) once the 1st PSC Meeting convenes, which will occur after at least one of the countries begins operations. Meanwhile, SEAFDEC has completed establishing the Project

Management Unit (PMU) Office and recruiting PMU staff comprising Project Manager/Technical

Advisor, Administrative Office, and Technical Specialist. Several consultants of Monitoring and Evaluation, Information and Technology, and Communications were also recruited to support the project in implementing Component 1 and Component 4.

2. Outputs, proposed activities, and budget in 2025-2026⁵

Project Outcomes/Outputs	Proposed Activities	Duration	Proposed Budget (USD)
Component 1: Regional approach and capacity for seaweed value chains in SE Asia			
Outcome 1.1	Regionally adopted plans and principles to harmonize seaweed aquaculture in SE Asia		
Output 1.1.1: Regional Seaweed Technical Working Group, constituted and formally mandated by SEAFDEC Governing Council	<u>Activity 1.1.1.1</u> Develop a Draft Terms of Reference of the S-TWG, including gender-specific considerations	July 2025	30,000
	<u>Activity 1.1.1.2</u> Obtain Governing Council's approval of the draft Terms of Reference of the S-TWG, its formation and giving it a formal mandate.	November 2025	
	<u>Activity 1.1.1.3</u> Obtain nominations from each government for a member in the S-TWG taking into consideration gender balance in the S-TWG	September 2025	
	<u>Activity 1.1.1.4</u> Convene the First Meeting of the S-TWG taking into consideration gender balance in the S-TWG	November 2025	

⁵ Component 1 and 4 of Workplan Year 2 covering 1 July 2025-30 June 2026. The workplan was approved by WWF GEF Agency

Output 1.1.2: Guide to Promoting a Sustainable Seaweed Industry in the SEA Region, endorsed by the SEAFDEC Governing Council	<u>Activity 1.1.2.1</u> Draft ToR and contract a consultant to support development of the Guide (of which Guide is developed with gender-sensitive considerations)	September 2025	-
	<u>Activity 1.1.2.2</u> S-TWG meeting to define the scope of the Guide and review ToR for a consultant to assist in drafting the Guide consider gender and inclusion dimensions in the scope of the Guide.	November 2025	
Output 1.1.3: SEA Regional Principles for Responsible and Safe Seaweed Aquaculture, including toolkit for applying principles, aligned to the Safe Seaweed Coalition	<u>Activity 1.1.3.1</u> Desktop assessment to inform the development of principles and criteria including consideration of gender and inclusion dimensions.	September 2025	12,000
Component 4: Knowledge Management, M&E, and IW Learn (regional)			
Outcome 4.1: Full participation in IW: LEARN and knowledge management/communication			
Output 4.1.1 Participation in two IW: LEARN regional meetings and one GEF International Waters Conference, delivering IW: LEARN experience notes	Activity 4.1.1.1 website uploaded/included on IW: Learn ensuring gender and inclusion learning are highlighted when and where relevant.	Oct - Dec 2025	15,000
Output 4.1.2: Knowledge management and	Activity 4.1.2.1 Formulate the KM and C Strategy and Plan (including Gender sensitive/responsive consideration)	June 2025	9,400

communication platform and products	Activity 4.1.2.2 Develop the Project website hosted by AQD, continuously update with project information.	Sept - Oct 2025	
Outcome 4.2: Monitoring and evaluation system in place			
Output 4.2.1 Monitoring and Evaluation reports (including project progress reports, midterm evaluation, terminal evaluation)	Activity 4.2.1.1 Inception workshop and PSC meeting taking into consideration gender balance in the event	August 2025	109,300
	Activity 4.2.1.2 Produce, deliver 6monthly project progress reports	July 2025	
	Activity 4.2.1.3 Produce, deliver Financial Reports Quarterly	Jan, Apr, and Jul 2025	
	Activity 4.2.1.4 Organize Adaptive Management/Reflection Meetings Yearly (4th Qtr, Yrs 1,2 and3)	Apr-June 2026	
	Activity 4.1.2.6 M&E consultant develop M&E plan (including Monitoring against gender disaggregated or gender-specific indicators)	Oct - Dec 2025	

3. List of Publications in 2025 (e.g. technical report(s), technical article(s), annual report(s), VDO, presentation file)

- ✓ <https://www.seafdec.org/wwf-blue-horizon-seaweed/>
- ✓ <https://www.seafdec.org/seafdec-conducts-kick-off-workshop-to-advance-sustainable-seaweed-aquaculture/>
- ✓ <https://www.seafdec.org/blue-horizon-seaweed-project-pmu-meets-aqd-bfar-tostrengthen-collaboration/>

4. Evaluation of Workshops/Training Courses by Participants of AMSs

None

5. Major Impacts and Issues

SEAFDEC and WWF GEF Agency entered into an Agreement on 26 April 2024 and the 1st Year Annual Workplan and Budget of SEAFDEC was approved on 30 July 2024, the 2nd Year Annual Workplan and Budget of SEAFDEC was approved on 23 May 2025. The Philippines has signed the grant agreement with WWG GEF Agency, meanwhile Viet Nam is currently working on obtaining final government approval before signing the agreement with the WWF GEF Agency. With the Philippines' agreement, the regional

component will proceed, including the PSC and S-TWG establishment, M&E training, and finalizing the Gender Action Plan. The PSC meeting will also address approaches to expedite project implementation following a one-year delay.

PART III: PROPOSED ACTIVITIES FOR THE YEAR 2025 AND 2026 (1 July 2025-30 June 2026)

The 2nd Year Annual Workplan and budget for SEAFDEC activities under Components 1 and 4, along with PMU cost, covering the period from 1 July 2025 to 30 June 2026 was approved by WWF, as provided in Part II. Below are the proposed activities for the 3rd Annual Workplan (1 July 2026-30 June 2027), which will be submitted to WWF for approval in April 2026.

Proposed Activities	Descriptions	Duration
Component 1: Regional approach and capacity for seaweed value chains in SE Asia		
Outcome 1.1	Regionally adopted plans and principles to harmonize seaweed aquaculture in SE Asia	
Output 1.1.2:	Guide to Promoting a Sustainable Seaweed Industry in the SEA Region, endorsed by the SEAFDEC Governing Council	
Activity 1.1.2.1	<input type="checkbox"/> Validate the draft Guide	Jan-Mar 2027
Output 1.1.3:	SEA Regional Principles for Responsible and Safe Seaweed Aquaculture, including toolkit for applying principles, aligned to the Safe Seaweed Coalition	
Activity 1.1.3.1	<input type="checkbox"/> S-TWG meeting on the Principles of Responsible and Safe Seaweed Aquaculture.	Jul-Sept 2026
Output 1.1.4:	Training modules and information packages to support a sustainable seaweed industry in South East Asia	
Activity 1.1.4.1	<input type="checkbox"/> Engage consultants to produce training modules and information packages for the ‘Guide’, Principles and	Jul-Sept 2026
	toolkit, and 3 priority subjects selected from the shortlist above	
Component 4: Knowledge Management, M&E, and IW Learn (regional)		
Outcome 4.1:	Full participation in IW: LEARN and knowledge management/communication	

Output 4.1.1:	Participation in two IW:LEARN regional meetings and one GEF International Waters Conference, delivering IW:LEARN experience notes	July 2026-June 2027
Activity 4.1.1.2	<input type="checkbox"/> Develop lessons learned/experience notes for IWLEARN participation and website posting	July 2026-June 2027
Output 4.1.2:	Knowledge management and communication platform and products	
Activity 4.1.2.1	<input type="checkbox"/> Develop knowledge products identified in KM Plan	July 2026-June 2027
Activity 4.1.2.2	<input type="checkbox"/> Package and disseminate knowledge products	July 2026-June 2027
Activity 4.1.2.3	<input type="checkbox"/> Maintain website hosted by AQD, continuously update with project information.	July 2026-June 2027
Outcome 4.2:	Monitoring and evaluation system in place	
Output 4.2.1:	Monitoring and Evaluation reports (including project progress reports, midterm evaluation, terminal evaluation)	
Activity 4.2.1.1	Project Steering Committee meeting	July 2026-June 2027
Activity 4.2.1.2	Produce, deliver 6-monthly project progress reports	July 2026-June 2027
Activity 4.2.1.3	Produce, deliver Financial Reports Quarterly	July 2026-June 2027
Activity 4.2.1.4	Organize Adaptive Management/Reflection Meetings Yearly (4th Qtr, Yrs 1,2 and3)	July 2026-June 2027

Require Consideration by PSC

- Take note of the overview of the Project and status

TERMS OF REFERENCE FOR SEAWEED TECHNICAL WORKING GROUP

Background

The Southeast Asian Fisheries Development Center (SEAFDEC) is an autonomous intergovernmental body established in 1967. SEAFDEC comprises 11 Member Countries: Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. The mission of SEAFDEC is “*To promote and facilitate concerted actions among the Member Countries to ensure the sustainability of fisheries and aquaculture in Southeast Asia.*”

SEAFDEC is implementing the Project “**Blue Horizon: Ocean Relief through Seaweed Aquaculture,**” which is funded by the Global Environment Facility (GEF) and implemented by the WWF-US GEF Agency from May 2024 to December 2028. The Project is managed by the Project Management Unit (PMU) under the supervision of the SEAFDEC Secretary-General, with the PMU Office located at the SEAFDEC Secretariat, Bangkok, Thailand. The overarching goal of the project is to develop sustainable seaweed value chains that deliver ecosystem services and socioeconomic benefits. The project comprises four components: 1) Regional approach and capacity for seaweed value chains in Southeast Asia; 2) Enabling Environment for Seaweed Aquaculture in the Philippines and Viet Nam; 3) Seaweed Value Chains (production, processing, and marketing); and 4) Knowledge Management, M&E, and IW Learn (regional).

Under **Component 1**, SEAFDEC will support the development of regional plans and principles of responsible aquaculture, including a toolkit to guide the application of the principles in developing standards of product, environmental protection, and operational safety. These outputs are expected to foster a harmonized approach across the region. Training activities will enhance the capacity of Member Countries in applying these plans and standards.

To support these efforts, the project will establish a **Seaweed Technical Working Group (S-TWG)** as a platform for technical collaboration, policy alignment, and capacity building. The project’s Gender Action Plan (GAP) will be integrated across the entire project cycle to ensure inclusive participation, decision-making, and impact. SEAFDEC will promote gender-balanced representation within the S-TWG, supporting women’s engagement in leadership roles, and ensure that gender perspectives are incorporated into project planning, implementation, and evaluation.

Objectives

The main objective is to foster a supportive regional enabling environment for seaweed

aquaculture through a coordinated regional approach. This will strengthen Southeast Asia's capacity to expand and modernize its seaweed industry and increase its contribution to global seaweed value chains. In particular, the S-TWG will guide the development of a Guide to Promoting a Sustainable Seaweed Industry in the Southeast Asia; the Principles of Responsible and Safe Seaweed Aquaculture; and a complementary Toolkit to support the application of these principles in developing standards of product quality, environmental management, and operational safety aligned with the Global Seaweed Coalition.

Expected Outcomes of S-TWG

1. Completion and regional endorsement of the Guide, Principles, and Toolkit
2. Enhanced regional collaboration and knowledge-sharing
3. Positive stakeholder feedback on the relevance and usability of the outputs
4. **Mainstreaming of gender equality** strategies into the seaweed industry, including actionable policy and practice recommendations.

Scope of Work

The Seaweed Technical Working Group (S-TWG) will be composed of nominated experts from SEAFDEC Member Countries, a representative from the SEAFDEC Aquaculture Department (AQD) in the Philippines, and technical experts from relevant regional and international organizations, such as the Global Seaweed Coalition. The PMU SEAFDEC will lead the coordination process for the formal establishment of the S-TWG. This includes reaching out to Member Countries to request official nominations, identifying and engaging relevant institutions and experts, and facilitating their participation in technical forums. The PMU will also organize and convene the inaugural S-TWG meeting to review and endorse the Terms of Reference, develop a detailed work program for drafting the Regional Guide and Principles for Seaweed Aquaculture, and define strategies for scaling and sustaining project outcomes across Southeast Asia.

To promote gender equality and meaningful participation of women in the S-TWG, the project will adopt a gender-responsive approach from the start. SEAFDEC will encourage Member Countries to nominate qualified women and prioritize gender balance across sectors. The PMU SEAFDEC will embed gender considerations into the S-TWG's Terms of Reference, invitations, and work program to ensure inclusive participation and diverse perspectives in decision-making. Capacitybuilding will incorporate gender-sensitive content, and progress will be monitored through the Gender Action Plan to ensure accountability and continuous improvement.

Terms of References of the S-TWG

1. Provide technical advice and recommendations on seaweed aquaculture development, including sustainable farming practices, value chain improvement, and ecosystem service integration.
2. Facilitate knowledge exchange, including technologies and best practices, to improve productivity and sustainability of seaweed products.
3. Provide technical expertise, leadership, and inputs for the consultant to develop, validate, review, and support adoption of the regional Guide (output 1.1.2) and Principles (output 1.1.3), and relevant guidelines/toolkits and standards to ensure the quality and safety of seaweed products.
4. Assist the consultant to connect with Member Countries in assessing seaweed regional and national regulatory, technical, and logistical challenges for market access.
5. Coordinate with regional and global initiatives to ensure strategic alignment and maximize synergies in sustainable seaweed production and development.
6. Represent a platform for awareness, networking, coordination, knowledge exchange among key authorities and organizations focused on seaweed development
7. Facilitate regional technical cooperation to address specific and shared concerns.

Composition and Membership of S-TWG

1. **Members:** one expert from each ASEAN Member States with expertise in seaweed aquaculture and value chains, and an expert from SEAFDEC/AQD.
2. **Chairperson:** Elected at the start of each meeting, from among members. The Chairperson will report the S-TWG progress to the Project Steering Committee (PSC).
3. Other **resource persons/experts:** Additional experts from ASEAN Member States or international/regional organizations may be invited on an ad-hoc basis as needed.
4. **Gender Expert:** SEAFDEC's Gender Focal Point will guide the integration of gender perspectives in all outputs.
5. **Secretariat:** PMU SEAFDEC, led by the Project Manager/Technical Advisor in collaboration with the SEAFDEC Secretariat and SEAFDEC/AQD, shall serve as the secretariat of the S-TWG meetings, will coordinate meeting logistics, prepare agendas, and manage documentation.
6. **Rapporteur:** The Secretariat of S-TWG will act as rapporteur and circulate meeting reports to all members.

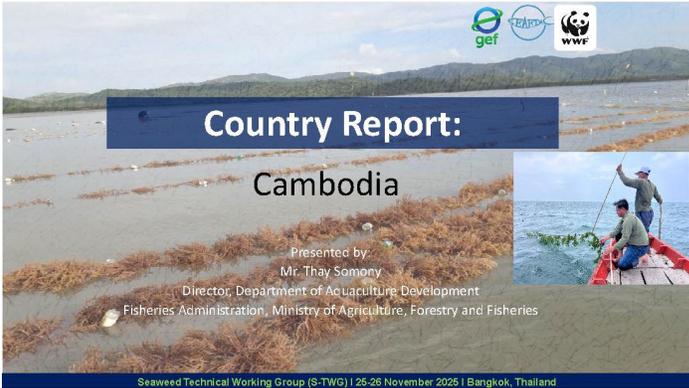
Nature of S-TWG Activities and Financial Arrangements

1. S-TWG meetings will be convened throughout the project period, coordinated by PMU SEAFDEC with input from members and under the guidance of the SEAFDEC Secretariat.
2. Inter-sessional activities may be conducted as necessary, subject to funding availability.
3. Meetings and workshops will be funded by the Blue Horizon Seaweed Project, including cost for member participation. These may be conducted in-person, online, or hybrid formats.
4. Costs for attendance of consultants and resource persons during meetings or intersessional activities will be covered by the PMU SEAFDEC.
5. Based on S-TWG’s advice, the SEAFDEC Council will determine appropriate follow-up actions, including referral the ASEAN mechanism.

Meeting Schedule of Seaweed Technical Working Group (S-TWG)

Meeting	Purpose	Year
1	Develop the S-TWG work program, agree on meeting schedule and expected outputs, and endorse the ToR	2025
2	Define the scope and outline of the Guide , define tasks and responsibilities and timeline, review ToR for a consultant to assist in drafting the Guide	2026
3	Initiate work on the Principles of Responsible and Safe Seaweed Aquaculture with experts and resource persons	2026
4	Review the draft Guide	2026
5	Validate the draft Guide	2027
6	Review the Principles and Toolkit and begin finalization of the drafts	2027
7	Validate the Principles and Toolkit	2028
8	Finalize the Guide , Principles and Toolkits; submit recommendations to SEAFDEC Council for endorsement	2028
9	Organize an online regional workshop to launch the Guide and Principles	2028

Country Report: Cambodia



Country Report:
Cambodia

Presented by:
Mr. Thay Somony
Director, Department of Aquaculture Development
Fisheries Administration, Ministry of Agriculture, Forestry and Fisheries

Status of Seaweed Industry:

- Types and Volume of seaweed: Red seaweed (*Kappaphycus alvarezii*) species. Volume: 5,000 tons to 50,000 tons (more if markets available)
- Size of economy: Currently around 1 millions US\$, possible to 20 millions US\$ dependent on markets (suitable locations available)
- Trend: Ministry of Agriculture, Forestry and Fisheries and Fisheries Administration put strong focuses on marine fisheries conservation and extractive marine aquaculture (IMTA – Seaweed, green mussel farming ...)
- Number of people/farmers working in this sector: 1,000 to 2,000 families dependent on the markets
- Main markets (retail, export, etc.): Dried seaweed imported to Vietnam via Cambodian brokers.

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Value Chain and Market Access of Seaweeds:

- Product diversification: **Mainly sun-drying method**
- Quality assurance, certifications at various levels: **Not yet implemented.**
- Market opportunities: **Mainly via Vietnam and possible China.**
- Roles of stakeholders in seaweed industry (government, farmers, communities, research institution, traders, processors, distributors, exporters, regulators, etc)?
- Country strategies, roadmap for promotion on seaweed industry? **FIA is looking for the opportunity to develop seaweed development strategy.**

Issues:

- Seaweed health problems (Ice-ice disease, epiphytic pests)? **Yes.**
- Quality of seedstocks? **Low quality.**
- Pollution: **Not a problem.**
- Low price or erratic price fluctuations? **Yes.**
- Conflicts with other industry (tourism): **Seaweed farming is still small so the conflicts with other industry like Tourism has not be identified.**
- Regulatory problems? **FIA/MAFF promotes seaweed farming while its technology is not yet developed.**

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Challenges:

- Extreme weather disturbance (climate change impacts)? **Since it is near shore and surrounded by Islands extreme storm is not a problem but if some rainy seasons have lots of rains.**
- Diversification of seaweed species for culture? **Not yet.**
- Sourcing of good quality seedlings? **We request the project/S-TWG to provide supports on good quality seedlings.**
- Financial access: **Limited.**
- Lack of support Infrastructure? **Limited.**
- Etc.

Next steps/ way forward:

- Institutional and Policy: Ministry of Agriculture, Forestry and Fisheries and Fisheries Administration (FIA) put strong focuses on marine fisheries conservation and extractive marine aquaculture (IMTA – Seaweed, green mussel farming ...). Department of Aquaculture Development (DAD) and Marine Aquaculture Research and Development Center (MARDeC), FIA.
- Investment/budget: Sustainable Coastal and Marine Fisheries Project (SCMFP) 2023-2029 – open water non-fed aquaculture and research, SME enterprise development for innovation and commercial upscaling.

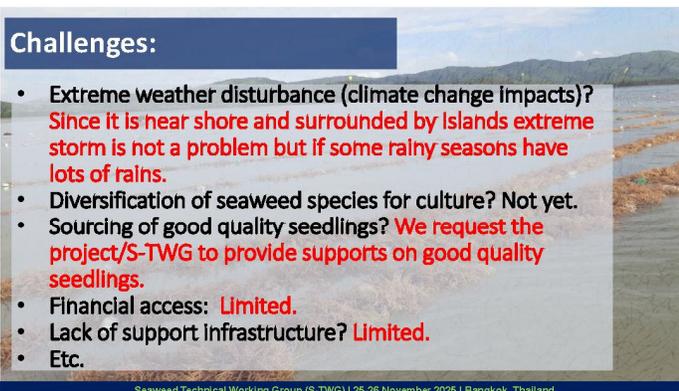
Ongoing Research By DAD/ MARDeC and MCC:

- Species Identification
- Seagrass (*Caulerpa lentillifera*) trial research.
- Because of a lack of funding, the trial research is still in its early stages.

Future Research Collaboration Require:

- Seaweed Species Identification
- Potential commercial species study
- Culture techniques adaptation (integrated species farming and off-shore farming).
- Funding support, investment and collaboration.
- Guidebook publication that accessible to local level.

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- Etc.**

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Country Report: Indonesia

Country Report:
INDONESIA

Presented by:
Lutfi Hardian Murtiono
Senior Aquaculture Analyst
Ministry of Marine Affairs and Fisheries

gef SEAFDEC WWF

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Status of Seaweed Industry:

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Production volume and value



Indonesian seaweed farmers 2020 - 2024

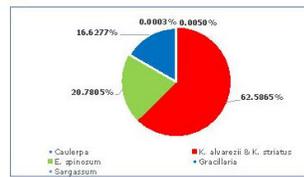
Year	Seaweed farmers	Seaweed farming households
2020	293,271	111,245
2021	254,422	112,969
2022	240,367	101,194
2023	254,068	96,806
2024	237,829	94,370

Indonesian seaweed production 2020 - 2024

Year	Production Volume (Tonnes)	Production Value (Rp)	Production Value (USD)
2020	9,618,421	26,30 T	1,64 M
2021	9,092,031	28,49 T	1,78 M
2022	9,234,268	40,56 T	2,53 M
2023	9,753,410	28,36 T	1,77 M
2024	9,853,004	24,29 T	1,52 M

Source : MMAF (2025)

Main seaweed species being harvested/ cultivated



Source : MMAF (2025)



Comparative Thallus Performance of *K. alvarezii* by Farming Location



Regulations on seaweeds, existing standards, principles, training modules, other relevant information

A. Regulation

1	Presidential Regulation Number 33 of 2019 on the Roadmap for the Development of the National Seaweed Industry for 2018–2021	serves as a roadmap for the development of the seaweed industry in Indonesia, covering efforts from increasing production to advancing value-added product development.
2	Minister of Marine Affairs and Fisheries Regulation Number 1 of 2024 on the Implementation of the Indonesian National Qualifications Framework in the Seaweed Aquaculture Sector	regulates the application of workforce competency qualifications—covering formal education, vocational training, and work experience—for professions in the seaweed aquaculture sector in Indonesia
3	Minister of Marine Affairs and Fisheries Decree Number 1 of 2019 on General Guidelines for Seaweed Farming	provides guidance for the implementation of seaweed farming practices in Indonesia
4	Government Regulation Number 28 of 2025 on the Implementation of Risk-Based Business Licensing	This regulation governs the implementation of business licensing based on the level of risk associated with each business activity, including seaweed aquaculture, to ensure legal certainty. Licensing requirements are classified into four risk levels: low, medium-low, medium-high, and high. All business licensing processes in Indonesia are integrated into the Online Single Submission (OSS) system.
5	Minister of Marine Affairs and Fisheries Regulation Number 10 of 2021 on Business Activity and Product Standards for the Implementation of Risk-Based Business Licensing in the Marine and Fisheries Sector.	This regulation outlines the standards required for the licensing process, categorized according to the risk level of each business activity. It aims to ensure that business operations in the marine and fisheries sector comply with established standards and provide legal certainty for business actors
6	Law Number 26 of 2007 on Spatial Planning.	This law serves as the legal foundation for the planning, utilization, and control of spatial areas—including marine spatial planning—across all regions of Indonesia, from the national level down to provinces and regencies

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B. Standards

Source : National Standardization Agency of Indonesia

B.1	Aquaculture	
1	SNI 7578:2010 (confirmation 2020)	Production of Gracilaria seaweed (<i>Gracilaria verrucosa</i>) in ponds under a polyculture system
2	SNI 7579.1:2010 (confirmation 2020)	Production of cottonii seaweed (<i>Eucheuma cottonii</i>) – Part 1: Bottom-off method
3	SNI 7579.2:2010 (confirmation 2020)	Production of cottonii seaweed (<i>Eucheuma cottonii</i>) – Part 2: Longline method
4	SNI 7579.3:2010 (confirmation 2020)	Production of cottonii seaweed (<i>Eucheuma cottonii</i>) – Part 3: Floating raft method
5	SNI 7673.1:2022	Production of seedstock of cottonii seaweed (<i>Kappaphycus alvarezii</i>), sakai (<i>Kappaphycus striatus</i>), and spinosum (<i>Eucheuma spinosum</i>) – Part 1: Off-bottom method
6	SNI 7673.2:2022	Production of seedstock of cottonii seaweed (<i>Kappaphycus alvarezii</i>), sakai (<i>Kappaphycus striatus</i>), and spinosum (<i>Eucheuma spinosum</i>) – Part 2: Longline method
7	SNI 7673.3:2022	Production of seedstock of cottonii seaweed (<i>Kappaphycus alvarezii</i>), sakai (<i>Kappaphycus striatus</i>), and spinosum (<i>Eucheuma spinosum</i>) – Part 3: Floating raft method
8	SNI 7903:2013	Production of Gracilaria seaweed (<i>Gracilaria verrucosa</i>) seedlings using the long line method in ponds
9	SNI 7904:2013	Production of Gracilaria seaweed (<i>Gracilaria verrucosa</i>) seedlings using the pond spreading method
10	SNI 8554:2018	Cultivation of lawi-lawi seaweed (<i>Caulerpa</i> sp) in ponds
11	SNI 8228.2:2015	Good Aquaculture Practices (GAP) - Part 2: Seaweed
12	SNI 7672:2011	Kotoni seaweed seeds (<i>Eucheuma cottonii</i>)
13	SNI 7902:2013	Gracilaria seaweed seedlings (<i>Gracilaria verrucosa</i>) in ponds

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B.2 Non-Food Fishery products	
SNI 01-6492-2000	Wet seaweed (<i>Eucheuma cottonii</i>) for consumption
SNI 8391-1:2017	Refined Carrageenan – Part 1: Kappa Carrageenan – Quality requirements and processing
SNI 2690-2023	Dried seaweed
SNI 8393-2017	Fresh brown seaweed as raw material for fucoxanthin - Quality requirements and handling
SNI 8469-2018	<i>Sargassum</i> spp. as raw material for alginate dye fixatives in textiles - Quality requirements and handling;
SNI 8394-2017	<i>Sargassum</i> spp. as raw material for alginate dye fixatives in textiles - Quality requirements and handling;
SNI 8393-2017	Fresh brown seaweed as raw material for fucoxanthin - Quality requirements and handling;
SNI 8922-2020	Alkali-treated Gracilaria (ATG)

B.3 Fishery products	
SNI 8168-2015 (confirmation 2021)	Determination of Clean Anhydrous Weed (CAW) in dried seaweed
SNI 8169-2015 (confirmation 2021)	Determination of impurities in seaweed
SNI 01-4497-1998	Determination of agar content from seaweed
SNI 7689.1-2013	Paper agar-agar - Part 1: Specifications
SNI 7689.2-2013	Paper agar-agar - Part 2: Raw material requirements
SNI 7689.3-2013	Paper agar-agar - Part 3: Handling and processing
SNI 2354.12-2013 (confirmation 2020)	Chemical testing methods - Part 12: Determination of seaweed carrageenan yield
SNI 2354.12-2013 (confirmation 2020)	Chemical testing methods - Part 12: Determination of seaweed carrageenan yield
SNI 7761-2013	Seaweed dodol
SNI 2802-2015	Agar-agar powder
SNI 8816-2019	Seaweed infusion
SNI 01-6236-2000	Packaged seaweed candy

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Regulations

Standards

Training Modules

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Product Diversification

Volume of Processed Seaweed Products in 2024

Products	Volume (Tonnes)	%
Agar / Agar Powder	6.564,76	2,9%
Carageenan	17.000,76	7,5%
Dried Seaweed	203.105,18	89,6%
Total	226.670,69	

Source: DG Marine & Fisheries Product Competitiveness, MMAF (2025)

Main products derived from seaweeds

PT. AGAR SWALLOW
Agar Powder, SRC
Kappa Powder, SRC
Powder Iota

Blended Carrageenan and Blended Agar for various food and drink applications

www.agswallow.com

PT. AGARINDO BOGATAMA
Agar Powder, Bio
Agar, Plantagar

Food and drink
Tissue Culture media
fertiliser

www.searincobogatama.com

PT. AGAR SARI JIWA
Agar Powder

Food and drink

www.agsarisarijawa.com

PT. ALGALINDO PERDANA
Refined Kappa
Carrageenan, Konjac
Gluin.

Food and drink
Tooth paste stabiliser

www.algalindoperdana.com

PT. AMARTA CARRAGEENAN INDONESIA
Kappa Carrageenan, Iota
Carrageenan.

Food Grade, Feed Grade
and Technical Grade
application

www.amartacarrageenan.com

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Main products derived from seaweeds

 PT. ANUGERAH MAPAN JAWA ATCC, SRC Powder, Blended Product Food and Drink www.amjhydrocolloid.com	 PT. BANTIMURUNG INDAH ATC, ATC, Kappa and Iota SRC Food Grade, Technical Grade www.bantimurungseaweed.co.id	 PT. BUANATAMA FAJAR ABADI ATC, Kappa and Iota SRC Food Grade, Feed Grade, Technical Grade www.primegum.com	 PT. CAHAYA CEMERLANG Iota / Kappa SRC Powder & Kappa / Iota RC Food Grade, Feed Grade, Technical Grade www.rcbyacarrageenan.com	 PT. GALIC ANTABAHARI Iota / Kappa SRC Powder & Kappa / Iota RC, Premix blended stabiliser Food Grade, Feed Grade and Technical Grade application www.tpsb.com
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Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

Main products derived from seaweeds

 PT. GALIC RINA MADA Refined Carrageenan, Jelly mix, Sodium Alginate, Kerjac Gum, Xanthan Gum, Gelatin Gum, CMC Food Grade, Feed Grade, Technical Grade www.gs.lcinamada.com	 PT. GUMINDO PERKASA INDUSTRI Carrageenan Food and Drink www.inccgum.com	 PT. HAKIKI DONARTA agar KA, agar OLES, phytafibre, agarEASY, kappatek, ukroalPS, jawaSAFE Food and Drink, Tissue Culture, Bump Grade Personal Care, Water Base moisturizer, Hydrostick SPF Stick, Hydrostick Lip Balm, Hydrostick Blush www.jawe-bio-colloid.com	 PT. HYDROCOLLOID INDONESIA Carrageenan, custom blended product Food Grade, Feed Grade, Technical Grade www.hydrocolloid-indonesia.com	 PT. INDOKING ANKRA AGAR-AGAR INDUSTRY Agar Powder Food Grade application www.indoking.co.id
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Main products derived from seaweeds

 PT. INFOFLORA CIPTA MANDIRI Agar powder, Refined and semi refined Carrageenan, custom blended product Food application www.infofloraseaweed.com	 PT. INDONUSA ALGAEMAS PRIMA ATCC, ATS Food Grade application www.algaemas.com	 PT. KAPPA CARRAGEENAN NUSANTARA Refined Carrageenan, Agar2, ATC, ATG Food and Technical application Capsule, Plastic bag, Fertilizer, Battery www.kcn-nusantara.com	 PT. KARAGEN INDONESIA Refined and semi refined Kappa Carrageenan, semi refined Iota Carrageenan, ATCC Food Grade application www.karagenindonesia.com	 PT. ROTE KARAGINAN NUSANTARA Semi Refined Carrageenan Food Grade, Feed Grade and technical grade application www.rotekaraginannusantara.com
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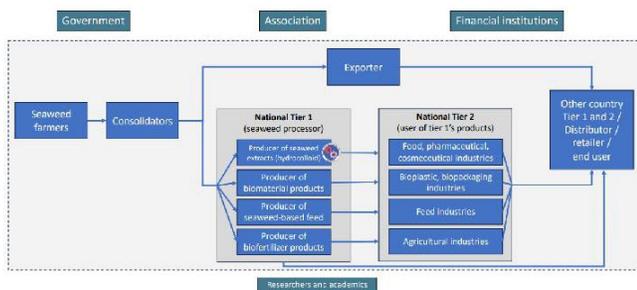
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Quality assurance & certifications

Good Aquaculture Practice - CBIB <ul style="list-style-type: none"> A certification that ensures aquaculture activities follow Good Aquaculture Practices to guarantee food safety, environmental sustainability. Issuing Authority : Ministry of Marine Affairs and Fisheries (MMAF) 	Phytosanitary Certificate <ul style="list-style-type: none"> An official certificate confirming that plant-based products (including raw seaweed or dried biomass) are free from pests, diseases, and comply with the phytosanitary requirements of the importing country. Issuing Authority : The Indonesian Quarantine Authority (Barantin)
Good Manufacturing Practices (GMP) & Sanitation Standard Operating Procedures (SSOP) <ul style="list-style-type: none"> GMP ensures that products are consistently produced and controlled according to recognized quality standards. Issuing Authority : Ministry of Marine Affairs and Fisheries (MMAF) 	Health Certificate (HC) <ul style="list-style-type: none"> An official document declaring that seaweed products have been inspected, meet food safety requirements, and are safe for human consumption. Issuing Authority : The Indonesian Quarantine Authority (Barantin)
Hazard Analysis and Critical Control Points (HACCP) <ul style="list-style-type: none"> An internationally recognized food safety management system that identifies, evaluates, and controls significant hazards to ensure product safety throughout the production process. Issuing Authority : Ministry of Marine Affairs and Fisheries (MMAF) 	Indonesian National Standard (SNI) <ul style="list-style-type: none"> A national quality standard that may be voluntary or mandatory. For seaweed, specific SNI exists for various products, such as dried seaweed and carrageenan. Issuing Authority : The National Standardization Agency (BSN)

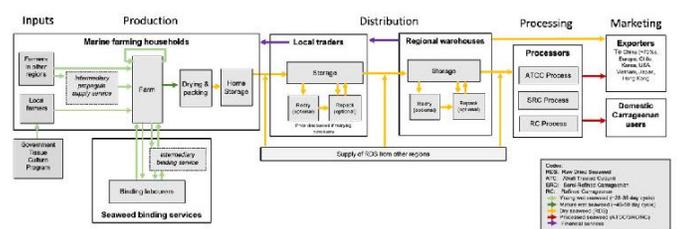
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Roles of stakeholders in seaweed industry



Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

Roles of stakeholders in seaweed industry



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Roles of stakeholders in seaweed industry

- Government**
- Develops policies, regulations, and marine spatial planning (MSP) to ensure sustainable farming zones.
 - Provides infrastructure support.
 - Offers training, high-quality seedlings, and technical assistance.
 - Facilitates licensing, certification, and export procedures.
 - Attracts investment and strengthens industry partnerships.

- Research Institutions & Academics**
- Develop improved seedstock (tissue culture, selective breeding).
 - Conduct research on diseases, water quality, and farming technology.
 - Provide scientific input for policy and industry development.
 - Build capacity for farmers, extension workers, and technicians.

- Seaweed Farmers**
- Carry out day-to-day cultivation: planting, maintenance, and harvesting.
 - Maintain seed quality and adopt environmentally friendly farming practices.
 - Organize into farmer groups or cooperatives to improve bargaining power.
 - Provide production data to support industry planning.

- Local Traders**
- Collect dried seaweed from multiple farmers and consolidate it into larger volumes.
 - Ensure continuous supply to processors or exporters.
 - Conduct initial quality checks, drying adjustments, sorting, and cleaning.
 - Reduce variability in raw materials before entering the industrial processing stage.
 - Provide storage facilities and organize transportation to processing plants or export hubs.
 - Reduce post-harvest losses through proper handling and warehousing.
 - Provide working capital or advance payments to farmers.
 - Connect farmers with larger markets and stable buyers.

Roles of stakeholders in seaweed industry

- Association**
- Advocacy and Policy Influence
 - Capacity Building & Training
 - Market Information & Data Sharing
 - Strengthening Member Networks
 - Quality and Standardization Support
 - Conflict Mediation

- Exporters**
- Connect Indonesian products with global markets.
 - Ensure compliance with international standards and buyer requirements.
 - Build long-term trade relationships to sustain market demand.

- Seaweed Processor**
- Transform raw dried seaweed into higher-value products such as chips, semi-refined carrageenan (SRC), refined carrageenan (RC), agar, alginate, and specialty hydrocolloids.
 - Enhance the economic value of seaweed compared to raw material sales.
 - Ensure that processing follows food safety and quality standards (SNI, HACCP, ISO, Halal).
 - Conduct testing for moisture, impurities, gel strength, viscosity, and microbiological safety.
 - Deliver consistent product quality required by global buyers.
 - Bridge the gap between farmers/consolidators and international markets.
 - Prepare products that meet international specifications (China, EU, US, Japan).
 - Absorb large volumes of seaweed, reducing price volatility for farmers.
 - Maintain continuous demand to support upstream production.
 - Provide long-term purchasing agreements or partnerships with farmer groups.

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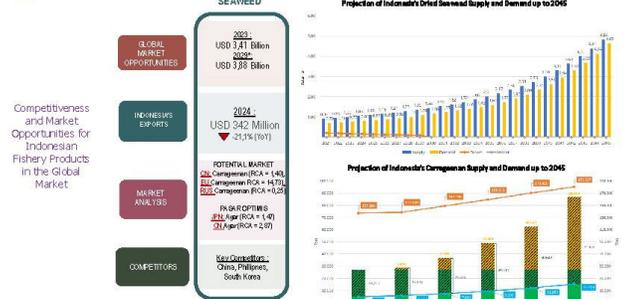
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Performance of Indonesia's Fisheries Exports



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Market Opportunities



Source: ITC Training 2014 & 2016; Indonesia 2025; data compiled & generated by O'Straw & Faehra/Prostate/Competitiveness, WFP

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Strategic Policy Directions for Downstreaming

Direction / Objective

Strengthening investment to build a seaweed-based industry capable of meeting national demand by 2040 through the development of carrageenan, biostimulant fertilizers, and agar flour industries, using a blue/green industry approach to support food security.

Strategies

- Optimizing the utilization of national potential for the domestic downstream industry through the provision of high-quality seedstock, improved use of seaweed farming areas, and export tax regulation for upstream products.
- Strengthening the investment to accelerate seaweed industry downstreaming by streamlining licensing processes, optimizing incentive schemes, and developing supporting infrastructure.
- Promoting investment and establishing cooperation with strategic partners to accelerate downstream industry development.
- Enhancing the self-reliance of the domestic seaweed downstream industry through access to domestic financing, collaborative research, and technology transfer.

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Issues:

Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

Issues

Seed Quality Issues	Diseases & Pests	Pollution & Environmental Degradation	Spatial Conflicts
<ul style="list-style-type: none"> Genetic degradation from repeated recycling Limited supply of high-quality seedstock No national standard or certification system Poor handling and uncontrolled distribution 	<ul style="list-style-type: none"> Ice-ice, epiphytes, jelly disease High vulnerability due to environmental stress Lack of monitoring and early-warning systems 	<ul style="list-style-type: none"> Industrial/domestic pollution and sedimentation Rising sea temperature and climate impacts Loss of supporting ecosystems (mangroves, seagrass, reefs) 	<ul style="list-style-type: none"> Overlapping use with tourism, shipping, and industry Weak enforcement of marine spatial planning (zoning) Farmer-to-farmer conflicts in crowded areas
Low Technology & Productivity	Price Volatility & Supply Chain Inefficiency	Weak Farmer Institutions	
<ul style="list-style-type: none"> Traditional farming methods, limited digital tools Weak post-harvest practices → inconsistent quality Limited modern processing capacity and innovation 	<ul style="list-style-type: none"> Highly fluctuating prices due to market dependence Middlemen dominance, low bargaining power for farmers High logistics cost and long transport distance Non-uniform raw material quality 	<ul style="list-style-type: none"> Fragmented farmer groups, weak cooperatives Limited partnerships with processors or industry 	

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Seed Quality Issues



Diseases & Pests



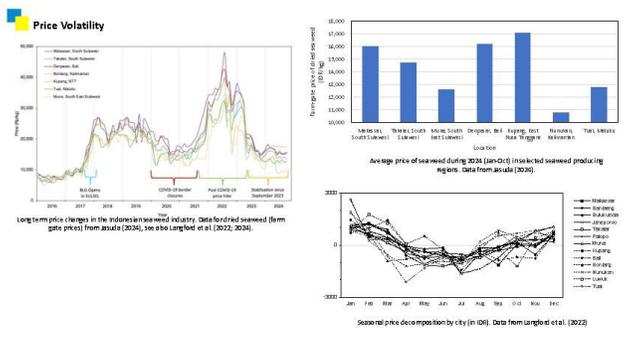
Pollution & Environmental Degradation



Spatial Conflicts



Low Technology & Productivity

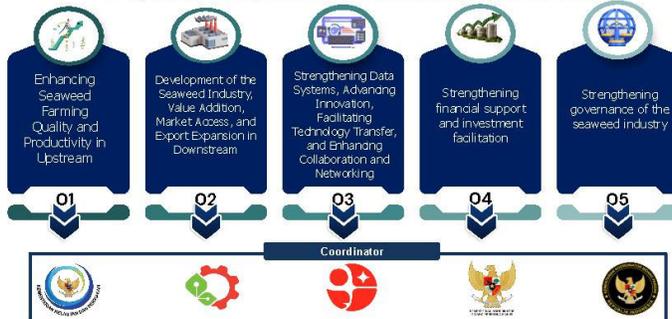
Challenges

<h4>Climate Change Impacts</h4> <p>Seasonal temperature shifts in Eastern Indonesia (South Sulawesi, NTB, NTT) cause slower growth and mass die-offs. Unpredictable monsoon patterns increasingly disrupt planting and harvest cycles, ex. Sempu cyclone in NTT</p>	<h4>Limited Species Diversification</h4> <p>Limited variety of cultivated seaweed species Dependence on wild-collected seedling Limited availability of high-quality seaweed seed stocks Genetic selection and breeding programs are still underdeveloped</p>	<h4>Weak Infrastructure & Post-Harvest Handling</h4> <p>Lack of communal drying facilities leads to inconsistent moisture levels. Poor road connectivity increases transport costs in Eastern Indonesia. Quality grading is not standardized across producing regions. Lack of mechanization, has resulted in low efficiency in seaweed cultivation</p>	<h4>Limited Access to Finance for Farmers</h4> <p>Most farmers are informal and cannot meet bank collateral requirements. Financing is dominated by local middlemen ("jangkong"), which reduces farmer bargaining power. Not large-scale private parties investing in the upstream sector.</p>
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Way forward

Integrated National Action Plan for Seaweed Development 2025-2029



Suggestion & Inputs

Enhance the Availability and Quality of Seedstock

- Develop certified seedstock centers at regional levels to ensure reliable, high-quality planting materials.
- Scale up tissue culture, selective breeding, and nursery systems to reduce dependence on wild stocks.
- Promote genetic improvement programs to increase productivity, resilience, and disease resistance.

Strengthen Farmer Capacity and Technical Competence

- Implement continuous
- Improve farmers' organizational and institutional management capacity to enhance bargaining power and market access.
- Encourage stakeholders participation and digital literacy to modernize the sector.

Expand Species Diversification

- Support research and pilot-scale farming of new species beyond *Kappaphycus alvarezii*, *Gracilaria*, and *Eucheuma spinosum*.
- Provide price incentives and guaranteed off-take schemes for emerging species to attract farmers and investors.
- Develop farming technologies tailored to Indonesia's multi-ecosystem conditions (e.g., IMTA, offshore culture).

Regulations governing marine spatial planning and coastal zone allocation

- Strengthen implementation of marine spatial planning regulations to secure designated aquaculture zones.
- Ensure zoning policies protect farming areas from competing coastal uses (e.g., tourism, mining, shipping).

Promote Research, Innovation, and Technology Adoption

- Accelerate R&D on disease control, climate resilience, and mass production of improved strains.
- Support adoption of smart farming technologies (IoT-based monitoring, remote sensing, digital farm logs).

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Thank you

Country Report: Lao PDR

Annex 9

Freshwater Weed Industry small scale in Lao PDR



Ms. Daovieng Yaibuoathong
 Technical officer
 Division of Fisheries
 Department of Livestock and Fisheries
 Ministry of Agriculture and Environment

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Outlines

- The Status of Freshwater weed
- Environmental and Social Benefits
- Challenges and Government Support
- The Future of the Freshwater Weed Industry small scale



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The Status of Freshwater weed

In Laos, the most freshwater weed is "Kai Pen," which is a type of filamentous green algae from the genus *Spirogyra*.

Kai Pen Production in Luang Prabang province in 2024

No	Name of District	Amount (kg)	Value (USD)	Sales Market (%)	
				Domestic	Export
1	Nambak	75,000	25,000	95	5
2	Viengkham	2,396	6,846	100	
3	Phonthong	90,600	30,200	100	



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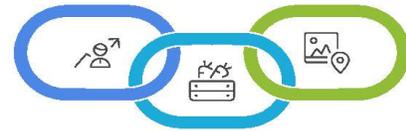
Market and Economics

Market Dynamics

Focuses on the local and domestic market interactions.

Cultural Linkages

Emphasizes the connection to tourism and food culture.



Income Generation

Highlights the economic benefits for rural families, especially women.



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2 community at Luang Prabang province supported by Korea

Bom Village



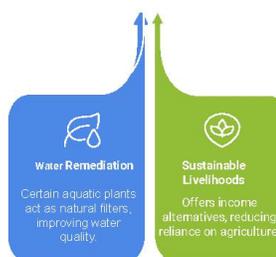
Lee Village



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Environmental and Social Benefits

Environmental Benefits



Social Benefits

Women's Empowerment

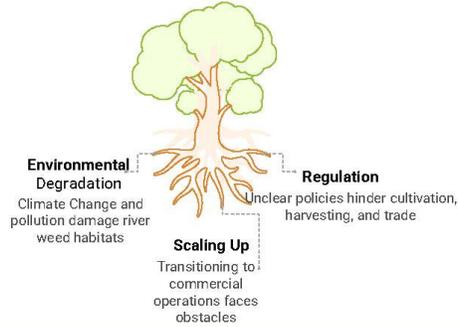
Provides financial independence and leadership roles for women



Food Security

Enhances nutrition and diversifies food sources in rural areas

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Aquatic Animal and Fisheries Law

Government Focus
The government's commitment to sustainable development and the blue economy.

Policies Framework
Laws and strategies designed to protect and manage aquatic resources.



- ✓ **Advanced Cultivation:** Diversity of Species, Implementing techniques to increase yield and quality while managing potential risks.
- ✓ **Product Diversification:** Exploring new products such as fertilizers, animal feed, and other commercial goods.
- ✓ **Export Potential:** Tapping into regional and international markets for nice products.

Conclusion: The freshwater weed industry small scale in Laos, while facing challenges, presents a significant opportunity for sustainable economic growth, environmental protection, and social development.



Washed and pounded



Pressed into thin, large sheets, seasoned with ingredients like garlic, tomatoes, and sesame seeds and sun-dried



Local food from Kai Pen



Products for domestic and export



Kob Jai
Thank you for your attention



Country Report: Malaysia

Annex 10



**SEAWEED TECHNICAL WORKING GROUP (S-TWG)
MEETING**

25 - 26 November 2025
Bangkok,
Thailand



**Seaweed Cultivation in Sabah,
Malaysia: 1970-2024**

Department of Fisheries Sabah, MALAYSIA
25 - 26 November 2025

www.fishdept.sabah.gov.my



content

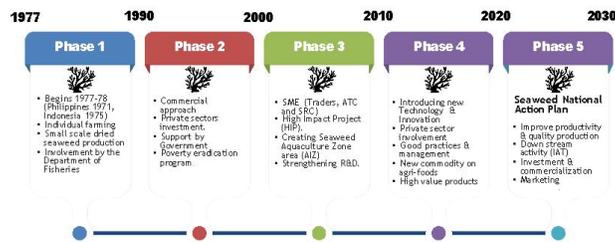
- Overview
- History of Seaweed Culture
- Current Status
- Trade of Seaweed
- Issue, Challenges & Threats
- Way forward Seaweed
- Conclusion



Overview of Seaweed in Malaysia

- Malaysia located in the Coral Triangle Area which rich in marine biodiversity
 - Coastline 1600km, Coral cover > 75% in Sabah, Mangrove > 65% in Sabah
- Seaweed found in this area a well adapted to tropical climate
 - red seaweed (Rhodophyta)
 - brown seaweed (Phaeophyceae)
 - green seaweed (Chlorophyta)
- Red seaweed eucheumatoid - *Kappaphycus* & *Euचेuma* are two common species found and farmed in Malaysia for Carrageenan
- Most active farming area are located on the East Coast of Sabah, Malaysia
- Dried seaweed products are exported abroad mainly to Republic of China and Europe.

History of the seaweed farming in Malaysia



Main species



Seaweed Farming Area - Malaysia



- More than 95 % seaweed farm located in Sabah (East Coast)
- Seaweed in Peninsular Malaysia mostly small scale (*Caulerpa* spp.)

Current status of Seaweed in Malaysia



Main species: *Kappaphycus* & *Euchemna*

Other species: *Caulerpa*, *Gracilaria* & *Ulva*



220,246 MT / 22,025 MT Dried (2024)



MYR 70.48 Million @ USD 16.7 Million



4464 hectare



1554 farmers



Seaweed contribute approximately 56 % national aquaculture production in 2022

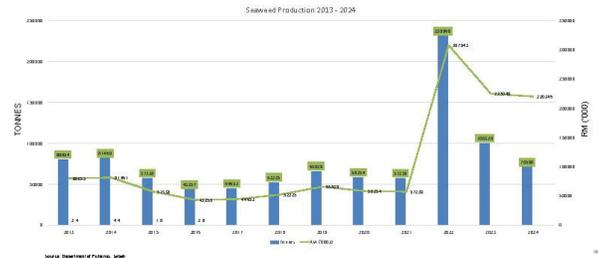


Current Seaweed Project in Sabah

List of Project

- Mini Estate [Entry Point Project (EPP) 3] - 9 private limited company
- Cluster (EPP3) - 6 co-operative company
- Nucleus (EPP3) - 565 farmers (individual)
 - Breakdown - 2021 (165); 2022 (200); 2023 (200)
- National Seaweed Empowerment Project - 5 communities (Kota Belud, Lahad Datu, Tawau, Kunak & Semporna)

Seaweed production 2013 - 2024 (Malaysia)



Current status of Seaweed in Sabah



- 98% seaweed production from East Coast of Sabah
- Semporna
- Tawau
- Lahad Datu
- Kunak



Current status of Seaweed in Sabah

Culture Method

- *Kappaphycus* spp & *Euchemna* spp - longline, fixed off-bottom/pole, raft (sea)
- *Caulerpa* spp - tank & pond (land)



Photos: Department of Fisheries, Malaysia

Photos: Department of Fisheries, Sabah



Seaweed trade in Malaysia

Domestic

- Dried seaweed
- Fresh
 - direct consumption - *Kappa*, *Gracilaria*, *Caulerpa*

Export

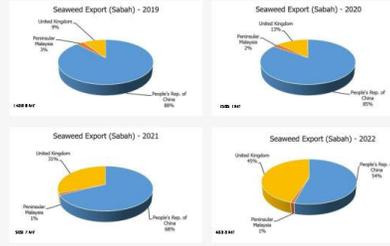
- Dried seaweed
- ATC chip (Alkaline Treatment Carragenan)
- WDS (Water Dissolved Seaweed)
- Powder form - UK (additive component)

others

- processed product
- canned product
- Toiletries
- Cosmetics
- sold fresh in the market/farm's



Seaweed trade in Malaysia



Source: data: Royal Custom Department of Malaysia

China Market

Seaweed & Other Algae: Fit for human consumption (Dried but not ground) (Eucheumatoid)

U.K Market

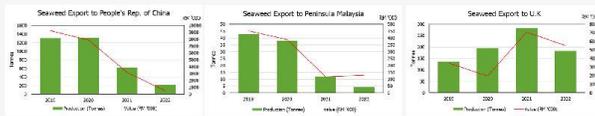
- Seaweed & Other Algae: Fit for human consumption (Dried but not ground) (Eucheumatoid)
- ATC, WDC & Powder

Peninsular Malaysia

- Seaweed & Other Algae: Fit for human consumption (Dried but not ground) (Eucheumatoid)
- Seaweed & Other Algae: Fit for human consumption (Dried but not ground) (other than Eucheumatoid)
- Other seaweeds and other algae other than of a kind used in Pharmacy

Trade seaweed in Malaysia

Export



- Other country
- Japan
 - South Korea
 - Hongkong

Source: data: Royal Custom Department of Malaysia

Seaweed Processing Factory

- Seaweed & Other Algae: Fit for human consumption (Dried but not ground) (Eucheumatoid)
- Seaweed & Other Algae: Fit for human consumption (Dried but not ground) (Eucheumatoid)
- ATC, WDC & Powder (U.K Market)



Company: TeeJoy Marine / Semporna Sea Product Enterprise

Issue, Challenges & Threats

Issues

- Seedlings
- Competitive area
- Inputs & materials price always increased
- Dry seaweed quality
- Lack of infrastructure
- Lack of local farmers/workers

Challenges

- Price fluctuation
- Natural Predators
- Depend on Govt. Assistant
- Lack of interest by locals (youths)
- Facility for collecting Centre

Threats

- Genetic seaweed quality
- Depend on foreign Labor
- Security
- Trade Barrier
- Price competition
- Diseases
- Natural disasters



Predator, Pest and Diseases

- Predator - turtle & Rabbitfish (siganids)
- Pest & Disease - ice-ice, epiphyte
- Climate change - sea temperature, extreme monsoon



Way forward Seaweed industry in Malaysia



Down stream/processing

- encouraging processing activity



Research & Development

- new variety/species
- new technology
- innovation (EPLF floats/etc)
- IMTA



Regional Development

- Under BIM P-EAQA initiatives, focus on small scales seaweed farmers to intensify the production



Expansion

- new location/area



GAP & Standards

- Certification (myGAP)
- MS2467:2012 Seaweed Cultivation- Code of Practice
- MS2528:2013 Dried Seaweed from Carrageenophytes - Specification
- Draft MS: Semi Refined Carrageenan - Food Grade Specification



Seaweed Farming Photos

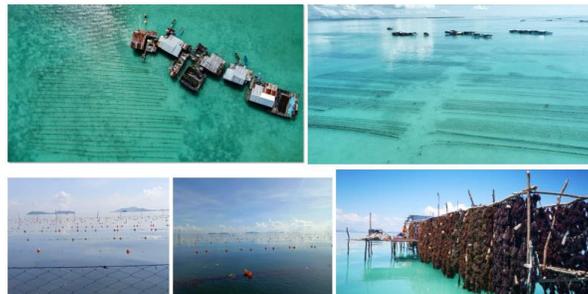
Seaweed Farming



Seaweed Farming Activities in Semporna



Seaweed Farm in Sangaban, Semporna & Madai, Kunak.



Seaweed Farm in Karindingan, Semporna & Merotai, Tawau



Seaweed Farm in Sangaban, Semporna



Seaweed Farming Activities in Semporna



Conclusion

❖ In MALAYSIA, Seaweed is an important commodity contributing to aquaculture production and, as well as to increase the livelihood of the farmers and fishermen resides along the coastal area and surrounding the island.

❖ A good coordination and collaboration in between Policy makers, producers, as well as academics / researchers, and trader to ensure the competitiveness and sustainability of seaweed aquaculture development for future



Thank You | Terima Kasih
**Department of Fisheries,
 Sabah**

Let's Contact :

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-  @dofsabah
-  fishdept@sabah.gov.my
-  <https://fishdept.sabah.gov.my>

Country Report: Myanmar

Annex 11

Country Report: Myanmar

Presented by:
Mya Mya Sint (Ms)
Deputy Director
Aquaculture Division, Department of Fisheries

Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

Status of Seaweed Industry:

- ◆ Belongs to three coastal shelves namely Rakhine, Ayeyarwaddy and Tanintharyi.
- ◆ Commercial species are – *Gracilaria edulis*, *Euचेuma cottonii* and *Euचेuma spinosum*
- ◆ Seaweed (*Gracilaria edulis*) was conducted in 1985 of pilot scale culture experiment in Thantwe T/S, Rakhine coastal. Stopped successful production, due to lack of demand for an ager industry by local users.
- ◆ In 2004-05, Department of Fisheries, Myanmar and a South Korean Company (Make Smart Company) were jointed the experimental of seaweed farming of *Euचेuma cottonii* in Tanintharyi Region with about 23 acre of water surface in the beginning .

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Status of Seaweed Industry:

- ◆ Make Smart Company has already constructed a processing plant and storage building. Their endeavor will create employment opportunity for local people and also technology transfer to the local entrepreneurs and communities.
- ◆ Their cultivated species are *Gracilaria*, *Euचेuma cottonii* and *Euचेuma spinosum*, total culture area is 44.68 acres at present in Tanintharyi Region.
- ◆ This company exports dry product to only Korea country 1-2 time par year.

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Status of Seaweed Industry:

Year	Volume(Ton)	Value	
		US\$	EURO
2000-2005	48.6	20,280	-
2005-2010	350	152,000	-
2010-2011	320	140,000	70,800
2011-2012	480	-	282,000
2012-2013	340	-	198,700
2013-2014	210	-	125,300
2014-2015	-	-	-
2015-2016	-	-	-
2016-2017	38	-	25,799
2017-2018	-	-	-
2018-2019	-	-	-
2019-2020	-	-	-
2020-2021	-	-	-
2021-2022	-	-	-
2022-2023	-	-	-
2023-2024	-	-	-
2024-2025	-	-	-
2025-2026	64.25	84,975	-
Total	1,127.65	325,255	499,599

Cottonii culture Farmer – 9pcs/ 24.6 Acres(9.96 ha)
Spinosum culture farmer – 41pcs/20.08Acres(8.13ha)
Total Area – 44.68 Acre (18.09 ha)

- Lack of production during 2017 to 2024 was due to infection of ice-ice diseases and grazing of fish.
- There is no specific regulation and standard on culture of seaweed.
- But sea weed culture must be registered at Department of Fisheries.

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Status of Seaweed Industry:

- ◆ As part of interdepartmental collaboration, the Department of Fisheries (DOF) and the Forestry Department have been implementing seaweed farming initiatives in the Ayeyarwaddy Region.
- ◆ In 2020, World View International Foundation support small scale farmers culture of *Gracilaria edulis* species at around the Ayeyarwaddy coastal area with about 12 acres of water surface in the beginning.
- ◆ Currently this organization supply the seed and technology and then buy their products.
- ◆ They produce 10 dry tones par year for domestic consumption and export .
- ◆ Total area has expended about 17 Acres and 10 families.

Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

Value Chain and Market Access of Seaweeds:

- ◆ Some local people produced seaweed sheets using *Hypneaor catenella*, known as “Kyaukwint” in Myanmar for sale in the domestic markets.
- ◆ Since 2020, farmers in the Ayeyarwaddy Region has been working alongside expert to cultivate seaweed and produce cosmetic products. Product Brand name is sjoliv by made in Myanmar and fertilizer for agriculture sector.
- ◆ MSC Company has export to Korea by dry product. This company reproduced by ager from *Gracilaria* and carragenan from *Euचेuma cottonii*, and *Euचेuma spinosum*.
- ◆ Some seller have made by suchi with ready made seaweed chips products which introduced from foreign country, especially from Korea, Japan.
- ◆ Quality assurance of seaweed must be taken certificates from DoF for the results of micro tests and nutrition tests.
- ◆ Until now, there is no road map for promotion of seaweed industry.

Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

Issues:

- ❖ Diseases, Water Quality, Seed Quality
- ❖ Direct Grazer, Climate and Natural Disasters
- ❖ Environmental Concerns
- ❖ Marketing barriers- (fresh seaweed/ Volatile markets/demands)
- ❖ Limited technical capacity and Weak Human Resource Development
- ❖ Investment and Financial Challenge
- ❖ Management Problems (Regulatory)
- ❖ Infrastructure- Related Problems

Seaweed Technical Working Group (S.TWG) | 25-26 November 2025 | Bangkok, Thailand

Challenges:

- ❖ Introducing improved farming practices
- ❖ Establishment of seed production center
- ❖ Promote the market and economic obstacles
- ❖ Supporting value chain development to help seaweed farmers
- ❖ Creation of loan opportunities
- ❖ Promotion of environmentally friendly farming methods
- ❖ Review and reform of the management system
- ❖ Active participation of local communities
- ❖ Climate change impacts at Western part of Myanmar (Rakhine State)

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Next steps/ way forward:

- ❖ Myanmar aims to promote sustainable seaweed farming to diversify coastal livelihoods and boost blue economy exports. Clear legal frameworks and environmental safeguards are needed to support industry growth.
- ❖ Capacity building through farmer training, seed supply, and research is essential. Public-private partnerships can enhance market access and processing value chains. Pilot projects and certification programs will ensure sustainable expansion and global competitiveness.

Seaweed Technical Working Group (S.TWG) | 25-26 November 2025 | Bangkok, Thailand



Thanks for your kind attention

Seaweed Technical Working Group (S.TWG) | 25-26 November 2025 | Bangkok, Thailand

Country Report: Philippines

Annex 12

COUNTRY REPORT
PHILIPPINES

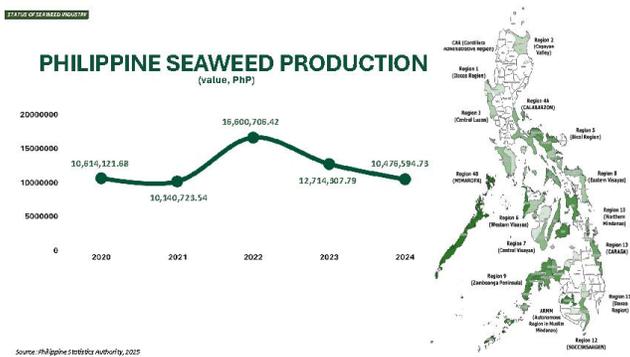
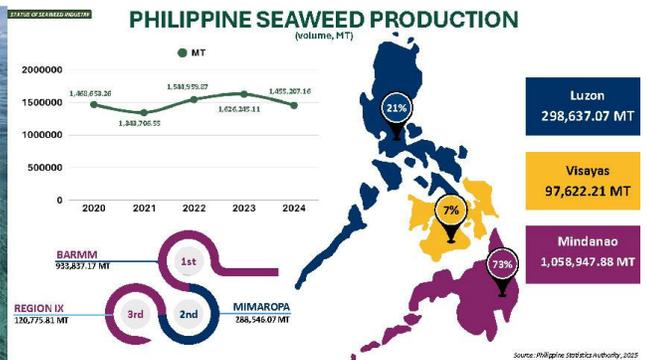
Presented by:
IDA T. CAPACIO
National Focal,
Enhanced Philippine Seaweed Development Program

The Establishment of the Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

OUTLINE OF THE PRESENTATION

- ▶ Status of the Seaweed Industry
- ▶ Value Chain and Market Access of Seaweeds
- ▶ Issues / Concerns
- ▶ Next Steps / Ways Forward

Status of the Seaweed Industry



SEAWEED SPECIES IN THE PHILIPPINES

1,065 Identified Species

5 Commercially Farmed Species

- Kappaphycus alvarezii*
- Kappaphycus striatulus*
- Lomentaria sp.*
- Eucheima dendriticum*
- Gelidium sp.*

PRODUCTION

Region	No. of Units
I	5
II	3
III	20
CALABARZON	2
MIMAROPA	120
V	20
6	20
7	30
8	5
9	120
10	2
11	5
12	3
CARAGA	10
BARMM	60
TOTAL	425



EXPANSION OF PRODUCTION AREAS



PRODUCTION

Region	No. of Units
I	5
II	3
III	20
CALABARZON	2
MIMAROPA	120
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EXPANSION OF PRODUCTION AREAS



PRODUCTION

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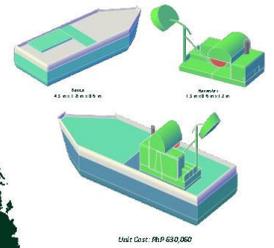


EXPANSION OF PRODUCTION AREAS



MECHANIZATION OF PRODUCTION SYSTEM

Region	No. of Units	Location
MIMAROPA	2	Puerto Princesa, Palawan
V	2	Rapu Rapu, Albay
9	1	Zamboanga Sibagay
TOTAL	5	



Unit Cost: PHP 630,000

MECHANIZATION OF PRODUCTION SYSTEM

Region	No. of Units	Location
3	3	Malabon, Marikina, Valenzuela City, Pasig, Quezon City
CALABARZON	5	Taytay, Rodriguez, Pinar del Rio, Olongapo, Cavite, Laguna, Alabang, Marikina, Alabang, Marikina
MIMAROPA	5	San Jose, Marikina, Marikina, Marikina, Marikina, Marikina
6	4	San Jose, Marikina, Marikina, Marikina
7	6	San Jose, Marikina, Marikina, Marikina, Marikina, Marikina
8	1	San Jose, Marikina
9	5	San Jose, Marikina, Marikina, Marikina, Marikina



Region	No. of Units	Location
10	2	Kalambuyan, Linao, Marikina, Marikina, Marikina
11	2	Digos City, Davao del Sur
13	2	Marikina, Marikina, Marikina
BARMM	4	Marikina, Marikina, Marikina, Marikina



Unit Cost: PHP 1,000,000

IMPROVEMENT OF POST-HARVEST SYSTEM

Region	No. of Units	Location
2	1	Dagupan, Cagayan
5	1	Garchitorena, Camarines Sur
9	1	Zamboanga City



Region	No. of Units	Location
MIMAROPA	4	Marikina, Marikina, Marikina, Marikina
5	1	Marikina, Marikina
6	1	Marikina, Marikina
9	1	Marikina, Marikina
BARMM	1	Marikina, Marikina



Unit Cost: PHP 6,700,000

Operationalization of Village-Level Agar Processing Facility



Activities Conducted:

- ◆ Agar-processing performance test: Agar extraction and agar sample produced will be analyzed for safety and quality analysis by NFRDI
- ◆ Review and presentation of the process flow of the Agar processing
- ◆ Operation of VLAPF

IMPROVEMENT OF MARKETING LINKAGE

Region	No. of Units
I	4
II	4
III	4
CALABARZON	4
MINDANAO	12
V	6
VI	6
VII	6
VIII	4
IX	12
X	4
XI	4
XII	4
CARAGA	4
DARAWAN	3



Region	Quantity
III	4
VI	6
VII	6
VIII	4
IX	12
X	4
XI	4
XII	4
CARAGA	4
DARAWAN	3



Issues & Concerns

ISSUES AND CONCERNS

ISSUES & CONCERNS

in the Philippine Seaweed Industry

Production

- Lack of good quality propagules
- Prevalence of diseases
- Low productivity and production of present cultivars
- Limited coverage by the Philippine Crop Insurance (PCI) Program

Processing

- Safety of fresh seaweeds and seaweed-enriched food products
- Limited promotion of value-added products and seaweed-based products (existing and new)

Marketing

- Presence of several 'tiers' in the trading chain
- Compliance to labelling and packaging of seaweed value-added products to international market standards

Research & Development

- Limited sustained funding on R&D with research institutions
- Limited technical staff to work on seaweed application

Access to Finance

- Numerous requirements of financing institutions
- High interest rates imposed by financing institutions



Next Steps & Ways Forward

KEY OUTCOMES

KEY OUTCOMES FOR THE SEAWEED INDUSTRY BLUEPRINT 2027-2031



REFERENCES

EXISTING LAWS

Supporting the Philippine Seaweed Industry

- PRESIDENTIAL DECREE 704: Fisheries Decree of 1975**
- ❑ Policy of the State to accelerate and promote the integrated development of the fishery industry and to keep the fishery resources of the country in optimum productive condition through proper conservation and protection.
- REPUBLIC ACT 8550: Philippine Fisheries Code of 1998**
- ❑ An act providing for the development, management and conservation of the fisheries and aquatic resources, integrating all laws pertinent thereto, and for other purposes.
- REPUBLIC ACT 10654 : An Act to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, Amending Republic Act No. 8550, Otherwise Known As "The Philippine Fisheries Code Of 1998," and for Other Purposes**
- ❑ Sustainable and responsible management of the Philippines' fishery and aquatic resources and adopt the precautionary principle and manage fishery and aquatic resources, in a manner consistent with the concept of an ecosystem-based approach to fisheries management and integrated coastal area management.
- FISHERIES ADMINISTRATIVE ORDER 146 (FAO 146) series of 1983:**
- ❑ Rules and Regulations Governing the Gathering and Farming of Seaweeds
- FISHERIES ADMINISTRATIVE ORDER 250 (FAO 250) series of 2014: Prohibition on the Collection, Harvesting, Gathering, Selling, and/or Exporting of Brown Algae (*Sargassum* Spp.), and Seagrass**
- ❑ It shall be unlawful for any person, association or corporation to collect, harvest, gather, sell, and/or export brown algae i.e. *Sargassum* spp. and seagrass



THANK YOU!

ncu_sdp@bfar.da.gov.ph
spscp.bfar.da.gov.ph
BFAR - Enhanced Philippine Seaweed Development Program

Country Report: Thailand

Annex 13





Country Report: **THAILAND**

by
Nawanith Klongklaew
Fisheries Biologist
Coastal Aquaculture Research and
Development Division

Thailand's Seaweed Productions

Production and value of seaweed aquaculture in 2020 - 2024



Year	Production (Tons)	Value (Million Baht)
2020	302.78	16,047,340.00
2021	382.75	26,909,400.00
2022	1,067.05	40,897,500.00
2023	1,086.12	44,905,395.00
2024	769.90	23,720,400.00

Seaweed Import - Export Statistics

- Import - export seaweed of Thailand in 2024

Export

Volume: **1,419,688.84** Kg
Value: **1,309** Million Baht

Major export country

Country	Percentage
China	22.39%
USA	13.79%
Malaysia	12.97%
Indonesia	11.76%
Japan	5.17%
Other	33.92%

Import

Volume: **982,548.30** Kg
Value: **380** Million Baht

Major import country

Country	Percentage
China	44.81%
Korea	35.50%
Taiwan	5.64%
Brazil	2.68%
UK	2.48%
Other	9.19%

Seaweed Aquaculture in Thailand

- Seaweeds cultured in Thailand
 - Graclaria fisheri*
 - Ulva rigida*
 - Caulerpa lentillifera*
 - Ulva intestinalis*
 - Caulerpa corynephora*
- Green seaweeds are a major species in the Thai seaweed culture, more than 80 % belong to *C. lentillifera* culture

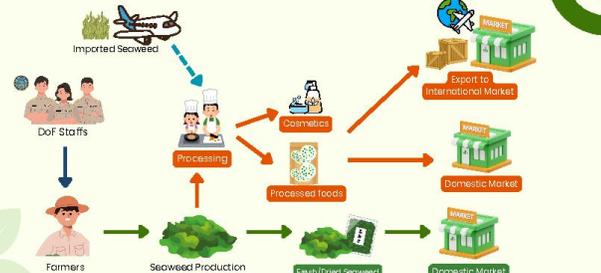


Current Status of Seaweed Farming



- 27 certified seaweed farms
- 4 provinces
- Farming areas 399.60 rai (63.94 Ha)

Value Chain and Market of Thai Seaweed



```

graph TD
    A[Imported Seaweed] --> B[Processing]
    C[Seaweed Production] --> B
    B --> D[Export to International Market]
    B --> E[Domestic Market]
    B --> F[Processed foods]
    F --> G[Fresh/Dried Seaweed consumption]
    G --> H[Domestic Market]
    
```

Food Products Derived from Seaweed



Seaweed Products



Problems in Thai Seaweed cultivation



Environmental and Coastal Degradation

- Deteriorating Water Quality, leading to poor water quality
- Sedimentation and Water Current Change
- Climate Change Vulnerability



Technological and Farm Management

- Diseases and Strain Vulnerability: Ice-ice disease, epiphytes
- Low and Unstable Yields



Economic and Market

- High Domestic Demand vs. Low Production

Challenge and Opportunity Thai's Seaweed culture

CHALLENGE

- 1. Environmental Risks and Climate Change**
 - o Tolerance to Temperature & Salinity: Some seaweed strains cannot tolerate severe environmental changes
 - o Coastal Pollution: Wastewater & drainage from agriculture or communities lead to pollution & unstable water quality
- 2. Technology and Farm Management**
 - o Cultivation Technology: Lack access to or knowledge in utilizing modern technology for cultivation
 - o Pest & Disease Management: Lack of knowledge & mechanisms for effective biosecurity & controlling disease
- 3. Economic and Supply Chain**
 - o Lack of Superior Strains: Developed seaweed strains (e.g., fast growth, disease resistance, high content of desired substances)
 - o Low Value-Added Processing: The processing industry remains in the commodity sector with low value-added & still cannot meet the entire domestic market demand

OPPORTUNITY

- 1. Trends in Future Food and Health Products**
 - o Increased Consumption: Plant-based food, high-nutritional-value nutraceuticals & dietary supplements
 - o Industrial Application: Pharmaceuticals, cosmetics & bio-fertilizer/growth stimulants
- 2. Government Support and Sustainable Economic Models**
 - o BCG Model Push: Thai government supports upgrading the agricultural sector through the BCG Model
 - o Sustainability Creation: Seaweed farming contributes to ecosystem services by absorbing CO2 & purifying water (SDGs)
- 3. Community Development and Employment**
 - o Supplemental Income: A stable supplemental income for coastal communities & fishermen
 - o Community Grouping: Enhancing the capacity of small entrepreneurs, especially women in coastal communities

Thai Regulation and Standard



Royal Ordinance on Fisheries B.E. 2558 (2015): Section 5

"Aquatic animals" mean animals normally inhabiting water, amphibians, animals inhabiting punctated areas, animals partially inhabiting water, and animals having one part of their life cycles in water during a specific water-borne part of their life cycles. These also include aquatic animals' eggs and spawns, sperms, marine algae, carcases or any one part of those aquatic animals, as well as aquatic plants as specified by Notification of the Minister as well as residuals or any one part of such aquatic plants.

Good Aquaculture Practices for Seaweed Farm (TA\$ 7434 - 2019)

This Thai Agricultural Standard covers requirements of good practices at all stages of seaweed (macroalgae) farming, starting from preparation of a cultivation unit, culturing, harvesting to post-harvesting prior to transportation in order to obtain good quality of seaweed that are safe for human consumption. Social and environmental responsibilities are also taken into account for seaweed farming.

The Department of Fisheries Strategic Plan 2021 - 2027

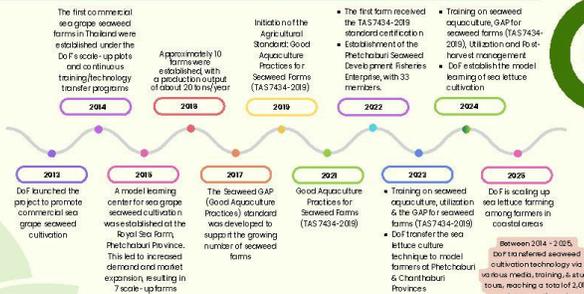


The DoF's Mission on Seaweed Aquaculture



The DoF's mission for seaweed development is aligned with the Bio-Circular-Green Economy (BCG) policy

Timeline of Seaweed Cultivation Extension



Future plans

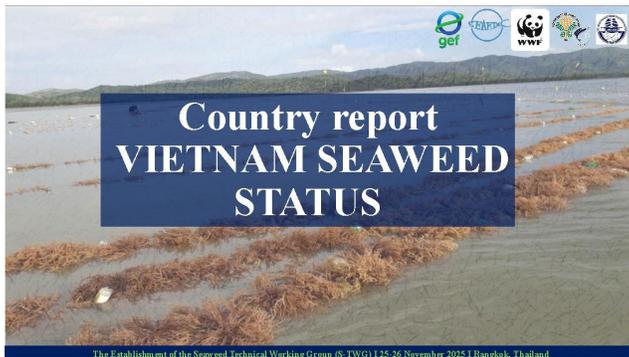
- Expanding seaweed farming to various coastal areas in Thailand
- Upgrading seaweed farms to achieve GAP (TAS 7434-2019) certification
- Developing new high-value products from seaweed, such as functional food, extracts, and cosmetics



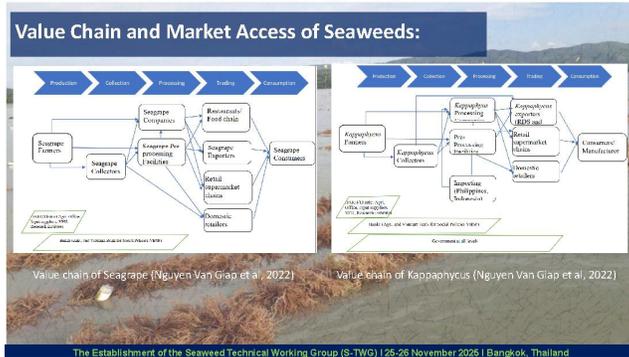
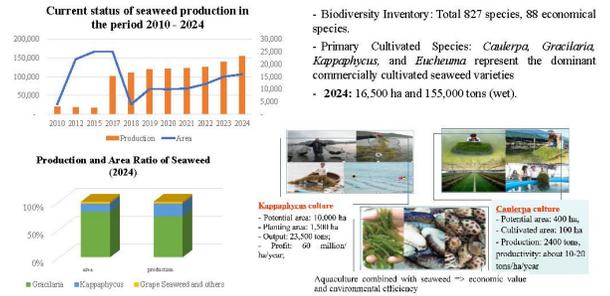
Thank You!
for Your Kind
Attention



Country Report: Viet Nam



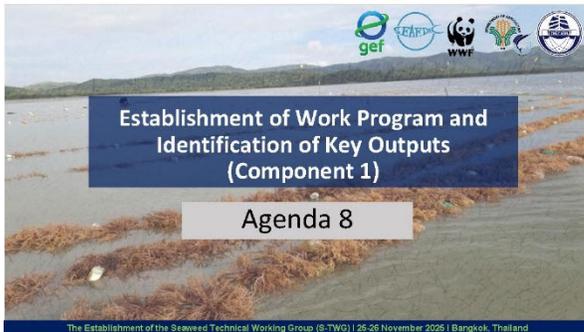
CURRENT STATUS OF SEAWEED IN VIETNAM



- Issues:**
- Seaweed health problems: high temperature (2024) lead to mass die-off (karrageenophytes)
 - Short cultivated duration; lack of seed at beginning of the cultivate period
 - Quality of seedstocks: seed degradation (Karrageenophytes)
 - Pollution: Not of concern so far
 - Low price or erratic price fluctuations: yes
 - Conflicts with other industry: out competed by shrimp culture; economic zones; national space planning as the bottle neck.
 - Regulatory problems: not observed so far

- Challenges:**
- Extreme weather disturbance: rising temperature, typhoon
 - Diversification of seaweed species for culture: too few species
 - Sourcing of good quality seedlings: lacking
 - Financial access: limited
 - Lack of support infrastructure: lack of mean for transportation

- Next steps/ way forward:**
- Country roadmap: seaweed cultivation is encouraged to practice in policies for fisheries development in general but not yet any separate roadmap has been issued
 - Laws to support the industry: stated generally in the fisheries law
 - Capacity building: not yet
 - Suggestions and input?



Establishment of Work Program and Identification of Key Outputs (Component 1)

Agenda 8

Overall Project Implementation

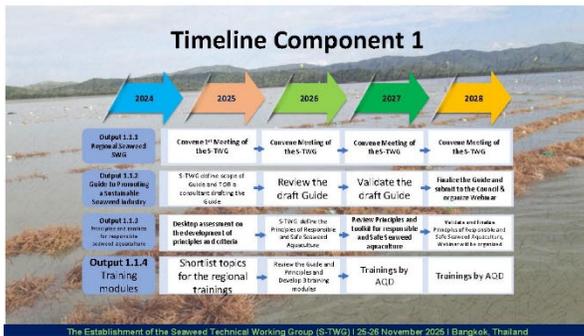
Component 1: Regional capacity building for seaweed aquaculture (SEAFDEC)

Outcome 1.1: Regionally adopted plans and principles to harmonize seaweed aquaculture in Southeast Asia

- Output 1.1.1: Regional **Seaweed Technical Working Group**, constituted and formally mandated by SEAFDEC Governing Council
- Output 1.1.2: **Guide to Promoting a Sustainable Seaweed Industry** in the SEA Region, endorsed by the SEAFDEC Governing Council
- Output 1.1.3: **SEA Regional Principles for Responsible and Safe Seaweed Aquaculture**, including **toolkit** for applying principles, aligned to the Global Seaweed Coalition
- Output 1.1.4: **Training modules and information packages** to support a sustainable seaweed industry in Southeast Asia led by ACD

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Timeline Component 1



	2024	2025	2026	2027	2028
Output 1.1.1 Regional S-TWG		Convene 1 st Meeting of the S-TWG	Convene Meeting of the S-TWG	Convene Meeting of the S-TWG	Convene Meeting of the S-TWG
Output 1.1.2 Guide for Promoting a Sustainable Seaweed Industry		S-TWG and non-seaweed of SEA and ACD to collaborate on the Guide	Review the draft Guide	Validate the draft Guide	Finalize the Guide and submit to the Council & endorse it
Output 1.1.3 Principles of Responsible and Safe Seaweed Aquaculture		Desktop assessment on the development of principles and criteria	S-TWG define the Principles of Responsible and Safe Seaweed Aquaculture	Review Principles and build the responsible and safe seaweed operations	Finalize and submit Principles of Responsible and Safe Seaweed Aquaculture to the Council for endorsement
Output 1.1.4 Training modules		Shortlist topics for the regional trainings	Review the Guide and Principles and develop training modules	Trainings by ACD	Trainings by ACD

The agenda 8 will discuss:

1. Key topics in the Guide, toolkits, and Principles of seaweed
2. Discuss work plan and program, including capacity building plan
3. Discuss scaling up and sustainability of the Guide and Principles in Southeast Asia

The Establishment of the Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

1. GUIDE TO PROMOTING A SUSTAINABLE SEAWEED INDUSTRY IN THE SOUTHEAST ASIAN REGION

I. Scope and Outline of the Guide

The Guide to Promoting a Sustainable Seaweed Industry in Southeast Asia will serve as a strategic reference for SEAFDEC Member Countries to accelerate seaweed sector growth while ensuring environmental integrity, social inclusion, and economic viability. It will:

- Provide regional principles and management measures for sustainable seaweed farming and value-chain development;
- Support harmonization of policies and standards across Member Countries;
- Offer guidance on gender equity, community participation, and benefit sharing;
- Incorporate learnings from global experiences, particularly the European 'Roadmap to Sustainably Develop the Seaweed Industry' and Serve as the foundation for capacity-building, policy dialogue, and regional cooperation.

1. Key topics in the Guide, toolkits, and Principles of seaweed

Examples of topics for discussion:

- **Environmental Standards:** recommended water quality parameters, site selection criteria, climate resilience measures.
- **Product Quality & Safety:** post-harvest handling, drying standards, contamination control, traceability requirements.
- **Operational Safety:** farm worker safety protocols, gear handling, vessel safety, emergency response.
- **Sustainable Farming Practices:** seedstock selection, farm design, pest & disease management, biosafety.
- **Gender & Social Inclusion:** ensuring equitable participation, benefit-sharing mechanisms, community engagement.
- **Governance & Compliance:** alignment with ASC-MSC standards, national regulations, ASEAN cooperation.

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2. Discuss work plan and program, including capacity building plan

Examples of topics for discussion:

- **Timeline for Deliverables:**
 - Drafts Guide V1.0 (Q1 2026)
 - Validation Workshop (Q2 2026)
 - Final Guide endorsement by SEAFDEC Council (Q3 2026)
- **Capacity-Building Activities:**
 - Training modules on environmental management, farmer safety, and value chain standards.
 - Workshops for national focal points on applying regional principles.
 - Webinars on GAP integration and monitoring tools.
- **Consultant Inputs:**
 - Data collection on regulations and existing standards
 - Drafting chapters of the Guide & Toolkit
 - Harmonizing regional principles with the Global Seaweed Coalition
- **Coordination Mechanisms:**
 - Monthly virtual S-TWG updates
 - Country level data submission schedules
 - Formation of small technical subgroups (e.g., environment, safety, gender)

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3. Discuss scaling up and sustainability of the Guide and Principles in Southeast Asia

Examples of topics for discussion:

Integration into National Policies:

- Adoption by BFAB, DFIS, and other AMS fisheries agencies.
- Use in developing/updating national codes of practice.

Industry Uptake:

- Piloting the guide with seaweed farmer cooperatives or processing companies.
- Incentive programs for sustainable certification or compliance.

Regional Alignment:

- Linking with ASEAN Working Groups (e.g., ASWGF, SOM-AMAF).
- Promoting harmonized standards for regional trade.

Long-Term Sustainability:

- Periodic review every 5 years.
- Embedding outputs into SEAFDEC's long-term program.
- Strengthening partnerships with WWF and other regional platforms.

Monitoring & Evaluation:

- KPIs for adoption, diffusion, and capacity-building reach.
- Gender-responsive indicators to ensure inclusive impact.

The Establishment of the Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

Request STWG members to take note on the agenda

Seaweed Technical Working Group (S-TWG) | 25-26 November 2025 | Bangkok, Thailand

II. Proposed Outline of the Guide

- 1 Introduction – Rationale, objectives, and linkages with Blue Horizon outputs (1.1.3, 1.1.4)
- 2 Regional Overview – Current status, production, challenges, and opportunities in SEA (information can be sourced from each country's presentation)
- 3 Conceptual Framework – Sustainability pillars (Environmental, Economic, Social, Governance, Cultural) and cross-cutting themes (gender, climate resilience)
- 4 Strategic Directions and Key Result Areas – Environmental sustainability, social inclusion, economic viability, governance, and innovation
- 5 Guiding Principles and Best Practices – Derived from international standards (e.g., ASCMSC, FAO Code of Conduct, Philippines' PNS-GAqP for Seaweed, etc)
- 6 Policy and Institutional Recommendations – Regional cooperation, enabling policies, PPP models
- 7 Implementation and Monitoring – KPIs, results framework integration, M&E and gender templates
- 8 References and Annexes – Case studies, glossary, indicator matrix

III. Workplan for the Development of the Guide

Phase	Activities	Lead / Support	Expected Outputs	Timeline
1. Preparatory Stage	Desk review of national policies and regional strategies; preparation of annotated outline and inception report.	Consultant + PMU + AQD	Inception report with outline and methodology	December 2025

2. Consultation Stage	Stakeholder consultations and interviews with SEAFDEC Member Countries and S-TWG members.	Consultant + PMU	Summary of consultations and input matrix	January 2026
3. Drafting Stage	Preparation of Draft 1 of the Guide; alignment with Outputs 1.1.3 and 1.1.4.	Consultant + AQD Technical Team	Draft Guide V1.0 submitted for review	February 2026
4. Review and Validation	Presentation of Draft Guide to S-TWG meeting; incorporation of comments and revision.	PMU + Consultant + Secretariat	Validated Draft Guide V2.0	February 2026
5. Finalization and Council Endorsement	Final editing, layout, and integration of policy recommendations for SEAFDEC Council submission.	Consultant + PMU + Secretariat	Final Guide document for adoption	March 2026
6. Publication and Capacity Building	Online launch webinar; development of training modules and information packages (linked to Output 1.1.4).	AQD + PMU + Consultant	Published Guide and training materials	April-May 2026

IV. Key Considerations:

- **Integration:** Ensure coherence with Outputs 1.1.3 (SEA Regional Principles for Responsible and Safe Seaweed Aquaculture, including toolkit for applying principles, aligned to the Global Seaweed Coalition) and 1.1.4 (Training Modules).

- **Inclusivity:** Ensure gender-balanced participation and equitable representation across SEA countries.
- **Validation:** S-TWG reviews at key milestones and SEAFDEC Council endorsement.
- **Sustainability:** The Guide should be updated every five years based on monitoring and new developments.

V. Require Consideration by S-TWG

- This draft scope and workplan are proposed for consideration and input by the Seaweed Technical Working Group (S-TWG) during the 1st S-TWG Meeting to guide the development of the ‘Guide to Promoting a Sustainable Seaweed Industry in the Southeast Asian Region.’

2. TERMS OF REFERENCE (TOR) OF CONSULTANT

Position	Consultant
Project	Blue Horizon: Ocean Relief through Seaweed Aquaculture
Workplace	Remote with frequent online and in-person meetings at SEAFDEC Secretariat Bangkok and SEAFDEC/AQD Tigbauan main station, Iloilo, the Philippines
Contract type	Consultancy-based (short-term consultancy)
Period of Assignment	45 working days (spread over six months)
Timeline of Proposal Submission	6 January 2026
Submission of Proposal	Project Management Unit, SEAFDEC Secretariat Bangkok Attn: Mr. Muhamad Nour, Project Manager Email: muhamad@seafdec.org Subject: Application – Consultant for Sustainable Seaweed Industry Guide

I. Background

The Southeast Asian Fisheries Development Center (SEAFDEC) is an autonomous intergovernmental body established in 1967. SEAFDEC comprises of 11 Member Countries: Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. The mission of SEAFDEC is *“To promote and facilitate concerted actions among the Member Countries to ensure the sustainability of fisheries and aquaculture in Southeast Asia.”*

In collaboration with WWF GEF Agency, SEAFDEC is implementing the Global Environmental Facility (GEF)-funded Project **“Blue Horizon: Ocean Relief through Seaweed Aquaculture”**, from 1 July 2024 until 31 December 2028. SEAFDEC hosted the Project Management Unit (PMU), which is located at the SEAFDEC Secretariat, Bangkok, Thailand and work close collaboration with SEAFDEC Aquaculture Department (AQD). The Project has also two national executing partners from the Philippines and Viet Nam. The project aims to create sustainable seaweed value chains, providing ecosystem services and socio-economic benefits across Southeast Asia. This project has four key components:

- 1) Regional approach and capacity for seaweed value chains in Southeast Asia

- 2) Enabling Environment for Seaweed Aquaculture in Philippines and Viet Nam
- 3) Seaweed Value Chains (production, processing, and marketing);
- and 4) Knowledge Management, M&E, and IW Learn (regional).

Under Output 1.1.2, SEAFDEC will develop a 'Guide to Promoting a Sustainable Seaweed Industry in the Southeast Asian Region.' This Guide will serve as a blueprint for orderly, inclusive, and equitable seaweed industry development, guided by social, economic, and environmental sustainability principles. It will define key result areas, identify management and technical measures, and recommend policy and enabling measures for Member Countries. The Guide will integrate elements from Output 1.1.3 (Principles for environmental, food, and occupational safety) and link with Output 1.1.4 (Training modules and information packages). The finalized Guide will be submitted for endorsement by the SEAFDEC Council and disseminated through a regional online launch and training program.

II. Overview of the Consultancy Work

The Consultant will lead the drafting, consultation, and finalization of the Guide to Promoting a Sustainable Seaweed Industry in the SEA Region. The work will be undertaken under the supervision of the Project Manager, with technical inputs from SEAFDEC/AQD and the Secretariat, and guidance from the Seaweed Technical Working Group (S-TWG).

III. Scope of Work

1. Desk Review and Assessment

- Review existing literature, national strategies, and regional policies relevant to seaweed aquaculture in Southeast Asia.
- Synthesize good practices and lessons learned from SEAFDEC Member Countries.
- Identify policy, social, and environmental gaps hindering sustainable seaweed development.

2. Framework and Content Development

- Draft an annotated outline of the Guide, including key result areas and thematic pillars (social, economic, environmental).
- Integrate gender equity, empowerment, and inclusive value chain considerations.
- Incorporate cross-references to Outputs 1.1.3 and 1.1.4 (Principles, Toolkit, and Training Modules).

3. Stakeholder Consultation and Validation

- Present the draft Guide to the S-TWG and PMU for review and input.

- Revise the Guide based on feedback and recommendations during S-TWG meetings and consultations.

4. Finalization and Submission

- Prepare the final version of the Guide, complete with proposed enabling policy measures.
- Submit to SEAFDEC Council for adoption.
- Support the PMU in preparing materials for the online launch and dissemination workshop.

IV. Deliverables and Timeline

Deliverables	Description	Target delivery dates	Payment schedule	Timeline
1. Inception Report	Detailed work plan, annotated outline of the Guide, and methodology	5	10%	December 2025
2. Draft Guide	Comprehensive draft Guide covering social, economic, and environmental aspects	10	25%	January 2026
3. S-TWG Consultation Report	Summary of consultations and feedback incorporated	5	15%	February 2026
4. Final Guide and Policy Recommendations	Final edited and formatted Guide ready for Council submission	8	30%	March 2026
5. Dissemination Workshop Support	Inputs to online launch and training module development	2	20%	April-May 2026

IV. Qualifications and Requirements

- At least 10 years of professional experience in fisheries/aquaculture policy development, sustainable livelihoods, or natural resource management.
- Proven experience in drafting strategic frameworks or policy guides for regional or international organizations.

- Demonstrated expertise in seaweed aquaculture development, blue economy, or coastal livelihoods in Southeast Asia.
- Advanced degree in Fisheries, Aquaculture, Marine Policy, Environmental Management, or related field.
- Familiarity with gender mainstreaming and social inclusion frameworks.
- Excellent command of written and spoken English; ability to synthesize complex concepts clearly.
- Strong facilitation and coordination skills in multi-country, multi-stakeholder projects.
- Experience working with SEAFDEC, FAO, UNEP, or similar intergovernmental bodies is an advantage.

V. How to Apply

Interested applicants must submit the following documents:

1. Updated CV highlighting relevant experience
2. Technical proposal describing the approach, methodology, and timeline for deliverables
3. Financial proposal specifying the total lump-sum amount, daily rate, and any travel or DSA (if applicable)

VI. Submission

Please send the above documents to:

The Project Management Unit, SEAFDEC Secretariat Bangkok
 Attn: Mr. Muhamad Nour, Project Manager
 Email: muhamad@seafdec.org
 Subject: Application – Consultant for Sustainable Seaweed Industry Guide

Please visit our website www.seafdec.or.th to see detailed information about the post and submit it in English with the following documents by 15 December 2025. Short-listed applicants will be contacted for an interview.

“SEAFDEC is an equal opportunity employer, considering all applicants based on qualifications, regardless of race, national origin, religion, gender identity, age, disability, or marital status.”

VII. Require Consideration by S-TWG

- Provide comments and suggestions on the terms of reference (TOR) of the consultant
- Adopt the TOR of the consultant

GENDER ACTION PLAN (GAP)
BLUE HORIZON: OCEAN RELIEF THROUGH SEAWEED AQUACULTURE
PROJECT

Introduction

SEAFDEC adopted Gender Strategy to facilitate gender mainstreaming at all levels of the organization and serve as an organizational overarching framework to facilitate SEAFDEC’s efforts in integrating gender in its programs, projects, and activities. The SEAFDEC Gender Strategy is also intended to subsequently support the integration of gender perspectives in fisheries and aquaculture in the Member Countries of SEAFDEC.

The SEAFDEC Council also adopted the Resolution on the Future of SEAFDEC, including the Vision, Mission, and Strategies Towards 20305, specifically stating “Strategy 5: *Addressing crosscutting issues, such as labor, gender and climate change, where related to international fisheries.*” Therefore, Blue Horizon: Ocean Relief through Seaweed Aquaculture Project recognizes gender equality and the empowerment of women and youth as essential strategy for achieving its environmental and socioeconomic goals. The project adopts a Gender Action Plan (GAP) that aligns with the GEF Policy and WWF GEF Agency on Gender Equality and is designed to ensure equal participation, benefit sharing, and decision-making power for women, men, and youth in seaweed aquaculture value chains in the Philippines and Viet Nam.

Women play key roles in seaweed cultivation, processing, and household management but face constraints in access to resources, technology, training, and decision-making. Young people and women often have limited influence in community management structures and cooperatives. Addressing these barriers will increase productivity, sustainability, and community resilience.

The Gender Action Plan will serve as a guideline for executing agencies such SEAFDEC Secretariat, Bureau of Fisheries and Aquatic Resources (BFAR), Department of Fisheries (DOF) Viet Nam in the project implementation. This GAP refers to SEAFDEC Gender Strategy⁶, Guidance to Advance Gender Equality in GEF Projects and Programs⁷ and WWF Gender Policy⁸ which outlines the practical steps and necessary actions to apply the principles and mandatory requirements of gender responsive planning, implementation, and monitoring of GEF programs and projects and WWF policy.

Address GAP in Project Cycle

⁶ <https://repository.seafdec.org/handle/20.500.12066/4861>

⁷ <https://www.thegef.org/projects-operations/policies-guidelines>

⁸ <https://www.worldwildlife.org/publications/wwf-gender-policy>

The Blue Horizon Seaweed Aquaculture has clearly specified Gender Action Plan in the project implementation. Below please see the summary of Gender Action Plan for each executing agency to address gender mainstreaming in the project activities:

Output	Gender-Specific Activity	Indicator & Target	Responsible
Component 1: Regional approach and capacity for seaweed value chains in SEAsia			
1.1.1. Regional Seaweed Technical Working Group, constituted and formally mandated by SEAFDEC Governing Council	<ul style="list-style-type: none"> • The project will promote equitable participation of men and women in the working group • The ToR of the Seaweed Technical Working Group will include gender specific considerations 	<ul style="list-style-type: none"> • At least 50% of the Regional Seaweed Technical Working Group is women • The ToR includes specific gender sensitive consideration 	SEAFDEC PMU (and SEAFDEC AQD and TD)
1.1.2: Guide to Promoting a Sustainable Seaweed Industry in the SEA Region, endorsed by the SEAFDEC Governing Council	Gender will be mainstreamed throughout the Guide, with recommendations and action items for mainstreaming gender in the SEA seaweed industry	Guide is developed with gender-sensitive considerations throughout.	SEAFDEC; consultant writing the guide (with the Gender focal points in AQD and TD).
1.1.3. Principles and toolkit for safe seaweed applicable to SEAsia, aligned to the Global Seaweed Coalition principles	Gender-responsive standards will be included, with the toolkit providing a guide for application of the principles.	Principles and toolkit are gender sensitive.	Focal points of AQD and TD, BFAR's GAD Committee, Gender officers of PH and VN N-PMU

1.1.4. Training modules and information packages to support a sustainable seaweed industry in the SEAsia	Training modules and information packages will include specific components on gender; this will support implementation of the actions above	<ul style="list-style-type: none"> • At least 60 % of participants attending the trainings are women • Gender-responsive training module 	SEAFDEC PMU and SEAFDEC AQD, facilitators develop and conduct the trainings)
Component 4: Knowledge Management, M&E, and IW Learn (regional)			
4.1.1: Participation in two IW:LEARN regional meetings and two IW Conferences, delivering IW:LEARN experience notes	Project lessons learned and best practice related to gender will be documented and disseminated in through IW: LEARN project	<ul style="list-style-type: none"> • Specific lessons and best practices related to gender documented and included in at least 2 products • Communication platform and products are gender-sensitive 	SEAFDEC PMU (and through communications consultant), Philippines coordination unit, Viet Nam coordination unit
4.1.2 Knowledge management and communications products	The project will develop and publish communication products related to gender. This includes lessons learned, best practices, and other information gleaned from the project and that could support scaling up of gender equality and women’s empowerment in the SEA seaweed industry.	<ul style="list-style-type: none"> • Information is disseminated in an equitable way (to ensure women and men have equal access) 	

4.2.1: Monitoring and Evaluation reports (including project progress reports, midterm evaluation, terminal evaluation)	<ul style="list-style-type: none"> • The PMU and project partners will collect sex disaggregated data at regional and national level • Progress against the Gender Action Plan will be assessed through project reporting requirements (PPR, midterm and final evaluations) 	<ul style="list-style-type: none"> • Monitoring against gender disaggregated or gender-specific indicators • Project reports include information on progress towards GAP goals 	SEAFDEC PMU, Philippines coordination unit, Viet Nam coordination unit
	<ul style="list-style-type: none"> • The project will report against gender-specific indicators annually 		

Progress against the Gender Action Plan will be tracked through the following indicators:

- GEF Core Indicator 11: Number of direct beneficiaries disaggregated by gender as cobenefit of GEF investment (11,000 women, 4,000 men)
- Women empowerment
 - Increase in the number of women in leadership and management roles in farmers' associations/cooperatives
 - Number and type of value chain upgrading initiated and operated by women
 - Number of women participating actively in the development of management plans
- Access to equitable resources
 - Decrease in disparity of men and women's wages in the production and processing segments.
 - % of women across the whole project (compared to baseline data), who now have access to or acquire:
 - Financing, resources, opportunities, capacity building
 - Higher income from value adding enterprises
 - Skills in enterprise planning and management

To promote equal participation of women and youth in all project activities, the executing agencies will implement affirmative measures, including actively encouraging women's involvement in the provisional prospectus, terms of reference, and official invitations.

Monitoring & Evaluation of Gender Mainstreaming

Progress of project's gender mainstreaming will be assessed through surveys, supported by

qualitative assessments. The GAP will be tracked through sex-disaggregated indicators included in project reports as follows:

- a. Annual Project Progress Report
- b. 6-months PPR
- c. Term of references
- d. Provisional Prospectus
- e. Quarterly Financial Report
- f. Mid-term report
- g. Terminal Evaluation

Contact Person for Gender Mainstreaming

1. Muhamad Nour – Project Manager/Technical Advisor, muhamad@seafdec.org
2. Jariya Sornkliang – Gender Focal Point SEAFDEC, jariya@seafdec.org
3. Safeguard and Gender Specialist (SGS) National PMU Philippines
4. Safeguard and Gender Specialist (SGS) Viet Nam
5. Gender Specialist WWF-US

Closing remarks
By Policy and Program Coordinator, *Dr. Worawit Wanchana*

I would like to congratulate everyone for the successful organization of the 1-S-TWG and special thanks to representatives from participating countries, SEAFDEC Member Countries, resource persons, especially experts from AQD, Dr. Leobert, Hopefully, we can work together as a family again.

And thank you, everyone for your contribution, valuable inputs for the 4 year-projects implementations.