BRAZILIAN GOVERNMENT

STANDING WITH THE BRAZILIAN PEOPLE

Brazil welcomes the opportunity to contribute to the Sharm el-Sheikh online portal under the Sharm el-Sheikh joint work on implementation of climate action on agriculture and food security, recognizing its important role in sharing information on projects, initiatives, programs and policies for increasing opportunities for implementation of climate action to address issues related to agriculture and food security.

Cultivation of macroalgae of socio-environmental interest: enhancing food system resilience and providing coastal communities with the means to adapt

I. Introduction

This submission portrays marine macroalgae cultivation as a strategy to build resilience in climate-vulnerable coastal communities of Northeastern Brazil, particularly those traditionally dependent on fisheries.

Microalgae and macroalgae play an important role in preserving ocean health. They are highly efficient carbon sinks, and their production contributes to water quality and biodiversity in coastal ecosystems.

In the agricultural sectors, seaweeds are used as food and a series of agricultural inputs, such as biofertilizers, biostimulants, biofuels, bioplastics, and feed supplements for reducing methane emissions from ruminants.

Northeastern Brazil has strong potential for macroalgae cultivation due to favorable water temperature and light conditions. The region also presents opportunities for brackish water cultivation aimed at producing biopharmaceuticals, food, and microalgae-based animal feed. Freshwater, brackish, and saline algae are also relevant for continuous production systems adaptable to small-scale local units, particularly as feed for mollusk and fish larvae.

Despite its immense potential, the sector still faces significant

challenges: value chain fragmentation, insufficient and inadequate regulation, technological limitations, and a lack of structured public policies fostering sustainable development. Consequently, seaweed production remains largely experimental and, in some regions, rudimentary, requiring the development of new cultivation and processing technologies.

Another challenge is the absence of technological packages for cultivating native algae, resulting in the depletion of natural stocks, which coastal communities frequently overharvest. In contrast, the Asian-origin species Kappaphycus alvarezii is being cultivated in Southern Brazil on a commercial scale with adequate productivity and manageable environmental impacts.

The project seeks to implement experimental Kappaphycus alvarezii cultivation in Northeastern Brazil while simultaneously developing technology packages to expand the production of native macroalgae. This serves as a means to reduce pressure on natural algae banks and promote biodiversity within value chains. Without adequate technology and risk assessments, Kappaphycus alvarezii and other profitable species tend to be unduly introduced in the area.

In this context, if the research institutions involved receive regular financing, and if coastal communities are provided with capacity building and access to low-cost technology and materials, the project will be able to conduct adequate ecological risk assessments of Kappaphycus alvarezii cultivation in the Brazilian Northeast, while also developing the technology packages to expand the cultivation of native macroalgae species.

II. **The project**

The project primarily targets concluding the risk assessment of cultivation of Kappaphycus alvarezii in the Brazilian Northeast and building capacities within the participating coastal communities.

The project will be implemented in partnership with Brazilian academic and research institutions, such as universities and startups with expertise in aquaculture, environmental sciences, and the transformation industries. These entities possess the infrastructure for research, product development, and stakeholder engagement.

Implementation will involve partnerships with the productive sector and local governments. Priority will be given to women engaged in shellfish harvesting and beach-cast seaweed harvesting and in communities traditionally dependent on capture fisheries.

This integrated approach ensures that the project responds to territorial realities, strengthens public governance of Brazil's marine spaces, and promotes the sustainable use of natural resources, with a focus on social inclusion, innovation, and job and income generation in coastal communities. Full project ownership will be guaranteed through collaboration with local researchers, aquaculture managers, and government agencies, thereby promoting knowledge transfer and policy integration.

Preparation began in early 2023, building on previous macroalgae cultivation and harvesting initiatives implemented in Brazil. The project is currently in the preparation phase, benefiting regulatory reforms recently approved to allow experimental Kappaphycus alvarezii cultivation in the territory.

Implementation will start immediately after regular funding is granted, covering an initial four-year period. It will encompass the development and adaptation of technology packages; building capacities in the local communities to produce, process and trade production; and a multiphase ecological risk assessment.

This submission seeks to secure funding for the project (US$ 2 million). Additionally, partnerships with international research institutions, donors and investors will make it possible to expand the project and introduce seaweed cultivation in more coastal communities.

The Ministry of Fisheries and Aquaculture intends to receive cooperation and offer support to countries interested in replicating the initiative. Brazil is engaged in the United Nations Global Seaweed Initiative (UNGSI), a collaborative platform that brings together Member States, UN entities, research institutions, industry stakeholders, and civil society to accelerate the safe, sustainable, and inclusive development of the global seaweed sector.

III. Scientific evidence

There is extensive literature on seaweed cultivation as a climate mitigation and adaptation strategy, as well as dozens of successful projects worldwide related to the introduction of seaweed cultivation in coastal communities.

Consultation of the extensive literature consolidated by the FAO is recommended, seconded by studies and initiatives in the sector carried out by other organizations and agencies, such as the World Bank, OECD, and UNCTAD.

Indicators to assess the project's progress, performance, and outcomes are indicated in "The Progressive Management Pathway for Aquaculture Biosecurity – Guidelines for application" (2023), supplemented by "The World Aquaculture Performance Indicators (WAPI)."

IV. Conclusion

Macroalgae cultivation make an important contribution to ensuring local communities in Northeastern Brazil have the means to adapt to climate change. The project will also contribute to global mitigation efforts, as macroalgae absorb significant amounts of CO2. While implementing macroalgae cultivation as adaptation and mitigation strategies, multiple cobenefits are expected, including enhanced food security and livelihoods, socioeconomic inclusion, and the safeguarding of traditional knowledge and ways of life.

Currently, Brazil accounts for only 5% of Latin America's seaweed production, while Latin America in turn accounts for only 5% of global production. At the same time, Northeastern Brazil possesses all necessary natural and human resources—including academia, industry, and distribution chains—to significantly expand national production sustainably by building capacities and providing adequate technology packages to coastal communities.

V. References

Ahern, M., Thilsted, S.H. & Oenema, S. 2021. The role of aquatic foods in sustainable healthy diets. Discussion paper. UN Nutrition. 64 pp. Available at www.unnutrition.org/wp-content/uploads/FINAL-UN-NutritionAquatic-foodsPaper_EN_.pdf.

Barkia, I., Saari, N. & Manning, S.R. 2019. Microalgae for high-value products towards human health and nutrition. Marine Drugs, 17(5): 304. doi: 10.3390/md17050304. PMID: 31137657; PMCID: PMC6562505.

Cai, J., Lovatelli, A., Aguilar-Manjarrez, J., Cornish, L., Dabbadie, L., Desrochers, A., Diffey, S., Garrido Gamarro, E., Geehan, J., Hurtado, A., Lucente, D., Mair, G., Miao, W., Potin, P., Przybyla, C., Reantaso, M., Roubach, R., Tauati, M. & Yuan, X. 2021. Seaweeds and microalgae: an overview for unlocking their potential in global aquaculture development.

FAO Fisheries and Aquaculture Circular No. 1229. Rome, FAO. https://doi.org/10.4060/cb5670en

Lovatelli, A., Aguilar-Manjarrez, J., Murúa Andrade, P. y Farías Molina, A. (coords.). 2025. Estado y perspectivas del cultivo de macroalgas en América Latina. Taller Técnico Regional de la FAO 24-26 de junio de 2024 Puerto Varas, Chile. FAO Actas de Pesca y Acuicultura n.º 74. Roma, FAO. https://doi.org/10.4060/cd5237es

FAO and WHO. 2022. Report of the expert meeting on food safety for seaweed – Current status and future perspectives. Rome, 28–29 0ctober 2021. Food Safety and Quality Series No. 13. Rome. https://doi.org/10.4060/cc0846en

FAO. 2025. World Aquaculture Performance Indicators (WAPI). In: Fisheries and Aquaculture. https://www.fao.org/fishery/en/collection/wapi

FAO. 2023. The Progressive Management Pathway for Aquaculture Biosecurity – Guidelines for application. FAO Fisheries and Aquaculture Technical Paper, No. 689. Rome. https://doi.org/10.4060/cc6858e