Strategies for Kenya's Seaweed Aquaculture Policy to Support the Development of a New Blue Economy

POLICY RECOMMENDATIONS

1. ***Streamline licensing procedures***: Simplify and clarify the licensing process for small-scale community farmers and large-scale commercial operations, ensuring transparent and efficient regulatory compliance. Licensing should be affordable and accessible and exemptions from fees should be considered for small-scale community farmers.
2. ***Support Marine Spatial Planning (MSP)***: Identify and designate specific zones most suitable for seaweed farming within the national MSP strategy to minimize conflicts with other marine activities and optimize resource use.
3. ***Strengthen seaweed cooperatives:*** Support the establishment of seaweed farmer cooperatives through Organizational Development capacity building that enhances access to equipment, financial resources, quality assurance and market opportunities, thereby improving collective bargaining power and economic resilience.
4. ***Empower women and youth in seaweed farming*:** Enhance the participation of women, youth and next generation in the seaweed farming sector through training programs, access to modern equipment and incentives for startups.
5. ***Enhance seed supply chains***: Establish (government-supported) seaweed nurseries to provide high-quality, disease-resistant seeds at subsidized rates, ensuring reliable and affordable supply during periods of loss or shortage.
6. ***Invest in research and innovation***: Increase government investment in seaweed-specific research (especially long-term funding opportunities) and technological innovation to safeguard production in changing climate conditions, such as breeding programs and offshore farming techniques and enhance value-added processing capabilities.
7. ***Invest in seaweed value chain infrastructure*:** Allocate resources for critical infrastructure development along the seaweed value chain, including seed banks, nursery facilities, warehousing capacities and processing facilities, to support value addition and market access.
8. ***Strengthen extension services***: Provide capacity building initiatives for extension officers and establish formal standards to ensure accurate, accountable, and best-practice guidance to seaweed farmers.
9. ***Establish seaweed research and training centers:*** Establish and equip specialized research and training centers focused on seaweed to support continuous learning, innovation, and the dissemination of best practices.
10. ***Create a national seaweed network***: Develop a national platform ("cluster") for seaweed farmers and stakeholders to enhance knowledge exchange, address sector challenges, improve marketing strategies, and advocate for the industry's interests.

An Emerging Seaweed Industry

Kenya's seaweed farming sector is in its early stages, predominantly involving smallholder farmers in local communities. Initially experimented with in the 1980s alongside Tanzania, it faced setbacks but regained momentum with technical feasibility studies by the Kenyan Marine and Fisheries Research Institute (KMFRI) in the mid-1990s[1]. Commercial small-scale farms were established in 2010, following successful trials in 2008-2009[1]. Currently, over 10 villages are engaged in seaweed farming, supported by coastal counties, non governmental organizations, private sectors, the national government and various international development projects.

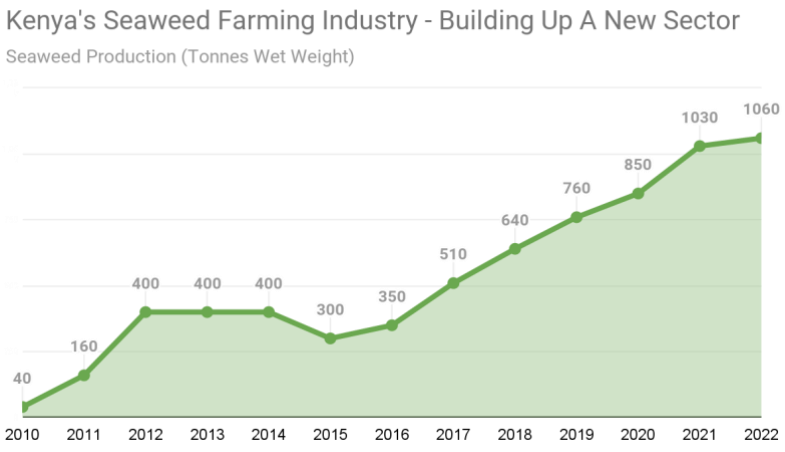

Figure: Seaweed aquaculture production data for Kenya. Graph is based on FAO data.

The sector predominantly focuses on cultivating *Eucheuma denticulatum* ("spinosum") using off-bottom methods, with ongoing experiments involving *Kappaphycus alvarezii* ("cottonii")[2]. Seaweed farming has become an important income source for coastal women, providing an alternative to the traditionally male-dominated fishing industry.

However, despite its potential for growth, the sector faces challenges such as fluctuating production levels, access to markets, and heavy reliance on exports. Additionally, the industry has experienced poor siting of farms with challenges to access deeper waters, and there is limited progress in the adoption of new farming technologies,

Areas For Improvement & Opportunities for Kenya's Seaweed Farming Policy

A thorough review of relevant literature and policies, combined with insights from expert interviews, was conducted to identify key areas for improving policies. The analysis focused on the regulatory framework, supportive infrastructure, research & innovation, and best management practices. Examining these four areas allowed for identification of the most important gaps and opportunities for policy development.

Regulatory Framework

Kenya recognizes the blue economy as crucial for creating jobs, alleviating poverty, enhancing nutrition, ensuring food security, and fostering economic growth. It is prominently featured in both medium-term development plans and the long-term vision outlined in Kenya Vision 2030[3], emphasizing its role in advancing social and economic objectives. As part of the Strategic Plan 2023-2027 for the Ministry of Mining, Blue Economy, and Maritime Affairs specific plans to enhance the establishment of seaweed farming infrastructure such as drying sheds and storage facilities are outlined[4]. Despite such initiatives to support the seaweed farming sector development, Kenya does not have a dedicated seaweed policy and is currently governed by broader aquaculture and fisheries policies.

Areas for Improvement	Gain	Potential Barriers	Opportunities
Streamlined licensing procedure *(considering requirements for small- and large-scale operations)*	A comprehensive and regulated system for managing and monitoring seaweed farming activities (incl controlled site selection).	Current framework attempts to differentiate between commercial large-scale and community-based operations without clearly defined criteria. Potentially limited local acceptance from small-scale farmers, particularly when licensing involves fees.	Implementing a "One-Stop-Shop" licensing approach can reduce barriers for large-scale investments. Support capacity building efforts to increase local awareness and acceptance of comprehensive management frameworks, including support for site selection processes. Exemptions from fees could be considered for small-scale community farmers.
Marine Spatial Planning (MSP) strategy including designating areas for seaweed farming *(Kenya is currently working on its MSP, but interviewees stressed the necessity of covering specific designating areas for seaweed farming)*	Efficient marine spatial planning is crucial to designate specific areas for seaweed farming, mitigating conflicts with other marine users. For instance, conflicts arise between seaweed farmers and local fishers due to damage caused to seaweed lines during fishing activities.	Acceptance and perception among local communities. Potential for increased conflicts due to competition between fishing and seaweed farming activities.	Zoning and legal protections for access to the sea will improve the security and scalability of the seaweed farming sector. Identifying suitable seaweed farming sites and implementing regulations will enhance the coexistence and management of different marine activities.

Supportive Infrastructure

In Kenya, seaweed farmers are organized into local seaweed farmer groups to facilitate their operations and interactions with regulatory and support bodies. These groups are usually part of the Beach Management Units (BMUs), which help them access farming sites and obtain necessary approvals from the Kenya Fisheries Service. Initiatives are being pursued to establish cooperatives dedicated to seaweed farming, aimed at aiding farmers in acquiring equipment and financing to enable them to start and sustain their operations.

Areas for Improvement	Opportunities
Establishment & strengthening of seaweed cooperatives	By adopting a cooperative system, individual seaweed farmers can gain access to necessary equipment and strengthen their position within the value chain, thereby promoting the overall growth of the seaweed farming sector.
Implementation of a networking platform ("seaweed cluster")	Creating a networking platform for seaweed farmers and stakeholders will facilitate knowledge exchange, addressing farming challenges, disseminating new methods, and exploring value-added activities to enhance the sector's development.
Improving seed supply for farmers	Developing a strategy to ensure access to quality seed material will enhance farmers' production levels and, consequently, boost the productivity of the sector. Government funded nursery facilities could be addressing current shortages

Research & Innovation

In Kenya, while government support and existing policies generally endorse research endeavors, the principal obstacle lies in securing long-term funding for essential ongoing research activities. Stable, sustained funding is critical for substantial progress in research focused on climate change impacts, innovative farming methods, value addition, diversified and emerging markets, and technological advancements in various sectors.

Areas for Improvement	Opportunities
Long-term research funding opportunities	Including seaweed as one of the research crops within the government research institutions with regular improvement programs and coordinated funding support by donors, will enable long-term research funding opportunities (e.g. for addressing climate change impacts, biobanking and breeding efforts, advanced farming techniques, and value addition) that will contribute to developing a more productive, sustainable, and resilient farming sector.
Support for technology development & adoption	Facilitating the adoption of new technologies and farming methods among seaweed farmers, especially benefiting female farmers, enhances livelihoods and promotes sustainable practices within local communities. Fostering an enabling environment for new technologies can reduce barriers for ventures and startups seeking to enter the seaweed farming sector, encouraging innovation. Connecting to diverse and emerging seaweed markets such as animal feeds, biostimulants, and biomaterials is also needed.

© Roshni Lodhia

Best Management Practices

Governmental entities such as KMFRI support seaweed farmers by offering technical assistance and capacity-building training focused on sustainable farming techniques and environmental monitoring. These efforts are strengthened through partnerships with diverse stakeholders, including NGOs and international organizations, aiming to enhance the seaweed farming sector's practices and sustainability.

Gaps / Areas for Improvement	Opportunities
Strengthening extension services	Establishing formalized training and registration processes for extension officers, coupled with comprehensive training programs, will enhance accountability and facilitate the dissemination of best practices across the seaweed farming sector.
Seaweed-focused research & training center	Specialized training and research centers play a crucial role in disseminating knowledge on farming methods, new technologies, and sustainable practices, fostering the growth of the seaweed farming sector. These centers can coordinate both existing and new capacity-building programs to further support sector development.

General Policy Recommendations for the Different Stages of a Developing Seaweed Industry

Based on a thorough review of relevant case studies, enabling policies that facilitate and support the growth of seaweed aquaculture across various developmental stages — from emerging to growing and established sectors — were identified.

Emerging Industry

- Investment in innovation: Mandate funding for advanced R&D in seaweed farming and processing technologies.
- Establishment of sector leadership bodies: Form and support organizations to represent and advocate for the seaweed industry's interests and enable access to funding and technical support.
- Incorporation of local knowledge: Integration of local knowledge systems into policymaking and sector research initiative and establish mechanisms for Free Prior and Informed Consent.
- Lay the foundation with a comprehensive Marine Spatial Planning to avoid user conflicts and identify most suitable seaweed farm locations.

Growing Industry

- Promotion of innovation: Policies to support the development and commercialization of new seaweed production methods.
- Development of standards & regulatory frameworks: Enact regulations to standardize seaweed product quality & safety, ensuring consistency & market trust.
- Facilitation of market development & technology transfer: Develop strategies to explore market potentials and streamline the transfer of technological innovations from research to industry application.

Established Industry

- Improved access to quality seed: Develop and support policies and infrastructure (gene banks, nurseries) that improve the genetic quality of seaweed seed materials through pest and disease control protocols.
- Advancement of new farming methods: Promote and incentivize the development of scalable innovative seaweed cultivation technologies (e.g. land-based and off-shore).
- Continuous government support & infrastructure development: Ensure robust governmental backing through comprehensive regulatory frameworks, infrastructure investments, & dissemination of best management practices.



© Roshni Lodhia

FURTHER READING:

1. Msuya, F. E. *et al.* Seaweed farming in Africa: current status and future potential. *J Appl Phycol* **34**, 985–1005 (2022).
2. Mirera, D. O. *et al.* Societal and environmental impacts of seaweed farming in relation to rural development: The case of Kibuyuni village, south coast, Kenya. *Ocean & Coastal Management* **194**, 105253 (2020).
3. Government of the Republic of Kenya. Kenya Vision 2030 - The popular version. (2007).
4. Ministry of Mining, Blue Economy and Maritime Affairs. State Department for the Blue Economy and Fisheries - Strategic Plan 2023 - 2027. (2023).

CONTRIBUTION & ACKNOWLEDGMENT: This project was commissioned by The Nature Conservancy and delivered by Hatch Innovation Services to provide policy recommendations for Kenya's seaweed farming policy. The authors would like to thank all stakeholders and experts (Patrice Jilani - Kenya Fisheries Service, Francis Akatsa Okalo - International Union for Conservation of Nature, Mbarak Mapapa & Zakaria Salim - County Government of Kwale, Dr Mirera Oersted David (Ph.D) & Alex Kimathi - Kenya Marine & Fisheries Research Institute. interviewed for their invaluable insights on the current seaweed farming policy situation: This project was funded by Norwegian Agency for Development Cooperation (Norad).