WORKING DOCUMENT

PRACTICAL GUIDANCE FOR THE UN GLOBAL COMPACT **SUSTAINABLE OCEAN PRINCIPLES**

SEAWEED

Sustainable Ocean Business Action Platform

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Note: The Practical Guidance maps current regulations, business standards and best and emerging practices for a particular sector. Under the auspices of the UN Global Compact Sustainable Ocean Business Action Platform, the guidance has been mainly developed by companies operating within the sector.

The guidance is a dynamic working document. It will be reviewed on a regular basis to follow new legislation, best business practices, higher standards and market innovations. Input, feedback and comments from all stakeholders are welcome. If you would like to contribute, please contact: ocean@unglobalcompact.org

GENERAL INTRODUCTION TO THE GUIDANCE DOCUMENT

1. THE UN GLOBAL COMPACT SUSTAINABLE OCEAN PRINCIPLES

The UN Global Compact has, in consultation with more than 300 stakeholders worldwide, developed the Sustainable Ocean Principles. The purpose is to promote the well-being of the ocean for current and future generations, as well as to emphasize the shared responsibility of businesses to take necessary actions to secure a healthy and productive ocean.

The nine principles cover three areas: ocean health and productivity; governance and engagement; and data and transparency. Signatories confirm their endorsement of the principles, setting out a framework for responsible business practices across relevant sectors and geographies. The principles build upon and supplement the overarching Ten Principles of the UN Global Compact, including the fundamental responsibilities in the areas of human rights, labour, environment and anti-corruption.

The principles are relevant for companies with activities that may impact ocean health and companies that are part of an ocean productivity value chain. The principles are, therefore, also relevant for land-based industries, including the financial sector. The principles are directed at company boards and executive management. They are designed as a tool for moving beyond minimum standards and towards excellence in sustainability. They can be used as basis for due diligence assessments and serve as a reference point for interaction between companies on sustainable uses of the ocean.

Companies should understand the broader environmental and social consequences of their activities. Companies should ensure that material ocean-related risks and opportunities are integrated in corporate strategy, risk management and reporting. They should ascertain that the ensuing responsibilities are clearly defined within the organization. The company board should effectively guide, monitor and review company management in these efforts.

The principles are not introducing a new set of reporting measures, but rather encourage companies to use existing mechanisms to disclose their practices.

*DISCLAIMER : This guidance and the information contained therein are intended as a general guide to the issues addressed. They must not be considered a substitute for legal advice and questions regarding the legal interpretation and application of the information should be directed to appropriate legal counsel. Any actions taken or omissions or alterations made on the basis of this information are done at the user's risk.

The guidance was issued in September 2020 and will be updated on a regular basis to ensure that relevant developments, expectations, standards and requirements are properly reflected.

2. THE GUIDANCE

WHAT?

This guidance document is complementary to the UN Global Compact Sustainable Ocean Principles and is intended to broadly outline ways to operationalize these nine principles to specific industry sectors. The guidance aims at guiding signatories on how they can deliver on the principles in practical terms.

WHO?

First and foremost, the audience is the set of companies operating in the sector targeted by the guidance. The guidance may also be used by financial institutions and insurers as a due diligence tool and to inform their decisions. The guidance may also support policymakers and civil society organizations to better understand the challenges, opportunities, regulations and standards of the sector.

WHY?

The guidance aims at identifying shared challenges, common solutions, risks, opportunities, relevant partnerships and reporting frameworks needed to help operationalize the principles.

HOW?

The document starts with an introduction presenting the authors and contributors, defining the scope of the document and general considerations for the sector, in line with the preamble of the Sustainable Ocean Principles.

The guidance is organized in three sections: following the Sustainable Ocean Principles

- **OCEAN HEALTH AND PRODUCTIVITY**
- **GOVERNANCE AND ENGAGEMENT**
- **DATA AND TRANSPARENCY**

For each of these sections, the guidance describes the main challenges and opportunities of the sector.

The document also highlights relevant reporting frameworks and partnerships which will help companies in the implementation of the principles.

Under each principle, the document seeks to provide clear and practical tools on how to implement the principles in business operations. In order to inspire companies, the document also identifies good practices from companies or initiatives.

Sustainable Ocean Principles

The ocean is vital to the wellbeing and prosperity of humankind. To achieve the world community's ambitions as laid out in the Sustainable Development Goals, there is a need to expand our use of the ocean to produce food, energy, raw materials and transportation. Carrying out these activities in a sustainable manner will contribute to reducing global warming and environmental degradation. Ensuring a healthy ocean provides significant opportunities for business and global economic growth.

As described in Sustainable Development Goal 14 on Life Below Water, there is an urgent need to protect and restore the health of the ocean, which is rapidly deteriorating due to increasing temperatures, acidification, depletion of natural resources and pollution from land and sea. Businesses have a shared responsibility, alongside Government and civil society, to take necessary actions to secure a healthy ocean.

These Sustainable Ocean Principles provide a framework for responsible business practices across sectors and geographies. They build upon and supplement the Ten Principles of the United Nations Global Compact on human rights, labour, environment and anti-corruption. We, as signatories of these principles, recognize the urgency and global importance of a healthy ocean, and will take action to promote the well-being of the ocean for current and future generations. As relevant to their business, we believe that companies should:

OCEAN HEALTH AND PRODUCTIVITY

Principle 1: Assess the short- and long-term impact of their activities on ocean health and incorporate such impacts into their strategy and policies.

Principle 2: Consider sustainable business opportunities that promote or contribute to restoring, protecting or maintaining ocean health and productivity and livelihoods dependent on the ocean.

Principle 3: Take action to prevent pollution affecting the ocean, reduce greenhouse gas emissions in their operations to prevent ocean warming and acidification, and work towards a circular economy.

Principle 4: Plan and manage their use of and impact on marine resources and space in a manner that ensures long-term sustainability and take precautionary measures where their activities may impact vulnerable marine and coastal areas and the communities that are dependent upon them.

GOVERNANCE AND ENGAGEMENT

Principle 5: Engage responsibly with relevant regulatory or enforcement bodies on ocean-related laws, regulations and other frameworks.

Principle 6: Follow and support the development of standards and best practices that are recognized in the relevant sector or market contributing to a healthy and productive ocean and secure livelihoods.

Principle 7: Respect human-, labour- and indigenous peoples' rights in the company's ocean related activities, including exercise appropriate due diligence in their supply-chain, consult and engage with relevant stakeholders and communities in a timely, transparent and inclusive manner, and address identified impacts.

DATA AND TRANSPARENCY

Principle 8: Where appropriate, share relevant scientific data to support research on and mapping of relevance to the ocean.

Principle 9: Be transparent about their ocean-related activities, impacts and dependencies in line with relevant reporting frameworks.

SEAWEED GUIDANCE

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SCOPE

The scope of this document is the seaweed industry, the production and use of macroalgae for any purpose. The guidance outlined has relevance for activities along the entire value chain.

> The guidance has a dual focus on both wild harvest and cultivation.

This scope and contents of this first version of the seaweed guidance document reflects the expertise of the contributors. It is designed to be a dynamic document in order to follow new legislation, best business practices, new standards and market innovations. As it is an industry at the start of a growth phase in many parts of the world, these Practical Guidances will need to be reviewed and, if necessary, updated on a regular basis.

The Practical Guidances developed for the aquaculture sector also offer relevant insights for this work.

If you have comments and/or would like to contribute the next versions, please send an email to ocean@unglobalcompact.org. General considerations for the sector.

The seaweed industries can deliver healthy food and nutritious food, bioactives and low-carbon feed for aquaculture and farm animals. Seaweed extracts can be used for many applications and materials, including bio packaging. It can also capture nitrogen and store carbon dioxide to limit climate change, and the sustainable expansion of the industry can provide new sources of revenue for coastal communities.

The global production of seaweed is increasing. The production of seaweed is already an established industry in Japan, China and South-east Asia. About 30 million tonnes of seaweeds and other algae are currently produced annually.

However, outside this region it is still an emerging industry at the start of a growth phase. Moreover, many seaweed producers are small family-owned businesses covering a range of socio-economic and ecological contexts.

Small-scale seaweed farming makes an essential contribution to the livelihoods of millions of people living marginalised coastal communities at or below the poverty line, often within areas of high biodiversity.

On the demand side, the market is already more globalised. For instance, Europe is becoming an increasingly large (and growing) import market for seaweed which goes on to be used as food additives, packaging materials, feed, or in cosmetics. Globally, seaweeds play a fundamental role in aquatic ecosystems, coastal protection, and are a valuable resource for coastal communities. The multiple benefits of seaweed capable to address some of global challenges we face such as hunger, climate change, pollution, and biodiversity loss are clearly outlined in the Seaweed Manifesto.

However, the expected rapid global expansion of seaweed production raises new ecological and socio-economic challenges for producers and the environment, from biosecurity and the health of wild seaweed stocks, to building capacity and knowledge within the sector and mitigating potential conflict over finite coastal resources.[1]

Due to the rapid growth of global seaweed production and its increasing economic importance, the sector naturally faces many of the same environmental and social challenges experienced by mariculture farms and fisheries. The seaweed industry must subsequently be developed in a sustainable way that considers not just how to ensure income generation, but also maintains the highest biosecurity standards, restore ecosystems and wild seaweed populations, safeguards workers' rights, and ensures an open dialogue with local communities.

There is a unique opportunity to scale-up the industry in a responsible, ethical and sustainable way, whilst simultaneously rehabilitating marine and coastal ecosystems. The concept of ocean sustainability does not just include ocean protection, but also incorporates communities and people. For both our planet and humanity to prosper and thrive - there is need to both protect and produce.

NOTE OF CONSIDERATION

It should be noted that due to the huge range of contexts within which the seaweed industry operates, there is no one-size fits all solution and different reporting regimes will be better suited to different contexts. In particular, tropical eucheumatoids, the seaweeds most cultivated globally, support thousands of vulnerable small-scale seaweed producers in the global south with complex dependencies. Moreover, they are almost exclusively supplying markets in the global north for the sake of various inter-dependent industries (i.e. raw materials producers, exporters and extraction/manufacturing facilities).

As an industry, it is crucial to undertake both detailed environmental and social impact assessments when considering the identified reporting regimes, benchmarks, and best practices underpinning the Sustainable Ocean Principles. It is important to encourage the adoption and use of effective Environmental and Social Management Systems (ESMS, see for e.g. IUCN ESMS) to ensure that these identified reporting regimes and practices do not cause harm to vulnerable groups, particularly those who have a high dependency on seaweed production. Unattainable barriers to market or competitive disadvantage within the industry caused must be avoided at all costs.

A worthwhile and important focus for future work would be to develop a form of criteria that would rate particular reporting regimes and benchmarks in terms of their suitability for specific contexts, with a focus on continuous improvement.

1. http://www.fao.org/in-action/globefish/publications/details-publication/en/c/1154074/

OCEAN HEALTH AND PRODUCTIVITY

CHALLENGES AND OPPORTUNITIES OF THE SECTOR

Promoting well-managed seaweed cultivation and harvest is essential to meet growing demand and to minimize negative environmental and social impacts. Seaweed can be a part of the solution to attenuate many of the world's most pressing challenges, through:

- Contribution to the food system, as nutritionally food, texturizers, feed and fertilizers
- Carbon sequestration and the "blue carbon effect"
- Ecosystem support and playing a key role in IMTA[2]
- Incomes to coastal communities and poverty alleviation
- Increasing productivity of offshore areas by partially replacing phytoplankton-based ecosystems with macroalgal-based ecosystems
- Restoring wild fisheries stocks heavily pressured providing alternative activities to coastal communities
- Alternative to plastic packaging to address single-use plastics challenge

If seaweed cultivation and harvesting are poorly managed, it can have a range of adverse impacts, including; genetic dilution of wild populations, eutrophication, negative impacts on biodiversity, disruption of local ecosystems, spreading diseases, conflicts with other ocean-users, and poor working conditions, driven by lack of appropriate tools and equipment together with lack of knowledge around best farming practices. The faster the industry grows, the greater its potentially negative impact on the environment and local communities. Several issues are important to address to achieve sustainable and environmentally sound growth:

UN policies

- Lack of spatial planning and operationalisation of existing spatial plans.
- Lack of uniformly accepted monitoring, data-sharing protocols and third-party certification to validate the safety and sustainability of seaweed production.
- Lack of biosecurity policies and sustainability protocols pose a major concern and risk to both farm productivity and wider ocean health.
- Lack of legal framework regarding licensing procedures specific to seaweed (including guidelines concerning alien species and carrying capacity).
- Marine planning and aquaculture policy often do not include seaweed aquaculture.

Knowledge gaps

- Lack of experience on the impact of seaweed cultivation on local ecosystems outside of Asia.
- Establishment and maintenance of seaweed farming systems
- Lack of knowledge on best management and cultivation/harvesting practices from seaweed farmers/harvesters towards end-users.
- Limited knowledge or understanding around the livelihoods of small-scale seaweed farmers in the Global South.
- Lack of commercial knowledge of seaweeds potential role in bioremediation and IMTA including, co-location offshore with renewable energy platforms.
- Lack of end consumer knowledge on seaweed – in western markets – its application, benefits and potential contribution to climate change to boost demand.

2. IMTA (Integrated Multitrophic Aquaculture): Enhanced production of aquatic organisms of two or more functional groups, that are tropically connected by demonstrated nutrient flows and whose biomass is fully or partially removed by harvesting to facilitate ecological balance

- Lack of investment in seedbanks and hatchery programs; disease and climate-resistance strains of seaweed are unavailable in many countries
- Technology and scalability barriers, such as cost effective and robust positioning, harvesting, remote sensor and processing solutions
- Lack of appropriate "ocean monitoring solutions" and IT systems to maximize farm productivity.
- Lack of investment in the application and marketing side of seaweed production

Biological constraints

- Lack of nutrients for seaweed cultivation in some deep sea offshore areas due to limited upwelling compared to coastal waters.

External anthropogenic stressors

- Run-offs from adjacent land-based agriculture, incorporating pesticides, heavy metals and insecticides.
- Climate change effects, such as warmer water temperatures and ocean acidification, may reduce seaweeds' resilience to disease outbreaks and create harsher farming environments.

REPORTING REGIMES OF RELEVANCE

In addition to several national standards and reporting requirements, especially regarding residuals, the following frameworks are commonly used and acknowledged throughout the seaweed industry:

- ASC-MSC Seaweed Standard: The Aquaculture Stewardship Council (ASC) and The Marine Stewardship Council (MSC) has developed Certification standard for sustainable seaweed production for aquaculture (ASC) and wild harvest (MSC).
- Organic standard (EU / Japan JAS / US NOP)
- Organic Global Standard
- FAO Code of Conduct for Responsible Fisheries and the Ecosystem Approach to Aquaculture
- FAO Technical Guidelines on Aquaculture Certification
- Seafood Stewardship Index (SSI)
- European Committee for Standardization: CEN/TC 454 – Algae and algae products
- European Union (Member Organization): European Union standards for E407a (Processed Eucheuma Seaweed) and E407 (Carrageenan)
- JECFA – FAO/World Health Organization: standards for Processed Eucheuma and Carrageenan
- Codex FAO & Generic ISO standards (9000, 14000 & 22000)
- NCS – Philippine National Carrageenan Standard (under development), which is proposed as the basis for a BIMP-EAGA harmonized standard;
- Habitats EU Directive (92/43/EEC) on the conservation of natural habitats and wild fauna and flora
- Marine Strategy Framework EU Directive (MSFD)(2008/56/EC, CD 2017/848): establishes a framework for community action in the field of marine environmental policy
- Water Framework EU Directive (WFD)(2000/60/EC): establishes a framework for the protection and enhancement of good status of inland surface, transitional, coastal and ground water
- PEGASUS: European Guidelines for the Sustainable Aquaculture of Seaweeds
- The British Standards Institution BS EN 17399:2020: Algae and algae products
- Standar Nasional Indonesia (SNI): developed to cover all products and processes related to production of seaweed and seaweed products, harmonized with international standards that are applied to export products including CCRF, CITES, ISO, HACCP and SPS agreements

PARTNERSHIPS TO BE CONSIDERED

In general, companies should engage in collaboration with science, NGOs, communities and other relevant stakeholders to ensure optimal assessments of the environmental, economic and social impacts of their operations. A number of partnerships lead the way, including:

- Aquaculture Stewardship Council (ASC)
- Noordzee Boederij.nl (Netherlands)
- Submariner Network for Blue Growth EEIG (Baltic Sea region)
- The International Seaweed Association
- China seaweed industrial association (CSIA)
- Seaweed for Europe
- European Algae Biomass Association (EABA)
- International Blue Cooperative (IGC)
- Algae Biomass Organization (US)

There are also important national industry associations:

- Zanzibar Seaweed Cluster (Tanzania)[3]
- Seaweed industry association of the Philippines (SIAP)
- Marinalg
- ARLI (Indonesia)
- COPRAM (Chile)
- The Seaweed Alliance (UK)
- The Scottish Seaweed Association
- The Danish Seaweed Association
- International Society of Applied Phycology (ISAP)
- China Algae Industry Association, CAIA (China)
- Indonesia Seaweed Industry Association (ASTRULI)

3. For more information, see: https://www.igi-global.com/chapter/revisiting-zanzibari-seaweed/219058 and https://open.unido.org/api/documents/4315887/download/3ADI_Seaweed%20value%20chain%20assessment.pdf

PRINCIPLE 1.

ASSESS THE SHORT- AND LONG-TERM IMPACT OF THEIR ACTIVITIES ON OCEAN HEALTH AND INCORPORATE SUCH IMPACTS INTO THEIR STRATEGY AND POLICIES.

GUIDANCE

It is recommended that companies and co-operatives:

- Set and publicly report on key performance indicators, covering environmental, social, economic and governance aspects, through an annual report on their website or similar, to track and monitor performance related to ocean health, including adherence to biosecurity protocols.
- Conduct environmental and social impact assessments aligned with the latest science, including: the potential social impact on the adjacent and neighbouring communities, characterization of the area, identification of endemic species, assessment of all seed sources from natural stocks, habitats, ecosystems, endangered, threatened or protected species, identification of vulnerable groups dependent upon seaweed activities and potential to impact their access to resources and markets, identification of indirect impacts, such as potential subsidy of fishing capacity.
- Implement and regularly review policies to mitigate or minimise environmental and social negative impacts stemming from seaweed production.
- Promote capacity building strategies through a series of training programs and workshops to stakeholders, including governments, decision-making institutions, researchers and community-based organizations to enable information-exchange on seaweed industry sustainability.
- Engage with relevant stakeholders, such as seaweed farmers, processors, extractors, policy makers, NGOs, scientific institutions and local communities, when possible.
- Define a code of conduct and set clear commitment from co-operatives, companies, contractors, and all others involved in the seaweed industry value chain, to strive to do no harm to neighbouring ecosystems and communities; this includes identifying and assessing environmental impacts and risks, implementing mitigation methods and reporting transparency.
- Incorporate sustainability into the business strategy based on a materiality assessment to ensure alignment with material environmental and social indicators.

GOOD PRACTICE EXAMPLES

- **The GENIALG project in Europe** (EU funded).
- **The GlobalSeaweedSTAR programme** in the UK, Philippines, Malaysia and Tanzania (UK funded), including the production of biosecurity related protocols.
- **The Red Seaweed Promise™ Cargill sustainability program**.
- **Coast 4C** in the Philippines and Ocean Farmers in Madagascar implements measures within their seaweed business to incentivise adoption of pro-environmental seaweed farming practices.

- **PEGASUS - PHYCOMORPH** European Guidelines for a Sustainable Aquaculture of Seaweeds.
- **AQUAVITAE** (from 2019) **ASTRAL** (from Sept 2020) for IMTA benefits.
- **GRASS project (Interreg BSR)** seaweed production and use in the Baltic Sea.
- **Macrocascade** (BBI-JU) biorefining seaweed.
- China Algae Research System (CARS-50).
- **IFF's Responsible Seaweed Program** was set up to evaluate and continuously improve the social and environmental performance of IFF's seaweed sources.

PRINCIPLE 2.

CONSIDER SUSTAINABLE BUSINESS OPPORTUNITIES THAT PROMOTE OR CONTRIBUTE TO RESTORING, PROTECTING OR MAINTAINING OCEAN HEALTH AND PRODUCTIVITY AND LIVELIHOODS DEPENDENT ON THE OCEAN.

GUIDANCE

Companies and co-operatives are encouraged to demonstrate their efforts to restore, protect and mitigate risks to the natural environment adjacent to their operations and in their supply chains.

- Optimize biomass utilization by strengthening existing or establishing new seaweed value chains, including developing commercially viable biorefinery processing facilities in seaweed-producing countries
- Apply Life Cycle Assessment (LCA) to all new products to gauge impact on global biogeochemical cycle governing processes
- Create better standards for the biodegradability of packaging materials to safeguard product end life
- Engage in, promote, and encourage regional coordination and effective management of cumulative or balancing effects from multiple farms operating within the same area
- Assess opportunities for implementing inclusive IMTA, including opportunities for external collaboration, where relevant
- Identify opportunities, operations and future projects for shared value creation with local communities and partners in areas such as habitat restoration and biodiversity restoration, climate change mitigation and adaptation, operation, training and education
- Develop sustainability criteria within supplier contracts, with a focus on environmental and social challenges with measurable outcomes
- Explore synergies between seaweed farming and the implementation / strengthening of marine protected areas (MPAs) that restore marine biodiversity
- Promote the development of sustainable seaweed farming as an alternative livelihood within MPAs amongst stakeholders, including government, tourism, coastal communities
- Report all accidents, disease and pest outbreaks and activities related to any farm site that may unexpectedly damage ocean health to the appropriate regulatory authorities
- Accelerate the monetisation of ecosystem services provided by seaweed, positioning this as a business opportunity, (for instance, payment for nitrogen removal and/or carbon capture)
- Develop and promote industry recognized best management and farming/harvesting practices guidelines
- Develop and make available cost effective, environmentally friendly farming/harvesting tools for seaweed producers
- Develop and make available cost effective, environmentally friendly farming/harvesting tools for seaweed producers

- Develop and implement effective and innovative traceability together with socio-economic and environmental monitoring tools to demonstrate impacts.
- Innovate and promote seaweed species which can be cultivated effectively all year round
- Accelerate knowledge for seaweed bioactive compounds to improve use of seaweed resources with higher value and larger market

GOOD PRACTICE EXAMPLES

- **Riken Vitamin's** and Riken Food's education program about the seaweed food culture: To maintain the seaweed food culture and create sustainable business opportunities, it is essential to attract the interest of the next generation. Employees have food education classes in elementary school and junior high school where they teach about seaweed, benefits to the ocean environment, human health benefits, etc.
- **ASC or MSC labelling of products:** The MSC and ASC have created a standard that rewards sustainable and responsible seaweed production and provides a global benchmark for improvement. Seaweed producers that meet the ASC-MSC Seaweed Standard must be able to demonstrate that they are well-managed, maintain the integrity and diversity of the local ecosystem, preserve natural habitats and manage waste, pollution, disease, pests and introduced species. Seaweed operations that meet the ASC-MSC standard gain the right to sell their products with the ASC-MSC label.
- **The Red Seaweed Promise™ Cargill sustainability program**
- **Coast 4C** in the Philippines links spatial planning for their seaweed activities with spatial planning for marine protected areas, and identifies opportunities for synergistic relationships between the two to support improved seaweed production and improved MPA performance.
- **Ocean Farmers** proposes seaweed farming as an alternative livelihood to fishermen communities in Madagascar to reduce pressure on declining natural resources and partners with conservation NGOs to integrate seaweed farming into MPAs governance frameworks, collaboratively engaging into coral restoration projects, seagrass protection and spatial planning.
- **IFF's Responsible Seaweed Program** includes a comprehensive set of "Environmental & Social Good Practices for Seaweed Harvesting" and has developed innovative tools to increase farmer productivity and approaches to drive the circular economy.

PRINCIPLE 3.

TAKE ACTION TO PREVENT POLLUTION AFFECTING THE OCEAN, REDUCE GREENHOUSE GAS EMISSIONS IN THEIR OPERATIONS TO PREVENT OCEAN WARMING AND ACIDIFICATION, AND WORK TOWARDS CIRCULAR ECONOMY.

GUIDANCE

Companies and co-operatives can reduce emissions by:

- Developing a life cycle assessment for any seaweed facility to understand and valorise impact on CO_2, sequestration.
- Collaborating with academic researchers to establish more scientific evidence of CO2 fixation and to quantify data on the positive effect to ocean environment.
- Utilizing the same approach in regards to nitrogen and phosphorus.
- Limiting the use of fossil fuels and fresh water and, where possible, using renewable energy sources.
- Demonstrating efforts to reduce marine plastic pollution from within their supply chains, by reporting waste volume and types of materials collected, by recycling and investing in the development of solutions to harmful petroleum-based plastics (bioplastics, compostable plastics) and participating in regular local community beach and water ways clean up.
- Adopting the Science Based Target Initiative (SBTi) and demonstrating CO2 emissions reductions to 2030 in alignment with the 2015 Paris Agreement and targets under a 1.5°C temperature increase threshold.
- Working towards a circular economy using seaweed for bioremediation services and incentivizing good waste management practices with smallholder farmers, as well as post- harvest processers down the supply chain through: implementing a waste management policy, mapping and reporting plastic use, promoting the use of biodegradable farming material when available, and utilizing by-products.

GOOD PRACTICE EXAMPLES

- Using renewable natural resources when possible: In **Philippines**, **Madagascar** and **Tanzania**, initiatives to support some seaweed farmers re-use their equipment and ropes and use sun-drying to remove pests, biofouling or diseased crop from this infrastructure.
- **The Ocean 2050 Blue Carbon Vision**: outlines markets for activities that are restorative to the oceans
- **LC-CLA-06-2019**: Inter-relations between climate change, biodiversity and ecosystem services: Enabling signatory states of the COP21 Paris Agreement to take the necessary actions to ensure the integrity of coastal ecosystems and the protection of their biodiversity in the context of combatting climate change and adapting to its impacts.
- Costal conservation and sustainable livelihoods through seaweed aquaculture in Indonesia: **A Guide for Buyers, Conservation Practitioners, and Farmers**.
- **LCA Analysis of Seafarm project for large scale cultivation of seaweed in Sweden**.

4. https://www.researchgate.net/publication/333994233_Monitoring_seaweed_aquaculture_in_the_Yellow_Sea_with_multiple_sensors_for_managing_the_disaster_of_macroalgal_blooms or https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0210460

- China's large national key research and development projects on blue granaries, marine environmental assessment and ecological restoration.[4]
- The largest seaweed processing sites for **IFF's Responsible Seaweed Program** are ISO14001:2015 certified, actively transitioning to the use of renewable energy and supporting the circular economy through upcycling and other efficiencies.

PRINCIPLE 4.

PLAN AND MANAGE THEIR USE OF AND IMPACT ON MARINE RESOURCES AND SPACE IN A MANNER THAT ENSURES LONG-TERM SUSTAINABILITY AND TAKE PRECAUTIONARY MEASURES WHERE THEIR ACTIVITIES MAY IMPACT VULNERABLE MARINE AND COASTAL AREAS AND THE COMMUNITIES THAT ARE DEPENDENT UPON THEM.

GUIDANCE

Companies, governments and co-operatives are recommended to:

- Promote and contribute to the development and implementation of marine spatial strategies to encourage concerted management of the rights of the different users
- Develop marine spatial plans for zones with collective action and services to control diseases, and collective consideration of the environmental sensitivity of the area
- Strive for collective certification of the zoned aquaculture areas, which can simplify the permit process and ensure that all farms have access to market
- Exercise the precautionary approach when introducing new or non-indigenous cultivars and avoid the introduction of exotic species
- Protect habitats in marine ecosystems from destruction, degradation and pollution that could be caused by seaweed harvesting or farming
- Explore potential solutions to restore marine habitats through positive ecosystem interactions including marine plants
- Consider potential risks that seaweed harvesting and -farming operations pose to critical habitats for endangered species
- Perform assessments that not only focus on the impact on the habitat, but also the habitat's delivery to ecosystem services
- Develop and implement training in order to strengthen communities' knowledge and raise awareness on environmental issues by smallholders
- Explore participation in independently verified certification processes that address environmental and social issues
- Engage in consultations and dialogue with local communities and indigenous people.
- Explore multi-use approaches and coordinate with other ocean activities, such as shipping, aquaculture, energy production, and tourism
- Determine an optimum threshold for farm density versus ocean productivity, bioclimatic risks and other production activities (e.g. traditional fishing)

GOOD PRACTICE EXAMPLES

- **Progressive Management Pathway for Seaweed Biosecurity**, led by SAMS and FAO (in progress)
- **UNITED Ocean Multi-Use Knowledge Network** (H2020)
- **Aquacoco project**

- Project "**Sustainable Seaweed Farming**" by Ocean Farmers in Madagascar, delivers a full "good farming and environmental practices" training and awareness raising campaign to farmers.

- **ASC-MSC Seaweed Standard**: Principle 2 covers environmental impacts and requires harvesting and farming activities to maintain the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the activity depends.

- **TNC/Cweed Corp** - A Cargill project on promoting Best Management Practices to seaweed farmers in Pemba and Ugunja – Tanzania

GOVERNANCE AND ENGAGEMENT

CHALLENGES AND OPPORTUNITIES OF THE SECTOR

The baseline requirement for any aquaculture operation must be in compliance with the legal obligations of the producing country. While harvesting and farming operations must, at a minimum, adhere to national and local laws, more ambitious sustainability requirements and volunteer action beyond those required by law may be developed.

In developing economies, particularly in Southeast Asia where the scale of individual seaweed cultivation producers is often small, it is challenging to make impactful individual efforts, which is exacerbated by convoluted and opaque supply chains that prohibit the efficient delivery of essential services to small-scale producers. Support for existing co-operatives is encouraged, together with support for innovative models that more efficiently aggregate seaweed producers to deliver services whilst increasing supply chain transparency and the value share of small-scale producers. Partnerships are needed – both cross-country collaboration and public-private partnerships – and there is an opportunity to build decentralized governance.

Outside of China and parts of South-East Asia, the seaweed industry is relatively underdeveloped, fragmented and regionalized in many places. Seaweed has a huge potential to contribute to alleviate poverty, to create revenues and to support gender equity in emerging countries. In developed economies, harvesting and farming often occur near communities that may be affected by these activities. Conflicts may occur between producers and surrounding communities. It is the responsibility of all stakeholders, including the production unit, to find a workable solution (e.g. spatial planning). The production unit can minimise potential impacts by maintaining clean and orderly harvesting and farm sites that do not impede navigation and avoid potential conflicts. Still the move towards offshore aquaculture (e.g. plans in both Europe and North America) might bring to life a new seaweed industry, especially based on biorefinery principles, and less on small-scale producers.

REPORTING REGIMES AND PARTNERSHIPS OF RELEVANCE

- ASC and MSC Seaweed Standard
- The CIESM Charter for Access and Benefit Sharing arising from the use of marine genetic resources
- ISEAL Code of Good Practice
- FAO Guidelines for Ecolabelling
- FAO Technical Guidelines on Aquaculture Certification
- Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration)
- Phycomorph European Guidelines For A Sustainable Aquaculture Of Seaweeds
- Marinalg
- Seaweed chain

PRINCIPLE 5.

ENGAGE RESPONSIBLY WITH RELEVANT REGULATORY OR ENFORCEMENT BODIES ON OCEAN RELATED LAWS, REGULATIONS AND OTHER FRAMEWORKS.

GUIDANCE

Companies can:

- Engage in work which aims to develop global standards for seaweed production
- Engage with UN Bodies (FAO, UN Global Compact, WHO and UNIDO) to develop a global database with agreed maximum levels of heavy metals or iodine per type of seaweed
- Promote the development of water rights guidelines and standards (see Good practices examples below) from international and UN organizationsfor sustainable seaweed mariculture, such as long term concessions, permits and management of introduced species and cultivars
- Participate in industry associations and contribute to consultations relevant for the industry
- Engage in multi-stakeholder partnerships to enhance policy frameworks and industry practices, including dialogues with local and national authorities on aquaculture matters
- Encourage pre-competitive partnerships between industry, non-governmental organizations and seaweed value chain stakeholders to address legal, regulatory and accountability tools
- Establish collaborative forums to address barriers to sustainable growth of the seaweed industry, including subsequent policy engagement
- Take a science-based approach and engage with policy-makers, science and civil society to develop solutions to sustainability challenges and harness opportunities
- Advocate for the sustainable management of wild harvest
- Undertake transparent information-sharing to help policymakers understand the potential of seaweed and the enabling legislative frameworks needed

GOOD PRACTICE EXAMPLES

- **GlobalSeaweedSTAR programme** (UK funded): has enabled seaweed-producing developing countries to work with FAO in the development of biosecurity guidance for the industry.
- **Maritime/Marine Spatial Planning (MSP)**: MSP Forum and MSPglobal established in 2018.
- **ASC and MSC Seaweed Program**

PRINCIPLE 6.

FOLLOW AND SUPPORT THE DEVELOPMENT OF STANDARDS AND BEST PRACTICES THAT ARE RECOGNIZED IN THE RELEVANT SECTOR OR MARKET CONTRIBUTING TO A HEALTHY AND PRODUCTIVE OCEAN AND SECURE LIVELIHOODS.

GUIDANCE

Developing and sharing best practices is critical to determine sustainable solutions and gain a license to operate and grow in the longer run. Companies and co-operatives are encouraged to:

- Demonstrate they maintain the integrity and diversity of the local ecosystem, preserve natural habitats and manage waste, pollution, disease, pests and introduced species; where applicable this should be to an international standard with independent verification
- Demonstrate that workers are protected from all child labour, forced labour and discrimination, and are well and appropriately trained, with safe workplaces, as well as fair and decent wages
- Engage in dialogue with related companies who have implemented relevant standards – going beyond laws and regulations
- Proactively share information and good practices, and report on material topics for the seaweed industry
- Engage directly with relevant certification initiatives and customers to learn which certifications and standards are of most relevance in their respective markets
- Set a target to certify facilities within a stated time period to drive progress and develop a realistic plan for certification implementation, including an assessment of existing management systems
- Seaweed harvesting and farming activities should strive to impact positively on other related activities, or the community and operations must adhere to strict requirements regarding location, equipment management, noise and odour

GOOD PRACTICE EXAMPLES

- **The ASC or MSC Seaweed Standard**
- **Red Seaweed Promise standards**
- Seaweed in Indonesia: **A Guide for Buyers, Conservation Practitioners, and Farmers**
- **PEGASUS - Phycomorph European Guidelines for a Sustainable Aquaculture of Seaweeds**
- **SeaPlant.net: The South East Asia Seaplant Network**
- **Jasuda Network in Indonesia**
- **The seaweedchain**

- **The Red Seaweed Promise™** Cargill sustainability program and indicators developed with PROFOREST.
- **IFF's Responsible Seaweed Program** includes a comprehensive set of "Environmental & Social Good Practices for Seaweed Harvesting."

PRINCIPLE 7.

RESPECT HUMAN-, LABOUR, AND INDIGENOUS PEOPLES' RIGHTS IN THE COMPANY'S OCEAN RELATED ACTIVITIES, INCLUDING EXERCISE APPROPRIATE DUE DILIGENCE IN THEIR SUPPLY CHAIN, CONSULT AND ENGAGE WITH RELEVANT STAKEHOLDERS AND COMMUNITIES IN A TIMELY, TRANSPARENT AND INCLUSIVE MANNER, AND ADDRESS IDENTIFIED IMPACTS.

GUIDANCE

Companies are encouraged to:

- Ensure that harvesting and farming operations are undertaken in a socially responsible manner that benefit workers and local communities
- Engage in the development of social responsibility codes of conduct, standards, and collaborative forums – also at local level – that improve transparency of social standards
- Establish a code of conduct for local community engagement and ensure compliance with regulations and UN principles, such as ILO standards and the Ten Principles of the UN Global Compact
- Ensure workers' health and welfare through safe working conditions and relevant training, both for seaweed farming and for harvesting of wild populations, paying particular attention to migrant workers
- Ensure and assess that the rights of indigenous people) are respected and that access to resources remain non-impeded
- Implement a transparent process for engaging proactively with indigenous groups, clearly identify benefits, define roles, and support capacity development according to needs, and use written consent if necessary
- Communicate the importance of respecting human labour rights in supply chains, conduct thorough supply chain audits and assist with capacity building for suppliers, giving special consideration to small-sized enterprises
- Refer to the Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration) to enhance the positive effects of operations
- Recognize the right to freedom of association and trade unions for all workers across the supply chain
- Engage in concerted action towards gender equality female empowerment, including industry impact assessments
- Empower coastal communities to participate and engage in the management of the coastal zone, ensuring mutually beneficial cooperation
- Decide on the capacity of harvest amount based on discussions with relevant stakeholders, and an assessment of natural biomass resources
- Engage in discussions with those who hold traditional knowledge or who use the ocean daily, integrating and recognize traditional knowledge

GOOD PRACTICE EXAMPLES

- **The GlobalSeaweedSTAR programme**
- The **CIESM Charter** on access and benefit sharing of marine genetic resources
- **Development and objectives of the PHYCOMORPH European Guidelines for the Sustainable Aquaculture of Seaweeds** (PEGASUS)
- **Ethical recommendations for ocean observation** (2018)
- **Smeta**, **BSCI**, **ICS** and other multi-stakeholder private schemes
- **Cargill supplier code of conduct**
- **FAO: Scoping Study on Decent Work and Employment in Fisheries and Aquaculture: Issues and Actions for Discussion and Programming**.
- **ILO Guidance on addressing child labour in fisheries and aquaculture**
- The **Nagoya Protocol** on Access and Benefit-sharing
- **ASC-MSC Seaweed Standard**: Principle 4 and 5 covers socially responsible and requires seaweed operations to operate in a manner that minimises negative impacts on neighbours, respects indigenous rights and benefits local communities..

DATA AND TRANSPARENCY

CHALLENGES AND OPPORTUNITIES OF THE SECTOR

The United Nations called for action from scientific communities, industries and policymakers to support aspirations for sustainable development and avert risks, stop and reverse growing inequalities in access to data and information, and ensure that the promise of the data revolution is realized for all. Data-sharing and ensuring open access are thus fundamental.
The UN Decade of Ocean Science for Sustainable Development (Ocean Decade) offers a framework to drive data-sharing forward.

Transparency is important for several reasons:

- Transparency and accountability is needed to build credibility and market- and consumer confidence
- Data disclosure and transparency gives scientists and innovators means to improve knowledge and technologies; the seaweed industry is particularly dependent on science-based decision making

CHALLENGES

- Lack of data within several areas, such as the quality of seaweed production, processing, market data for seaweed products, harvest production and cultivation yield.
- Lack of traceability and data on the environmental impact of wild seaweed collection
- Traceability challenges due to direct trading between fishermen and companies without government reporting mechanisms
- Lack of a global database for multitudes of industries associated with various the seaweeds industries

However, there are clear opportunities to improve data-sharing and transparency; for instance, the creation of an open access global register of all seaweed stakeholders and related production. Moreover, while satellite technology and remote sensing could help monitor production and yields, blockchain technology could ensure traceability throughout the supply chain.

The fear that both transparency and accountability constitute a competitive risk, possibly leading to reputational risks, is justified. However, the current lack of data and transparency is a barrier towards achieving insurability of the industry. Collecting data and transparency will be vital to sustain indigenous species abundance and diversity at desired levels. This will require:

- Spatially explicit regulatory/zoning instruments to define the boundaries over which aquaculture sustainability should be assessed
- Sustainability indicators and monitoring systems in respect to the local ecological carrying capacities of these zones. Institutional arrangements that assure compliance and transparency will be needed to operationalize such system.

It is imperative that such zones are operationalized so that the farmers clearly see a number of benefits, including:

- Reduce risk of poor stock performance, disease etc.
- Reduce the cost and complexity of environmental impact assessment;
- Lay the framework for a new approach to certification and increase market access;
- Improve sustainability—economic, social and environmental—of aqua-businesses;
- Demonstrate good stewardship of the environment;
- Lower insurance rates and ease credit terms on demonstrably lower risk investments.

5. UN data revolution report, 2014. https://www.undatarevolution.org/wp-content/uploads/2014/11/A-World-That-Counts.pdf

REPORTING REGIMES AND PARTNERSHIPS OF RELEVANCE

- Aquaculture Stewardship Council (ASC)
- UN Global Compact Communication on Progress
- Global Reporting Initiative (GRI)
- Marine Stewardship Council (MSC)
- B-Corp

PARTNERSHIPS TO BE CONSIDERED

- SeaweedTrace by Koltiva

PRINCIPLE 8.

WHERE APPROPRIATE, SHARE RELEVANT SCIENTIFIC DATA TO SUPPORT RESEARCH ON AND MAPPING OF RELEVANCE TO THE OCEAN.

GUIDANCE

Companies are encouraged to be transparent and share relevant non-financial data for scientific use. Authorities also have a role in providing and maintaining suitable data storage platforms and services to ensure collection, storage and distribution of collected data, such as:

- Environmental baseline data collection
- Ongoing and post construction monitoring studies
- Environmental impact assessments and life cycle impact assessments

Companies and cooperatives can also:

- Be transparent and share data with the scientific community and other relevant stakeholders
- Assess options to collect data as a part of regular activities in the ocean, when possible
- Engage in pre-competitive collaboration to pro-actively share data and find solutions to common industry challenges
- Engage in and contribute to research and development on material issues affecting the sustainability of the seaweed industry, such as disease resistant cultivars, or digital solutions to collect farm data to improve resource use
- Contribute to academic and student research on relevant topics for the industry
- Participate in industry, science and government cooperation schemes on research and innovation
- Join global collaboration efforts on seaweed through the development of recognized regional clusters of competences

GOOD PRACTICE EXAMPLES

- **SeaweedTrace by Koltiva** – a digital traceability tool - **https://www.koltiva.com/**
- **Ethical recommendations for ocean observation** (2018)
- Open Access Publications : all reports and scientific findings from the **GlobalSeaweedSTAR** programme have to be 'open-access' and will be freely accessible to the industry once published.
- Research Contribution: **OceanVisions** Research Consortium and network run an ocean-based carbon dioxide removal program
- **JaSuDa.net** Indonesia & **SeaPlant.net** Indonesia

PRINCIPLE 9.

BE TRANSPARENT ABOUT THEIR OCEAN-RELATED ACTIVITIES, IMPACTS AND DEPENDENCIES IN LINE WITH RELEVANT REPORTING FRAMEWORKS.

Companies, government and co-operatives can:

- Make relevant data publicly available, and disclose status and progress on key performance indicators, as well as ongoing or planned activities
- Regularly assess potential impacts using environmental monitoring studies; for quality reasons, this data should be presented in line with acknowledged reporting frameworks and ideally be independently verified
- Publish an annual report with material stakeholder information and performance data, including how their activities impact ocean health and productivity
- Engage and share information for relevant reporting benchmarks
- Environmental monitoring studies to assess potential impacts should be performed regularly and general results should be publicly available
- Publish relevant Social Impacts Assessments findings and Environmental Impact Assessment reports

GOOD PRACTICE EXAMPLES

- **QR code to make information available to consumers**
  Seaweed based food can be labelled with a QR code with details about for example the processing history, cultivation and harvest method, characteristics of the seaweed biology and ecology, positive factor for human health of the species, processing advantages for higher qualities.

- **Harvest sold to fishermen's cooperative associations (e.g. Japan and China)**
  In Japan, for several species of seaweed such as Nori, Wakame and Kombu, fishermen have to sell harvest to fishermen's cooperative associations. The private companies buy the harvest from cooperative association through a bidding process, which improves the transparency and confidence of data. Jiangsu Nori Association in China trades Nori in the same way.

- **The ASC-MSC certification process** is a transparent and participatory process, where all information is published on the website and stakeholders are invited to provide comments.