

BNCFF | BLUE PRINTS SERIES

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The Blue Natural Capital Financing Facility (BNCFF) supports the development of sound, investable Blue Natural Capital (BNC) projects with clear ecosystem service benefits, multiple income streams and appropriate risk-return profiles.

This Blue Prints Series outlines the business models and illustrates the investment structure of a selected number of Nature-based Solution (NbS) projects. See [here](#) for other Blue Prints.

CLIMATE RESILIENT SEAWEED CULTIVATION

Blue Print builds upon the SeatechEnergy efforts in Indonesia and Vietnam (in partnership with Greener Grazing)



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Problem and practice so far

Algae-based aquaculture in developing countries usually involves tying seaweed on strings on the water surface close to the coast in shallow waters. This method does not fully exploit the growth potential of the algae, is at the mercy of external factors (solar radiation, water temperature, pollution and coast proximity) and is prone to the prevalence of seaweed pests.

New seaweed farming methods with multiple environmental, economic (protein, plastic, fiber, fertilizer and bio-fuel), and social benefits are being fostered, through the cultivation of seaweed in open water on platforms, which can be submerged. Not only can this method potentially increase harvest 20-fold, these platforms also act naturally as barriers to fishing or shipping activities, *de facto* enforcing a Marine Protected Area (MPA). In addition, seaweed farming may have further environmental benefits such as the lowering of ocean acidification at a local scale, providing habitats for many marine species and reducing methane release of cattle when the right seaweed is incorporated in feedstock.

Blue Natural Capital solution

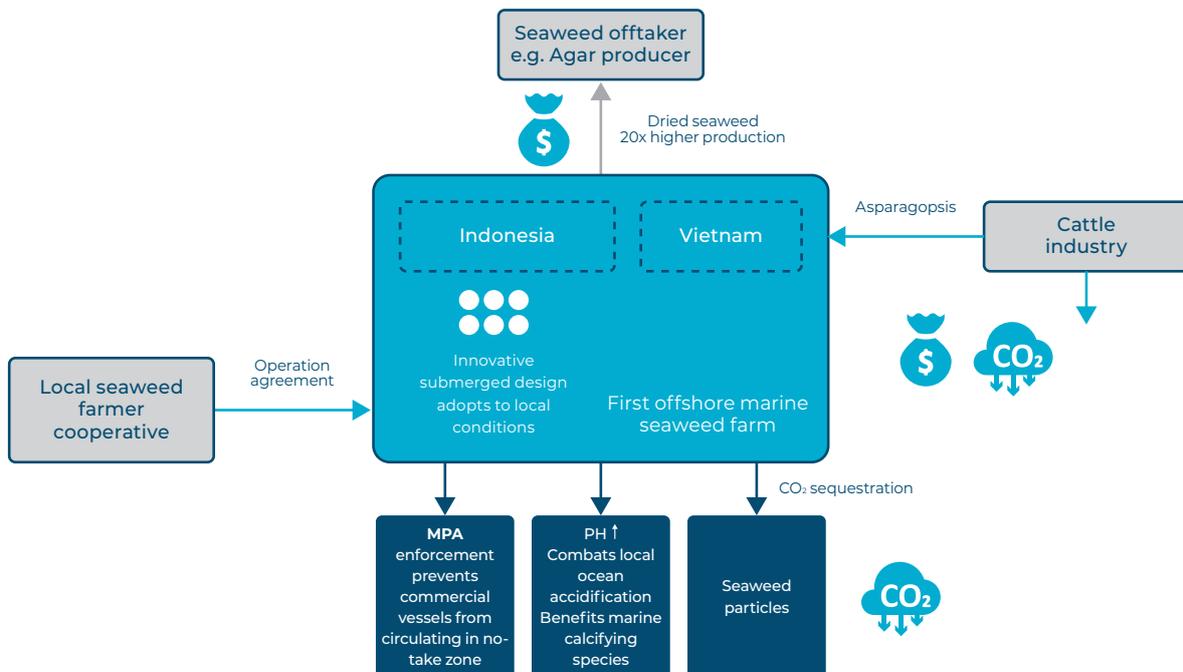
The BNCFF has been engaging with partners with expertise in both marine conservation and seaweed farming to develop models that integrate commercially viable private sector business approaches with clear ecosystem service benefits. The aim is to deliver improved seaweed farming as a Nature-based Solution that has conservation benefits through the conservation of marine habitats and the *de facto* enforcement of a local MPA.

This summary is based on the experiences of a BNCFF supported project. The Blue Print serves as a broader example of how this vision - to integrate marine protection and seaweed farming - can be delivered, outlining both the challenges but also the possibilities.

BNC business model

The main revenue stream in this model derives from the sale of seaweed to a local processor and agar producer with whom an off-take agreement has been signed. With a design that allows users to adapt production to external conditions, these innovative seaweed farming platforms can be submerged and operate in deeper water where the temperature of the water is lower and more stable, mitigating possible climate variations.

As a spin-off project and not part of the core business plan, the commercial cultivation of the wild seaweed species *Asparagopsis taxiformis* is piloted in Vietnam. *Asparagopsis taxiformis* has enormous greenhouse gas (methane) mitigation potential when incorporated in relatively small quantities to feedstock for ruminants.



Blue impacts and safeguards

In general, the positive impacts include climate change mitigation, ecosystem protection, climate adaptation, business impact mitigation and social impact.

Positive impacts on ecosystem protection and climate adaptation

The main positive impacts on ecosystem protection and climate adaptation stem from effectively protecting marine ecosystems. These platforms act naturally as barriers to fishing or shipping activities, *de facto* enforcing a MPA, which would otherwise be unmanaged due to lack of alternative income opportunities.

In addition, seaweed cultivation is expected to have positive impacts on biodiversity through habitat creation and creating attractive breeding areas. For instance, it is reported that fishermen in Madagascar who started seaweed farming have noticed the return of octopi.

Positive impacts on climate change mitigation

Seaweed also has the capacity to fixate carbon and has promising potential in lowering ocean acidification at a local scale.

Studies also suggest that the seaweed called *Asparagopsis taxiformis* has a methane release reduction potential of up to 98% when incorporated in relatively small quantities to feedstock.¹

Positive impacts on business impact mitigation

The impacts of the seaweed farming are being minimised by developing the platforms locally to limit transport-related CO₂ emissions, which will be made from recycled materials.

Positive impacts on social aspects

Finally, the cultivation of seaweed would create an estimated 500 new jobs in rural areas currently facing little income opportunities, and training will be provided to enable personal growth. Women would occupy 50% of the newly created jobs.

Blue stakeholder roles and needs

- **Project developer:** A private sector entity with sufficient expertise and access to funds to manage revenue oversees seaweed farming activities. It should ideally be well embedded in the local economy as well as regulatory setting notably by having received all necessary permits. Depending on the private entity set-up, having a local subsidiary can help managing the seaweed business on the ground.
- **Public entity:** state, regional or local bodies with the legal authority to issue permits and licenses to operate/reserve sea space and to use land. It is also beneficial to identify the governmental entity that promotes and regulates the seaweed industry, for example Ministry of Marine and Fisheries.
- **Local communities** for seaweed production and other potential jobs/ancillary income, possibly channelled through local cooperatives of seaweed farmers.
- **Client(s)/customers/prospects:** local companies with access to international buyers/markets to sign off-take agreements of seaweed products, may it be for agar production, feed material or any other seaweed use.

¹ <https://www.sciencedirect.com/science/article/pii/S0959652620308830>



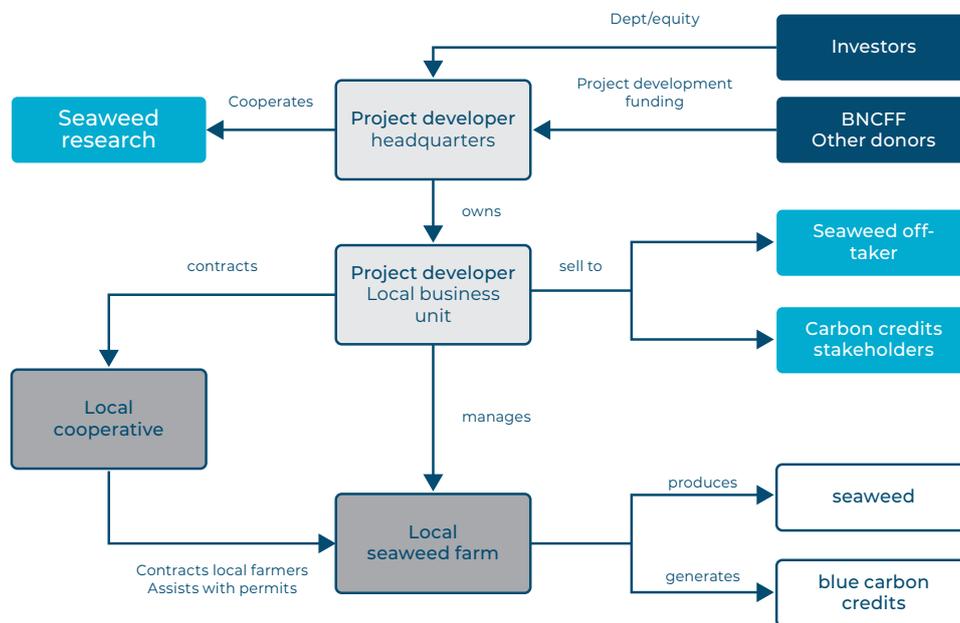
- **Interested investor(s):** impact investors, public bodies and philanthropic partners interested in investing in the project given the potential

attractiveness relating to climate change, nature conservation and improving livelihoods.

Blue investment structure

Substantial capital expenditure investments will be required for the implementation of the business plan, and early funding will be allocated to constructing and deploying the cultivation platforms, conducting environmental impacts studies, and covering the cultivation costs of *Asparagopsis taxiformis*.

At the same time, there is need for a local legal entity to handle local employment, contracts and other related issues.



Blue scalability and replicability

The business model is fully scalable and replicable. Multiple farms can be rolled out globally in coastal countries. With the help of the BNCFF, work on a pilot site in Indonesia is progressing. Indonesia alone has a coastline of 96,000 kms, which is mostly suitable for seaweed farming. The technology and project setup are such that roll out of multiple

farms can be done simultaneously. According to MarketsandMarkets, the seaweed cultivation market size is estimated to be valued at USD 16.7 billion in 2020 and is projected to reach USD 30.2 billion by 2025, recording a compound annual growth rate of 12.6% during the forecast period, in terms of value².

2 [Seaweed Cultivation Market Size, Share, Trends and Forecasts to 2025 | COVID-19 Impact on Seaweed Cultivation Market | MarketsandMarkets](#)

Practical tips

In order for investors to have confidence in the bankability of such projects, it is important to be able to demonstrate the working of the technology, the benefits of the cultivation of seaweed and its potential sales channel (for example, its use as supplement for ruminants) and the environmental impacts across the life cycle. Such information

should ideally be backed by studies or case studies. Finally, adding revenue streams, for instance the generation of carbon credits through external verification and auditing, will foster the confidence of investors. This notwithstanding, such approach can only be successful if embedded in the local economy as well as in the regulatory setting.

To learn more about this BNCFF supported project in Indonesia and Vietnam (in partnership with Greener Grazing) visit here:

<https://bluenaturalcapital.org/campaigns/seaweed-farming/>

<https://seatechinnovation.com/>



Since its launch in 2018, the BNCFF has become a global brand name in Ocean Impact Finance. After screening over a hundred proposals, it is presently supporting 8 blue Nature-based Solutions pioneer projects with grant funding.

<https://bluenaturalcapital.org/supported-projects/>

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