



Sustainable and circular organic waste and Sargassum management on Bonaire (BONCIRC)

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Background

Sargassum blooms are a persistent problem throughout the Caribbean, with negative impact on coastal ecosystems, fisheries and tourism. The Dutch Caribbean islands are affected by these blooms, and currently sargassum management plans are being developed to mitigate the negative effects of these blooms. There is a need for valorisation of the sargassum biomass towards products of interest for the islands, that fit in the current goals towards sustainable Nature management and resilience of the island communities.

The blooms are difficult to predict, both with respect to time and location of appearance and with respect to the amounts of biomass that would land on the coasts. Therefore, it is difficult to define value chains based exclusively on sargassum biomass. In a recent study¹, strategies have been described to co-process sargassum together with organic residues in the context of the Dutch Caribbean islands. These strategies are developed further in Bonaire (Fig. 1,2) as case study.



Figure 1. Map of Bonaire.



Figure 2. Cleaning of Sargassum on sand in Bonaire. Photo credit: Sabine Engel

Objectives of the BONCIRC project

- To develop *circular systems to manage organic wastes and Sargassum* on Bonaire to increase sustainability of waste management, *decreasing landfilling and associated leakage of nutrients and environmental damage while adding value*
- To evaluate and develop *circular applications for organic wastes in agriculture and for energy*, with positive impacts on Nature, economy and society in Bonaire. The streams (chicken manure, Sargassum, vegetable, food and garden waste) will be assessed for *direct applications for high value products (feed)* as well as for *applications as substrates for compost and energy*
- Investigate how the project approaches and results can be combined with similar activities in the area and establish or reinforce *interactions on knowledge and networks in the Caribbean region*

Approach

Bonaire is a special municipality of the country of The Netherlands. With a population of 22,573 inhabitants in 2022 and 288 km² of surface, this island represents a relatively small community, that limits the processing scales of technologies to be implemented. Potential uses of the organic wastes for applications in agriculture and for energy generation (biogas) are being investigated (Fig. 3).

Circular use of organic residues aim not only to avoid a waste problem, but to optimally use and re-use the components in the organic residues (nutrients, fiber, elements, protein, etc).

To be processed, the sargassum biomass needs to have low sand content, making harvesting on the sea a preferred option compared to removal from the coast. In addition, the applications of sargassum in agriculture could be limited due to its content in heavy metals, iodine and/or arsenicum¹. Therefore, alternative applications of sargassum streams outside the food chain will be evaluated as well.

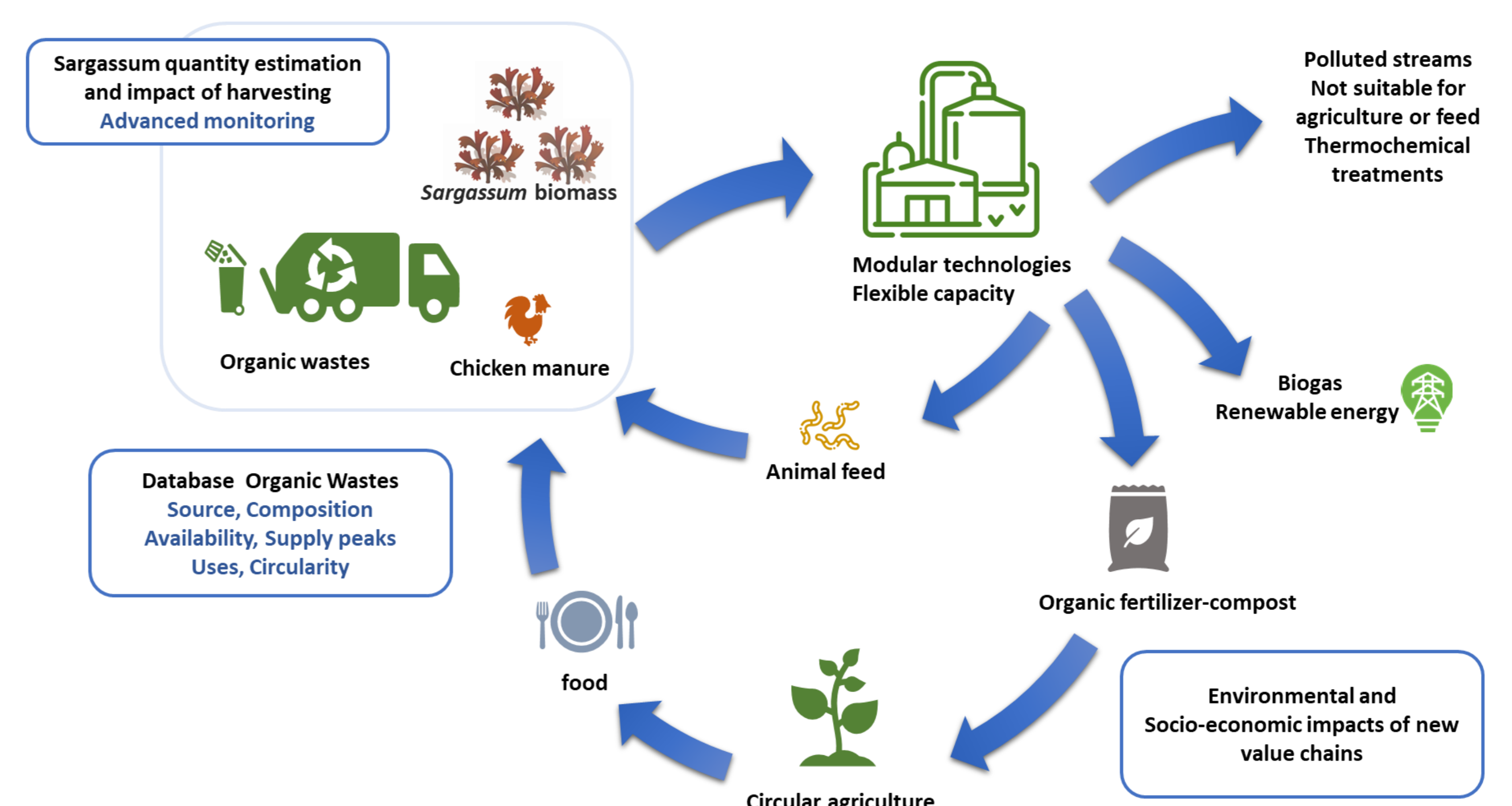


Figure 3. Concept of the BONCIRC project for circular use of organic residues of organic wastes and sargassum biomass and major tasks and approaches,

All local relevant parties involved in waste management, energy and water supply and agriculture development are collaborating together with two local agricultural businesses, the Dutch company AlIOptimal (coordinator, provider of biogas/composting technologies) and Wageningen University and Research (Scientific coordinator).

Conclusions

- Integrated circular uses of organic wastes and incidental sargassum biomass fitting the local scale and needs are being developed for Bonaire. These approaches could be applicable for other areas, however for each specific area the value chains need to be adapted.

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Reference

1 A. M. López-Contreras, et al (2021) "Opportunities for valorisation of pelagic Sargassum in the Dutch Caribbean" WUR report 2137, DOI: 10.18174/543797

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