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# Exploiting blue byproducts and managing the tension between transition and transitory economy. A comparison between green seaweeds in Brittany and shrimp fishery byproducts in Quebec.

Antoine Police\*<sup>1</sup> and Juliette Daquin\*<sup>†</sup>

<sup>1</sup>Arènes: politique, santé publique, environnement, médias – Université Rennes 1 CNRS – France

## Abstract

The problematic relationship between the production-based economy, both on land and at sea, and the marine environment is regularly singled out for criticism. Both environmental pollution and overexploitation of stocks are cited as factors in the degradation of natural marine capital. However, this problematic situation is giving rise to economic activities at the crossroads between the circular economy, which promotes the treatment and reuse of waste, and the blue bioeconomy, which seeks to maximize the added value derived from biomass by generating new (co)products (Laperche et al., 2024). The requalification of residual material or excreta from industrial activity into a stock of marine (bio)resources is at the root of new value chains and economic projects (such as a French company which, since 2020, has been incorporating oyster shell powder into wetsuits to limit the use of neoprene). There is an underlying tension running through them. The claim to build a viable "transitional" blue economy echoes well the conventional narratives of the bioeconomy that aim to drive economic investment in these emerging industries (Giampetro, 2019). However, the medium-term viability of these new activities is hampered by the uncertainties surrounding their supply of blue by-products as feedstocks. Proactive environmental policies aimed at eradicating marine pollution generated by land-based industrial activities, or at preserving natural marine resources by restricting marine extractive industries, confer a potentially "transitory" character on economic projects based on the exploitation of "blue by-products". This article looks at the socio-economic construction of these blue by-product value chains, based on a bottom-up territorial approach. How do operators in blue by-product value chains take advantage of the tensions and complementarities between waste management policies (local, national, international), incentive policies for the economic valorization of blue by-products and environmental policies for the protection of the marine environment? What material and symbolic resources do these policies provide? How do these value chains fit into their respective territorial configurations, and what affiliative strategies are industry operators deploying towards the dominant land-based and sea-based sectors? Do new activities help to green the linear productivist model? Are they limited circular extensions of this model, or are they undergoing a process of autonomization driven by economic logics that, for example, encourage the import of exogenous by-products to supply their activities? How are operators attempting to resolve the tension between transitional and transitory economies that the ambiguous status of blue by-products poses for the viability of their

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\*Speaker

<sup>†</sup>Corresponding author: juliette.daquin@univ-rennes.fr

economic activity? Does the debate over the status of the material (polluting excreta, by-product, waste, etc.) constitute an argument likely to have an impact in a rivalry between emerging activities?

To answer these questions, this article is based on a qualitative investigation of two case studies concerning value chains for green seaweed in Brittany (France) and shrimp residues from fishing in Québec maritime (Canada). The material consists of semi-directive interviews with stakeholders (economic operators, scientists, professional representatives, local players) and a documentary analysis of public reports, press articles and corporate communication materials. The case of green seaweeds is set against a backdrop of environmental controversy surrounding the origin and responsibility of the "green tide"<sup>1</sup> phenomenon. The explosion of nitrate levels in soils and their run-off into coastal waters are fuelling the proliferation of green algae (*Ulva* sp.), which constitute a drifting biological mass whose rapid putrefaction following their stranding on shores is proving toxic (Menesguen, 2021). The campaign against green tides, through the regulation of nitrate effluents via local plans<sup>2</sup>, is seen as a public objective weighing on pig farming, an important sector of the regional agro-industrial complex. Meanwhile, the sustainability of the shrimp fishery, which over the past twenty years has become one of the key resources of the Quebec fishing industry, is threatened by the instability of wild stocks<sup>3</sup>. Encouraged by proactive economic policies, the food processing sector has made major R&D efforts to add value to shrimp residues, seeking to overcome the sector's weaknesses in a region facing recurring regional development problems. Against this backdrop, a number of players are basing their economic activity on the collection, processing and valorization of these blue by-products. Since the mid-2000s, we have seen the emergence of a Breton value chain involving companies affiliated with the regional agro-industrial sector, deploying non-energy valorization for the animal and plant health markets. In Quebec, following on from scientific studies, shrimp processing plants are equipping themselves to ensure the valorization of shrimp by-products for the agri-food, human and animal industries, as well as diverse applications in various sector.

These case studies enable us to compare the forms of territorial hybridization between circular economy and blue bioeconomy projects, as well as the political and economic uses of these two motifs. The first set of results concerns the tensions between the creation of a new economic model that is autonomous in its supply and the maintenance of a dependence, linked to the availability of the resource, on threatened or changing historical sectors. Are operators developing blue by-products seeking to emancipate themselves by linking up with other sectors offering them opportunities? Do territorialized value chains present particular limitations in this respect? A second set of results concerns the political limits of the blue by-products economy in regional contexts of uncertainty. Do we observe differentiated strategies for adapting to uncertainty? Do the repertoires of the circular economy and the blue bioeconomy constitute repertoires that operators mobilize to legitimize their value chain? Are the difficulties of building a territorial brand around blue by-products, such as Breton green seaweeds, compensated for by integration into projects claiming to be part of the blue economy?

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