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Theme issue contribution

A Wealth of Worths: Critical Details in the Cultivation of Norwegian Seaweed

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Abstract
In recent years, the blue bioeconomy has been promoted as an economy that can deliver economic growth while being sustainable. Yet, it has also been subjected to critique. This article engages with the question of how to perform a scholarly critique of the blue bioeconomy by studying the Norwegian seaweed cultivation industry. Seaweed cultivation has been attributed with the potential to be environmentally beneficial and to generate enormous economic growth. Inspired by the "good economy", the article problematises the good of Norwegian seaweed cultivation by investigating alternative ways of relating normative and economic value than the one currently dominating the industry. Through ethnographic studies of the manual processing procedures on a small seaweed farm, the article shows how these processing procedures enact the good of cultivated seaweed as residing in its processing rather than in the biological substance. The article also shows how this manual processing generates a wealth of registers of valuing, which value both seaweed and the beings in its environment for more than their commercial potential. Finally, the article argues for attending to details and uses them to commence a critical dialogue about what is and ought to be good of good economies.

Keywords: blue bioeconomy; seaweed cultivation; good economy; critical proximity; details

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Introduction

What makes a blue bioeconomy good? And how to critically examine economies that purport to be good? As policy efforts turn to making the ocean economy environmentally sustainable, these questions have become pressing.

For over half a century, efforts of growing the Norwegian ocean economy through attempts at domesticating salmon, trout, and cod, and cultivating new markets, have brought about a "great economization of the ocean" – an intensified exploitation of the ocean and its beings (Asdal and Huse 2023). Recently, the EU launched a strategy for a "blue bioeconomy", indicating a strategic shift away from the mere pursuit of "blue growth" and towards a more sustainable bioeconomy at sea (European Commission 2021). This sustainability is envisaged to be achieved by cultivating hitherto uncultivated marine organisms such as microbes and algae, and through the "valorisation of co-products" from traditional marine industries, such as fish discards (European Commission 2020). In Norway, a similar vision of a sustainable blue bioeconomy has been launched in policy and research reports. Here, seaweed cultivation has been envisaged as the basis for a whole "new Norwegian bioeconomy" (SINTEF 2014), and attributed with an enormous potential for economic growth as well as for enriching the ocean environment by sustaining marine biodiversity, mitigating ocean acidification, and up-taking carbon (DKNVS and NTVA 2012; SINTEF 2014). This year is the tenth anniversary for the legalisation of commercial seaweed cultivation in Norway, and now the development of the industry has also been subjected to critique, especially with regard to its strong focus on large-scale growth (Albrecht 2023).

The industry's focus on growth can be traced back to a report published by the Norwegian Society of Sciences and Letters (DKNVS) and the Norwegian Academy of Technological Sciences (NTVA) (DKNVS and NTVA 2012). This report estimated a production potential of as much as 4 million tonnes in 2030 and 20 million tonnes in 2050 and delineated industrialisation, mechanical automation, and large-scale production as the path to profitability (DKNVS and NTVA 2012). Access to very large areas was also required, and subsequent reports argued for making space for seaweed cultivation by cultivating in offshore locations (Broch et al. 2019; Norderhaug et al. 2020. See also Stilling and Asdal, forthcoming). Albrecht (2023) has demonstrated that although entrepreneurs in the industry generally consider the growth potentials estimated by the report as being too optimistic, the orientation towards large-scale and industrialised growth is shared by policymakers, researchers, and most entrepreneurs, and that alternative trajectories – such as those advocating for a more diversified industry, with locally rooted, small-scale farms – are marginalised (ibid.: 9). Observing that most

Norwegian seaweed entrepreneurs consider upscaling to depend on investment-intensive automation, technological innovation, and integration into existing food and feed processing systems, Albrecht warns that large-scale growth, while beneficial to company shareholders and investors, may reduce the "coherent distribution of the potential social benefits" that scholars vested in socially just blue resource management call for (ibid.: 8).

This critique is found across marine science and technology studies (STS) and adjacent fields, where policy visions of and economic ventures into the blue bioeconomy have been met with scepticism, particularly regarding the effects of reconciling capitalist pursuits of economic growth with environmental concerns. Helmreich (2007) has characterised biotechnological attempts at harnessing marine biodiversity for commercial purposes as a "blue-green capitalism", "where blue stands for (a particularly American vision of) the freedom of the open ocean and speculative sky-high promise, and green for belief in ecological sustainability as well as biological fecundity" (Helmreich 2007: 289, original emphasis). Arbo et al. (2018) have argued that blue growth strategies risk furthering the industrialisation and financialisation of ocean space and resources and warned that concepts such as "ecosystems services" enable the expansion of "unsustainable capitalistic practices" to new domains. Similarly, Johnson and Braverman (2020) have linked the rise of the blue economy with the techno-optimistic notion of the "good Anthropocene", and criticised blue economy advocates' portrayal of the "oceans as utopian spaces of limitless, yet sustainable, development" (Johnson and Braverman 2020: 9). Thus, this literature outlines several overlaps between the blue bioeconomy and its land-based, green counterpart, including the high hopes surrounding it (Martin 2015), and its investment in biotechnology as a means of surpassing ecological limits to growth (Cooper 2008).

Recently, Asdal and Huse (2023) have suggested a different approach to ocean economy studies and the critique of it. Bringing valuation studies and social studies of markets together in a study of the life and economisation of the cod fish, they seek to bring nature back into these fields of studies. By attending to "(…) the rich nature-worlds that markets and commodities are made from, we can learn about preferences, but even more about dependencies, precarities, and the vulnerabilities of nature as well as economy. We can begin to ask, is this a good economy?" (Asdal and Huse 2023: 26). This question references the notion of "the good economy", which Asdal et al. (2023) have suggested as an analytical tool for critically investigating the bioeconomy without presuming it to be "simply another turn in a capitalist logic" – at least from the outset (Asdal et al. 2023: 2). They argue for an analytical approach that examines the entwinement of normativity and economic values in the bioeconomy, as well as in

other economies in the recent past, to "demonstra[te] how the economy can be otherwise and in fact relatively recently was otherwise" (Asdal et al. 2023: 2, original emphasis). Compared to the marine STS studies referred to above, "the good economy" provides a more pragmatic entrance to critique, in which the question of whether the economy is good is approached by investigating how different economic configurations were constructed as good in the first place (ibid.).

What, then, is a good seaweed? This article examines how economy, biology, and normativity are related, albeit not in the Norwegian seaweed industry as such, but in one small farm, here called Goodweeds.[1] Whereas most entrepreneurs in the Norwegian seaweed industry pursue profit by scaling up production volumes and automatising production processes (Albrecht 2023), Goodweeds produces seaweed of an artisanal quality and aims to "make money by being green". To study how Goodweeds produces good seaweed, I take inspiration from Heuts and Mol's study of "good tomatoes" (2013). Unlike Asdal et al. (2023), Heuts and Mol do not consider the economy as a whole, but they provide a compelling analysis of the various "registers of valuing" at play in the production of valuable goods. I apply this to show that Goodweeds' manual processing values seaweed along registers which extend beyond commercial and even environmental potentials.

This article is also concerned with developing a critique of the good economy. Here, I draw on Latour's distinction between two strategies of critique in science studies, "critical distance" and "critical proximity" (Latour 2005a). The former performs critique by developing grand narratives and from a strong, normative stance, whereas the latter renders objects critical by closely examining details. These two strategies and the tension between them are also present in valuation studies. Here, an editorial has debated whether blatant critiques of valuation practices make valuation discussable or merely reproduce existing oppositions – and vice versa, whether impartiality and symmetry allow for a deeper understanding of the issues at hand, or rather inhibit interventions (Doganova et al. 2014). This article relates to both positions. I suggest that valuation studies can develop critique through critical proximity to valuing activities and by attending to what I call "critical details": small things of value that can be mobilised to problematise the good of economy.

The analysis is based on ethnography conducted between spring 2022 and spring 2023. I visited Goodweeds three times, for five weeks in total. During those stays, I worked as an unpaid intern, partaking in daily life on the farm on roughly the same terms as other interns – most of them university students – working there. In addition to participating, observing, taking notes, and photographing, I have

[1] All names of companies, people, and places are pseudonymised.

conducted interviews with the management, seasonal workers, interns, and with one freelancer – eight interviews in total. I also participated in an online seminar for Goodweeds' shareholders in the summer of 2022. The analysis emphasises "thick description" (Geertz 1973) of valuing activities and the "details" that these activities foreground. This means that the analysis is based on ethnographic data – notes and quotes which were jotted down while situations unfolded, and which were elaborated afterwards. It also means that the analysis provides a synchronic description of Goodweeds, which gives prominence to the here and now of said situations rather than to the changes that Goodweeds underwent during the year I followed the company.

The article proceeds as follows. The first section discusses the Norwegian seaweed industry in relation to the strategies of critical distance and critical proximity. The empirical sections first place Goodweeds' strategy of "making money by being green" in relation to the dominant way of relating sustainability to economy in the Norwegian seaweed cultivation industry. Studying the processing procedures at Goodweeds, I show that the "good" of Goodweeds' seaweed consists in being processed well, that is, by skilled hands, thus becoming an artisanal product rather than a green biomass. This manual processing generates a wealth of registers of valuing, which value both the cultivated seaweed and the beings in its environment for more than their commercial potential. I argue that these registers of valuing foreground certain details, small, but significant things that apprise us of the relations between the cultivated seaweed, the farm, and their environment, and which hold a potential for challenging and redefining the good of Norwegian seaweed cultivation. However, they do not lend themselves easily to the valuation tools usually deployed to account for environmental impact, and this challenges Goodweeds' goal of "making money by being green". In conclusion, I propose that even though Goodweeds filed for bankruptcy while this article was written, there lies a critical potential in salvaging the details from the bankruptcy estate, by which I mean extricating them from Goodweeds, and using them to problematise the good of the Norwegian seaweed cultivation industry and to engage in critical dialogue about the good of good economies.

Norwegian Seaweed Cultivation and critique

What makes the Norwegian seaweed industry an interesting case of a "good economy" is its promise to deliver both an enormous economic growth and to benefit the marine environment. In 2012, an influential research report stipulated that in 2050, Norway's seaweed cultivation industry could produce as much as 20 million tonnes of seaweed biomass per year – a potential which has since become a target for governmental policy (DKNVS and NTVA 2012; see also

Stilling and Asdal, forthcoming). This large-scale seaweed cultivation industry is envisioned as the basis of "a new Norwegian bioeconomy" that will bolster the Norwegian economy when oil extraction ceases, while simultaneously enriching the ocean environment by sustaining marine biodiversity, mitigating ocean acidification and up-taking carbon (DKNVS and NTVA 2012; SINTEF 2014).

In environmental humanities, the term "good Anthropocene" has been applied to criticise such projects of solving the current ecological and climate crises by the use of well-known means (Hamilton 2015; Haraway et al. 2015; Tsing 2017). When it was first introduced by the environmental scientist Erle Ellis, the term "good Anthropocene" was used to argue that if humans use "our unprecedented and growing powers (…) to create a planet that is better for both its human and nonhuman inhabitants", the Anthropocene should be perceived "not (…) as a crisis, but as the beginning of a new geological epoch ripe with human-directed opportunity" (Ellis 2012: n.p.). Since then, scholars such as Tsing and Haraway have given the term a different value by using it to warn against "the fix-it people", those who "believe in a 'techno-fix'" and consider the Anthropocene, the current epoch where humanity and its industry have become a destructive force of nature, as a situation that "(…) can be controlled and exploited by familiar civilizational tools (…)[such as] capitalism, elite technology, and canonical philosophy" (Haraway et al. 2015: 546; Tsing 2017: 16).

With its grandiosity, its aim of creating market dominance, its envisioning of upscaling, expansion and intensification as the means of creating an economically viable growth, and its technological solutions to "problems" such as ocean acidification, biodiversity loss, and climate change, the vision of a new, Norwegian industry based on industrial-scale seaweed cultivation lends itself easily to this kind of distanced critique. Research and innovation strategies present Norwegian seaweed cultivation as an environmentally friendly alternative to the resource extracting and pollutive carbon-based ocean economy it is imagined to replace, but they also promote a fast-paced development of large-scale production, which is to be realised through industrialisation, automation, biological refinement, and by extending cultivation activities to offshore regions (DKNVS and NTVA 2012; SINTEF 2014; Broch et al. 2019). As Albrecht (2023) has illustrated, this has several problematic consequences. The need for a sizable production area has led to visions of establishing industrial production in offshore areas, and the comprehensive investments required to realise such a production are likely to result in the concentration of business ownership. Thus, Albrecht concludes that "to prosper [in the Norwegian seaweed cultivation industry] without a strong growth focus seems more utopic (…) than the envisioned conquering of offshore spaces" (Albrecht 2023: 10). In that light, the new, Norwegian

seaweed cultivation industry seems more like a continuation of long-running attempts at intensifying and expanding the ocean economy than a break with them.

On the other hand, describing – or passing judgement of – this new industry with concepts such as "good Anthropocene" runs the risk of failing to notice that which does not fit into these logics or to overhear those voices that point in a different direction. As Albrecht (2023) brings attention to, there are more versions of the Norwegian seaweed cultivation industry at play than that presented by the above-mentioned reports. Besides, as other studies of emerging aquacultures have illustrated, intensive innovation efforts cannot ensure that the visions of innovation reports are ever realised (Asdal 2015; Asdal and Huse 2023).

The "good economy" offers a different critique of the bioeconomy, which is based on an interrogation of how the normative and the economic are related within it or what "the good" of this version of economy purports to consist of (Asdal et al. 2023: 2). Thus, Asdal et al. (2023) describe how, in the emerging bioeconomy, "the 'bio' is made to stand out as the essentially good". Put bluntly, the bioeconomy is presented as good simply because it is based on biology and, therefore, making this economy good becomes less of question about how to relate it to society, and more of an expert challenge. This also applies to how research and policy papers present the Norwegian seaweed cultivation industry. Here, the "good" of seaweed cultivation seems to consist in the seaweed's properties – its nutrient and carbon absorption, for instance. As mentioned in the introduction, this article engages with the "good economy" (Asdal et al. 2023) as an analytical move that can interrogate alternative ways of relating the normative and economy. This form of critique can be read as an intervention into the tension between the kind of distanced critiques presented above and the pragmatic approach of valuation studies, where value is studied as an outcome of valuation practices (Helgesson and Muniesa 2013; Muniesa 2011). This pragmatic approach has entailed an interest in multiplicity, regarding registers of value, valuation practices, metrics, and processes as well as the multiplicity of values (Helgesson and Kjellberg 2013). Thus, in valuation studies, attempts at reconciling economy and other concerns are often approached as an inquiry into how economic and non-economic values are made and made to co-exist, for instance in markets for impact investment (Barman 2015), or clean technologies (Doganova and Karnøe 2015). This does not mean that valuation studies cannot perform critique, but rather that critique is performed by showing tensions between different valuations, for instance by showing that environmental actions are subordinated to market principles in circular economy start-ups (Ariztia and Araneda 2022) or by showing that markets for environmental impacts contain a tension between commodification, which entails detaching

environmental impacts from their physical environment, and actual environmental improvements, which hinge on the opposite (Chiapello and Engels 2021). While sharing the attention to tools and practices of valuation, the "good economy" extends valuation studies to analyse economies "at large" as well as their historically different ways of relating the economy and the good (Asdal et al. 2023: 8). As such, and by emphasising that the "good" of an economy is also about its relations to politics, society, and the resources it exploits (ibid.: 2), the "good economy" intervenes in this pragmatist vein in valuation studies, prompting the field to expand its means of performing critique of the economy.

Latour has engaged with the tension between distanced and pragmatic critiques in a text titled "Critical Distance or Critical Proximity" (Latour 2005a).[2] A fictional dialogue written in honour of Donna Haraway, the text stages a heated argument between two friends and allies, referred to as SHE and HE. They discuss how science studies should perform critique and be politically relevant in a time when neo-conservatives use terms developed by science studies to deny the existence of global warming, and where tech and agro conglomerates seem to become ever more dominant. The unnamed friends share a concern about these matters, and both agree that the political front lines have moved since the 1980s and that "science studies is in the middle of a difficult search for political relevance" (Latour 2005a: 5). Yet, they part on the question of what good critique performed by science studies should entail. More specifically, they disagree on "details" and the role they should play in science studies critiques. SHE argues for a critical distance that does not get so lost in details and a pragmatism that cannot address politics, but that can defend facts, take massive asymmetries into account, and call out "patterns of irreversibility" (ibid.: 5). HE warns against "replacing politics with moralizing" (ibid.: 4). Instead, HE promotes an approach of "critical proximity", which studies those details that can make sure that issues "reach criticity": that they become hot enough to engage public discussion (ibid.: 8). Since then, Birkbak et al. (2015) have developed a methodology under the name of "critical proximity", in dialogue with Latour's works on critique (2005a, 2005b) as well as with Haraway's "situated knowledge" (Haraway 1988). Not unlike Asdal et al. (2023) and Asdal and Huse (2023), the methodology of critical proximity encourages avoidance of "grand scale ideas" such as capitalism and democratisation in favour of critiques which pay notice to, latch onto, and further develop the critiques that are "always already present in the empirical cases we study" (Birkbak et al. 2015: 268). This, they argue, allows the researcher to explore how actors

[2] The dialogue is published on Latour's website. In Latour's own words, it was "[w]ritten for a book in homage of Donna Haraway but then rejected by the editor". Available at www.bruno-latour.fr/node/248

become connected to or disconnected from issues and to consider actors in the field as allies, whose problematisations challenge existing frameworks for critique (ibid.: 285).

Although I draw on this approach, I do not read the dialogue as a denunciation of critical distance. The statement that the two positions are separated by "details" is ambiguous – it can either mean that they differ on the importance of details or that they are not that far from one another after all. Therefore, I read the dialogue as an appraisal of a tension within science studies regarding what good scholarly critique is and ought to be – a tension which is also appreciated in valuation studies (Doganova et al. 2014) – and as a staging of critique worth listening to as one performed by allies with shared concerns.

A critical voice in the development of a Norwegian seaweed cultivation industry

My guide to the details of Norwegian seaweed farming is Bitten, a marine biologist who is the co-founder and managing director of the seaweed farm Goodweeds. Before that, she was an academic, studying the environment of the seaweed she now cultivates. Goodweeds also stands out among the Norwegian seaweed farms as a small farm with ambitions of increasing the quality rather than the quantity of the production and with an emphasis on the perks of manual labour and slow growth. In Bitten's own words, the company and its team have a reputation in the sector for "doing things differently", and for sometimes playing the role of the devil's advocate in the community of seaweed cultivators.

It was while she was playing this role that I first encountered Bitten. She was a presenter at an online conference, jointly organised by several Norwegian research institutes, municipal authorities, and trading organisations, aimed at discussing means and methods of "commercialising" seaweeds. Over two days, the conference participants – a diverse group of seaweed farmers from Norway, Iceland, the Faroe Islands and Portugal, researchers in marine biology and aquaculture, economists, private investors, municipal officials, and a finance adviser from the national Norwegian innovation fund, Innovation Norway – presented their businesses or research projects. Not unlike the entrepreneurs in the Cleantech Funders Forum described by Goldstein (2018), most presenters commented on the sustainability of their products, for instance how seaweed added to cattle feed might reduce methane emissions, or, when used as a non-synthetic fertilizer, aid decreasing agricultural land use, or which initiatives were taken to lower the carbon footprint of their production. At the centre of discussions, however, was how to make both cultivated and wild-harvested seaweeds the basis of profitable business. Despite their diverse professional backgrounds, most

presenters seemed to agree on the preconditions for achieving profitability. Firstly, the small companies that today make up the Nordic seaweed cultivation industry must be made profitable – something they, according to an economist presenting at the conference, were not at the time. Secondly, the seaweed cultivation must be "industrialised", which here seemed to mean mechanising production processes in order to increase the companies' production volumes without increasing the production costs, thereby lowering the price of the product.

In this setting, Bitten's presentation stood out as a moment of critique. Rather than praising and making plans for how to realise the enormous growth potentials accredited to the Norwegian industry, Bitten criticised the big expectations surrounding the growth and profitability of the seaweed cultivation industry in Norway. The critique followed a recent reorientation of her business, Goodweeds, and a reformulation of the goals in the business plan. When she and her business partner founded Goodweeds a few years prior to the conference, they had started out with a business plan aiming at increasing yields and reducing the production costs, since they were expecting a fall in market prices. However, the business plan did not correspond well with the challenges Bitten and her partner met when they began cultivating. These challenges were biological (getting the seaweed to grow), regulatory (getting a cultivation licence), and finally market-related, with customers asking questions such as "what are seaweeds?", "are they edible?", "what do they taste like?", "what are the differences between the species?", "why are they [cultivated seaweeds] so expensive compared to wild-harvested seaweeds?", and "can you deliver 500 kg yesterday?". Thus, their immediate challenge was not to bring down the production costs to meet a decreasing market price, because there was no "ready-made market", as Bitten put it. Rather, they had to "build a market" by educating people about seaweed. And thus, they changed the goals of their business plan. Instead of pursuing growth on a large scale, they set a goal of "mak[ing] money by being green (…) [N]ot just by acting sustainably, but by being environmentally beneficial" – that is, rather than being sustainable by reducing the negative impacts of the pursuit of profit, Bitten and her company wanted to generate more values than profit alone. They wanted to make a positive impact on the environment and society – the former by translating principles of regenerative agriculture[3] to seaweed farming, the latter by aforementioned educational activities, by engaging in collaborations, and by giving the diverse team working on the farm a sense of "immaterial ownership" by drawing on their different perspectives. To sum up, Bitten presented

[3] Introduced by the Rodale Institute in the 1980s, regenerative agriculture refers to farming aimed at restoring rather than depleting ecosystems and natural resources (Kallio and LaFleur 2023). See also Rodale Institute (2020), and Ahl (2023).

a business plan that no longer envisioned reaching goals of large-scale production and competitiveness in a low-price market, but a slow growth sustained by the production of a high-value product and a pursuit of generating and sharing multiple values: economic, ecological, and social.

Interestingly, this critique seemed to be both normative and quite pragmatic. Normative, because the presentation of a business that pursues other values than profit alone and the rejection of sustainability in favour of a goal of being environmentally beneficial introduced new ideals for seaweed cultivating businesses. Pragmatic, because rather than engaging in ideological arguments against strategies of large-scale growth, Bitten seemed to argue for the possibility of an alternative simply by practicing it. I was interested in how this alternative way of developing a seaweed farm was practiced: how is a high-value seaweed product produced, in which way does such production generate multiple values, and how would Goodweeds translate these values into profit? And what might that tell us about alternative ways of relating normative and economic value in the Norwegian seaweed industry?

Crafting product quality

If the Norwegian seaweed cultivation industry at large attempts to achieve profitability by industrialising production processes and thereby seeking a lower price, Goodweeds pursues a strategy of increasing the price of their product by processing well, thereby "valuing" their product as a craft product. I use the term "valuing" here to indicate that this processing is an activity that entails both "evaluation" and "valorising" (Heuts and Mol 2013: 129). This distinction builds on Vatin (2013), who argues that valuation studies should not only study evaluation, the "static judgement attributing a value" to something, but also "valorization", the dynamic increasement of value, which Vatin locates in the sphere of production. Work and production, Vatin argues, do not merely produce goods to be valued and priced on and by the market. It creates value along several "registers of valuation", economic as well as non-economic in kind (see also Asdal and Cointe 2023). Heuts and Mol (2013) develop this argument further by showing that the activity of valuing is carried out by vendors and consumers as well as producers. Moreover, they foreground "registers of valuing" and the clashes and compromises between them, showing the complex work that goes into making tomatoes good.

Goodweeds is, as mentioned, managed by Bitten, an academic who has previously lived on several continents. Her right-hand man is Alfred, the head of production, a former fisherman, who is so locally rooted that his family shares its name with the village where

Goodweeds' has its headquarters. Goodweeds is a cooperative, and both Bitten and Alfred are shareholders. It is a small company. During the time I studied Goodweeds, the permanent staff consisted of three people: Bitten, Alfred, and a sales manager, a position occupied by several people. In addition to the permanent staff, academic interns from various universities in Europe and the US conduct the company's basic tasks and develop projects. In the high seasons, when the seaweed is "seeded" and when it is harvested, the staff expands to include seasonal workers who are paid by the hour. These might be locals with multiple sources of income, adolescents working part-time after school, shareholders, or Bitten's friends, who come from various places in Europe to spend their holiday at the farm while earning a little extra income. At Goodweeds, the growing season begins in November, when ropes infused with germinated seaweed spores are deployed in a marine field – Goodweeds is located in a fjord close to the coast. The harvest season begins in April and continues for about a month and a half, until the end of May.

Goodweeds' seaweed product is only sold for human consumption. It consists of a finely ground, dried seaweed from the two species known as sugar kelp (Lat.: *Saccharina latissima*, Nor.: *sukkertare*) and winged kelp (Lat.: *Alaria esculenta,* Nor: *butare*). Their target customers are businesses in the food industry, in particular food producers with an organic or environmental profile, such as businesses producing vegan replacements for meat, fish, or dairy. Thus, Goodweeds pursues a niche market with high demands for quality, or, to paraphrase Heuts and Mol (2013), a market where consumers value naturalness and sensual qualities above the seaweed's price. In a sense, they produce a seaweed equivalent to the "Tasty Tom" tomatoes described by Heuts and Mol (2013: 132), which should enable them to receive a higher price than if the seaweed had been sold as a supplement to feed for household animals or as growth enhancer for agriculture.

To ensure this high product quality, Goodweeds processes the seaweed manually. Among the larger farms, the seaweed is often processed by cutting the seaweed blades[4] off the ropes, sometimes while still on the boat, and fermenting them in tanks. They argue that this method is the most efficient, allows for more mechanisation of the processes, and that it is the easiest method to scale up. In Goodweeds' case, the seaweed is preserved by drying, exactly because drying allows for manual work. They harvest the seaweed without detaching it from the rope it grows on and transport it to Goodweeds' headquarters,

[4] Since seaweeds are not plants, but algae, their parts are described by another vocabulary than that used for plants. "Blade" refers to the flat part, which resembles a leaf; "holdfast" refers to the part anchoring the seaweed to rocks (or here, a rope), which resembles a root; and "stipe" is the stem-like structure in-between the holdfast and the blade.

where the ropes are fastened to clips in the ceiling. The seaweed is still alive at this point, since the blades have not been severed from the holdfasts attached to the rope. This postpones the decay of the seaweed and allows time to clean it while it is still wet. In a dried condition, the seaweed is crisp, crumbly, and easily broken, and the crops and fouling will stiffen together and become inseparable. Therefore, the crew "cleans" the seaweed manually immediately after the ropes have been fastened to the ceiling. Dressed in rain gear, hairnets, and sometimes rubber gloves, they unfold those blades that have coiled up around the ropes, disentangle knots, and run their hands through the blades – carefully, so as to not break them – to sever the crops from the greasy threads of filamentous brown algae that have attached themselves to the ropes during the growth season.

This sorting is a "valuing" activity (Heuts and Mol 2013), in which seaweed is both evaluated and valorised along many of the same registers as mentioned by Heuts and Mol, such as sensuality and handling. While Goodweeds' staff distinguish between valuable and worthless seaweed, they improve the taste of the end product, which becomes purer, and prepare it to be dried and thereby become practically imperishable and very easy to handle. Yet, what is perhaps more important than the product's sensual qualities is the manual processing procedures by which these qualities are produced. Because it is processed by the skilled hands of Goodweeds' staff, Goodweeds' seaweed becomes an artisanal product.

This much became clear to me one day, when, during the cutting down of the now dry seaweed, Bitten called me over to show me a vividly green spot on one of the seaweed blades. This is a sign of contamination with sulphuric acid, which the crop gets while being a neighbour to the seaweed species known in Norwegian as "*myk kjerringhår*" or "ladies' hair" in English (Lat. *Desmarestia viridis*), a seaweed containing high concentration of said acid. Bitten's point in calling me over was not so much the spot – which, she said, was not a problem and could just be cut off – but to direct my attention to the value of a processing procedure that allows for noticing these interspecies relationships and their effects. It was the youth worker who "picked it up", she told me, adding that he also worked here during last year's harvest. If the seaweed were processed already on the boat, this would not have been noticed, she said, implicitly referring to the few large and well-known Norwegian seaweed cultivators who cut the seaweed off the ropes on the boat – often using machinery – and preserve it in bulk, for instance by fermentation. Bitten thus implied that Goodweeds' skilled workers produced a product of a quality that cannot be created through mechanical processing, and she characterised Goodweeds' manual procedures as a "craft", a skill acquired through hours and hours of touching and closely examining the growths on the ropes. In producing a craft product, Bitten said that

Goodweeds' "goal is not to make a standardised product", but one where local specificity could be emphasised as a kind of seaweed "terroir" and seasonal variations as "vintage, like in fine wine", so that natural variations could add to rather than subtract from the value of the product.

This suggests a different approach to the development of a profitable seaweed cultivation business than the one dominant among Norwegian cultivators, who pursue profit by scaling up production and automating processing, creating what one of them during a conversation called "economies of scale". As Albrecht (2023) has noted, several Norwegian seaweed cultivators indicate an annual production of 200–300 tonnes as the point when they "break even", while aiming for even higher production volumes. Goodweeds' emphasis on crafting high product quality indicates a different path to profitability.

More importantly, it suggests an alternative relation between the normative, the economic, and the biological – a different version of the "good economy" (Asdal et al. 2023). As Paxson (2010) has illustrated, the notion of terroir has been evoked by US artisanal cheesemakers

> for conveying the value of their craft practice and products [that] … may enhance a cheese's cultural capital and price per pound [and] suggest that the gustatory values that make artisan cheeses taste good to consumers are rooted in moral values that make the cheeses ethically good for producers to make (Paxson 2010: 445).

What I want to suggest here is that, unlike the version of the Norwegian bioeconomy described by Asdal et al. (2023), "the good" of Goodweeds' seaweed does not so much consist in the seaweed's biology, but in the artisanal – and thereby good – processing of this biology.

A wealth of worths

Yet, in Goodweeds' operations, the normative and the economic seemed to be related in more ways than by its good processing methods. Looking closer at Goodweeds' staff while they cleaned the wet seaweed, it became clear that the manual processing procedures allowed for valuations of the seaweed in ways that went beyond valuing the product. In fact, I will argue, the manual cleaning of seaweed fostered a wealth of "registers of valuing" (Heuts and Mol 2013), among them aesthetics, emotional appeal, and interspecies effects, which included the crop's marine environment and its fellow beings on the growing ropes in the array of things to be valued, and, notably, valued them for more than their commercial potentials.

When the staff at Goodweeds cleaned the newly harvested seaweed, Bitten instructed them in a fashion that cultivated the kind of attention and skilled touch that enabled the youth worker to notice the contaminated spot on a crop, as described above. As she moved through the rows of wet seaweed, I heard her point out other seaweed species, describe the characteristics that identify them and add information such as "this grows in shallow waters, on sand", or – referring to a specimen of another species – that it "has a long stipe, grows on mussels". While this kind of attention was put to work to produce the artisanal quality of Goodweeds' product, it appeared that it also fostered other registers of valuing.

One of these registers of valuing was aesthetics, as when Laura, an intern, showed me a specimen of winged kelp which she described as "actually quite pretty" with its long, broad blade and its symmetrical midrib. Another was the emotional appeal exuded by other species than the crop, for instance the lumpsucker, a fish that spawned and reared on the farm site, and which was sometimes pulled up from the water when its rearing ground was harvested. With gentle hands, Laura picked the juvenile fish from the seaweed blades or from the floor and carried it to a bucket of seawater, which she and her colleagues emptied into the sea at regular intervals. In her own words, Laura had become "such a lumpsucker nerd" during her internship. One particular day, she showed me a silvery blue specimen, no longer than a centimetre, that she had found in the folds of the alaria. To her expressed relief, this one wriggled its tail as she slipped it into the bucket of seawater, but most of the lumpsuckers died if they were unlucky enough to be pulled up during harvest. Still, Bitten was adamant that all were carried to the bucket and released in the sea. It was a matter of ethics, Bitten told me on a different occasion: "It's just not good that they die on the floor in there."

More registers of valuing came to the fore in the experiments Bitten conducted to interrogate the relations between the farmed kelps and their environment. For instance, she once showed me an experiment carried out by tying short pieces of seeded rope onto a growing rope and untying one every two weeks to study it under a microscope. Here, she could follow the growth of the seaweed, see when unicellular algae, called diatoms, fastened to the tips of her crops, and get a closer look at the many skeleton shrimps inhabiting the farm site. Like the cleaning procedures, these experiments had a commercial purpose. Knowing how and when the crops and fouling grow might inform Bitten in her attempts to optimise the farming. Yet, when Bitten told me about the fouling, I heard the same fascination that characterised Laura's relation to the juvenile lumpsuckers. So, while Bitten informed me that the diatoms create a rough and slimy surface on the crops that other fouling algae can thrive in, she also told me that they look "beautiful" under the microscope, with their clear colours and star-like

structures. Similarly, Bitten told me that she had observed that the skeleton shrimps inhabiting the farm had spikes along their spine, indicating that they were not of the native, Norwegian species, but of the invasive, Japanese one. The latter is better at colonising new substrates than the native species, and the presence of seaweed farms may therefore fuel its proliferation (Hancke et al. 2021: 24). Even as she told me this, Bitten still valued its emotional appeal, as she smiled while pointing out the resemblance between a brooding skeleton shrimp and a pregnant woman.

The point is that while the purpose of Goodweeds' manual processing procedures and Bitten's close attention to the beings on the rope was to make a high-quality product in the short term, and to improve the cultivation procedures in the longer term, it also generated registers of valuing which did not just value the seaweed as a crop, but the interspecies relations between the crop and the other beings in its marine environment. This valuing activity brought certain details to the fore – small things, such as diatoms, skeleton shrimp spikes, and tail-wriggling lumpsuckers. Albeit small, these details have normative significance. Firstly, because the staff at Goodweeds, by appreciating their beauty, sharing their fascination with each other, and caring for them, also gives worth to the non-crop life forms on the farm. Secondly, because recognising what farming inflicts on these life forms – whether by giving them a rearing ground during the growth season or by effectively putting an end to them during harvest – gives the farm a moral responsibility for these beings. And thirdly, because it complicates the virtues that have been attributed to Norwegian seaweed farming by policy papers and research reports, for instance that of providing rearing and spawning grounds and thereby contributing to marine biodiversity (SINTEF 2014). When the seaweed is harvested and cleaned at Goodweeds, this biodiversity becomes "palpable" (Haraway 2008: 6), and therefore appears as something else or more than biodiversity. One does not relate to a lumpsucker squirming in one's palm as "biodiversity", but as a being, a being made vulnerable by seaweed cultivation. This other notion of life inflicted by farming raises questions about what responsibility seaweed cultivators have for lumpsuckers' and other marine species' lives and deaths once their rearing ground has been pulled up from the water, and whether they are all equally good to rear.

By prompting these questions, Goodweeds' close attention to the growths on the rope itself comprises a critique of the grand-scale visions of the Norwegian seaweed economy. This is not an accusatory or judgemental critique, but a critique "by other means" (Latour 1988), more specifically by granting critical importance to the relations between the crops and the farm on the one hand, and the aquatic environment on the other, and by lending "criticity" to questions regarding seaweed cultivators' responsibility for the intricate and never

innocent effects of introducing new species to the economy, even with the best of intentions.

Making seaweed goods

Thus far, I have shown how Goodweeds' manual processing enacts the good of seaweed as consisting of being processed well. I have also shown that this processing generates multiple registers of valuing which value the seaweed and its companion species (Haraway 2008) for more than their commercial potential, and which, by appreciating that seaweed cultivation affects these beings, holds potential for critique. The remaining question is how to integrate these values into the price of Goodweeds' product and enable them to "make money by being environmentally beneficial", as Bitten put it at the conference. At a shareholder meeting in the summer of 2022, it appeared that making these values commensurable was perhaps too large an undertaking for Goodweeds.

The conversation in the meeting evolved around how Goodweeds should document what they called the "non-economic positive impacts" of their production and enable customers to assess them. A shareholder working with the marketing of Goodweeds emphasised the importance of finding a means to distinguish their product from that of others, because "the customers we want to work with ask for indicators that we are beyond sustainability. We need to be able to assure them that they do the right thing with us." Certification was needed, this shareholder argued. Yet, certifications are costly to obtain, as another shareholder argued, and among the ones discussed by the shareholders, none seemed able to define and measure the qualities most valued by Goodweeds. Was it worth the time and effort, then, one shareholder asked, or should they rather focus on building a strong and trustworthy brand? Or was the most important thing, as yet another shareholder proposed, to formulate a single statement encapsulating "our higher purpose, our mission, our aim, or whatever you want to call it, and we always try to strive for achieving that"?

Following Callon et al.'s (2002) distinction between a product and a good, one might argue that what Goodweeds' shareholders struggled with in this meeting was the task of turning their product into a good – or, more specifically, to turn their good production into qualities attributed to their good. Callon et al. propose to understand a product as a process, a series of actions and operations in which the object's characteristics change, whereas a good is a moment in that process – a stabilised product which can be characterised by a set of properties which both establish its singularity and position it in relation to other similar goods.

The discussion at the shareholder meeting demonstrated that how the good of Goodweeds' processing should or could be qualified,

verified, and translated into properties of their good was still an open question. Whereas the suggested mission statement enacts the good as a moral orientation – as being good – the certifications enact the good as doing good. The latter relates to the goal of being "environmentally beneficial" and making "positive impacts" expressed by Bitten at the conference mentioned initially. At the shareholder meeting, it became apparent what a massive undertaking this would be. As works from valuation studies have illustrated, making such impacts a property of a good or a good in themselves requires making them calculable and thus comparable by devising calculative tools (Barman 2015), a costly process involving the conducting of scientific experiments and measurements (Doganova and Karnøe 2015). The value of an attentive youth worker or of a staff member appreciating the intricate relations between cultivated seaweed and the beings in its environment, however, does not lend itself easily to such metrics for environmental and social value. It seemed, in other words, that Goodweeds had developed registers of value which were too attached to the circumstances of their production to be translated to "impact" – and therefore to become economically valuable properties of the good.

Conclusion: Salvaging details for critical dialogue

As mentioned in the introduction, Goodweeds did not succeed in developing an economically viable alternative to the scale-pursuing businesses in the Norwegian seaweed industry. The company filed for bankruptcy while this article was underway. Yet, the case of Goodweeds illustrates that there might be an alternative way of developing the Norwegian seaweed cultivation industry rather than through large-scale growth and automated production, and that the good of seaweed cultivation might be enacted differently. At Goodweeds, I have argued, the good of the cultivated seaweed did not consist in its undemanding metabolism, which requires neither fresh water nor fertilisers to grow. Rather, it became good by being processed well: manually and in a manner which required resources such as the time, skill, and attentiveness of an engaged staff. Moreover, I have shown how these processing procedures generated other normative values, including the notion that seaweed and the beings in its marine environment hold a value aside from their commercial potential, and that cultivation could include responsibility for how farming activities affect these beings.

In conclusion, I would like to return to the Latourian dialogue with which this article began and its claim that "details" separate critical distance from critical proximity. In this article, I have stayed close to the processing procedures at Goodweeds in order to convey the small but significant details that appeared in these procedures: the acid-green spot on a kelp blade, the nerdy staff, the tail-wriggling lumpsucker, and

the spikes along the spine of the skeleton shrimp. I suggest that studies invested in the good economy might find critical potential in salvaging these details from Goodweeds' estate, by which I mean extricating these details from Goodweeds and moving them into a broader conversation about the good of the blue bioeconomy. Not because they add up to a coherent critique of the Norwegian seaweed cultivation industry, but because they can be mobilised to problematise the virtues that underpin it.

In the specific case of Goodweeds and Norway's blue bioeconomy, mobilising these details can lend criticity to such questions as whether upscaling and automatising are the best paths to breaking even, whether all the species thriving and proliferating on the seaweed farms are equally good, and which responsibility seaweed cultivators might assume for their lives and, in some cases, deaths. Those questions do not add up to a big-picture critique, but they might be a starting point for dialogue between the actors developing Norway's blue bioeconomy and its critics.

On a more general note, proximity may also offer a contribution to the ongoing discussions about valuation and critique. Critical proximity is influenced by the same pragmatism that characterises valuation studies (Birkbak et al. 2015; Muniesa 2011), but its emphasis on critical details allows for developing critiques that lend criticity to questions about who and what is and should be made valuable in good economies – critical, but open-ended questions that may allow alternative problematisations of economy to enter scholarly conversations, and perhaps also for rethinking how good economies can and should be developed.

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