Opportunity Areas for a Seaweed Cluster

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What Is a Cluster?

Clusters are geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate (Porter, 1998). The companies in the cluster are also linked by commonalities and complementarities. For the seaweed industry, the word cluster is therefore fitting as the seaweed industry involves several sectors such as other aquaculture and marine industries, energy- and information technology companies. Consequently, the cluster wording will be used to describe the initiative explored in this report.

Why the Need

In the 'Best Practice Report and Current State Analysis of the Norfolk and UK Seaweed Sector in 2023' published on (15/12/23), the need for a unified platform was discussed to be able to scale up the UK seaweed industry as well as the local sector in Norfolk.

There are currently multiple well-developed seaweed and aquaculture networks in the UK (Table 1). Some of the largest ones being the British Phycological Society, South West Aquaculture Network and the Pembrokeshire Coastal Forum. However, there is currently a lack of a central body for the seaweed industry in Wales and England, where Scotland has the Scottish Seaweed Industry Association (SSIA), that can act as a single voice for the sector when engaging with regulators and government.

Accordingly, a formalised cluster structure with an online platform for England and Wales is needed in order to build a competitive and sustainable industry and will enable collaboration, communication, knowledge sharing, and partnerships within and beyond the sector. This would also support the development of an industry in Norfolk as the sector is still relatively small in the East of England. Hence, being able to source

partners for the value chain, especially end-users and buyers of seaweed and seaweed products, through a network will be crucial for the success of the industry. The cluster and associated platform could also be used to find funding and investment opportunities, partners for research, development and innovation projects, service providers for monitoring needs, support for licence applications, communicate with other sea users and help identify UK and regional unique selling points.

Current Local Marine Networks

The largest active current network in Norfolk and the East of England for seaweed is the **Algae Innovation Platform (AIP)**, which was established by Hethel Innovation in June 2021. The network was founded after discovering a local interest for micro- and macro algae with a lack of a shared platform to communicate about initiatives. The AIP has, at the point of writing, held 11 meetings and has 151 members of the network. The main interest of the platform has been seaweed, where the aim of the AIP is to facilitate collaboration, better understand what is needed to develop a viable and sustainable seaweed and microalgae industry in the East of England and discuss current barriers to development as well as knowledge sharing and networking.

Another local group focusing on aquaculture and the marine environment is the **Marine Science & Technology Sector Council**. The sector council represents companies involved in all aspects of marine science and technology, recently incorporating three additional specialist areas: Agriculture; Aquaculture and Space, to provide a full representation of the services contributing to the industry in the East of England. The steering group is made up of industry professionals from private and public sector companies. Members of the sector council include global survey providers, world-class academic institutions running marine programmes and the many SMEs providing innovative and bespoke solutions to the industry. The sector council is free to join with member forums being held quarterly (information sourced from the Marine Science & Technology Sector Council's LinkedIn page). A list of additional aquaculture networks in the UK can be found in the table below.

Table 1. Current Seaweed and Aquaculture Networks in the UK. As there currently are several aquaculture and seaweed associated networks in the UK, an overview of the main groups is presented in the table below.

Network	Description	Reference
British Phycological Society	Charity devoted to the study of algae founded in 1952; one of the first to be established in the world and the largest in Europe. The society holds annual meetings, supports training courses, has ongoing biodiversity and conservation projects and coordinates education and outreach activities.	(*The British Phycological Society*, 2022)
South West Aquaculture Network (SWAN)	Extensive experience across marine and freshwater cultivation with support from world leading research institutes and UK government agencies. Members meet quarterly.	(*South West Aquaculture Network (SWAN)*, 2023)
Dorset Coast Forum	Independent strategic coastal partnership, which looks at the long term, broad-scale issues facing the Dorset coast and its inshore waters. Linked to SWAN.	(*Dorset Coast Forum*, 2023)
Pembrokeshire Coastal Forum	A Community Interest Company that works to inspire, collaborate and deliver solutions for coastal communities, protect the coast and marine environments and providing independent stakeholder engagement, project development and partnership working.	(*Pembrokeshire Coastal Forum*, 2023)
The Seabed User & Developer Group	Represents the UK's key marine industries. Working with government, its agencies and other stakeholders, such as environmental NGOs, the group supports the development of regulation and marine management	(*Seabed User and Developer Group*, 2023)

	that benefits both business and the environment.	
Scottish Seaweed Industry Association (SSIA)	Based in Oban dedicated to the growth and innovation of the seaweed industry. Their vision is to promote Scottish seaweed, exchange knowledge, grow the sector, inform regulatory guidance, develop the sub-sector, explore and identify funding options and organise events to give exposure to the sector.	(*SSIA*, 2023)
Algae Innovation Platform (AIP)	Established by Hethel Innovation in June 2021. The network was founded after discovering a local interest for micro- and macro algae with a lack of a shared platform to communicate about initiatives. The AIP has in the moment of writing held 11 meetings and currently has 140 members of the network. The main interest of the platform has been seaweed where the aim of the AIP is to collaborate to better understand what is needed to develop a viable and sustainable seaweed and microalgae industry in the East of England and discuss current barriers to development as well as knowledge sharing and networking.	Hethel Innovation, Oct 2023

Best Practice Examples

Scotland already has a joint platform to act as a single voice for the sector, the **Scottish Seaweed Industry Association (SSIA)**, based in Oban. The SSIA is dedicated to promoting the growth and development of the seaweed and aquaculture sector, providing essential resources and services to their members and the wider industry (SSIA, 2023). The SSIA represent over 40 members and organisations and provides a dedicated platform to help seaweed and aquaculture businesses network, share information, and gain access to the best resources the industry has to offer (SSIA, 2023). The SSIA is committed to growing and supporting the industry, from help with funding, assistance with licensing, all the way through to signposting as well as with

up-to-date information and a solid network to engage effectively with. A database of services, blogs and news is available through their website, and they also have a yearly conference. Associate Membership to the SSIA is offered from £200, which include conference discount, engagement with the Scottish Seaweed Industry and subscription to a mailing list for news and information. The full membership can be purchased for £250 and gives access to all of the above as well as right to stand at election and voting rights at AGMs and EGMs. The SSIA also offers business support and advice, including access to funding, market research, and technical expertise (SSIA, 2023).

Best practice examples of groups that act as a collective voice for the seaweed sector outside of the UK include the **North Sea Farmers (NSF)** in the Netherlands. NSF acts as the central network organisation in the Dutch seaweed sector that hosts events and provides communication opportunities for the industry. This platform is seen as essential for the sector to share knowledge and bring the whole value chain together. NSF is also working as a marketing channel for seaweed opportunities and acts as the one place for government and regulators to engage with the industry. The NSF offers a dynamic platform for inspiration, knowledge exchange, and network expansion, where members can access thematic sector sessions organised 6-8 times per year, networking events organised twice a year, exclusive access to a wide range of resources through their member portal, member consultancy, direct support with questions or issues, matchmaking within their network for structural operational support and monthly newsletters (North Sea Farmers, 2023). Membership fees vary based on the organisation's size and starts at €495 p/year for micro-companies. The NSF now have more than 100 paying member organisations, including over 40 internationally operating companies (North Sea Farmers, 2023).

Another example is from the successful seaweed sector in Norway, where the **Norwegian Seaweed Association (NSA)** works as a joint national platform for the seaweed value chain. The NSA was established in March 2021 by merging two Norwegian seaweed networks and is an arena for developing complete value chains within food, feed, ecosystem services and other innovative areas with cultivated and hand-harvested macroalgae as a resource (NSA, 2023). For the NSA, companies for the purpose of farming, small-scale harvesting, production and/or providing seaweed can apply for membership, where membership requires buying a share in the Association and a yearly fee (NSA, 2023). The NSA now has around 70 partners, where members get access to exclusive content, conferences and seminars, focus groups, study trips, exchange of experience, common development projects, partnership in research projects on behalf of the members and sharing of results from R&D projects.

Learnings From Other Local Clusters

To learn from other local cluster developments, a conversation with the team at **Space East** was conducted. Space East is the UK's newest space cluster to be supported and join the national network of Space Clusters. The cluster officially launched earlier this year and brings together leaders from across industry, research and government in the East of England to develop and champion exciting new opportunities in space technology (Space East, 2023). The Space Cluster can offer members a wide range of benefits including knowledge exchange and access to the latest sector information, facilitated introductions, access to a supply chain, networking opportunities, access to market opportunities and collaboration opportunities (Space East, 2023).

As mentioned, the cluster is a part of a wider national network of 15 Space Clusters that meet up regularly to discuss developments and next steps in the sector as well as to share knowledge and useful connections. The Space East cluster itself came out of writing up a Space Strategy for Norfolk and Suffolk document, and now work to progress and connect the space sector in the East of England and beyond. Through the cluster that currently is free for businesses and organisations to join, members get access to an engaged community, business support, insight on current funding and project opportunities and skills resources. One of the main takeaways from the Space East cluster is their focus on marketing and communication with the other space clusters in the UK. In addition to having recurring meetings with the other clusters, they also have separate meetings just focused on marketing initiatives with the appropriate people from each cluster. This collective effort to ensure transparency and cohesive marketing efforts and statements as well as the regular meetings between the different clusters, is something that could be replicated for seaweed cluster building.

Another learning from the Space East cluster is the importance of creating an understandable product that brings value to the members. Space East has therefore worked on their offering and credibility in the sector to build the member base. They also have their own Steering Group made up of local companies and organisations working in the industry. The cluster currently offers free membership, but as it evolves and proves value to its members, a membership fee could be explored. Another way to fund the cluster could be through sponsorships, as it could be vulnerable to rely on one funding stream to operate a cluster.

A conversation with the team at the **Food Innovation Cluster** was also held to gather local cluster learnings. Since 2021, the University of East Anglia (UEA) has been building a growing Food and Drink Innovation Cluster in Norfolk and Suffolk. Emerging from the ERDF funded Broadland Food

Innovation Centre, the Food Innovation Cluster work to support organisations within the food and drink community in the East of England. The cluster is the only trade organisation for the food and drink sector in the East of England, where Norfolk and Suffolk are the home to 1,000 F&D businesses that employ 35,000 people (Broadland Food Innovation Centre, n.d.). The cluster works to connect food and drink producers, suppliers and researchers and promotes knowledge exchange, collaboration and innovation (Broadland Food Innovation Centre, n.d.). To deliver on this, the cluster is linked with Norwich Research Park and their world-leading research alongside the UEA, ranking 1st in the UK for Agriculture, Food & Veterinary Sciences.

The cluster now has over 500 members forming the community and is currently free to join until March 2024. Next year, the goal is to take the cluster from being fully public funded to a sustainable, ambitious and commercially viable cluster. The new membership plan launching next year offers members of the cluster access to mailing list and weekly newsletters, events, workshops and networking opportunities, inclusion in the trade directory, and the opportunity to work with local schools and universities on collaboration projects. To deliver value to its members, it is important for the Food Innovation Cluster to work with the businesses to be able to deliver what they need and want. This will be especially important when the new cluster model is launched next year, and the cluster will already from January be set up as a not-for-profit company limited by guarantee. This means that the Food Innovation Cluster will be controlled by its members, so by joining the cluster as a member, you also become a guarantee. The cluster will also have an advisory board made up of directors and founding members. With the new model, the Food Innovation Cluster hopes to continue to lobby for the sector, where the membership money will be used to deliver support for the businesses in the cluster. The membership once introduced will be a tiered membership model based on the number of employees in a company and will be available from £200 a year for companies with up to 5 employees.

What the Seaweed Cluster Could Look Like

As mentioned, there are several active seaweed and aquaculture networks in the UK. However, many companies in the sector are unaware of these groups and their benefits and do not participate in network activities. There is also little cross pollination and collaboration between different regional groups. More interaction would provide opportunity for wider sharing of best practices and innovation, new business-to-business interactions, novel research and development collaborations and a stronger voice lobbying for

the industry. More advantage could be derived from the current seaweed groups by building a formalised group of clusters in England and Wales similar to that which has been developed in the UK space sector.

Here, there is an opportunity for Norfolk and the AIP to take a leadership role and be the central cluster in the sector that coordinates activities and events. The AIP is the group, from those identified, that has the closest activity to an industry cluster focused on the seaweed supply chain. While the other active seaweed and aquaculture networks identified in Table 1 have a strong geographic focus, many of them also have a wider remit than seaweed. In comparison, the AIP is specifically focused on the development of the seaweed industry and the wider supply chain, and though the AIP has a regional focus, members of the group come from a wider geography.

As the geographic locations of companies are important when defining and establishing clusters, the local groups should be kept and could be re-branded to local seaweed micro-clusters. The ability to meet in person is essential for cluster development and relationship building, which is why cluster borders are often identified by commute time. However, as the seaweed clusters would be geographically dispersed in the UK, and some groups, like the AIP, currently hold members outside of a normal commuting zone, virtual meetings and online resources / services would also form an important part of some clusters, and certainly an overarching cluster association. Annual in-person meetings could be held for each regional/local micro-cluster and an annual event/conference to connect all seaweed clusters and any additional stakeholders, which could be organised and led by the AIP in Norfolk but visiting different venues around the UK. This conference would aim to discuss developments in the sector and what is needed to overcome current challenges, scale up and accelerate the industry. A model to explore for the conference could be that a representative of each regional cluster joins an event committee to develop plans and the programme for the annual event, with one cluster taking a lead and organising in their region each year, but with AIP being the centralising body that provides branding, marketing, coordination and administration of the conference through established channels. This activity could be supported by conference ticket revenue. The model proposed here is similar to how Innovate UK organises their annual events.

From looking at other successful sector clusters abroad, such as the NSF and NSA and the SSIA in Scotland, a membership model might be the most feasible option to fund the development of the cluster model for the seaweed industry in England and Wales. As established networks, including the AIP, already have shown to provide value for its members and have already been operating for several years free to members, a membership model could be initiated with three months of free access followed by either

a monthly or yearly fee. Even though value has already been proven to members, the initial free access could lower the barrier for new organisations to engage with the cluster network. The membership could thereby grant access to all local micro-cluster activities as well as providing access to the overarching seaweed cluster platform. Access to the wider cluster platform could provide additional benefits in addition to the micro-clusters, including signposting to activities of the micro-clusters, news and communications relevant to the industry, access to information and connection with other members across the wider geography, membership rates on events, providing a voice for the sector and many other potential benefits could be offered such as business support and involvement in projects to address cross-cutting challenges. If the new cluster formation for England and Wales followed this structure, it would also be cohesive with the membership model of the SSIA in Scotland, which is currently based on a yearly fee.

This model would also ensure funding of the cluster formation as building the platform to continue to offer value to members will come with a cost. The membership fee and introduction of different member levels could be re-evaluated when the cluster is operating successfully, and the operating model has proved to deliver the expected value. Other funding streams, such as sponsorship or project funding, could also be explored similarly to that of Space East.

Initial funding will be needed to support the build of the cluster business case, website and for marketing efforts before relying on membership fees to cover operational costs. The funding for this could be accessed through sponsorship from key organisations, domestic research and innovation funding bodies or local initiatives. As mentioned, there is a need to increase the awareness level of present seaweed networks, including the Norfolk AIP, in the UK to enable companies in the sector to benefit from the initiatives. Hence, a new cluster model for the seaweed sector will have to be visible, and marketing of the new structure and offer will have to be a focus in the first months. In the longer-term funding may come through specific sponsorship and project grants in addition to membership and events fees, to enable growth of the cluster offering and to build up a pot of funds or support mechanisms to provide or help secure funding for specific initiatives of the micro-clusters. Learnings from the space sector can also be applied here, where separate meetings focused on marketing initiatives could be held between the appropriate people from each micro-cluster. Building the cluster network's identity over social media could also be discussed.

Regarding the members of the cluster network, memberships could be open to businesses and organisations across the whole seaweed value chain

in England and Wales, as well as for other sectors that support the seaweed industry. However, the primary purpose of the cluster formation will be to scale up the UK and regional seaweed industries collectively. A benefit of allowing other industries to access cluster information and become members is that this could enable collaboration around applying for licences to share space at sea. Further, discussions with energy companies and the fishing industry, enabled through cluster meetings and resources, could ensure mutually beneficial, constructive and early process communication, which could resolve any challenges before a potential licence application for seaweed cultivation.

Focusing on the leading Norfolk micro cluster, which could emerge from the current AIP network, a Steering Group or Committee should be formed to drive the cluster forward. The Steering Group could have regular meetings to plan cluster activities and ensure members gain the projected value. The Steering Group or Committee should include influential companies in the sector from across the value chain, key research and governmental bodies, as well as representatives from the micro-clusters when domestic matters are discussed. This would ensure that the current networks are consulted and buy into development plans, ensuring benefits and joint up efforts from relevant parties and networks in the development of a potential new cluster model.

On a local scale, the micro-clusters will have their own Steering Groups and have meetings to support regional development. For the proposed Norfolk seaweed micro cluster, the Steering Group could include representatives from companies such as Hethel Innovation, Norfolk Seaweed, Norfolk County Council, and UEA, as well as from other companies in the local sector. However, the Steering Group should not contain more than 6-10 people to ensure efficiency. It should also ensure that all stakeholders in the local sector have their interests declared in the Steering Group. For this reason, the concept of the Triple Helix could be used to ensure that the Steering Group has good representation from all parties. The theory about the Triple Helix emphasises the importance of creating synergies between three poles: intellectual, business and government (Herliana, 2015). For the Norfolk seaweed micro cluster, this could be local universities, government, and businesses. The Steering Group will also need a chair or leader; this could be a representative working for a company in industry.

After speaking to companies in the seaweed sector about their needs through the interviews for the 'Best Practice Report and Current State Analysis of the Norfolk and UK Seaweed Sector in 2023', the associated dedicated cluster platform or website could have several functions to provide value to members. One feature that could be particularly useful to access industry information, such as reports and evidence for licence

applications, cultivation practices, and funding opportunities, could be having live discussion forums for specific topics available through the membership portal. This could also be used to find collaboration partners for funding calls, as a place to share industry knowledge and best practices, and to ensure communication between the micro-clusters outside of the annual conference. Additionally, regional forums for the micro-clusters could enable local clusters to upload recent information and minutes from meetings so that other micro-clusters could follow progressions. The proposed leading Norfolk micro cluster could also send out monthly newsletters with industry and member updates, articles, and sector events taking place across the UK.

Publications, articles, and industry news could be shared via a blog page or an online knowledge base similar to the NFS portal. This could limit duplication of research done in the sector and spread awareness of recent developments. For this purpose, selected articles and blogs could be available to the public outside of the membership. Some farming companies in the industry also have plans to market and sell their intellectual property so that other cultivators can access their knowledge, experience and operation models when they scale up. This could also be accessed through the cluster website for members. A resource database containing guidelines from regulators and other scientific data could be an additional feature. Another role of the leading cluster could be to help signpost questions and tasks to the right people in the sector, where introductions could be facilitated. The members would also have access to other members through the forums and membership pages, making accessing people and organisations in the industry easier.

The leading cluster could organise cluster-specific coordinated training and workshops to keep momentum and ensure the progression and meeting of the cluster network aims. This could, for example, be to share best practices with other cluster companies and can be held in-person or online through the cluster platform. Meetings should also frequently be held with the SSIA to ensure that all groups provide a coherent front for the UK seaweed industry. Ultimately, the new cluster formation with the proposed leading cluster and the associated platform should act as the one place to go to find information about the seaweed sector in England, Wales and provide the current missing collective voice for the industry that can influence policies and regulations and help to scale up the sector. Finally, after being established, the seaweed cluster formation in England and Wales should also look to coordinate efforts with seaweed initiatives in Northern Ireland.

By combining management efforts of the Norfolk micro cluster and leadership of an England and Wales cluster, benefits such as pooling staff resources can be achieved, which will be cost effective and reduce the

overall effort required if each activity were to be managed completely separately.

Recommended Next Steps

- Work with other sector clusters in the UK and abroad who have been through a similar process and development. Learn from their experiences and take this into consideration when doing further planning and building of the cluster.
- Mapping exercise – create a cluster network map and describe the geography of the proposed seaweed cluster group.
- Engage with existing networks to understand how an overarching cluster could work beneficially with their existing activities, and to enable their activities and regional needs to be factored into cluster planning.
- Identify associated costs with establishing a formalised seaweed cluster network and platform.
- Assess funding opportunities for the cluster network including a membership model and sponsorship.
- Organise a meeting with stakeholders who can act as the first Steering Group or Committee for the proposed leading Norfolk micro cluster to start the planning process.
- Develop a business plan and marketing strategy to define the actions needed to make the cluster network launch a success.

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