

# Project Madoc

**Making waves with seaweed – a new, regenerative industry for Wales**



## Project Madoc: Foreword and introduction

### The Seaweed Alliance

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Cover art by Kath O'Reilly – Multimedia Artist



# Foreword

By Vincent Doumeizel

Seaweed is utterly amazing; it never fails to surprise and excite me for what it can do for us...and what we can do with and for it. Despite having been all around us in every climatic zone since time immemorial, we've lost our close connection with it and concentrated resources on land-based cultivation for the most part.

However, in various parts of the world, thanks to the passion and devotion of a totally committed band of people – like Fiona Trappe and Charles Blair of The Seaweed Alliance – things are starting to shift in the other direction. Back to the oceans, from whence all life on Earth has sprung, to rebalance our ecosystems that are under the most intense pressures from the climate emergency and population growth as never before.

The seaweed revolution we are experiencing gives fresh hope for tomorrow. We only know how to commercially cultivate, harvest and process barely a handful of the many thousands of varieties found globally. If significantly scaled, it could provide an additional source of nutrition, replace plastic and synthetic fertilisers, accelerate medical innovations, mitigate global warming, restore biodiversity and support economies in coastal communities.

The diligent work undertaken by The Seaweed Alliance to produce this comprehensive feasibility study establishes the basis for a sustainable and viable seaweed industry for Wales. It clearly illuminates the way ahead. As the author of 'The Seaweed Revolution', I highly commend the vision put forward in Project Madoc as an inspiration for others to support and emulate to take the industry forward.

I equally applaud the Welsh Government for taking such a positive stance to advance the seaweed revolution.



**Vincent Doumeizel:** Author of 'The Seaweed Revolution'; Senior Adviser on the oceans to the United Nations Global Compact; Director of the Food Programme at the Lloyd's Register Foundation.

Vincent leads the charitable objectives of the Foundation through the funding of innovative projects to drive safety in the food supply chain. Partnering with the UN, FAO, The World Bank, WWF, universities, NGOs and large brands, Vincent led and released the 'Seaweed Manifesto' in a call to scale up the seaweed industry in order to address some of the world's most important challenges (food safety, hunger, global warming, pollution and poverty).

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# Introduction

Historically, the wealth of Wales has been hewn by hand from the earth. From the 'black gold' rush of the 19th century to copper smelting in Swansea, the iron works of Merthyr and the slate mines of North Wales, our nation was in the vanguard of the Industrial Revolution. This forged our cultural identity alongside, and served as the basis of our prosperity.

These extractive industries, though, have ultimately proved unsustainable. Resources taken from the ground have only depleted and are now largely incompatible with Wales's climate goals. Dynamic new industries are replacing them.

In a rapidly changing world, where the climate emergency has come to dominate the agenda, Wales now stands again on the brink of a new era of opportunity originating from and beyond our remarkably diverse coastline. Our resource-rich waters are, as they always have been, the world's gateway to Wales, and equally Wales's gateway to the world.

This catalytic project illuminates an opportunity to accelerate a shift to a new and regenerative industry based on the sustainable farming of selected, native species of seaweed.

## Ordinary *and* extraordinary

The astonishing versatility of harvested and processed seaweed results from its natural occurrence and intrinsic extraordinary qualities. Thriving in the wild throughout much of Welsh waters, it is one of the most nutrient-rich life forms on the planet. Its unique compounds have led to a multitude of applications within high value markets, from pharmaceuticals and nutraceuticals to cosmeceuticals and, more recently, advanced medical devices.

Its future lies at the heart of the Blue Economy – an exciting arena of sustainable industrial development, predicted to double in size globally to \$3 trillion by 2030.<sup>1</sup>

One of the most abundant and promising untapped resources on the planet, seaweed is among the most scalable of nature-based solutions. Alongside its economic advantages, it can offer tangible solutions to the challenges posed by climate change and provide a plethora of ecosystem services.

To do these things, however, it has to be farmed at scale.

Several countries are striving to lead the way in this journey of discovery – Norway, the Netherlands, Ireland, Australia and Scotland among them. All have made significant headway through scientific research, policy, innovation, technology and offshore colocation.

Here in Wales, we face a simple choice. Act now, or get left behind.

## Testing the viability of a Welsh seaweed industry

Funded through the European Maritime and Fisheries Fund (EMFF) – a partnership of the European Union and the Welsh Government – Project Madoc is a feasibility study. Independent specialists, contracted through a competitive public tendering and selection process, examined the viability of a Welsh cultivated seaweed industry in four parts:

- Economic and Market Assessment
- Social License to Operate
- Environmental Assessment
- Suitability Mapping – Sites for Kelp Farming.

Various economic scenarios and timeframes are modelled and stress tested. The highest ambition scenario indicates that Wales has the

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<sup>1</sup> <https://thecommonwealth.org/bluecharter/sustainable-blue-economy#:~:text=The%20worldwide%20ocean%20economy%20is%20valued%20at%20around%20%241.5%20trillion,by%202030%20to%20%243%20trillion.>

potential to build a £106 million industry, contributing £57 million to GVA and close to 1,000 jobs by 2033. This does not include the associated supply chain or potential monetary value of ecosystem services.

Given the characteristics of this nascent industry, a 'beachhead' strategy is recommended, focusing resources initially on a small market area to create a stronghold of the future. This will enable seaweed farmers, processors, entrepreneurs, investors and researchers to coalesce.

The findings of the Environmental Assessment conclude that, in the Welsh context, there would be minimal negative environmental impacts. Overall, the potential environmental risks of seaweed farming would be outweighed by the benefits, including water quality improvements, enhanced biodiversity, bioremediation and coastal protection.

For illustrative purposes, marine mapping indicates that half of Wales's marine space would be suitable for kelp farming. Locations for 'demonstration' sites are identified for the next stage of development.

## Charting a way forward

By its very nature, a new industry is pioneering, innovative, opportunity led, and challenging, with gaps in knowledge and expertise.

Whilst Project Madoc cannot fill all of these gaps, it provides key decision makers, across the political, economic and environmental arena, with a thorough evidence base to inform next steps.

It demonstrates that well-established ecosystem services offered by seaweed can form the basis of a sustainable, regenerative industry for Wales, with an array of high-value, commercial applications. It can feed the supply and value chains of a rapidly advancing Welsh bioeconomy, while at the same time replacing seaweed feedstock imported from East Asia.

In doing so, it can support and promote several foundational tenets of Welsh Government policy namely the Welsh National Marine Plan (2019), the Innovation Strategy for Wales (2023), the Well-being of Future

Generations Act (2015), and the Strategic Vision for the Food and Drink Industry (2021).

An emergent Welsh seaweed industry can form an intrinsic component of a wider new, blue economy for Wales, learning from excellent models in Europe and Australia to accelerate the agenda.

## A call to action

**Our comprehensive analyses conclude that, with the necessary levels of ambition, commitment and investment, a competitive Welsh seaweed industry is eminently technically and commercially feasible, and socially and environmentally desirable.**

How can a small, yet ambitious and confident nation, committed to the sustainable development of its economy, alongside the wellbeing of its future generations, afford not to take this historic opportunity?

The key recommended next step is to develop a comprehensive seaweed industry development plan for Wales, steered by the 'beachhead strategy' and consisting of three phases:

- promoting and supporting capacity-building and knowledge transfer, focusing on three native species – kelp, dulse and Ulva
- scaling of farms and bioprocessing facilities to meet the increasing demands of the seaweed bio-based sector
- colocation with offshore wind farms.

**To fully realise this vision and become market leaders in Europe, this plan should be fully costed, with the human, technical and financial resources to create a best-in-class Welsh seaweed industry.**

It should reflect our intention to once again operate at the world's economic frontier and play our full part in the new, blue industrial revolution.

# Authorship

Motivated by a shared passion for ocean health and nature-positive solutions for climate change, Fiona Trappe and Charles Blair, co-founders and directors of The Seaweed Alliance Ltd, initiated, led and edited this comprehensive, 12-month European Maritime and Fisheries Funded (EMFF) feasibility study as project managers.

The study consists of four key components plus supplementary material:

- Economic and Market Assessment
  - *Economic Modelling Methodology*
  - *International Case Studies*
  - *Seaweed Farming Innovations*
- Social Licence to Operate
- Environmental Impact Assessment
- Suitability Mapping – Sites for Kelp Farming.

Research, analyses and evaluations were conducted by:

**Strategic Innovation Ltd** led by Dr Jamie O'Hare

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