A crop in the ocean

A clever plastic substitute, a nutritious food *and* a skincare ingredient, seaweed is emerging as a miracle plant that could play a big role in combatting climate change. Here, we investigate a growing British industry

by REBECCA NORRIS

Bruce Hare's office is perched on the weathered coastline of Scotland's Isle of Skye. From here, he can look out over the site of his first farm – not a muddy stretch of field, but a patch of ocean. Beneath the waves he plans to suspend ropes laced with kelp, an umbrella term for brown species of macroalgae, more commonly known as seaweed.

Often condemned as smelly and unsightly, the seaweed that rots on our beaches has a bad reputation – an obstacle on the sand to hop over, slimy tentacles to avoid when swimming. The name doesn't help either, aligning macroalgae with those shoots so loathed by gardeners. But Hare, 72, is among a crop of up-and-coming British seaweed farmers who believe it is a miracle plant for our time.

Not only is it a superfood extolled by the likes of Victoria Beckham and Jamie Oliver (who called it 'the most nutritious vegetable in the world'), it's also a mineral-rich skincare ingredient, can be used in feed for cattle – pilot projects in Sweden cut cows' methane emissions by up to 80% a day – and it works as a fertiliser. It could even help tackle plastic pollution, with London start-up Notpla winning Prince William's Earthshot Prize in 2022 for its seaweed-based packaging. Notpla's biodegradable seaweed-coated takeaway boxes are now on the market, with seaweed 'cling film' next on its list.

The plant's environmental credentials begin at the growing stage: it needs no land or fertiliser and some scientists estimate that, acre-by-acre, seaweed growing in the sea is up to 20 times more effective at absorbing carbon than trees. 'The potential is staggering,' says Hare, founder of start-up KALY, which he conceived in 2020. Formerly an architect and real-estate developer, this is his third career. 'Time is precious to me,' he says. 'I think of life as a mountain and I'm on the downward slope, so I'm very careful about how I spend my days.'

Though worldwide seaweed production has tripled since 2000, more than 97% of this £11 billion industry is concentrated in Asia. Britain's output has grown considerably since we had one lonely seaweed farm in 2016, but our offering remains a literal drop in the ocean. There are now around 20 farms, most of which are small-scale. But with more than 650 native species of seaweed thriving in our seas – broadly categorised into brown, red and green groups – 'aquaculturists' are committed to making the UK's industry bloom. 'We're pioneers,' says Hare, whose farm will be in operation later this year.

His business model involves hiring local fishermen to cultivate kelp in their off-season. 'Seaweed can create supplemental income for fragile rural communities,' he says. Conveniently, the farm will also boost fish populations. Lamenting the damage that synthetic fertilisers have done to the soil, Hare plans to use his harvest for an eco-friendly alternative.

This is not a new idea. For centuries, seaweed has been collected along Scotland's west coast for use as a fertiliser. And its nutritional value has not gone unnoticed. In Wales, laverbread – a pureed red seaweed that is more paste than loaf – was a nourishing breakfast for pit workers, and it remains a Welsh delicacy.

Another red species, dulse, has been eaten in Ireland for more than 1,000 years. It kept communities alive during the Great Famine in the 1840s, though suffered dismissal as food for the poor. But it is now experiencing a renaissance, helped by the fact that it supposedly tastes like bacon when shallow fried.

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Seaweed is highly nutritious, containing minerals such as calcium, iron, zinc, and iodine, and often high in vitamins A, B, C, E and K. The exact nutritional value varies by species and growing conditions: red and green types have a higher protein content than kelp, which contains more of the mineral iodine.

With a name befitting of his occupation, Wave Crookes, 49, is co-founder of SeaGrown, which operates the UK's first offshore seaweed farm in Scarborough, North Yorkshire. Established in 2018 by Crookes and his partner, marine scientist Professor Laura Robinson, they began by harvesting wild seaweed by hand. Armed with ➔

Kelp remedies Seaweed farmer Bruce Hare (*top*)

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At the helm Wave Crookes, co-founder of SeaGrown, one of the UK's largest seaweed farms

scissors, they crawled on to the rocks at low tide to extract the crop, which they used to develop a series of food seasonings. 'We quickly realised that this wasn't practical,' says Crookes. 'You've got to farm it to get the quantities needed to address the grand industrial challenges the world is trying to fix.' Today, the seasonings are sold in Selfridges. They have an umami taste (lip-smacking, meaty), which Crookes says adds a depth of flavour to cooking.

SeaGrown has since developed soap and body cream, which utilise another benefit of seaweed. 'I've worked at sea all my life, so I don't have the smoothest hands in the world,' says Crookes, who was in the Royal Navy. 'But after I've handled seaweed, they feel really soft. It's got naturally occurring chemical compounds in it that make your skin softer and fuller.' He says it has also been known to reduce irritation for people with eczema.

These healing properties are not a recent discovery – at the start of the 20th century, there were up to 300 seaweed bathhouses in Ireland, which dwindled in number before experiencing a recent revival.

SeaGrown has also partnered with a brewery and a distillery to create beer and gin made from seaweed, which Crookes promises don't taste salty. But despite these successes, retail is not the focus. 'We're trying to achieve a bulk crop of seaweed so we can address carbon sequestration, bio-plastic production, peat-free fertilisers and cutting down greenhouse gas in farming,' he says.

This goal is why he has built the farm offshore. Most of the UK's seaweed farms are in shallow, sheltered waters, where space is limited. With the right equipment, SeaGrown was able to establish a farm further out to sea. 'Here, you've got almost infinite expansion potential,' says Crookes. Currently, the farm uses 65 acres of sea, making it one of the largest in the country.

He grows three types of kelp: sugar kelp, oarweed, and winged kelp. 'They like the high energy, they like the toing and froing, the fast water flow.' Kelps are the most popular choice for British seaweed farmers. This is because they grow quickly in high volumes, and have a vast array of uses so farmers can access several markets with the same harvest. Others cultivate dulse at sea, which is prized by chefs, but this is a trickier species to work with; prone to disease.

The Seaweed Academy, the only educational facility in the UK dedicated to seaweed farming, opened in 2022. 'We were getting so many inquiries about how to start a seaweed farm,' says Jenny Black, project manager. Now the academy is offering courses for anyone interested.

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But while these can teach how to cultivate a crop, achieving a profit is more difficult. 'Everyone wants the industry to grow, but there are a number of bottlenecks,' says Black. 'The main issue is that cultivated seaweed is expensive.' This means buyers can be hard to find, and Britain needs to produce far more seaweed to capture the attention of big industrial players. But there is hope. The Scottish government has committed to investing in seaweed farms. 'I think the rest of the UK will follow suit,' adds Black.

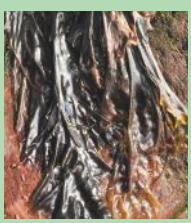
So, with all this potential, beachgoers should have more respect for seaweed. At the very least, if you can try not to squirm when you touch it, your skin will reap the rewards.

WEED ALL ABOUT IT

KELP
Used as food, fertiliser, animal feed, bioplastic, a potential biofuel, and thickener for beauty products. **Flavour** Savoury, umami.

DULSE
Used as food (as a bacon substitute or sprinkled into cooking), skincare and animal feed. **Flavour** Smoky when fried.

SEA LETTUCE
Used as food, skincare and is being studied for use in medicines, bioenergy and animal feed. **Flavour** Herby, similar to sorrel.



LAVER
Used as food (as a soup base or flavouring, and Welsh laverbread) and skincare. **Flavour** Savoury, often compared to olives.

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