The Red Seaweed Promise™ Progress Report 2021

How Cargill and our partners are making waves in seaweed sustainability

Cargill® Helping the world *thrive*

The Red SeaWeed Promise™

Cargill's commitment to securing a long-term, sustainable red seaweed supply.

Seaweeds are among the most productive plants on the planet, capturing carbon more efficiently than tropical forests, reversing ocean acidification and eutrophication, and helping to build up depleted fish stocks.

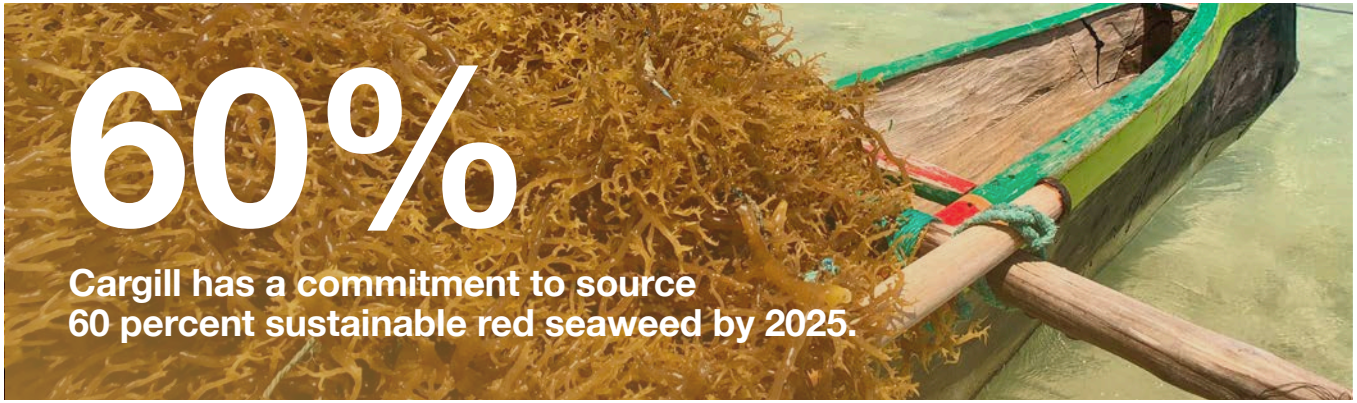
Commercially, the most important species are collectively known as eucheumatoids *(Kappaphycus spp and Eucheuma denticulatum)*. These species are naturally rich in in the versatile texturizer **carrageenan**, which can be found in products that many people use on a daily basis, including food (e.g. dairy and confectionery), pet food, cosmetics and household products.

As a whole, seaweeds serve as a key resource for some of the poorest people on the planet. Importantly, seaweed farming also serves as a key occupation for gender equity in coastal communities.

However, due to outdated and unsustainable farming practices and productivity declines, many small-scale producers remain trapped in poverty. As the planet's ocean temperatures rise, the people who depend on coastal waters are at risk – and the very labor upon which they rely may be accelerating the decline of sensitive marine habitats.

These dynamics pose a long-term challenge to ingredient suppliers such as Cargill who launched the **Red Seaweed Promise™** in 2019 to help drive positive change in our carrageenan supply chain, with a commitment to source **60 percent sustainable red seaweed by 2025**, and **ultimately achieving 100 percent**.

The global supply of seaweed is heavily concentrated in a few geographical areas that account for 95% of all product: 85% is farmed in South East Asia (mainly farmed by small-scale fishers in the Philippines and Indonesia), 5% is farmed on the coast of East Africa & Madagascar, and 5% is collected from the wild on the South West coast of South America (the Chilean coastline).



Behind the Red Seaweed Promise™

Cargill has a long tradition in carrageenan, through both its heritage sites and decades of acquiring innovators within this space, and today offers one of the widest ranges of commercially available carrageenan, employing proven production processes and using a large variety of different types of red seaweeds (Rhodophyceae) from the Gigartinales group.

At Cargill we are working to nourish the world in a safe, responsible and sustainable way and we believe that seaweed can truly serve as an ideal crop to support and enable the recovery of our oceans and climate, while providing a valuable livelihood for marginalized coastal fishing communities.

This is why we are actively looking to address these supply chain challenges, and ensure that farmers are ultimately receiving a fair price for their crop, without impacting the local ecosystem in which they operate.

It replicates some key strategies that Cargill has been implementing for years in its collaboration with cocoa farmers in Ivory Coast, Ghana and Indonesia through **Cargill's Cocoa Promise™**, with many similarities existing between the cocoa and seaweed supply chains involving local farmers in remote communities.

The Red Seaweed Promise™ commitment is seen as a new international standard to define and integrate sustainability into all dimensions of algae production: traceability, good cultivation/harvest/post-harvest practices, improvement of the living conditions of farmers, support to communities, and the preservation of the environment.

The program is independently assessed and verified by **ProForest™**[1] – a world leader in supporting the sustainable management and sourcing of natural resources and smallholder development.

The evaluation tool rates seaweed operators and suppliers on a scale of 0-3 in terms of sustainability, with 0 being "Not sustainable", and 3 being "Fully sustainable."

This is why we are also participating in the GlobalSeaweedSTAR, a four year challenge-led program funded by the GCRF Fund of UK Research and Innovation (UKRI). The program brings together an international team of experts in science, policy and economics from nine partner institutions across the UK, Philippines, Malaysia, Tanzania and supports 6 other countries through their GlobalSeaweedSTAR Research and Innovation Fund (R&I Fund). The program is aimed at safeguarding the seaweed industry by promoting best practices and setting the groundwork for the conservation of the seaweed resource. Cargill in particular is supporting two GlobalSeaweedSTAR R&I Fund projects aiming at developing new seaweed strains, with the intent of increasing yields and farmer livelihoods.

The Red Seaweed Promise™ program seeks to actively partner with producers, suppliers and NGOs across the globe to deliver three clear goals:

- **Empowering seaweed producers**
- **Improving community prosperity**
- **Conserving marine habitats**

"The Red Seaweed Promise™ is a truly impactful program with great breadth, that cuts across key seaweed growing communities. The fact that we are taking it to another level by helping the farmers and the environment in which they operate is the crux."

James Ede, Global Sustainability Lead, Cargill Starches, Sweeteners and Texturizers

What have we accomplished?

The Cargill supply chains assessed to date by ProForest™ have been rated as 2: "Sustainable," with ambitions to go much further on this journey by 2025.

KEY PRIORITIES:

Empower producers

We are committed across our supply chains to providing training on sustainable practices and improve access to markets. To this end we aim to provide training and tools to support responsible and resilient seaweed production.*

In Madagascar our supplier Ocean Farmers has assisted and empowered over 1,700 seaweed producers.

Community prosperity

Key to the future sustainability of the red seaweed sector is the strengthening of seaweed producers' communities and promoting gender equality.

That's why 60% of the producers trained have been women in our program with C-Weed and The Nature Conservancy, on the island of Pemba, Tanzania.

Marine conservation

Enhancing the marine habitats where seaweed is sourced and promoting plastic circularity (floats and ropes) in the production of seaweed are fundamental.

With the help of COAST4C in the Philippines, we are supporting producers to tackle single-use plastic floats in seaweed production by training in the use of longer-lasting materials and collecting and recycling the materials used.

* Supporting the Cargill global goal to provide training on sustainable agricultural practices and improve access to markets for 10 million farmers by 2030 https://www.cargill.com/sustainability/priorities/farmer-livelihoods

Empowering seaweed producers

The Red Seaweed Promise™ in Madagascar

Seaweed farming in Madagascar is still a relatively young industry, having only truly started to flourish in the late 1990s. For context, the production of some 1,800MT of dry seaweed per year in the country is still very small when compared to Indonesia's annual production of 100,000MT.

Cargill formed a partnership with Madagascar-based organization COPEFRITO[2] in 2011, aimed at expanding seaweed farming into new areas and supplying bigger volumes to Cargill. "Seaweed was seen as a perfect fit, as it allowed local communities to achieve a different source of income and led efforts to better respect of biological closures and the creation of temporary marine reserves," Sébastien Jan, a former Cargill employee who is now employed by Ocean Farmers, adds.

Sébastien worked with COPEFRITO on supporting them to achieve their production objectives, leading to the creation of a dedicated company, **Ocean Farmers**[3] in 2017, for the development of new growing areas and increasing supply — all while keeping the interests of the farmers close to heart. He completely transitioned to Ocean Farmers in early 2021, and thereby laid the foundation for a bridge between Cargill and seaweed growing communities in Madagascar.

During this sustainability improvement trajectory, The Red Seaweed Promise™ program and verification process was developed. Initial efforts as part of the Red Seaweed Promise™ over the last two years have already brought success (see below).

Through finding a balance between short-term monitoring and investment in long-term technologies and techniques, it will be possible to further empower seaweed producers in Madagascar and ensure the sustainable viability of this new sector in this truly beautiful country.

Signs of success in Madagascar:

1. Depleted marine resources are slowly recovering and local communities are now truly making a living from seaweed.

"We are currently working with **over 1,700 seaweed farmers** across 40 villages in quite a remote coastline area – and both parties are benefiting."

Sébastien Jan of Ocean Farmers

2. For Cargill, the efforts in Madagascar have resulted in the country becoming quite a significant source for its seaweed.

"When Cargill initially came to Madagascar, production was very limited at 500MT in total. Right now, the country produces 1,800MT per year, with 1,500MT produced by Ocean Farmers, Cargill's preferred supplier. We hope to reach 2,000MT during 2021."

Sébastien Jan of Ocean Farmers

We work alongside farmers to increase the economic, social and climate resilience of farming households and communities. By partnering with farmers, we strengthen agricultural supply chains in an economically and sustainable way that helps build more resilient farms and communities. We have set a global goal to provide training on sustainable agricultural practices and improve access to markets for 10 million farmers by 2030.

Improved community prosperity

The Red Seaweed Promise™ in Tanzania

Seaweed farming is the third largest export industry in Tanzania (after clove and tourism) – employing over 25,000 farmers, 80 percent of whom are women. The country is responsible for the production of some 10,000MT of seaweed each year, with 95 percent of this intended for export (predominantly for further processing into carrageenan products).[4] As well as being an important industry to rural Tanzanian women, seaweed also serves as an alternative means of income to mitigate the threat of overfishing.

In recent years, the industry has been stagnating in Tanzania due to issues such as changing water quality conditions and poor seedstock – as well as the impacts of less sustainable farming practices. Additionally, the Tanzanian marine areas in which seaweed farming is most established are actually among the highest priority regions to protect on the continent of Africa.

In 2020, The Nature Conservancy (TNC[5]) and Cargill entered a new partnership aimed at improving incomes for hundreds of seaweed farmers and restoring globally important coastal ecosystems in Tanzania, particularly within the country's insular autonomous region of Zanzibar. The program is being supported by C-Weed Corporation,[6] the largest supplier of seaweed in Tanzania, and conducted in collaboration with the government of Zanzibar.

The initial efforts illustrate how The Red Seaweed Promise™ will be instrumental in making a huge difference for Seaweed communities and their local environments in the years ahead.

Signs of success in Tanzania:

10 **By 2024, the project aims to have trained up to ten villages ...**

1,000

... having reached 1,000 farmers at that stage.

- In the first year, TNC will train more than 100 farmers on how best to site, design, and manage their farms and to increase yields while also reducing farming impacts to seagrass, mangrove areas, and marine debris on beaches, and waterways.
- TNC are currently piloting the project training materials in three different villages and in two different production cycles.
- Progress is monitored through detailed interviews with participating farmers, which will be used as part of a continuous improvement strategy.

Conserving marine habitats

The Red Seaweed Promise™ in the Philippines

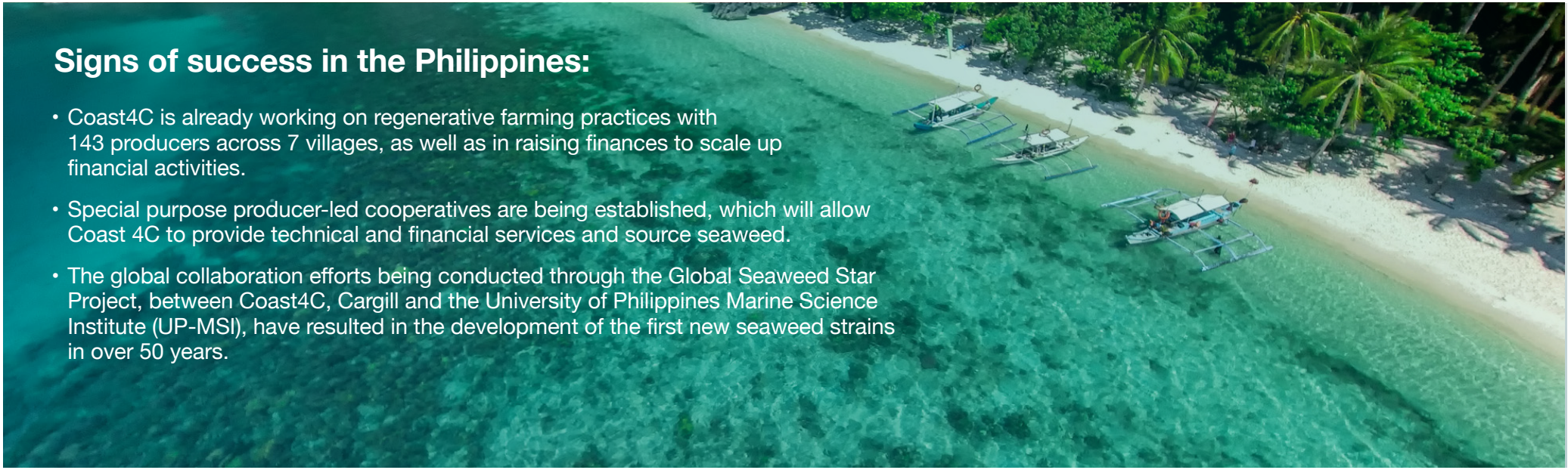
Seaweed farming to serve the carrageenan market has been promoted in The Philippines as part of a diversified livelihood for small scale fisheries since the 1960s. Initially, carrageenan producers worked quite closely with farmers in the country, with a mutually beneficial model of engagement. However, during the 1980s and 1990s the market started to become quite convoluted. As a result, seaweed farming in The Philippines has been underperforming from a commercial, environmental, and social perspective.

Since production levels were falling and long complex supply chains were in place, there was little incentive for seaweed growers to provide good quality, clean crops. Farmers were using tired strains and methods for production that date back to the 1960s, and are no longer fit for purpose due to the changing climate. Furthermore, these systems were likely contributing to overfishing in the region,[7] as well as being responsible for 50 percent of plastic pollution in these coastal communities as a result of its use as a float in seaweed farming. Last but not least, seaweed farming was being conducted in the wrong habitats, and was thereby leading to environmental degradation of areas containing corals and sea grasses.

In 2020, Cargill entered into a partnership with Coast4C,* with a medium-term aim to work with families across 35 villages. Through this partnership, we aim to improve the lives of 2,500 families in these fishing communities, while also hoping to increase the supply of seaweed to Cargill from approximately 120MT in 2021, to an estimated 600MT in 2022, and 2,500MT in 2023.

Cargill's support of this project goes beyond procurement alone, with valuable input in terms of processes and agronomy improving seaweed production practices, and mitigating the impacts of climate change.

The Philippines will remain one of the most important sourcing regions for the seaweed that is ultimately processed into high quality carrageenan. The Red Seaweed Promise™ will help to ensure that farming practices will remain a viable model for years to come.

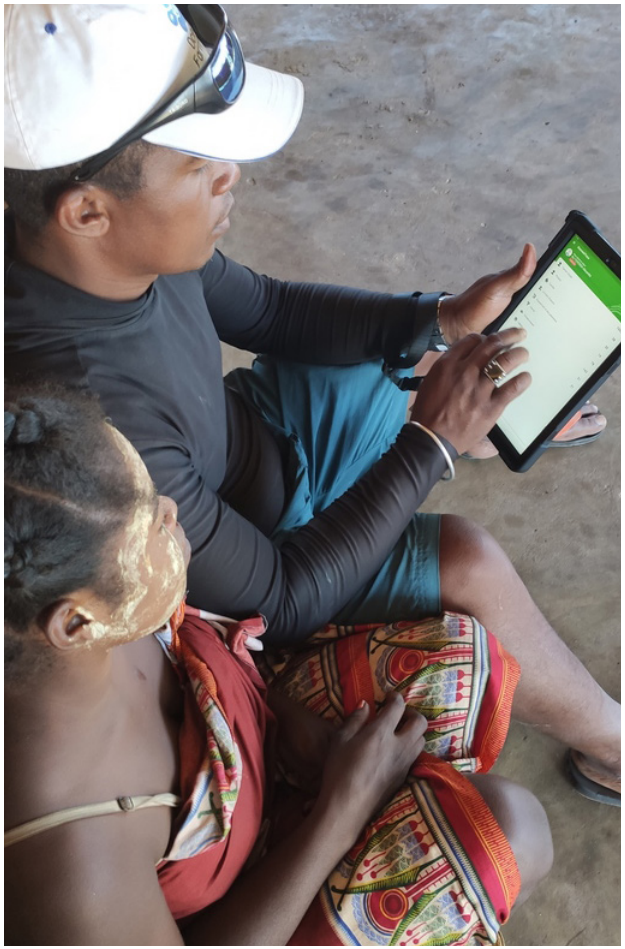


Signs of success in the Philippines:

- Coast4C is already working on regenerative farming practices with 143 producers across 7 villages, as well as in raising finances to scale up financial activities.
- Special purpose producer-led cooperatives are being established, which will allow Coast 4C to provide technical and financial services and source seaweed.
- The global collaboration efforts being conducted through the Global Seaweed Star Project, between Coast4C, Cargill and the University of Philippines Marine Science Institute (UP-MSI), have resulted in the development of the first new seaweed strains in over 50 years.

Traceability

Applying the SeaweedTrace™ tool



When it comes to empowering seaweed producers, improving community prosperity and conserving marine habitats, excellent traceability systems are required. Through a mapped, traceable and transparent supply chain, sustainability activities from responsible businesses can be used to encourage those in the supply chain who may need to improve their sustainability journey.

With this in mind, Cargill has been partnering with Indonesia-based integrated agriculture technology company, **Koltiva AG**,[9] since 2013. Cargill's initial focus was on adopting CocoaTrace™ to our cocoa & chocolate supply chains in Indonesia, Ghana, the Ivory Coast, where we still use the tool, to support Sustainability Project Management and supply chain transparency.

Cargill Cocoa & Chocolate uses this tool in conjunction with Koltiva's FarmXtension platform, which features updated information from independent smallholder farmers and their farms or plantations, so that farmers, traders, and input suppliers can arrange visits, coaching, and business support.

Since traceability is an important step when you want to talk about sustainable sourcing, Cargill believed in the potential of launching the Koltiva tool for seaweed, too.

The system relies on the scanning of QR codes that are digitally connected to individual farmers. This access delivers benefits for both farmer and supplier, as farmers know that they will get a guaranteed price for their efforts and buyers know exactly where the product came from in case there is an issue.

The other advantage is that the tool allows companies such as Ocean Farmers to assess what the impact of the project is in a particular area. "You can track whether production is increasing and by how much. Then we have data and are able to produce a dashboard that indicates how we are working with farmers, in which regions, and the gender breakdown of the farmers," Sébastien Jan, Ocean Farmers, explains.

- **SeaweedTrace™ is fully operational in several Madagascar villages together with FarmXtension™ and FarmGate.™** Ocean Farmers intends to implement the tool in all villages it is operating in by the end of 2021.
- **Coast4Sea recently achieved financing** to start setting up SeaweedTrace™ in the Philippines as well. The process of registering farmers to the system began in June 2021.

By employing new digital tools into Cargill's supply chain, traceability that protects both the farmers and the buyers from malpractice is key on the roadmap to a fully sustainable red seaweed supply chain.

"The app features a signing function, whereby the farmer can confirm that they have received the money, and that they have been paid a fair price for their seaweed. Every transaction is consolidated into a single database, so that operations can be visualized on a map and an immediate overview of local monthly volumes becomes available."

Sébastien Jan of Ocean Farmers

What's next for sustainable carrageenan?

Over the past decades carrageenan has found its way into more and more applications, from dairy to meat to personal care, but two specific areas of high potential have been identified:

1. **Gelatin replacement:** Thanks to the uninterrupted rise of the plant-based/vegan movement, carrageenan presents opportunities to replace an animal-based and highly ubiquitous hydrocolloid.

2. **Cosmetics:** There is also vast potential in a small but rapidly expanding market for this ingredient. Innovators in this sector are being encouraged to step up to the tough technical challenge of replacing the multi-functional, inexpensive and synthetic, petro-based polymers like carbomer, which is primarily made from acrylic acid.

Cargill must maintain a forward-looking vision when it comes to raw material supply. Expanding the prevalence of the program in Indonesia and the Philippines will be a major priority en route to our target of having 60 percent of the seaweed we purchase falling under The Red Seaweed Promise™ by 2025, and the longer term goal of reaching 100 percent.

Our work together with ProForest™ is yet another example of how important partnership will be on this sustainability journey. Making true progress will require challenging commonly held beliefs and upping the game on best practices. After all, no single entity can achieve sustainability in the seaweed farming industry alone — we all have a part to play and advice to offer our partners.

The Red Seaweed Promise™ does not stop with established raw materials for carrageenan. The program is intended to raise the environmental sustainability standard of all Cargill's red seaweed ingredients, including the recently launched **WavePure™ seaweed powder**.

Development work on WavePure™ began even before The Red Seaweed Promise™ was launched in 2019. Since it is sourced from a variety of seaweed originating from Indonesia, the product does as yet not fall under the program.

WavePure® is a seaweed powder range based on native seaweed obtained without any chemical modification. It's a unique ingredient with **texturizing properties**, enabling smooth and creamy textures in categories like gelled dairy desserts. Since it can be labeled with a reference to the familiar seaweed source, WavePure® is fully in line with growing consumer demand for label-friendly options.

Cargill's first series under this innovative range is WavePure® ADG 8250, which is based on a blend of Gracilaria seaweeds, and which **contributes to the mouthfeel** and maintains stability in gelled dairy desserts, with limited impact on sensorial profile. Its whole, non-transformed seaweed origin also delivers several nutritional advantages: Low calorie content, rich in fiber and other naturally healthy elements (i.e. proteins, vitamins, and antioxidants). Due to the patented intellectual property that Cargill maintains on the processing technique, a uniform quality product is always guaranteed.

About Cargill

Our purpose is to nourish the world in a safe, responsible and sustainable way.

We are
155K
employees

Working in
70
countries

With more than
156
years of experience

Delivering for customers in more than
125
countries

We combine 156 years of experience with new technologies and insights to serve as a trusted partner for food, agriculture, financial and industrial customers in more than 125 countries. Side-by-side, we are building a stronger, sustainable future for agriculture.

About Cargill Starches, Sweeteners & Texturizers

Cargill Starches, Sweeteners & Texturizers business develops and commercializes ingredients made from renewable and nature-derived sources. We employ about 10,000 employees in 40 countries who are committed to delivering high-quality products to our food, feed and industrial customers. We process corn, wheat, potatoes, peas, seaweeds, fruit-peels, sunflowers, rapeseed and soy to manufacture a comprehensive collection of value-added ingredients dedicated to the food & beverage, papermaking & corrugating, pharmaceutical, and animal nutrition industries. We take a unique approach to each of these categories to help our customers thrive and deliver valuable products and services. In the food space, we focus on sweetness, texture and protein & specialties innovations, while our industrial offer is designed to supply renewable solutions. Our portfolio includes sweeteners, starches, ethanol, acidulants, proteins, texturizers, corn oil, dry corn ingredients, specialties and animal feed ingredients.

About Cargill Starches, Sweeteners & Texturizers Europe

Cargill Starches, Sweeteners & Texturizers Europe transforms renewable, nature-derived raw materials into ingredient solutions. We address the needs of a broad swath of industries with a diverse portfolio that includes sweeteners, starches, proteins, texturizers, fibers and animal feed ingredients, all supported by world-class expertise in formulation, processing, logistics and more. Our European footprint includes over 4,000 employees, spread over 16 production facilities, 14 offices and 3 innovation centers and applications labs, further supported by Cargill operations around the world.

From food & beverage to papermaking & corrugating, and pharmaceuticals to animal nutrition, we bring together the ingredients, knowledge and technology to help our food, feed and industrial customers thrive.

Footnotes

[1] ProForest defined what sustainability was in terms of how Cargill treats suppliers, how they in turn treat farmers, and the environments in which they operate.

[2] COPEFRITO had traditionally supported fishermen in local communities along a 300km stretch of the southwest coast of the country.

[3] Ocean Farmers was registered in Madagascar in 2017 to take over the red seaweed operations from COPEFRITO. Ocean Farmers has administrative authorization to farm seaweed as well as to purchase seaweed. The company operates a community-based production system, under which contracts are in place with individual farmers within their production villages along the coast of Tulear (Madagascar), who will exclusively sell their dried seaweed to Ocean Farmers. The contracts includes mutual engagements, where Ocean Farmers supplies farming material, defines best farming practices to use together with individual coaching through skilled technicians in the villages. It also includes other clauses on target-based incentives for farmers and village groups. These targets are mainly on the maintenance of seaweed lines, removal of EFA infected lines, and harvest yields.

[4] Dr. Flower Msuya: "Scoping The Nature Conservancy's Engagement Towards Sustainable Seaweed Aquaculture in Tanzania" – Dar es salaam, Tanzania, December 12, 2018.

Kyewalyanga S, Msuya F (2016). Evolution of Seaweed Farming in Tanzania: Achievements and Challenges Associated with Climate Change, Instiute of Marine Science, University of Dar Es Salaam. https://www.spf.org/en/opri/newsletter/379_1.html?full=379_1

[5] The Nature Conservancy (TNC), is one of the largest conservation organizations globally, operating in 72 countries around the world. The group has flagged aquaculture under one of its key aims to "provide food and water sustainably," with a strategy in place for this sector, grounded on the concept of "restorative aquaculture." Since its recent launch in 2017, TNC's Aquaculture unit has already begun working with teams in seven regions: Indonesia, Tanzania, Belize, Puerto Rico, the US, Hong Kong, Palau, and New Zealand. Specifically in terms of seaweed, TNC's longest standing program has been in Indonesia, whereby the organization is already operating in eight villages, in serving the burgeoning carrageenan, and agar markets.

[6] C-Weed Corporation is registered with the Zanzibar Investment Promotion Authority as an investor in seaweed. The company's operations involve investment in, and purchase of seaweed from various sites on the Pemba and Zanzibar islands, as well as limited activities on the shores of mainland Tanzania. Under the company's operations, they do not have contracts with farmers, but rather operate a trust/loyalty system where they they provide technical support through field technicians and also purchase seaweed through their buyers. In this set-up there is the presence of active buyers that compete to purchase seaweed after harvest and drying. These buyers may provide different levels of support, and according to the fisheries department, those registered as local buyers are not legally required to invest in the production. Thus, competition is a key characteristic of this market.

[7] Kelly et al 2020. Environmental impacts and implications of tropical carrageenophyte seaweed farming. Conservation Biology 34, 326-337

Hayashi et al 2017. The cultivation of Kappaphycus and Eucheuma in tropical and sub-tropical waters. In: Tropical seaweed farming trends, problems and opportunities: Focus on Kappaphycus and Eucheuma of commerce. (Eds. Hurtado et al) 193-205 (Springer International Publishing, 2017). doi:10.1007/978-3-319-63498-2_11

Spencer 2017. Is certification the answer? A consideration of local power and perspectives in a seaweed value chain. MPhil thesis, Biodiversity, Conservation and Management, University of Oxford. https://coast4c.com/is-certification-the-answer-a-consideration-of-local-power-and-perspectives-in-a-seaweed-value-chain/

[8] Coast 4C was launched as an independent social enterprise in 2020 as the evolution of Net-Works.™ (Net-works was co-founded between conservation charity the Zoological Society of London, and carpet tile manufacturer Interface and initially piloted their multi-award winning inclusive value chain model on diverting end-of-life fishing nets from the ocean for recycling into fashion and flooring.) It is an Australia-based company with a mission to: "build vibrant and resilient blue economies in marginalized coastal areas that benefit communities, commerce, conservation and climate by unlocking the promise of the seaweed revolution and circular economy." Their vision is to: "empower 22 million small-scale fishers to deliver thriving coastal communities and a healthy ocean."

[9] Koltiva AG is the leading agriculture system specialist geared towards assisting oil palm, cocoa and chocolate, coffee, rubber, seaweed, and various natural ingredients sourcing/processing companies achieve profitable and inclusive growth. With Koltiva mobile and web applications, smallholders, traders, processing industry, input suppliers and banks can be connected through sustainability management, and end-to-end traceability platforms.

thrive™

www.cargill.com

Cargill® Helping the world thrive