

FINANCING REGENERATIVE SEAWEED AND AQUACULTURE

THE INVESTMENT NEED AND OPPORTUNITY

November 2025

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S Y S T E M I Q

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ABOUT THIS WHITEPAPER

This white paper was developed by Systemiq (Jennifer Ring and Jasmine Chu) in partnership with the Global Seaweed Coalition (Adrien Vincent) and Planet Ocean Capital (Markus Böhm and Michael White). It was produced with the generous support of Builders Vision.

The logo for Systemiq, consisting of the word "SYSTEMIQ" in a blue, spaced-out, sans-serif font, enclosed within a thin blue rectangular border.

Systemiq was set up in 2016 to drive and accelerate the implementation of the Paris Agreement and the SDGs by transforming markets and business models across critical economic systems. It does this by advising industry leaders, influencing policy through research and deep stakeholder engagement, incubating disruptive business opportunities, and helping to mobilise large scale capital across these systems to drive transformational change.



Planet Ocean is an asset management platform investing in the future of our oceans, and with it into climate, circularity, and biodiversity. It invests in PE/VC funds, founders and SMEs to support the next generation of solutions addressing some of the ocean's most pressing environmental stressors.



Hosted by the UN Global Compact, the GSC supports the safe and sustainable scale-up of the seaweed sector, grounded in science.



Builders Vision is a team of investors and philanthropists harnessing innovative capital, from grantmaking to market-rate investments, to accelerate promising solutions in three sectors: food & agriculture, energy and oceans. We seek to grow and transform markets that will generate financial returns and sustainable outcomes. Our success is only possible because of our collaboration with the entrepreneurs, innovators and investors who are driving us forward to a more resilient future. Learn more about Builders Vision at www.buildersvision.com.

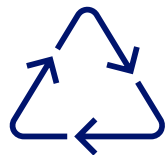
This paper builds on the 2025 report, *Unlocking the Potential of Europe's Seaweed and Bivalve Industries*, developed by the Global Seaweed Coalition and commissioned by the European Investment Bank

Thank you to the many experts who provided ideas and feedback, including individuals from Arctic Seaweed, Bright Tide, European Molluscs' Producers Association (EMPA), Hatch Blue Revolution Fund & Research Institute, Katapult Ocean, Sea & Believe, and WWF.

Statements and views presented in this report do not necessarily reflect those of any individual or organization associated with this project.

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EXECUTIVE SUMMARY (I/II)



Seaweed & bivalve aquaculture are high impact sectors with compelling market fundamentals

The ocean is a lynchpin of **human health, prosperity and climate stability**. Yet it is under pressure, facing intensifying and compounding threats from overexploitation, pollution, habitat destruction, invasive species, and climate change. Moving from our traditional ocean economy to a new paradigm – a **regenerative ocean economy** – offers a pathway to restore ecosystems while strengthening food systems, livelihoods and resilience.

Seaweed and bivalves aquaculture are nature- and climate-positive sectors that embody the potential of a regenerative ocean economy. They require **no freshwater, fertilisers or land-clearing**, actively **improve marine ecosystems**, and **provide sustainable food** and **low carbon raw materials**.

Their impact potential is matched by robust market fundamentals. **Bivalves account for nearly half of EU aquaculture by volume**, with prices rising across markets. The global seaweed sector has **tripled since 2000** and is forecast to grow at **~20% CAGR**, reaching an estimated **\$313 billion by 2040** in most ambitious projections. While nascent in Europe, the sector is gaining traction, with a **potential multi-billion euro market** opportunity this decade.



In Europe there is healthy dealflow but companies struggle to access the financing they need

For investors looking to the sectors, the pipeline is robust. In Europe there are **~480 seaweed companies**. This figure is growing at **15%+ annually**, coupled with innovation in farming systems, advanced processing and integrated **biorefinery models** that support multiple high-value applications. Cultivation remains nascent compared with wild harvesting – just **~15 farms produce more than 10 T p.a.** – but with significant room to grow share.

Europe's bivalve industry, by contrast, is well-established. Worth **€1.3 billion**, it employs **~38,000 people** and produces **550k T annually** - nearly half of all European aquaculture volumes.

Both sectors **struggle to access the finance they need**. Combined, they require an estimated **€1.7 billion in debt finance over the next five years** – **€1.45 billion for bivalves** and **€0.25 billion for seaweed** – for investment in expansion, modernisation, mechanization and resilience to climate impacts. Yet **structural barriers constrain access to commercial bank** lending, including lender **unfamiliarity**, **limited collateral value** of equipment, and **seasonal cashflows** coupled with a lack of offtake agreements, which reduce creditworthiness. In parallel, **ocean impact funds** are heavily **skewed towards equity**, leaving the debt financing gap unaddressed.

EXECUTIVE SUMMARY (II/II)



Designing fit-for-purpose financing solutions

Achieving industry potential requires vehicles that directly address this financing need and capitalise on the seaweed and bivalve opportunity. In particular, **flexible debt financing** is needed for seaweed and bivalve SMEs and start ups to support **day-to-day operations, expansion, diversification and climate adaptation**.

The design of new financing solutions **can embed blended finance best practices and learnings** from previous funds on land and at sea. Critical learnings include crystallising a clear design rationale anchored in **addressing market failures, limiting structure complexity**, tailoring debt instruments to **align with sector cashflows**, and **integrating of technical assistance** with origination to build a **bankable pipeline**. Transparent **impact metrics** and inclusive stakeholder engagement further ensure **integrity and accountability**.



WHY IS DEDICATED FINANCING NEEDED FOR SUSTAINABLE SEAWEED AND BIVALVE AQUACULTURE?

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A

The context

SUSTAINABLE SEAWEED & BIVALVE AQUACULTURE ARE VITAL SOLUTIONS FOR A REGENERATIVE OCEAN ECONOMY

The ocean is indispensable to human health, prosperity, and wellbeing. Its value extends far beyond its estimated \$2.5 trillion contribution to the global economy. Yet, despite its crucial role, the ocean is increasingly under threat from multiple stressors.

In response, **the concept of a regenerative ocean economy** has gained momentum. This approach recognises the urgent need to restore marine ecosystems while delivering better **nutrition, resilient communities and livelihoods, and climate mitigation.**

Seaweed and bivalves represent a low-trophic revolution. The sectors are a source of **sustainable blue food**, and, particularly in the case of seaweed – offer raw materials for **low carbon, nature-positive alternatives** for a host of applications – for **fertiliser, feed, packaging and cosmetics** - all while actively contributing to **healthy marine ecosystems.**

SEAWEED AND BIVALVE AQUACULTURE ARE CRITICAL BUILDING BLOCKS OF LOW CARBON AND RESILIENT DEVELOPMENT

The concept of a “regenerative ocean economy” has experienced unprecedented momentum recently

“An economic model that combines rigorous and effective regeneration and protection of the Ocean and marine and coastal ecosystems with sustainable, low- or no-carbon economic activities, and fair prosperity for people and the planet, now and in the future”

– IUCN, “Towards a Regenerative Blue Economy” (Le Gouvello & Simard, 2024)

A regenerative ocean economy also contributes to resilient and low carbon development:



Stronger food system and better nutrition



Job creation and diversification of livelihoods



Ecological and climate benefits

Seaweed and bivalve are flagship sectors of a regenerative ocean economy



Seaweed

Multi-cellular macro algae with photosynthetic properties. There are over 12,000 species grouped into red, green, and brown seaweeds.



Bivalves

Aquatic shelled molluscs with the key characteristics of being filter feeders (primarily on phytoplankton). The main species groups are oysters, clams, mussels, and scallops.

Note: More than 12,000 seaweed species have been formally described, yet global diversity is estimated to be significantly higher, possibly up to 24,000 species.

Source: EIB & Global Seaweed Coalition – European Seaweed and Bivalve Report (2023). Natural History Museum & Scottish Association for Marine Science – *The State of the World’s Seaweeds* (2025)

BOTH SECTORS GENERATE A HOST OF POSITIVE IMPACTS FOR COMMUNITIES, BIODIVERSITY, AND CLIMATE CHANGE MITIGATION

Impact dimension		 Seaweed	 Bivalves
Climate change mitigation	 Carbon sequestration	✓ Dissolving carbon from the water and sequesters after storage in deep ocean	✓ Remains a topic of scientific debate; first certificate of carbon credits awarded
	 Low-carbon alternatives	✓ Provides sustainable substitutes to existing products e.g. bioplastics, biofuels	✓ Requires minimal energy to produce compared to other sources or protein
Social-economic	 Food security	✓ Nutritious, rich in minerals/vitamins, with some species high in amino acids and proteins	✓ Source of high-quality proteins, vitamins and omega-3 fatty acids
	 Job creation and diversification	✓ Creates jobs for coastal communities and wider industry through multiple applications	✓ High export value leads to job creation for coastal communities
	 Empowerment of women	✓ Seaweed farming increases financial independence and social influence for women	✓ Promotes to gender equality in coastal communities through employment
Other ecosystem services	 Water quality	✓ Performs photosynthesis and absorbs excess nitrogen and phosphorus	✓ Filter planktonic algae and fix nitrogen and phosphorus into tissue
	 Biodiversity enhancement	✓ Integral food-chain component and habitat to marine and terrestrial species	✓ Reefs formed by bivalves can create habitat for wildlife
	 Coastal resilience	✓ Dissipates wave energy and prevents coastal erosion	✓ Eco-engineered reefs can protect sedimentary coasts from erosion
	 Low-input cultivation	✓ Requires no freshwater, chemical fertilisers, or land-clearing	✓ Requires no freshwater, chemical fertilisers, or land-clearing to grow
	 Benefits to wild stocks	✓ Provides habitat, nursery and feeding grounds	✓ Oysters inhibit disease spread and embryos provide feed for wild populations

Looking at the seaweed and bivalve aquaculture sectors holistically can maximise impact

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B

The market

BOTH SECTORS REPRESENT A COMPELLING ECONOMIC OPPORTUNITY IN THE DECADE AHEAD

The seaweed and bivalve sectors are entering a period of significant transformation. Global and European markets are being reshaped by **shifts in consumer demand, evolving product applications, technological advances, and climate pressures.**

These industries offer **strong potential for growth and resilience**, but their ability to develop will depend on how effectively they harness powerful **tailwinds**—such as rising demand for sustainable food and policy support—while addressing structural **headwinds**, including regulatory hurdles and industry fragmentation.

This section provides an overview of seaweed and bivalves markets. It examines:

- **Global and European market size, trends, and value chain dynamics**
- **Tailwinds and headwinds** that will shape how these industries capture their economic opportunity

The market

THE BIVALVE MARKET

CHINA LEADS GLOBAL BIVALVE PRODUCTION, BUT VIBRANT SECTORS IN EUROPE, USA, AND CHILE

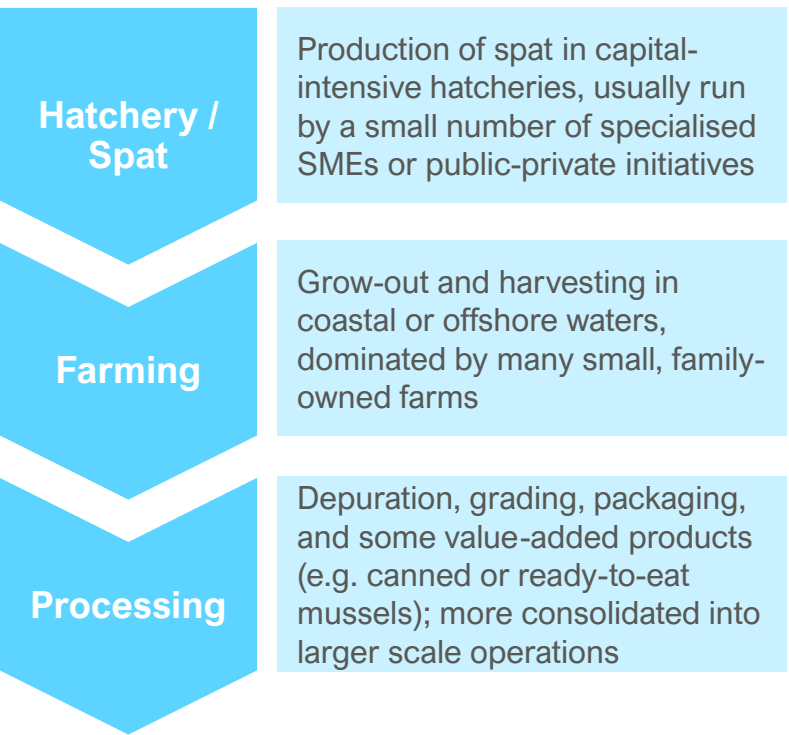
Top bivalve producing regions

	China	Responsible for ~85% of global production value
	Europe	Accounts for ~4% of global production, with 6,521 farms
	USA	Hosts ~1,300 bivalve farms, with oysters being the largest subsector (~70%)
	Chile	Among the top global mussel exporters, concentrated in Patagonia

Key takeaways

- **Majority of bivalves consumed are farmed**, with production concentrated in China, followed by Europe, North America, and Chile
- **Global demand for bivalves has remained relatively steady**, supported by consumer perception as a healthy and sustainable food option
- **Bivalve prices are increasing** across all major markets due to inflation and high demand
- New regions are emerging; though current production is negligible, **bivalve farming is gaining interest in Africa**, with FAO projects focused on transferring farming and product diversification

Simplified bivalves value chain



Precise value chain steps vary by species & end use

Source: USDA – 2022 Census of Aquaculture (2023), FAO – 2022 Census of Aquaculture (2024). FAO – The State of World Fisheries and Aquaculture (2024)

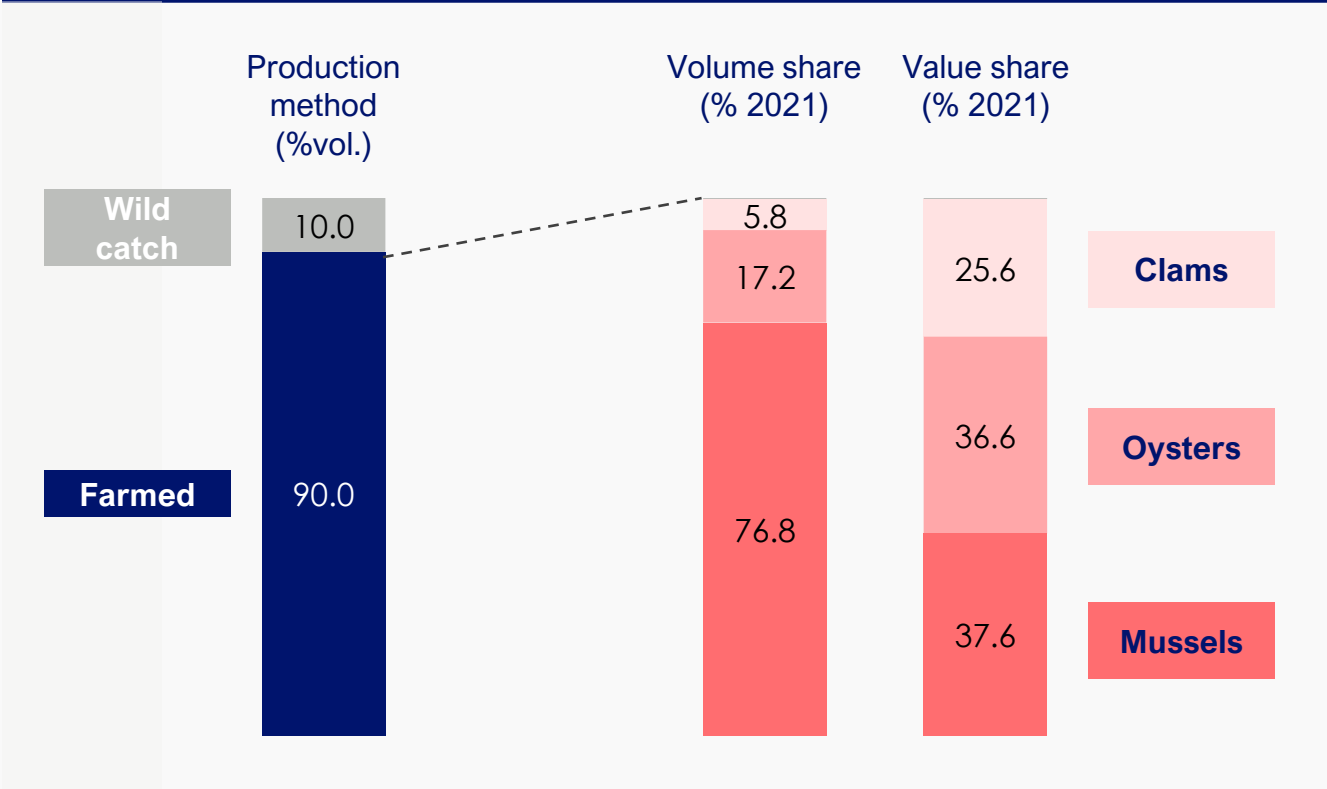
BIVALVES FORM THE BACKBONE OF EUROPE’S AQUACULTURE MARKET, WITH STABLE GROWTH

Bivalves is a key and steadily growing segment of the European aquaculture market

- Europe produces 553k tonnes annually, **equal to 4% of global production** or 26% when excluding China
- Bivalves are the **largest aquaculture commodity group in Europe**, representing 49% of volumes
- Bivalves production is **valued at ~€1.3 billion**, making up 30% of the aquaculture total
- **Sector value is growing at a steady pace** (+3% from 2021-2022) despite volume decline, driven by rising prices
- **The industry carries high socio-economic importance**, providing employment for ~38k people



European bivalve production is dominated by 3 main species: clams, oysters, and mussels



ROBUST DEMAND & ENABLING ENVIRONMENT SUPPORT BIVALVE SECTOR RESILIENCE DESPITE ENVIRONMENTAL AND REGULATORY HEADWINDS

Tailwinds



Supportive policy

- Regional initiatives such as the European Blue Growth Agenda and “Farm to Fork” strategy
- Funding mechanisms e.g. the European Maritime, Fisheries and Aquaculture Fund (EMFAF)



Robust demand

- Recognised for quality and sought after locally and in export markets (e.g. oysters to China)
- Prices are rising and show greater resilient than other aquaculture products



New products applications

- Rising demand for canned and ready-to-eat formats, especially for mussels
- Growing valorisation of by-products (e.g. shells for concrete), unlocking new revenue streams



Growing enabling environment

- Formation of producer associations (e.g. clam O.P.s in Italy) strengthening sector organisation
- Increased policy advocacy by stakeholder-led enterprises e.g. Aquaculture Advisory Council

Headwinds



Regulatory hurdles

- Administrative burden for permits, including long waiting time and uncertain outcomes
- Changing food safety and water quality regulations e.g. post-Brexit UK requirements



Limited access to space

- Competition for coastal space is intensifying e.g. Galicia reached capacity for mussel production from rafts a few years ago)
- Need citizen support for new concessions at sea



Environmental factors

- Climate change and acidification impacting yields e.g. mussel declines in Italy
- Harmful algae blooms and invasive species increasingly causing closures e.g. France in 2023



Fragmented industry

- Many producers are small-scale or micro-enterprises, vulnerable to shocks in revenue
- Limited economies of scale restrict efficiency and financing access

The market

THE SEAWEED MARKET

THE GLOBAL SEAWEED MARKET IS GROWING STRONGLY BOTH IN VALUE AND PIPELINE SIZE

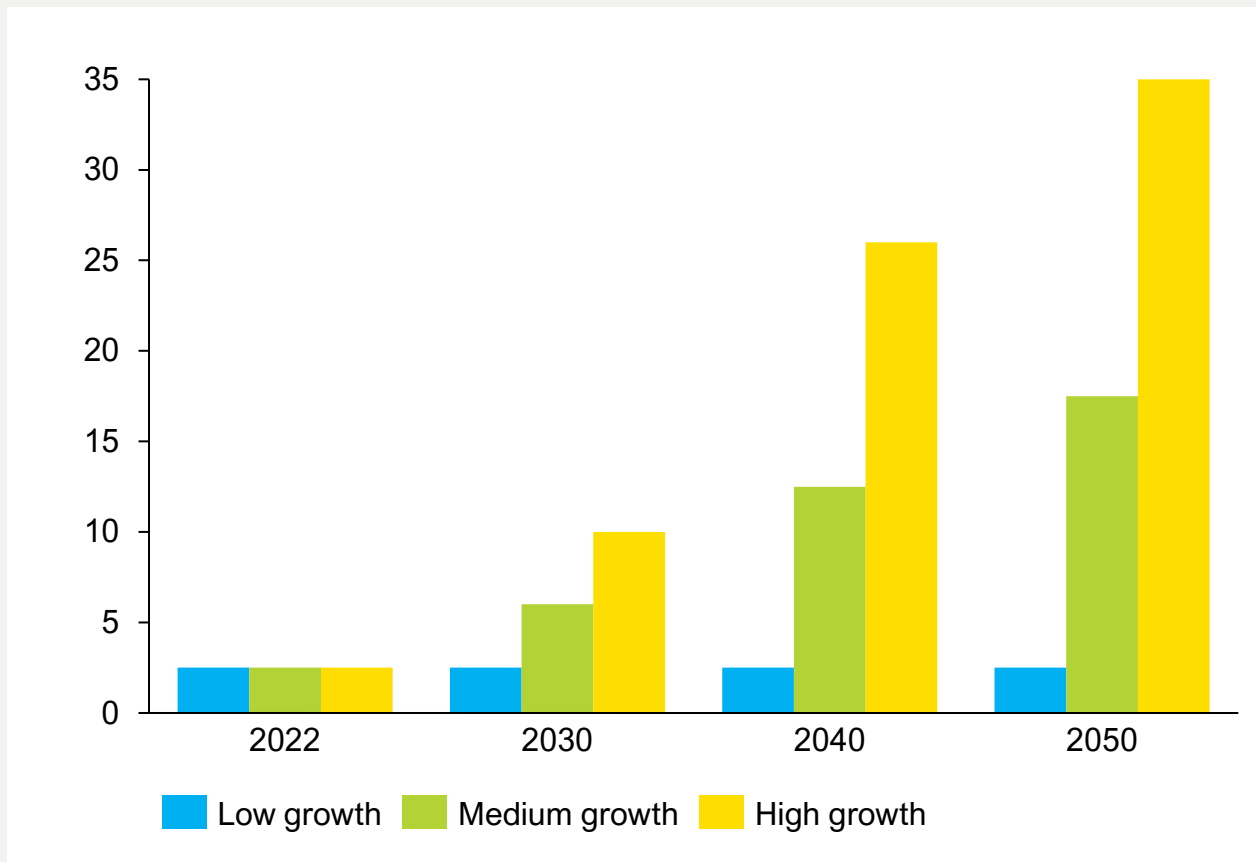
Forecasts anticipate a double-digit CAGR in the next 5 to 10 years

- The global seaweed market has more than **tripled between 2000 and 2018**, reaching 32m tonnes of production with a value of \$3.3 billion
- The growth is driven by the **expanding market for seaweed-based foods and food additives**
- Standard Chartered projects the **total market can reach \$313bn in 2040 with \$100bn of investments** (~20% CAGR)
- **Asia produces 97% of seaweed – with China is the leading production country**, with 54% of the global output
- **Emerging** seaweed producing markets across **Europe, Latin America and Africa**



Food-related seaweed demand could increase 12x by 2050

Total production (Mt) for food products based on low-, medium-, and high-growth scenarios

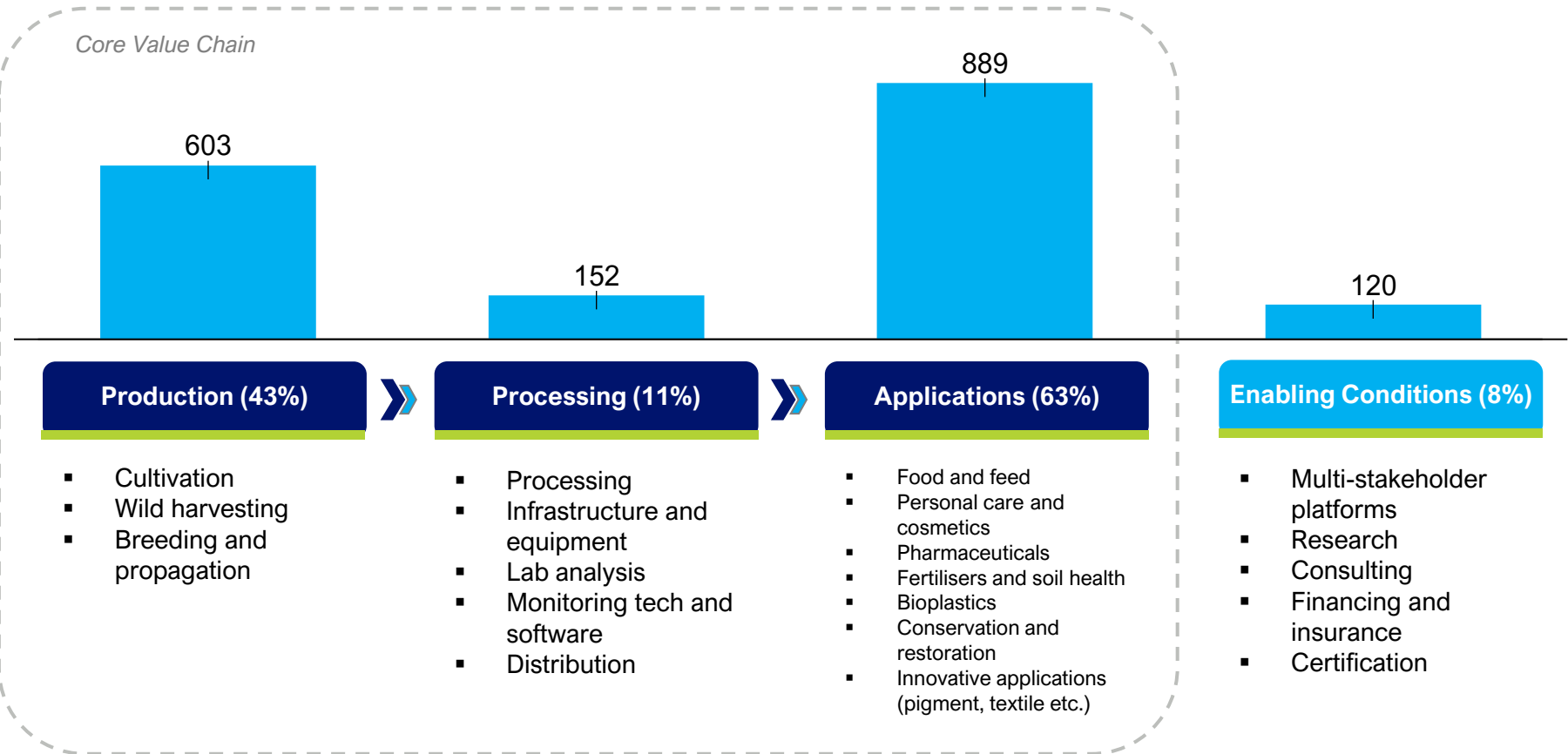


Note: 2 companies do not have data on HQ, and 746 companies do not have data on founding year. Company growth trend is based on 671 out of 1,417 with available data.

Source: FAO – The global status of seaweed production, trade and utilization (2018). Standard Chartered – Kelp Is on the Way (2019). World Bank & Hatch Innovation Services – *Seaweed Market Analysis* (2023). Grand View Research. (2020). Grebe, G.S. et al. – Global status of seaweed production, trade, and utilization (2021). Phyconomy data, Systemiq analysis

GLOBAL SEAWEED COMPANIES ARE CONCENTRATED IN APPLICATIONS AND PRODUCTION, WITH SIGNIFICANT VERTICAL INTEGRATION

Global seaweed organisations breakdown by value chain
of organisations



Key takeaways

Of a global dataset of ~1400 seaweed companies:

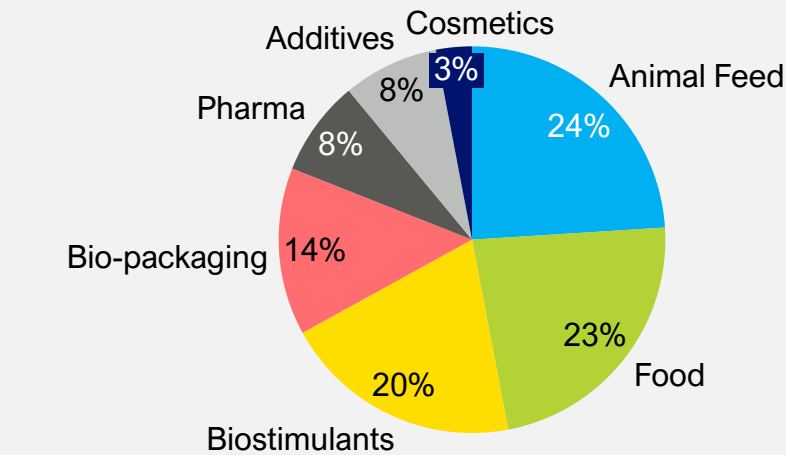
- **25% are active across multiple steps of the value chain**, reflecting a trend towards vertical integration
- **Production and applications attract the largest share of companies**, while processing is notably underrepresented, pointing to a potential bottleneck in scaling
- **8% of organisations focused on building enabling conditions**, addressing awareness and policy barriers through including advocacy, research, and multi-stakeholder platforms

Note: Some companies operate across multiple steps of the value chain, hence total exceeds 100%. 4 companies do not have value chain data.

THE EUROPEAN SEAWEED MARKET HAS POTENTIAL TO GROW TO BECOME A MULTI-BILLION EURO INDUSTRY BY 2030

European demand for seaweed could reach €3 - 9 billion in 2030

Breakdown of European seaweed demand 2030



- Animal feed, food, and biostimulants make up ~2/3 of the projected demand
- Rising consumer health and sustainability preferences are set to support market growth



European production could capture one-third of this market under the right conditions

Opportunities:

- **Scale farming:** current production is still largely wild-harvested (96% in Europe vs 1% in Asia); there is significant opportunity to expand aquaculture
- **Target high-fit species:** cold, nutrient-rich waters support specific species e.g. palmaria palmata
- **Differentiate product:** consumers' focus on health and sustainability is driving demand for traceability and nutrition

Seaweed cultivation has low share of total European production today – highlighting potential to scale

European production baseline (2020) (wild harvest & aquaculture)	~300,000 t
Share of aquaculture	4%

Note: Production in wet tonnes.

THE EUROPEAN SEAWEED INDUSTRY CAN LEVERAGE POLITICAL SUPPORT & NETWORK OF ENABLING ORGANISATIONS TO OVERCOME CHALLENGES

Tailwinds



Political support

- The European Commission supports via funding, the EU Algae Initiative, and EU4Algae forum
- National governments are developing ambitious initiatives e.g. France Algae Roadmap 2024



Supportive enabling ecosystem

- Active support from non-state actors, including research institutes and NGOs (e.g. WWF, Algae UK, European Algae Biomass Association) that are generating content essential to industry transformation



Accelerating innovation

- Innovation reduces production costs and enables by-product valorisation e.g. biorefineries
- New, high-value markets unlocked via product application innovation e.g. cosmetics and paints



Consumer demand

- Rising demand for eco-friendly or locally sourced products in parallel with new product application innovation and growing awareness of seaweed's environmental benefits

Headwinds



Regulatory challenges

- Licensing requests are assessed against inappropriate criteria e.g. those designed for finfish or shellfish
- Complex processes and stringent standards (e.g. novel food and iodine content) delay development



Fragmented industry

- Seaweed farming in Europe remains nascent with limited track record, constraining financing options
- Industry players are small-scale compared to Asian peers and lacks knowledge-sharing mechanisms



International competition

- Strong competition from Asia puts pressure on Europe to scale up and reach cost competitiveness or differentiate through high value-added outputs or sustainable value chains

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The pipeline

IN EUROPE, THERE IS HEALTHY DEALFLOW WITH KEY FINANCING NEEDS FOR RESILIENCE AND GROWTH

While Asia leads in global production, Europe's seaweed and bivalve industries are underpinned by a **vibrant landscape of companies spanning the full value chain**.

For seaweed, Europe has seen a surge of new entrants over the past decade. These companies are carving out niches by focusing on **differentiation, innovation, and sustainability**.

For bivalves, Europe is already an **established global player** with a long history and strong reputation. The priority now is on **building resilience and adapting to changing environmental and market conditions**.

This section examines the pipeline of European seaweed and bivalve aquaculture, covering:

- **Pipeline size and growth trends**
- **Deep-dive analysis of each value chain stage**
- **Examples of promising enterprises**

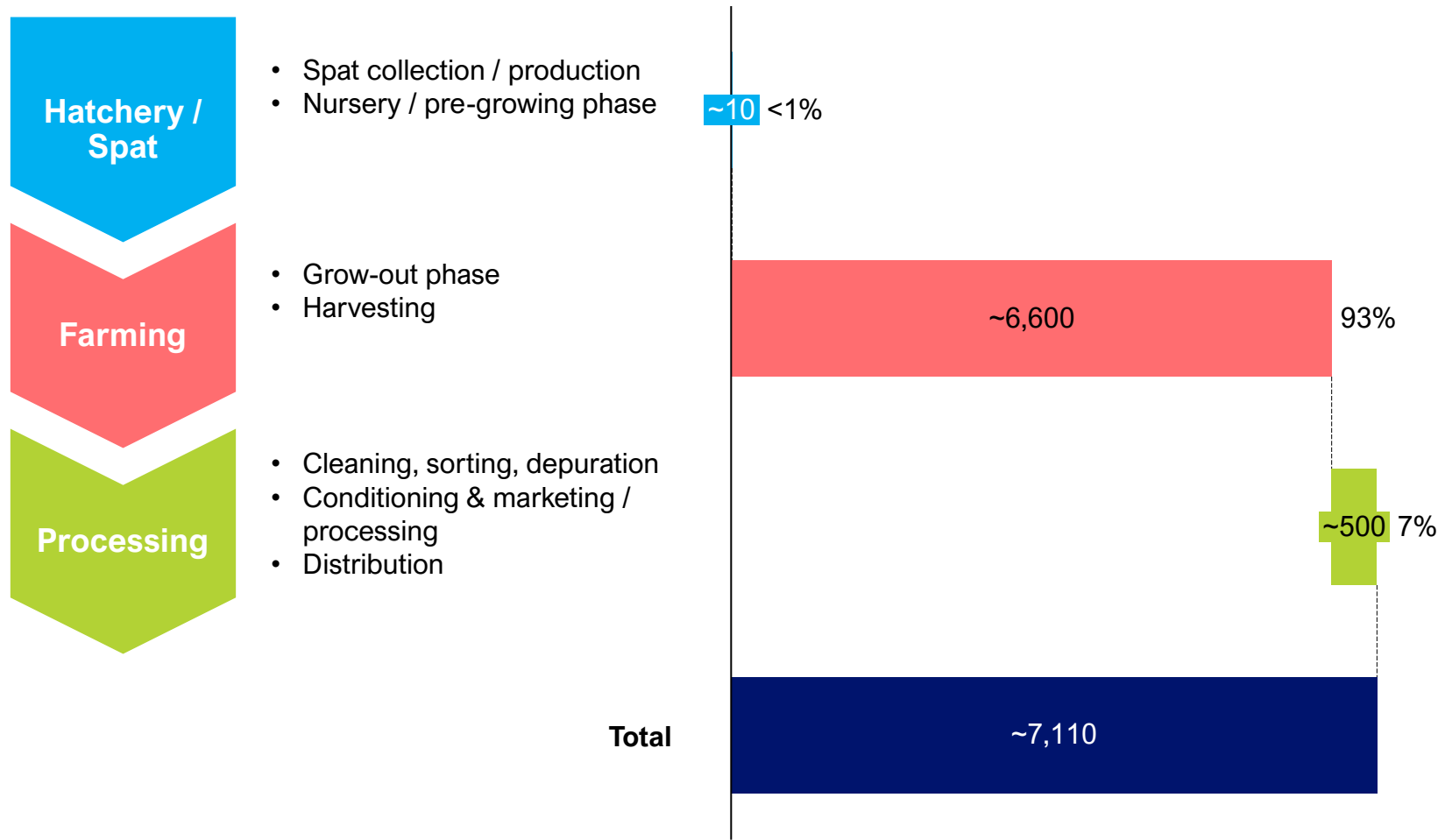
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EUROPEAN PIPELINE DEEP DIVE: BIVALVES

6500+ COMPANIES IN EUROPE'S BIVALVE PIPELINE HIGHLY CONCENTRATED IN THE FARMING SEGMENT AND MICRO-ENTERPRISES

Estimated Europe bivalve farming pipeline breakdown by value chain
Total # of companies across mussels, clams, oysters



Key Takeaways

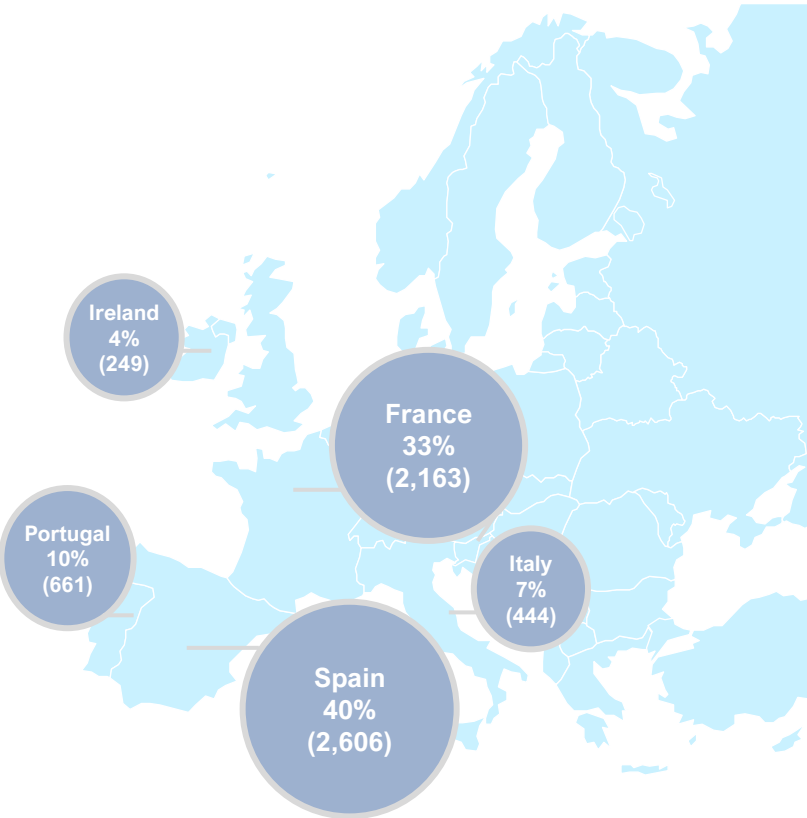
- Farms make up 90%+ of the European bivalve pipeline
- The sector is highly fragmented, ~95% of companies are small-scale businesses employing fewer than 10 workers and average turnover is ~€200k
- Farming segment has seen strategic investments aimed at improving sustainability and resilience, e.g. in Italy, the clam industry created producer organization (O.P.s) to strengthen coordination amongst farmers and enable better market access
- Processing companies have been diversifying product offerings in recent years, particularly in mussels to include microwave and ready-to-eat meals beyond traditional fresh or canned ones

EUROPEAN BIVALVE FARMING SEGMENT IS MATURE, WITH MUSSELS THE LEADING SPECIES AND SPAIN AND FRANCE LEAD PRODUCERS

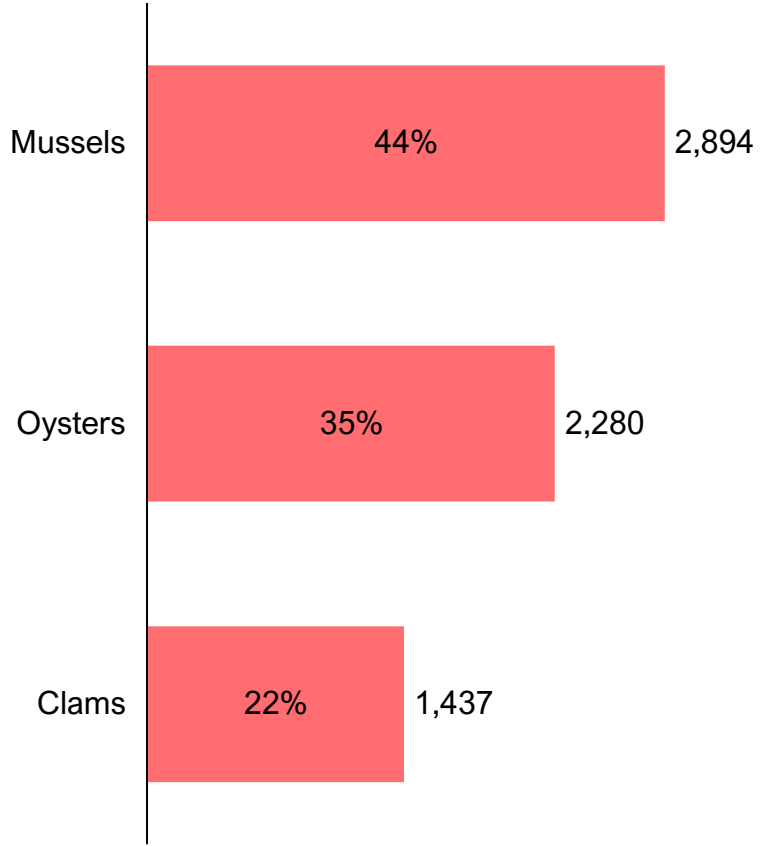
Key takeaways

- **Spain and France lead the Europe farming pipeline**, together accounting for over 70% of the 6,521 enterprises
- **The sector is mature and stable**, with number of enterprises increasing 1% from 2021 to 2022
- **Labour and capital intensity vary significantly by country**; Denmark, Germany, and the Netherlands rely on capital-intensive systems, while others are more labour-intensive
- **In terms of species, mussels lead the farming pipeline with 44% of companies**, but ~75% of production by volume

Geographical distribution of 6,521 enterprises
of organisations in the bivalve industry



Breakdown by bivalve species
of organisations



Note: Some companies producer more than one type of bivalves, hence sum exceeds the 6,521 total.

PIPELINE EXAMPLES: EUROPEAN BIVALVE HATCHERY & FARMING

Enterprises active in bivalve hatchery and farming

Offshore Shellfish, UK



- **Founded:** 2014
- **Focus Area:** Offshore mussel farming
- **Overview:** Builds and operates large-scale rope-grown mussel farms in Lyme Bay; one of the first large offshore shellfish farms in Europe
- **Investments disclosed since 2020:** £870,000 UK Government grant under the “Ropes to Reefs”, additional undisclosed private capital
- **Key investors:** UK Marine Fund Scotland / DEFRA

Scottish Shellfish, Scotland UK



- **Founded:** 1992
- **Focus Area:** Europe’s largest rope-grown mussel farming entity, operating multiple sites across the west coast of Scotland and Shetland. Also runs a cooperative marketing group (Scottish Shellfish Marketing Group)
- **Investments disclosed since 2020:** £756,000
- **Key investors:** Multiple EU grants from 2012-2017

Oceano Fresco, Portugal



- **Founded:** 2015
- **Focus Area:** Clam hatchery and offshore cultivation
- **Overview:** Operates Europe’s first open-sea clam nursery in Algarve and a hatchery in Nazaré, using advanced breeding techniques from their BioMarine centre
- **Investments disclosed since 2020:** ~ €27,000,000 (Series B, Crowdlending)
- **Key investors:** Indico Capital Partners, Aqua-Spark, BlueCrow Capital

Irish Premium Oysters, Ireland



- **Founded:** 2000
- **Focus Area:** Oyster farming and harvesting
- **Overview:** Operates two farm sites in Atlantic bay waters under stringent quality control, targeting premium market segment with exports to Asia and Europe
- **Investments disclosed since 2020:** NA
- **Key investors:** NA

PIPELINE EXAMPLES: PROCESSING EXAMPLES

Companies operating in post-harvest activities, including processing, distribution, and applications

Seastex, Scotland UK

SEASTEX



- **Founded:** 2019
- **Focus Area:** Applications — bio-materials
- **Overview:** Converts mussel “beards” (by-product) into biodegradable, wool-like textiles for apparel and acoustics for interior, creating new circular models for the industry. Partners with the Scottish Shellfish Marketing Group
- **Investments disclosed since 2020:** NA
- **Key investors:** UK Government

Baltic Muppets, EU project

Baltic MUPPETS



- **Founded:** 2016 (As part of EU Baltic Blue Growth initiative)
- **Focus Area:** Applications — pet food and aquafeed
- **Overview:** EU-funded pilot turning Baltic mussels into protein meal for animal feed and pet food, showcasing value-added applications from small mussels.
- **Investments disclosed since 2020:** ~ €4,000,000
- **Key investors:** EU Interreg, Submariner Network

Mytilimer, France

Mytilimer
Groupe



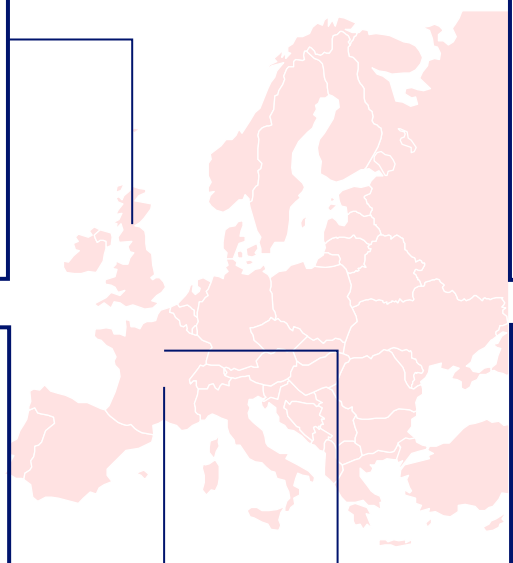
- **Founded:** 1980s
- **Focus Area:** Processing and distribution
- **Overview:** Major French mussels and oysters processor and distributor; acquired Ulysse Marée and invested in the creation of a 6,500 sqm factory in Cancale to recycle undersized mussels into flavours and eco-materials
- **Investments disclosed since 2020:** Undisclosed; revenue post-acquisition estimated at ~€60m annually
- **Key investors:** NA

Edulis, France

edulis



- **Founded:** 2020
- **Focus Area:** Applications – cosmetics
- **Overview:** A marine cosmetics brand that offers products made from natural ingredients, specifically featuring patented Cap Ferret oyster extract
- **Investments disclosed since 2020:** NA
- **Key investors:** NA



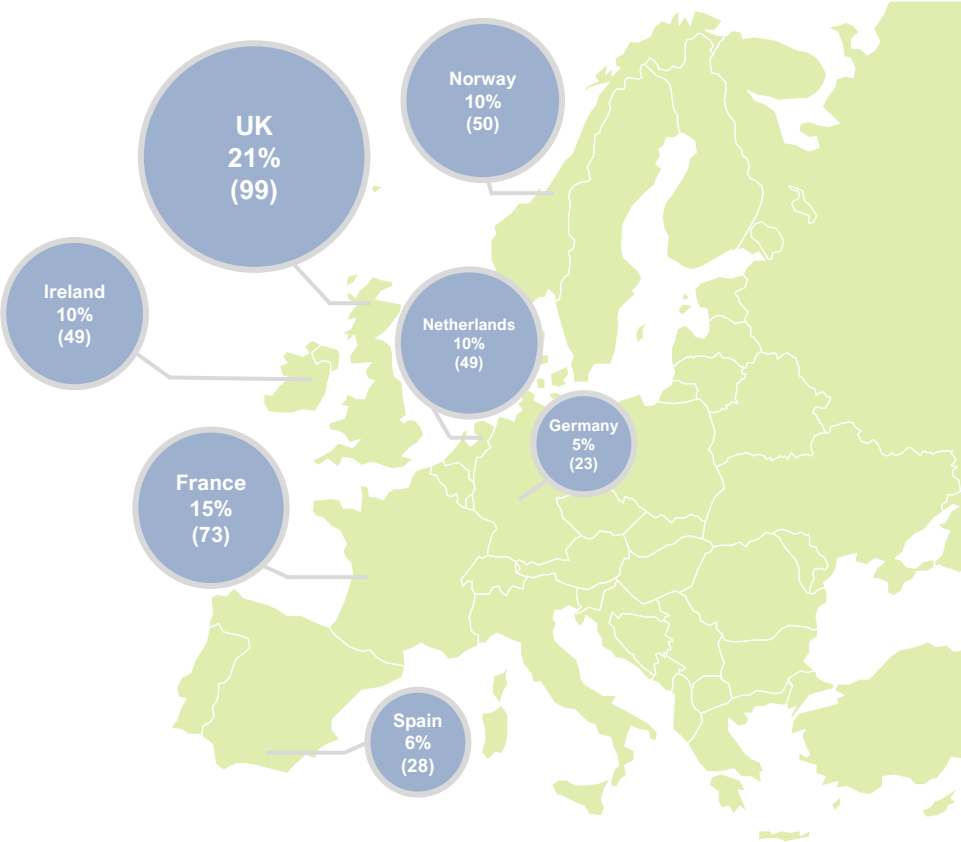
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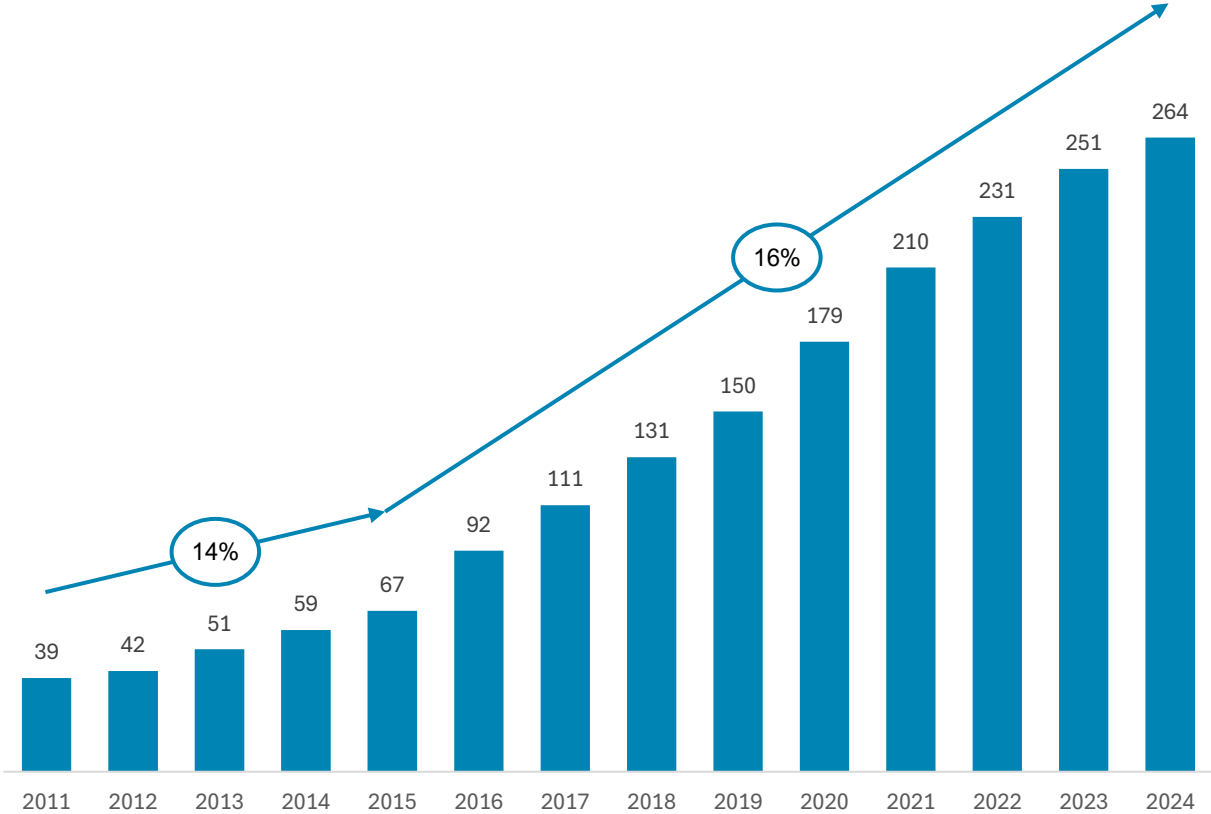
EUROPEAN PIPELINE DEEP DIVE: SEAWEED

EUROPE'S SEAWEED PIPELINE INCLUDES ~480 COMPANIES AND IS GROWING AT 15%+ EACH YEAR

Geographic distribution of 479 European companies



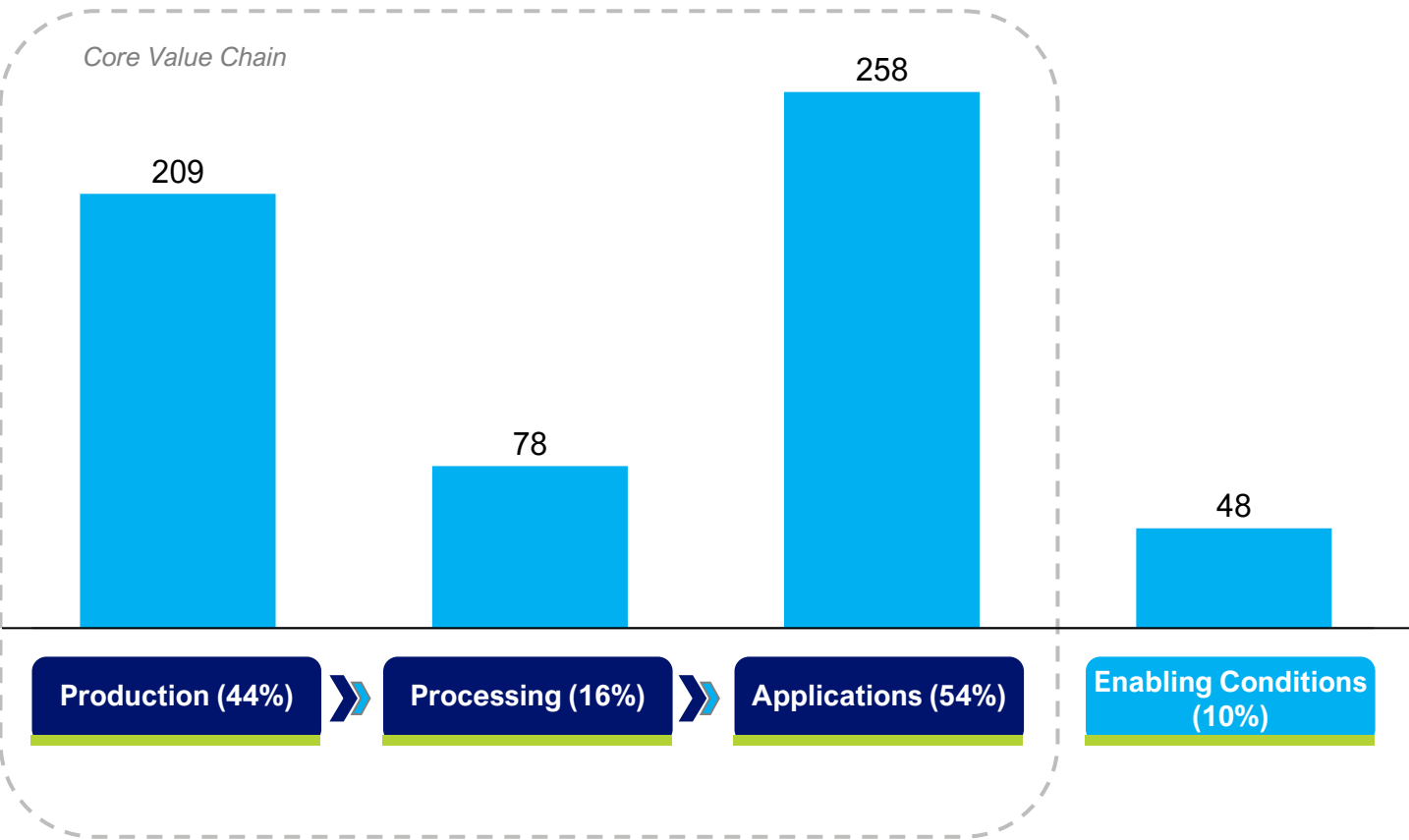
Cumulative number of European seaweed organisations



Note: Founding year data only available for 264 out of 479 organisations

APPLICATIONS AND PRODUCTION STAGES OF THE VALUE CHAIN DOMINATE THE PIPELINE – ECHOING TRENDS IN THE GLOBAL SEAWEED MARKET

Europe seaweed pipeline breakdown by value chain
of organisations



Note: Some companies operate across multiple steps of the value chain, hence total exceeds 100%.

Key Takeaways

- **Europe’s pipeline broadly mirrors global patterns**, with strong activity in production and applications but fewer companies engaged in processing
- The diversity across the value chain **requires a mix of financing instruments**, from early-stage equity for innovation in applications to debt for infrastructure-heavy farming or processing projects
- The enabling environment is reinforced by **48 dedicated organisations, political support from the European Commission, and national initiatives** such as the EU Algae initiative and France’s National Roadmap for Seaweed Development

EUROPE’S PRODUCTION PIPELINE IS SMALL-SCALE BUT GROWING, WITH GROWING POTENTIAL TO SHIFT FROM WILD HARVEST TO AQUACULTURE

Key summary: Production



Companies: 209 (44% of total) – of these, 74 are seaweed farms



Top countries: UK – 49 (19%), Ireland – 33 (15%), France – 31 (15%)

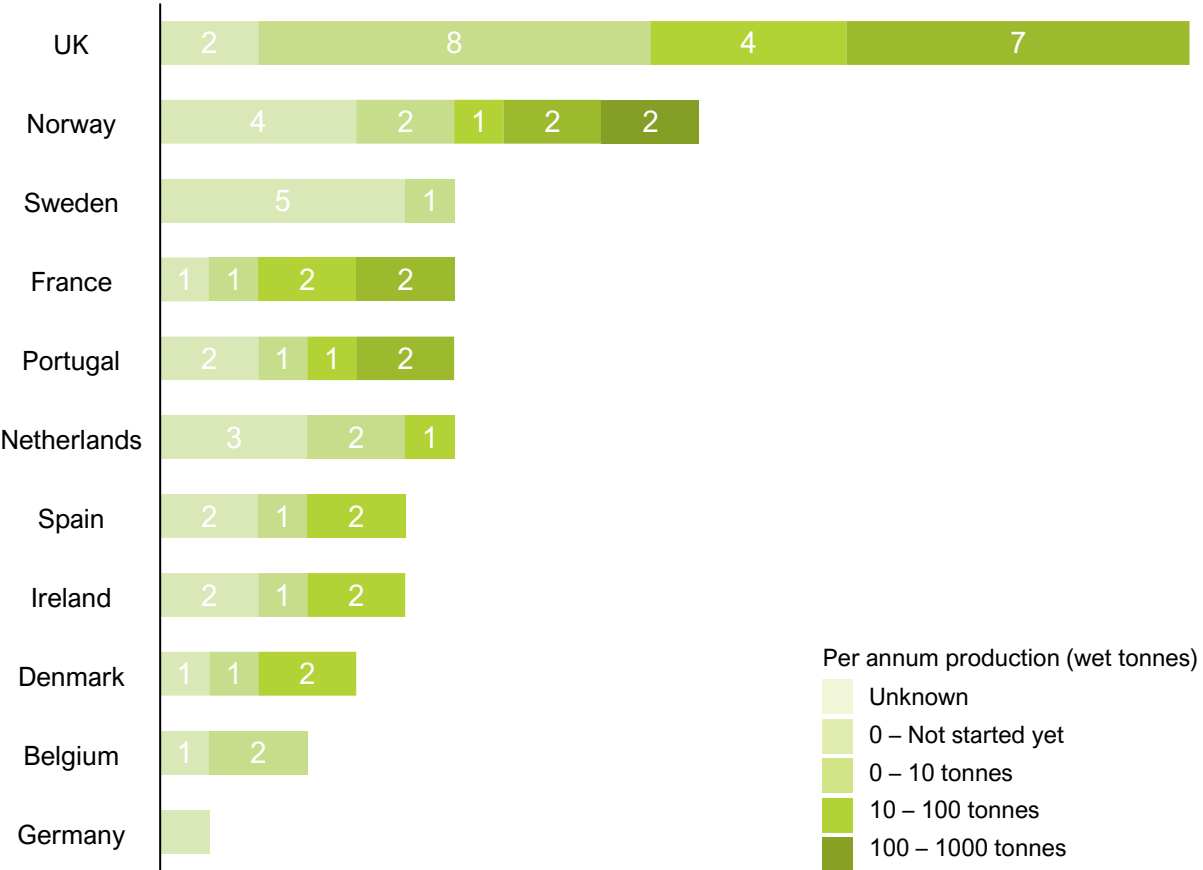


Investments since 2020: ~ €83 million disclosed

Overview and opportunities

- Production pipeline, which includes harvesting and aquaculture, is **concentrated in UK, Ireland, and France**, together accounting for ~50% of the total
- A total of 74 farms are identified in Europe, but data shows **relative infancy of the industry**, with only 15 (20%) producing more than 10 tonnes annually
- Wild harvesting dominates Europe’s seaweed supply (96%)**, but is now approaching its ecological limits
 - Harvest volumes have plateaued over the past two decades
 - By contrast, 97% of global seaweed production is farmed
- Transitioning from wild harvest to farming** offers a promising growth opportunity, though it is constrained by regulatory and financing challenges
 - Europe’s cold, nutrient waters are considered “high opportunity” zones for seaweed aquaculture, particularly for species such as *Palmaria palmata*

Breakdown of seaweed farms by country and production
Categorised by annual production in wet tonnes



PIPELINE EXAMPLES: EUROPEAN SEAWEED PRODUCTION

Enterprises engaged in seaweed production, including cultivation, breeding, and propagation

Ocean Rainforest, Faroe Islands



- **Founded:** 2007
- **Focus Area:** Open-ocean farming
- **Overview:** Cultivates seaweed in open ocean using innovative offshore rigs designed for the North Atlantic and Pacific Ocean
- **Investments disclosed since 2020:** €10,500,000 (Series A)
- **Key investors:** Katapult Ocean, WWF, Grantham Foundation, Sea Ahead, Norðoya Íløgufelag, Ocean Born Foundation, Twynam Invest, Triodos Impact Investment, Potato Impact Partners

Seaweed Solutions, Norway



- **Founded:** 2009
- **Focus Area:** Seed and propagation
- **Overview:** Supplies premium-quality seaweed seeds and tailored services to cultivators, enabling large-scale ocean farming
- **Investments disclosed since 2020:** €4,700,000
- **Key investors:** EASME - EU Executive Agency for SMEs, Innovation Norway, WWF

Algolesko (Aleur), France

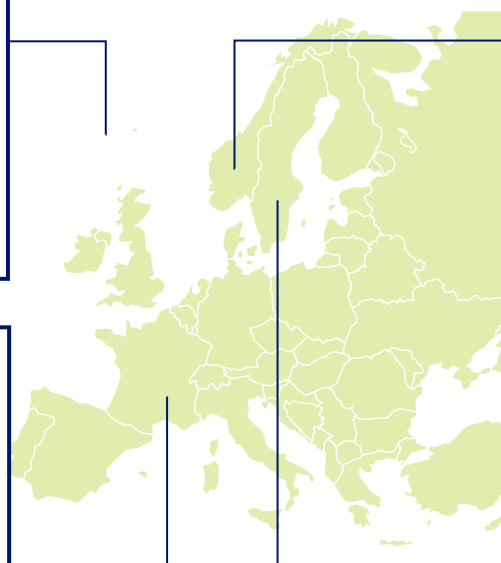


- **Founded:** 2013
- **Focus Area:** Organic cultivation
- **Overview:** Farms brown laminarian seaweeds in offshore Natura 2000 marine areas in Brittany, overseeing end-to-end crop cycle for traceability
- **Investments disclosed since 2020:** €1,397,433
- **Key investors:** Undisclosed

Nordic Seafarm, Sweden



- **Founded:** 2016
- **Focus Area:** Ocean farming
- **Overview:** Cultivates high-value seaweeds (e.g., sugar kelp) through large-scale hybrid farming, with expertise in hatchery and R&D focused on regenerative aquaculture
- **Investments disclosed since 2020:** €4,550,000
- **Key investors:** Almi Invest, JCE Ventures, Kale United, Inter Ikea Group, InnoEnergy



EUROPE’S PROCESSING SEGMENT IS CAPITAL-INTENSIVE WITH A GRADUAL BUT GROWING SHIFT TOWARDS INTEGRATED BIOREFINERIES

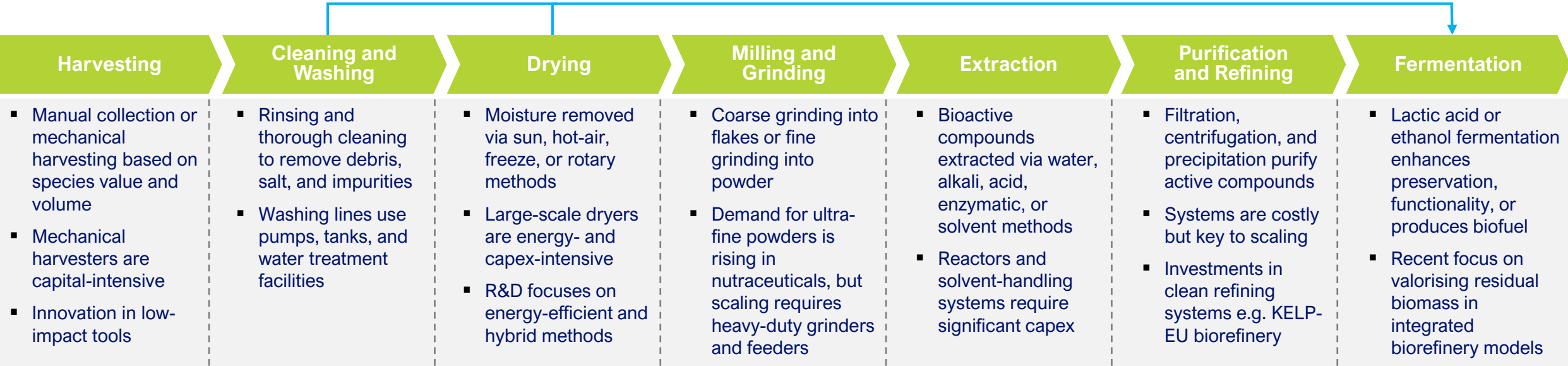
Key summary: processing

-  Companies: 78 (16% of total)
-  Top countries: UK – 19 (24%), Netherlands – 16 (20%), Norway – 12 (15%)
-  Investments since 2020: ~ €148 million disclosed

Overview and opportunities

- Processing companies are **concentrated in the UK, Netherlands, and Norway**, which together account for ~60% of the pipeline
- The processing segment is **infrastructure-intensive**, requiring significant capital investment and making it **suitable for debt financing**
- Biorefinery concepts are gaining traction** in Europe, promoting a multi-product, integrated, and sustainable approach to processing

Some biorefineries and processors bypass drying, and certain fermentation processes occur without all preceding steps



Note:

PIPELINE EXAMPLES: EUROPEAN SEAWEED PROCESSING

Companies active in seaweed processing or providing infrastructure, equipment, lab analysis, and monitoring technologies

Oceanium, Scotland UK



- **Founded:** 2018
- **Focus Area:** Biorefinery
- **Overview:** Develops a proprietary green-chemistry process to convert seaweed into functional, high-value ingredients
- **Investments disclosed since 2020:** €7,000,000
- **Key investors:** Katapult Ocean, WWF, Green Angel Syndicate, Sky Ocean Ventures, Sustainable Ocean Alliance, Builders Vision, Norfolk Green Ventures, Sustainable Finance Initiative, BDT & MSD Partners, Sea Ahead

Origin by Ocean, Finland



- **Founded:** 2019
- **Focus Area:** Biorefinery
- **Overview:** Converts sea and algae biomass into functional bio-based ingredients for food, cosmetics, agriculture, textiles, and beyond while helping ecosystems via detoxification
- **Investments disclosed since 2020:** €10,375,000
- **Key investors:** Angel investors (various), KPMG Finland, Kiilto Ventures, Blue Bio Value, Batofin, Lifeline Ventures, Voima Ventures

Seaweed Concept, France

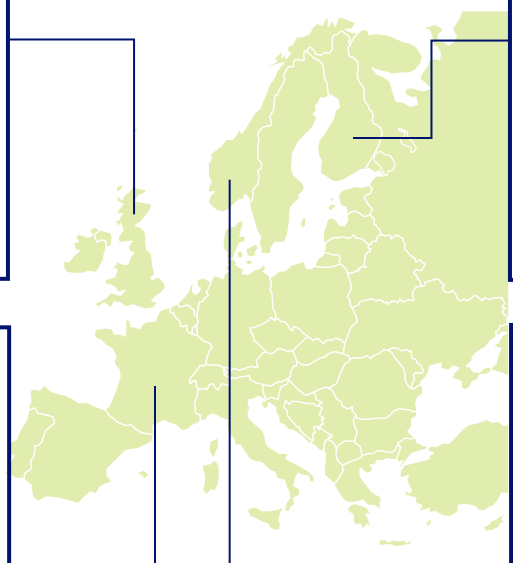


- **Founded:** 2024
- **Focus Area:** Biorefinery
- **Overview:** A marine biotech firm offering modular mobile biorefinery units and patented lacto-fermentation technology that enabling year-round production of standardized, high-quality seaweed ingredients for multiple industrial sectors
- **Investments disclosed since 2020:** €2,100,000 (Series A in 2025)
- **Key investors:** Blue Forward Fund

Alginor, Norway



- **Founded:** 2014
- **Focus Area:** Biorefinery
- **Overview:** Building a fully integrated, traceable value chain—from sustainable harvesting to biorefining into ingredients such as high-G sodium alginate, fucoidan, cellulose, and alginate
- **Investments disclosed since 2020:** €97,050,000
- **Key investors:** EASME - EU Executive Agency for SMEs, Hatteland Group, Borregaard, European Innovation Council Fund (EIC Fund), Must Invest AS



THE FOOD SEGMENT LEADS EUROPE'S APPLICATIONS PIPELINE, BUT PRESENCE ACROSS ALL PRODUCT SEGMENTS HIGHLIGHTS INNOVATION

Key summary: applications

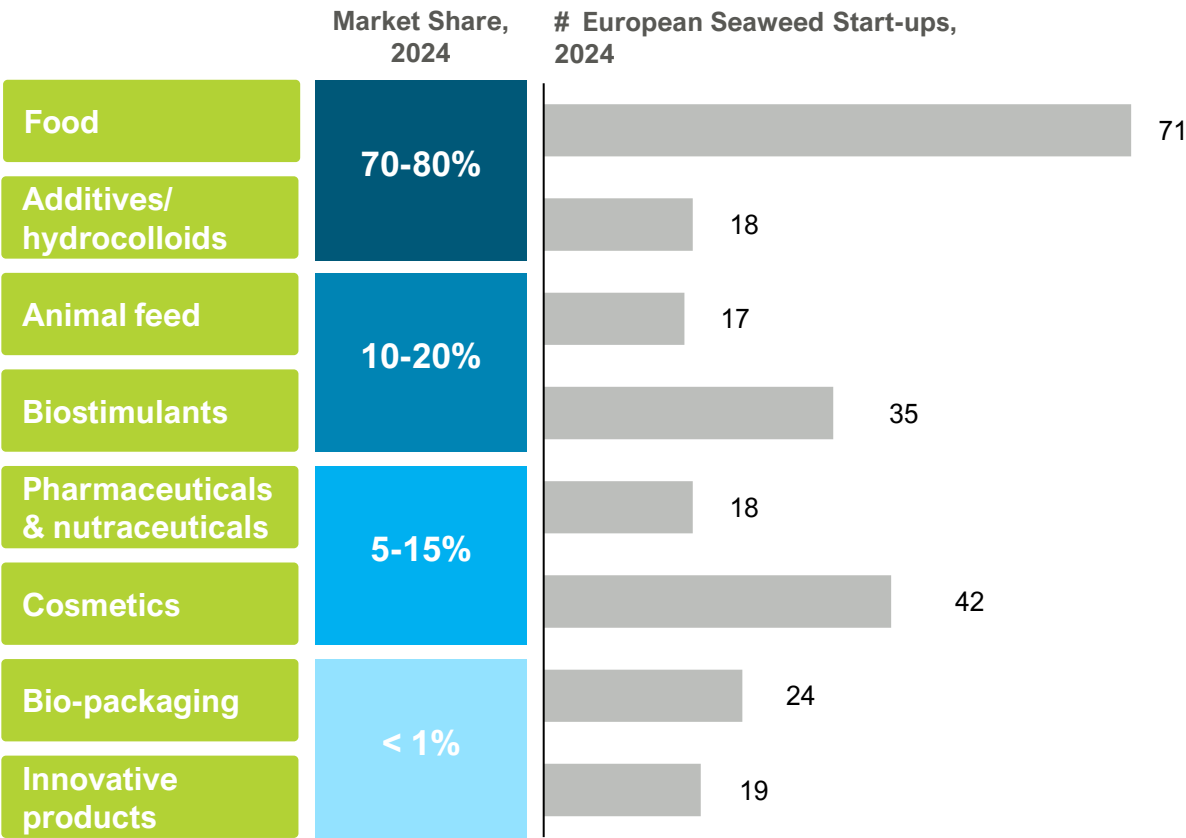
-  Companies: 258 (54%)
-  Top countries: UK – 58 (22%), France – 42 (16%), Ireland – 34 (13%)
-  Investments since 2020: ~ € 280 million disclosed

Overview and opportunities

- Top countries in applications mirror farming, with the **UK, France, and Ireland accounting for ~50% of companies**
- Europe's application companies are diverse**, spanning eight sub-sectors: food, additives, animal feed, biostimulants, pharmaceuticals & nutraceuticals, cosmetics, bio-packaging, and other innovative products
- Food usage dominates**, through both direct consumptions and hydrocolloids, representing ~75% of market share; this segment continues to attract start-ups, with 89 active in 2024
- Animal feed and biostimulants form the next largest segments**, together accounting for ~15% of the market
- Despite only accounting for <1% of the current market, **a growing number of start-ups are exploring applications in innovative products** such as pigments, textiles, and bio-packaging

Breakdown of applications by product segment and start-ups

Estimated % of total production



Note: Market share = % of total production. A number of start-ups target more than one application

PIPELINE EXAMPLES: EUROPEAN SEAWEED APPLICATIONS

Enterprises developing seaweed-based applications

Kelpi, United Kingdom



- **Founded:** 2020
- **Focus Area:** Bioplastics / biomaterials / coatings
- **Overview:** Developing seaweed-derived biomaterial coatings for paper packaging to replace single-use plastics
- **Investments disclosed since 2020:** €9,633,408
- **Key investors:** Bristol Private Equity Club (BPEC), Science Creates Ventures, Green Angel Syndicate, Blackfinch Ventures, Evenlode Foundation, Kadmos Capital, Nurture Brands, One Planet Capital, QantX, South West Investment Fund, V&A

The Seaweed Company, Netherlands



- **Founded:** 2018
- **Focus Area:** Functional food ingredients
- **Overview:** Specialises in the development of high-quality seaweed products, including animal feed supplements, food products, and biostimulants
- **Investments disclosed since 2020:** NA
- **Key investors:** Colruyt Group (growth capital), European Union grant

Algo Paint, France

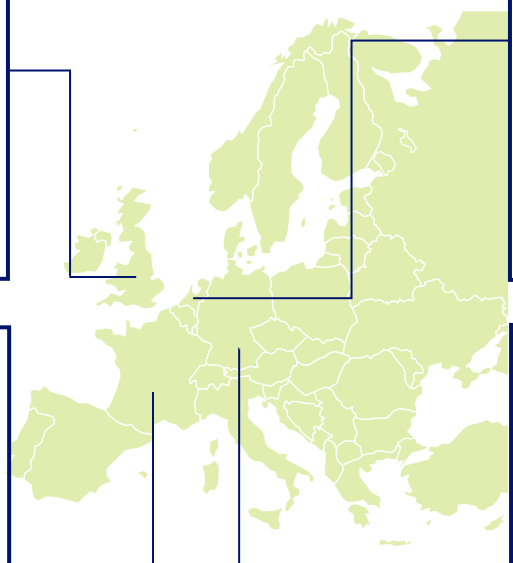


- **Founded:** 2015
- **Focus Area:** Pigments, inks, dyes
- **Overview:** Produces interior and exterior environmentally friendly paint formulated with algae, reducing petrochemical use, and sold via hardware stores and home improvement channels
- **Investments disclosed since 2020:** €3,540,000
- **Key investors:** Amundi, EDF, Mer Invest (Banque Populaire Grand-Ouest), Crowdfunding

BettaFish, Germany



- **Founded:** 2020
- **Focus Area:** Plant-based seafood alternatives
- **Overview:** Developing 100% plant-based tuna alternatives combining seaweed (cultivated regeneratively in Europe) with plant proteins (e.g., fava beans)
- **Investments disclosed since 2020:** NA
- **Key investors:** Pale Blue Dot, Astanor Ventures, SAGANA, Mudcake (prev. Trellis Road), DLF Ventures, EIT



The financing gap

TODAY, CAPITAL NEEDED TO SCALE THE SECTOR IS FALLING SHORT, ESPECIALLY DEBT

The sustainable ocean economy has historically been underfunded. Of all the SDGs, SDG 14 “Life Below Water” has received the least public financing. The good news is that investment in a sustainable ocean economy has gained momentum – particularly over the last decade – with aquaculture emerging as a focus area for impact capital.

Seaweed and bivalve stand to gain from this surge in capital – but today they still **struggle to access the finance they need**. The sectors need **debt financing to address cashflow mismatches, modernize, expand, and build resilience** to climate impacts – but face challenges in accessing commercial bank lending. What’s more, investment by **dedicated ocean impact funds** is **largely equity-driven**, limiting debt availability.

This section examines the debt financing needs of the two industries, covering:

- **The role of debt in company growth**
- **The estimated size of debt financing needs** based on key archetypes
- **The challenges companies face in accessing debt**

The financing gap

THE NEED FOR DEBT FINANCING IN EUROPEAN SEAWEED AND BIVALVE SECTORS

SEAWEED AND BIVALVE COMPANIES NEED DEBT FINANCING TO OVERCOME GROWTH BOTTLENECKS

Debt financing needs for seaweed and bivalve sectors

Managing cashflow mismatch



Seaweed

- **Seasonal gap:** upfront costs for farming, including purchases of seeds, growing materials, and equipment, are misaligned with revenue cycles
- **Grant delays:** company spending often precedes reimbursement, as payments of awarded grants can face delays



Bivalves

- **Seasonal activities:** necessary working capital management to bridge cash flow gaps between harvests
- **Adverse events:** buffer against temporary drops in revenue due to severe weather events or algal blooms
- **Emergency response:** address unforeseen challenges including diseases and abrupt regulatory changes

Financing infrastructure for scaling and resilience



Seaweed

- **Cultivation expansion:** creation of in-house hatchery to improve yield, and scaling of ocean & land-based farming and harvesting infrastructure
- **Processing infrastructure:** investment in pre-processing, single-application processing, and integrated biorefinery facilities



Bivalves

- **Improve resilience:** upgrade farms with high-quality infrastructure and green energy
- **Operational efficiency:** mechanization for farming and harvesting to lower costs and reduce ecological impact
- **Business diversification:** development of IMTA projects to increase sustainability and improve profitability

Enabling industry consolidation



Seaweed

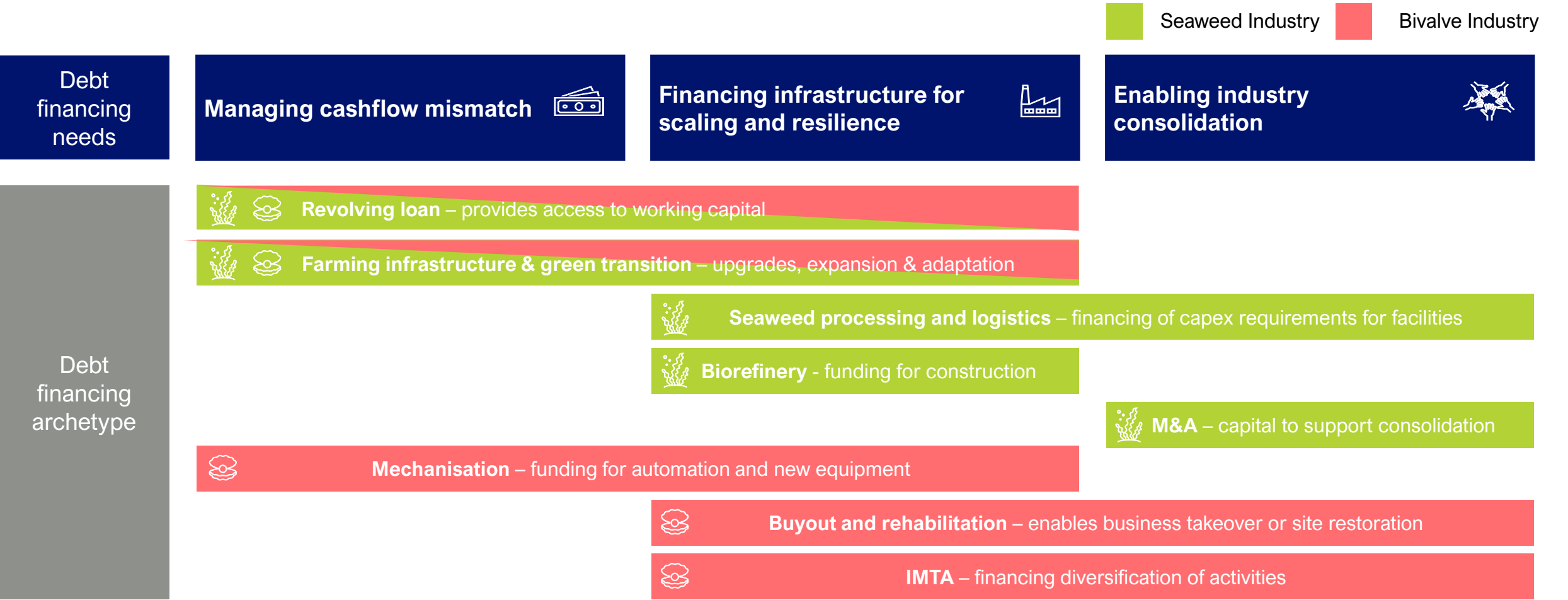
- **Vertical integration:** consolidation to secure feedstock, reduce supply chain charges, and scale to compete
- **Horizontal integration:** small-scale farms to share hatchery or processing infrastructure, and larger product companies to expand portfolio and distribution networks



Bivalves

- **Acquisition finance:** general M&A or intergenerational farm transfers
- **Assets tied to buyout:** acquire assets, such as equipment, that can serve as collateral
- **Site rehabilitation:** restore abandoned or underutilized sites as a cost-effective solution

THE EUROPEAN SEAWEED & BIVALVE REPORT IDENTIFIED KEY DEBT FINANCING ARCHETYPES THAT DIRECTLY ADDRESS THE SECTORS NEEDS



THE EUROPEAN SEAWEED AND BIVALVE PIPELINE HAVE A COMBINED ESTIMATED FINANCING NEED OF €1.7BN OVER THE NEXT 5 YEARS

		Seaweed		Bivalves	
Debt financing archetype		Est. % of pipeline with financing need to 2030	Ticket size	Est. % of pipeline with financing need to 2030	Ticket size
	Revolving loan	~15%	€200k – €1.5 m	~15%	€100k – €1m
	Farming infrastructure & Green transition	~5%	€500k – €2 m	~5%	€100k – €2m
	Mechanisation			~30%	€20k – €500k
	Processing and logistics	~3%	€500k – €5 m		
	Biorefinery	1%	€20m - €50 m		
	M&A	4%	€1m - €10 m		
	Buyout and rehabilitation			~2%	€500k - €3m
	Integrated Multi-Trophic Aquaculture (IMTA)			~5%	€200k - €1m

~€1.7bn

Total **estimated debt financing need** in European seaweed and bivalve sector **over the next 5 years**

€1.45bn

bivalves

€0.25bn

seaweed

The financing gap

THE CHALLENGE IN ACCESSING DEBT FINANCING

DESPITE THE NEED, THERE ARE CHALLENGES AND RISKS THAT PREVENT SEAWEED & BIVALVE COMPANIES FROM ACCESSING DEBT FINANCING

Challenges to accessing traditional debt financing		
  Seaweed and bivalve shared barriers		
Small ticket sizes • Micro-SME base: Most enterprises are small operations*, presenting small ticket sizes that are less desirable to commercial banks • High relative costs: transaction costs for debt instruments are difficult for SMEs to absorb • Weak bargaining power: Fragmentation limits companies' ability to negotiate better loan terms	Collateral challenges • Specialised equipment: Processing machinery, mooring, and harvesting gear are not easy to valorise in other contexts • In-water asset: equipment is generally less acceptable collateral than land equipment due to resale challenges; no option to use land as an asset to secure funding if water-based farms are not privately owned	High real & perceived default risk • Uncertain cashflows: seasonal and weather-driven income reduces creditworthiness a • Lack of offtake agreement: absence of contracted buyers hence predictable revenue streams discourages traditional debt provision • Credit risk may be over-estimated by traditional lenders due to lack of familiarity with the sectors
 Seaweed sector challenges	 Bivalve sector challenges	
Limited debt investor understanding • Nascent market: limited track record and sparse data on yield, costs, and profitability, especially for new applications (bioplastics, nutraceuticals) Carbon credit uncertainty • Sequestration standards: The degree of carbon sequestration remains unclear, which prevents pricing in of ecosystem services	Succession issues • Predominantly family-owned: businesses with unclear management transition plans raises lender concerns around governance and continuity Environmental and regulatory risks • Biological shocks: disease, algal bloom, and predation can temporarily impact repayment particularly as products are mostly sold fresh • Regulatory shifts: food safety and water quality regulations (e.g. post-Brexit UK water quality requirements) can directly revenue and market access	

Notes: 80% of European seaweed farms produce fewer than 10 tonnes per year; 95% of bivalve companies have fewer than 10 employees

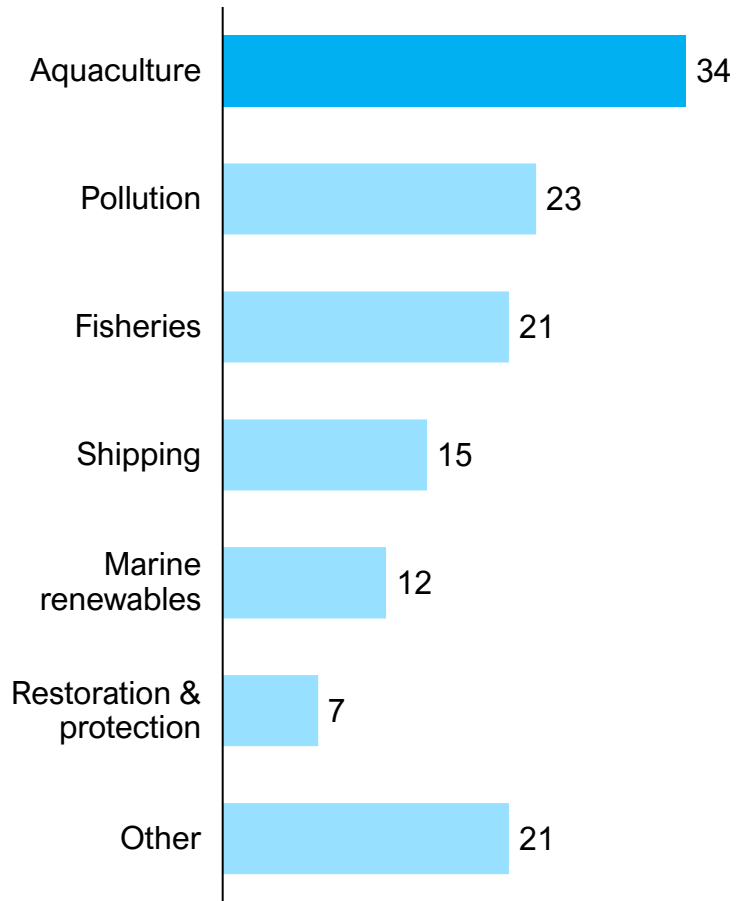
DEBT ACCESS CHALLENGE FROM TRADITIONAL LENDERS IS COMPOUNDED BY SKEW TOWARDS EARLY-STAGE EQUITY AMONG OCEAN FUNDS

Key takeaways

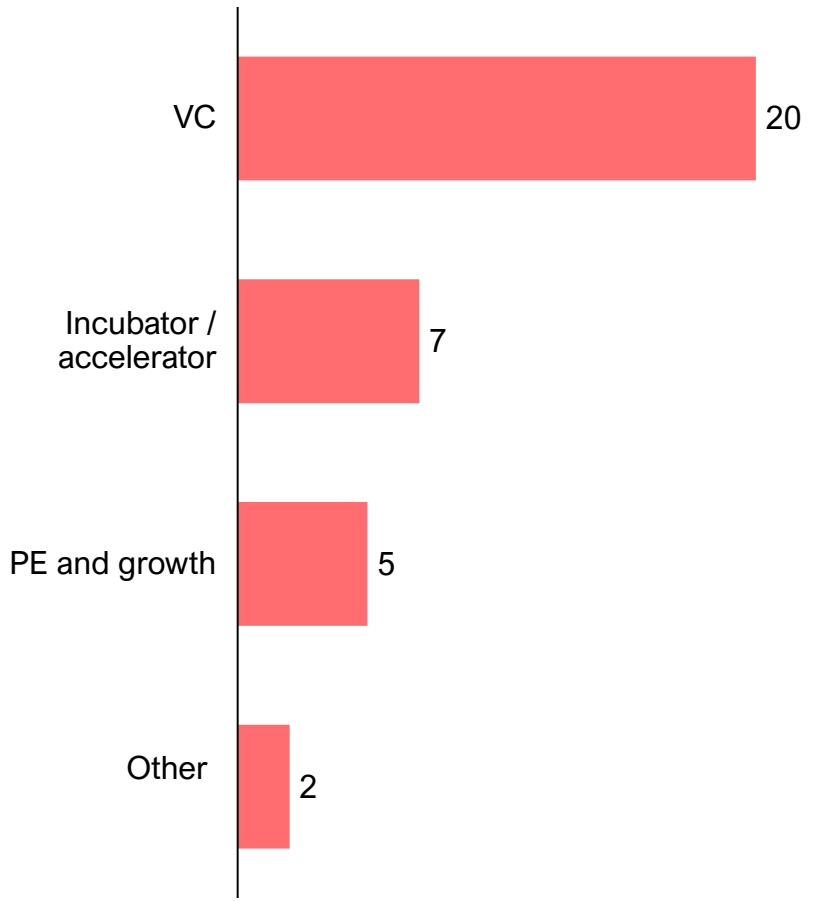
- Out of 48 ocean impact funds analysed, **aquaculture is the leading target sector** with 34 funds (~71%)
- **However...**
- **32 out of 34 aquaculture-focused funds (~94%) are equity**, including VCs, incubators/accelerators, and PE, indicating limited availability of debt
- **Most funds targeting aquaculture invest in multiple ocean sectors (~70%),** meaning aquaculture may just be a small part of the portfolio
- Even within the aquaculture investment landscape, **funds have varying degrees of seaweed & bivalve focus vs. other segments e.g. finfish** aquaculture

The result is limited debt availability

Number of ocean impact funds by sector targeted



Breakdown of aquaculture-focused funds by type



Note: A number of funds invest across multiple sectors

EXAMPLES OF EUROPEAN SEAWEED & BIVALVE COMPANIES RAISING DEBT VIA CROWDFUNDING UNDERSCORE CHALLENGE OF ACCESSING DEBT



Company Information

- **Algolesko (ALEOR)**
- **Country:** France
- **Segment:** Seaweed Cultivation
- **Description:** Farms brown laminarian seaweeds in offshore Natura 2000 marine areas in Brittany, overseeing end-to-end crop cycle for traceability

Key Insights

- **Outcome:** The company raised €1.2m equity the year after
- **Learnings**
 - **Successful case of community funding**, allowing for small investor participation
 - **Replicability issue** due to high reliance on community trust and understanding

Deal Snapshot

- **Instrument:** Convertible corporate bond, crowd-funded
 - Size: €500k
 - Lender: Subscribed by 15 investors
 - Use of Proceeds: Expansion of production capacity via a new park in southern Cornouaille
- **Context:** The bond was raised in 2019 via local crowdfunding platform GwenneG at above-market rates. In 2020, the company followed with a €1.2m equity raise on the same platform.
- **Role of debt:** Provide non-dilutive capital ahead of capex-heavy scale-up



Company Information

- **Oceano Fresco**
- **Country:** Portugal
- **Segment:** Clam hatchery and offshore cultivation
- **Description:** Operates Europe's first open-sea clam nursery in Algarve and a hatchery in Nazaré

Key Insights

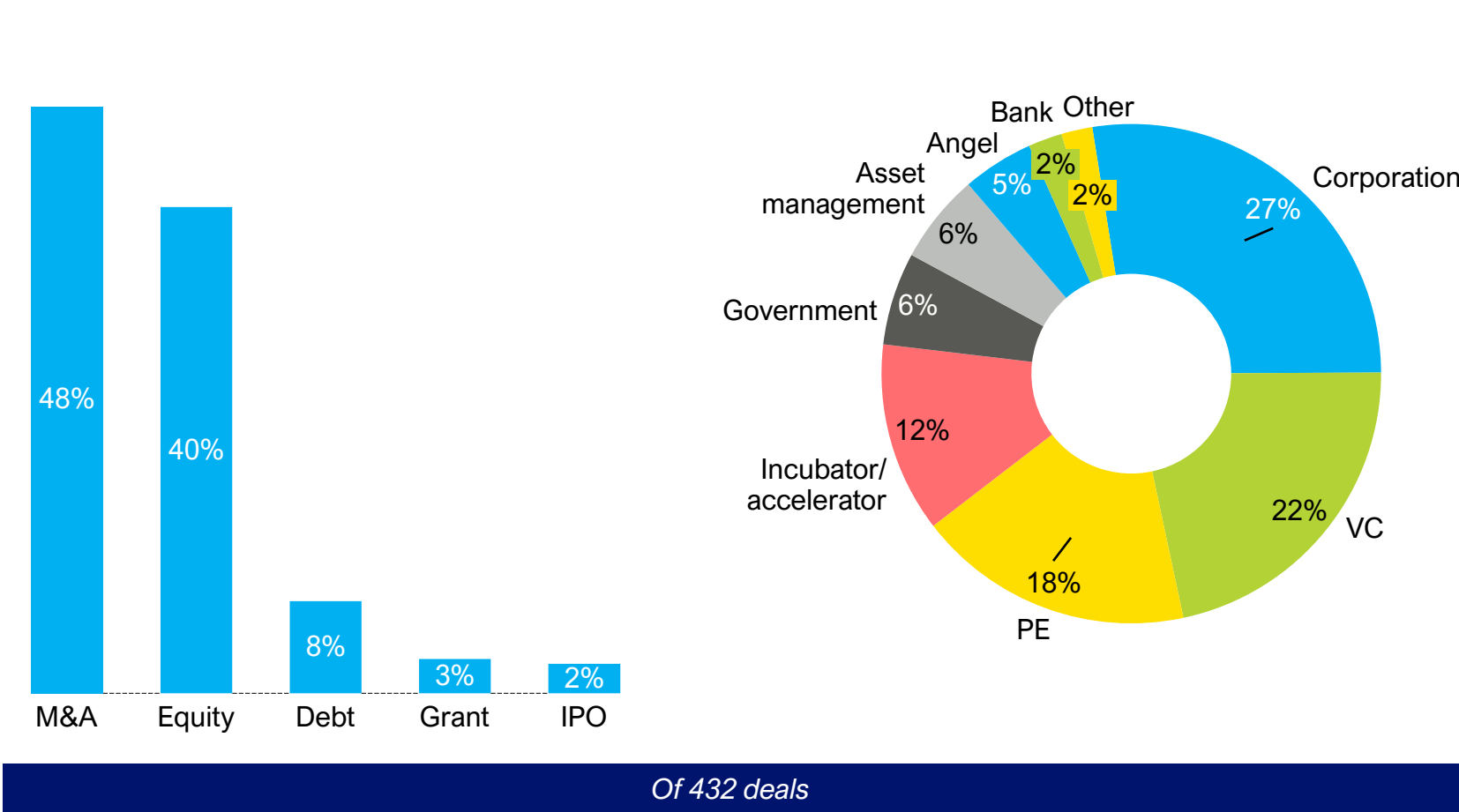
- **Outcome:** This loan, together with €1.5m MAR2020 programme and €800k company capital financed an off-shore farm investment of €3.1m
- **Learnings:**
 - **Crowdfunding can target projects with different risk levels**, e.g. infrastructure and R&D

Deal Snapshot

- **Instrument:** Crowdlending loans
 - Size: €730,000 across five campaigns
 - Lender: GoParity investor community
 - Use of Proceeds: Purchase and installation of off-shore farm equipment
- **Context:** The company raised ~4-year loans at an interest rate of 5-5.5% on the crowdfunding platform GoParity. The loans have 6-month grace periods to align with company needs. Following successful campaigns, Oceano Fresco also started Innovation campaigns to finance two R&D projects in genetics and pathology.
- **Role of debt:** Provide non-dilutive capex for early-stage infrastructure

THE WIDER EUROPEAN AQUACULTURE LANDSCAPE ALSO HIGHLIGHTS LIMITED DEBT FINANCING, CONTRASTED WITH ROBUST M&A AND EQUITY

2018-2023 Europe aquaculture deals by type (%)

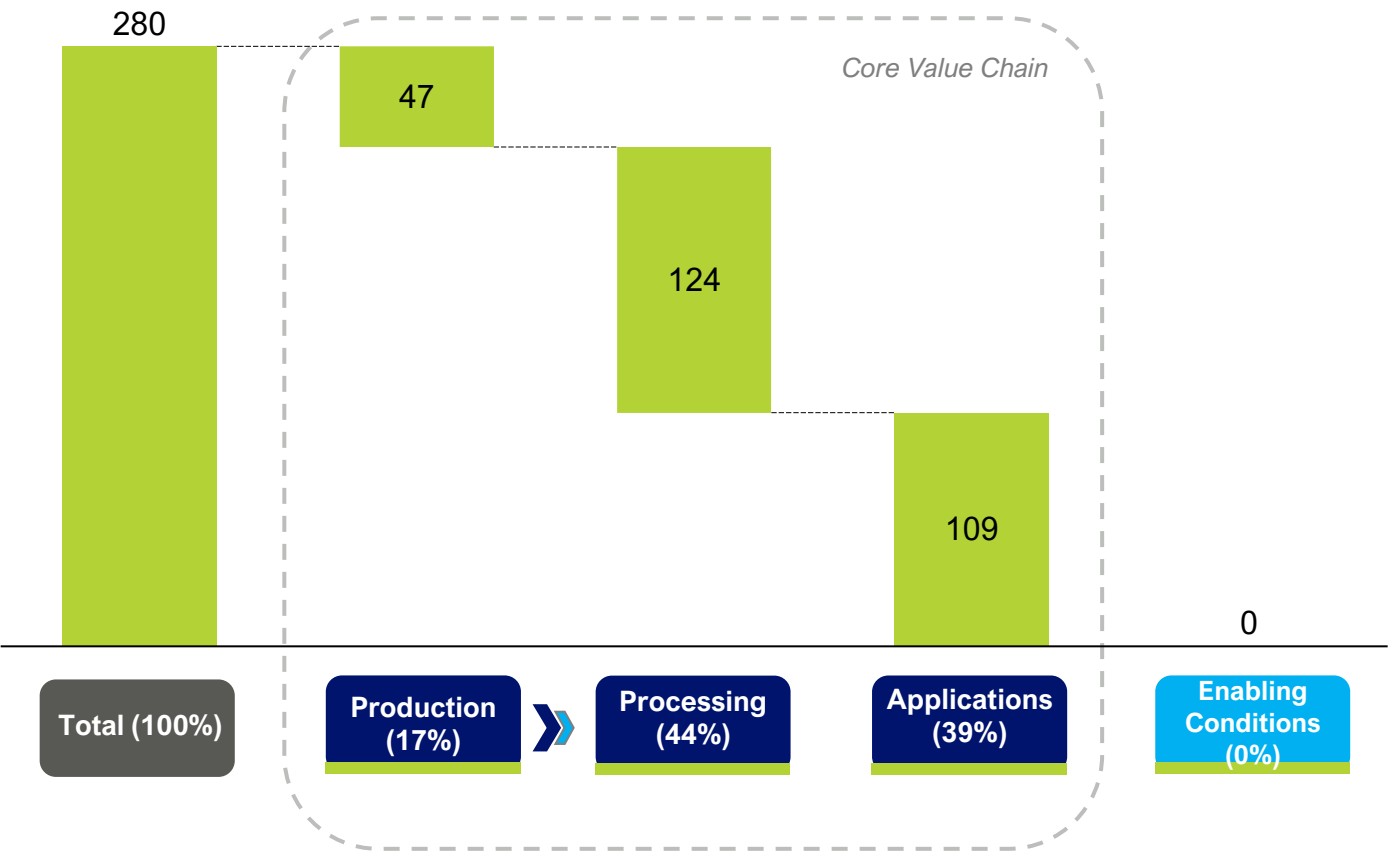


Key takeaways

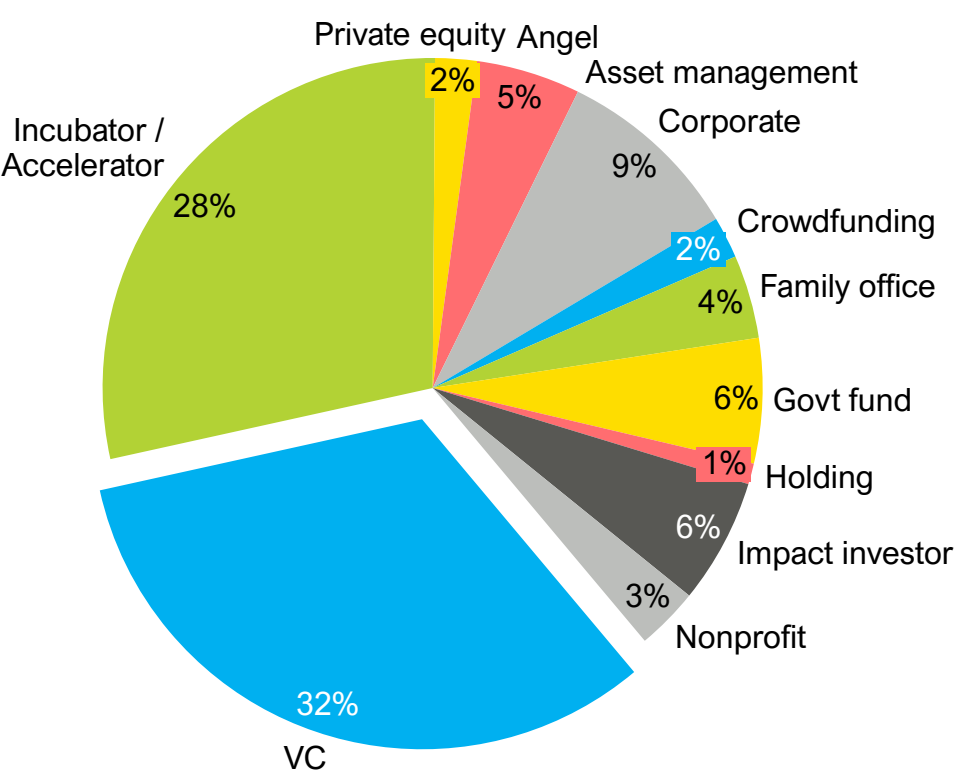
- **Aquaculture is the EU’s third largest blue economy sector by number of deals** identified (432), after blue renewable energy and blue tech and ocean observation
- Total deal volume from 2000 to 2023 reached ~€1.5 billion, with an **average ticket size of €13.7 million**
- Deal activity is concentrated in **Norway, UK, Denmark, France, Spain, and the Netherlands**
- **M&A and Equity lead the transactions**, together representing ~90% of deals, signaling healthy capital inflows and presence of exit strategies¹
- **Debt financing only accounts for ~8% of deals**, underscoring challenges for non-growth, capex-heavy projects (though a portion of the M&A deals is likely funded by debt)
- **The investor base is diverse, but equity-focused** players (VC, PE, and incubator / accelerator) make up more than half, reflecting a skew towards equity instruments

SEAWEED DEEP DIVE: DISCLOSED INVESTMENT IN EUROPE SKEWS TOWARD PROCESSING & APPLICATIONS, WITH VC THE LEADING INVESTOR TYPE

Disclosed investment since 2020 by value chain segments
€ million, Europe



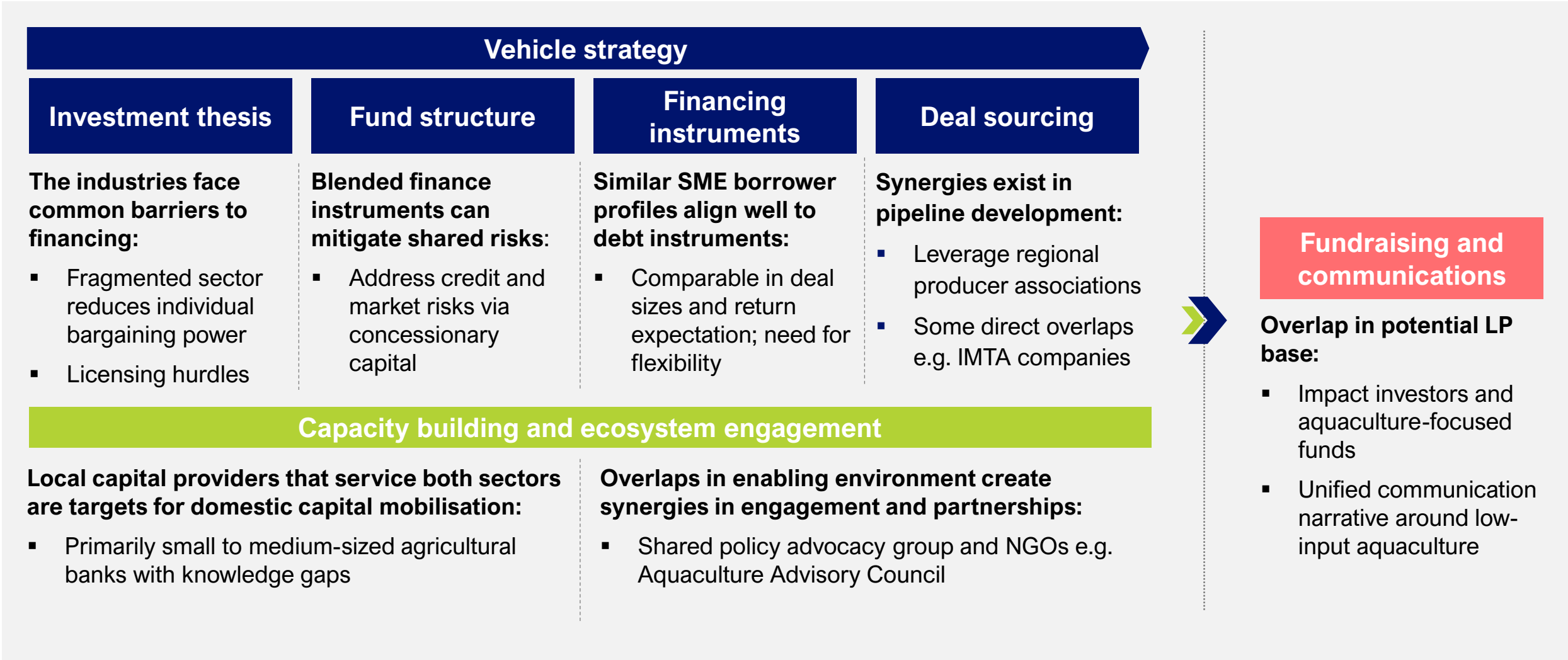
Investor type by number of disclosed investments
% of deals present



Note: Analysis covers Europe and only includes disclosed investments since 2020. Multi-segment companies are allocated pro-rata across value-chain steps. Deals are likely under-represented due to lack of publicly available information
Source: Phyconomy data, Systemiq analysis

JOINT FINANCING VEHICLES COMBINING SEAWEED AND BIVALVES COULD OFFER SYNERGIES

Summary of seaweed and bivalve synergies across the lifecycle of a potential financing vehicle



HOW TO DESIGN TAILORED FINANCING SOLUTIONS FOR SEAWEED AND BIVALVES THAT EMBED BEST PRACTICES?

Blended finance learnings

INTEGRATING BEST PRACTICES FROM PAST BLENDED FUNDS AT SEA AND ON LAND

Blended finance has grown significantly over the past decade, with more than \$250 bn of private capital mobilised since 2012.

Despite this, **blended mechanisms face challenges**. Models are **highly bespoke**, raising transaction costs and incubation timelines. **Common pitfalls** – such as overly complex capital stacks or misaligned incentives – continue to recur.

By **learning from best practice and established models**, new blended funds can **shorten time-to-market, reduce costs**, and ensure **concessional capital is used most effectively** to mobilise private finance at scale.

This section explores best practices from sea and land blended finance funds including:

- **Critical learnings for each element of fund design – including common pitfalls to be avoided and best practices to embed**

THERE IS AN OPPORTUNITY FOR DEBT VEHICLES TARGETING SUSTAINABLE SEAWEED AND BIVALVE AQUACULTURE IN EUROPE

The situation



Low trophic aquaculture generates a host of **positive impacts** for **communities, biodiversity, and climate**



Compelling underlying market fundamentals for seaweed and bivalves in Europe



Healthy pipeline with **significant debt financing** need of **~€1.7bn over 5 years**



Clear **gap** in **debt financing** availability and access



Potential **synergies** from **joint investment strategy** targeting both **seaweed and bivalves**



Implies need and opportunity for **financing vehicles** targeting the seaweed and bivalve sectors – with a **focus on debt instruments**

Potential to explore **de-risking mechanisms** to mitigate key challenges to mobilising finance associated – in particular credit, technical and demand risk in a European context

Lessons learned from **blended finance** can ensure new vehicles are **fit for purpose**

OUR APPROACH TO ASSESSING BEST PRACTICE AND LESSONS LEARNED DRAWS ON ANALYSIS OF FUNDS AND LITERATURE

Our analysis benchmarked blended funds working at sea
and on land...

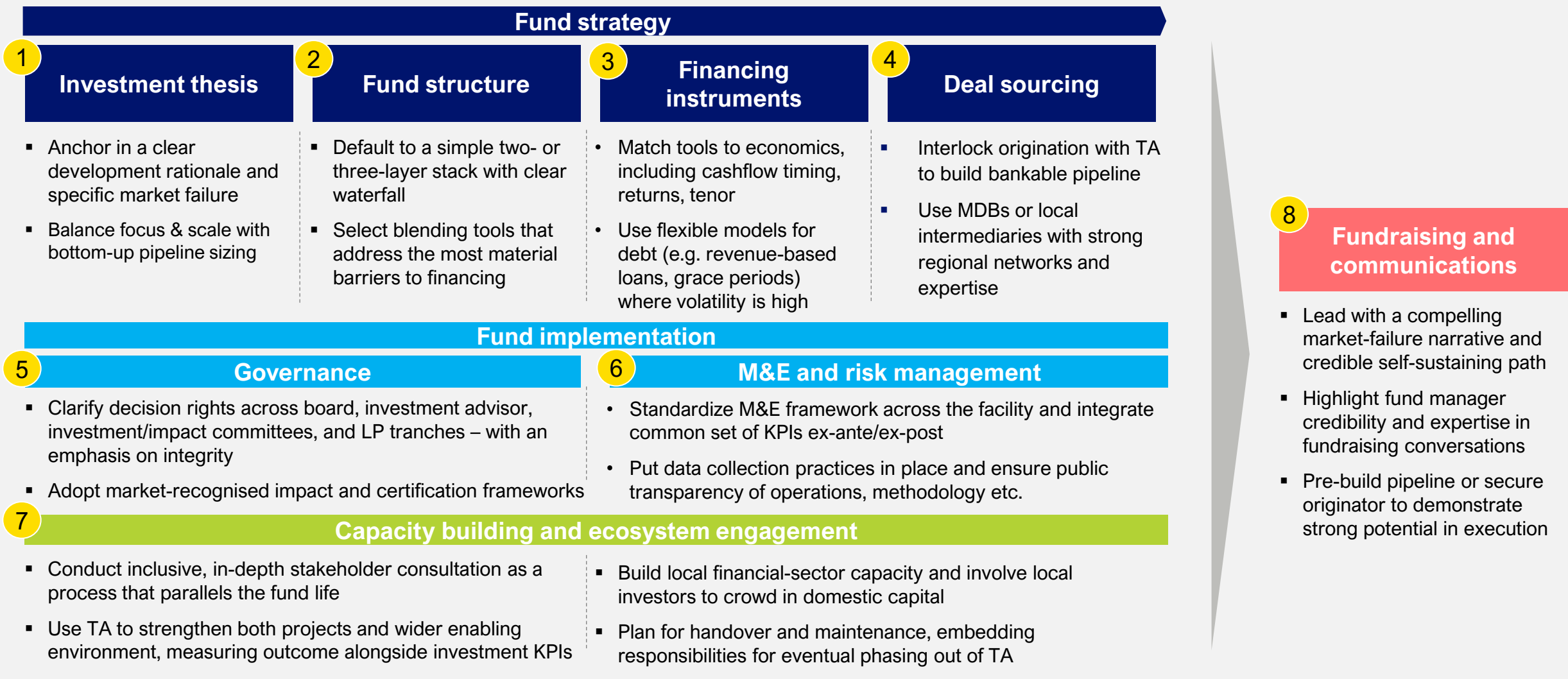


...and integrated take aways from thought leadership and
practitioners to inform future blended vehicles



NEW SEAWEED AND BIVALVE DE-RISKED VEHICLES CAN EMBED LEARNINGS AND BEST PRACTICES FOR BLENDED FUND DESIGN

Summary best practice considerations for critical components of fund design





Overview

An investment thesis defines where a fund will invest (geographies, sectors/verticals, value chain stages, target company sizes) and why (developmental and financial rationale). A tight thesis can reduce search costs, accelerates time-to-deploy, and help match concessional tools to specific, temporary market failures rather than diluting them across “all-things” mandates.

The OECD’s principles emphasise that blended finance interventions should anchor in clear developmental and financial additionality and demonstrate that underlying market fundamentals are in place for commercially sustainability once concessionality is phased out.



Fund Spotlight: Sustainable Ocean Fund (SOF)

(Size: USD 132 million final close)

SOF has a mandate defined by clear verticals—sustainable seafood, aquaculture, circular-economy, and marine conservation, all of which have direct impact on their objective to protect marine ecosystems. Geographically, the fund targets Latin America and Caribbean, Africa, and Asia Pacific, which ensures a strong pipeline. This result has been steady deployment into 15 investments over the first 4 years.

Common challenges and pitfalls

- **Over-broad mandates** (multi-region + multi-sector) can lead to domain expertise, slower origination, and difficulty in reconciling divergent expectations amongst stakeholders
- **Conversely, excessively narrow constraints** can cap pipeline and fund size, undermining the scale and ability to mobilise institutional investors
- **Trade-offs between financial and development additionality**; e.g. pursuing high mobilisation of capital may skew fund toward already bankable segments, weakening development rationale
- **Insufficient planning for exits strategies** in current blended finance approaches



Learnings and best practice

- **Anchor thesis in development framework and policy**, including international (e.g. SDGs) and local policy priorities (NDCs), setting clear and measurable targets
- **Diagnose the specific gap or market failure** that concessionality will close and demonstrate that commercial sustainability can be achieved once the market matures
- **Balance focus and scale with bottom-up pipeline sizing**, quantifying investable demand to calibrate the fund’s scope and size accordingly. Pipeline construction should be grounded in each target sector(s)’ specific financing needs (i.e. on instrument, ticket size, role for TA) etc. to ensure fit with fund strategy
- **Build for exit at inception**, on both transaction-level and market level. This includes designing financial and developmental triggers that taper concessionality, and ensuring regulatory and investment frameworks are in place or will be developed in parallel to the blended finance



Overview

The capital stack is guided by investor interests. It determines who bears which risks, the price of capital across tranches, and ultimately, how investable the vehicle is to commercial LPs. Blending can occur at different levels, including directly into a project (e.g. concessionary loans), as part of a fund (e.g. first loss tranche), as part of a facility (e.g. guarantees), or at the market level (e.g. offtake agreements). Good blended structures align concessionality with clearly identified existing market challenges (e.g. credit risk, political risk). They also plan for currency, tenor and liquidity mismatches so the structure remains resilient over the fund's life.



Fund Spotlight: Climate Investor 2 (CI2)

(Size: USD 675 million first close)

CI2 uses a dual-facility blended model: a donor-backed Development Fund finances early-stage project development, while a Construction Equity Fund supports build-out once projects are investable; many assets are later refinanced. The layered approach matches concessionality to the riskiest phase without over-subsidising and creates a pipeline conveyor belt in emerging markets (Africa, Asia, and LatAm).

Common challenges and pitfalls

- **Mis-aligned incentives or mandates** between private vs. concessional capital providers and/or managers that undermine de-risking benefits for pipeline origination & enabling environment
- **Over-engineered stacks** with many tranches or sub-funds, which can lead to long negotiations, complexity, and confusion
- **Mis-calibrated concessionality**; too much concessionary capital for example can cause market distortion or crowding out
- **Inappropriate de-risking mechanism** can increase costs without addressing the challenges to financing

Learnings and best practice

- **Co-develop mandates for catalytic (e.g. TAFs) and investment windows** of blended funds in tandem to ensure activities and incentives are aligned and optimise for synergies
- **Default to standard two- or three-layer stacks** (e.g., junior / mezzanine / senior) with clear waterfall, fees, and triggers; it allows initiators to segment investor types by tranche-level while helping institutional investors better understand and compare like-for-like
- **Start with the root causes of the market failure when designing de-risking tools**, ensuring that the blended instrument directly address the most pressing barriers to financing, e.g. hedging for currency and interest rate risks; guarantees to mitigate credit and commercial risks
- **Right-size the catalytic layer**; research market risk-return expectations of the senior tranche and design junior layer to achieve lower WACC, ultimately selecting the minimum concessional tool that mobilises private capital and avoids over-subsidy



Overview

Financial instruments must match cash-flow reality and other factors such as asset tangibility, technology maturity, and risk-return profile. Focusing on debt, there is a variety of instruments that can be deployed based on the profile of targeted borrowers, including venture debt, senior loan, and sustainability-linked loans. Blended structures can also use debt with concessional features to solve specific issues. For example, funds targeting SMEs and infrastructure can rely on flexible debt or alternative models such as grace periods, covenants, and revenue-linked features to bridge “marginally bankable” gaps.



Fund Spotlight: Energy Entrepreneurs Growth Fund (Size: USD 112 million first close)

EEGF deploys four instruments—mezzanine, long-term senior debt, a receivables-financing “product-gap” line, and minority equity. Debt terms are explicitly flexible and take cashflow timing into consideration: mezzanine and long-term debt include 36–42-month principal grace and staged/bullet repayments. The instrument mix has supported 20+ pipeline companies with double digit returns for investors.

Common challenges and pitfalls

- **Instrument-thesis mismatch** can raise default and erode impact, for example using short-tenor loans for business with long payback periods
- **“Copy-paste” terms from developed** markets, such as hard-currency and fixed amortization that do not match borrower cash-flows
- **Instruments address the wrong bottleneck**; in many SME segments, working capital timing is a real constraint. Using one-size-fits-all instruments can miss sector idiosyncrasies (e.g., seasonal cashflows in agri or aquaculture)

Learnings and best practice

- **Select instruments to align with fund purpose**: for example, use equity to pioneer impact in early-stage companies in emerging sectors, and debt to enable scale and mobilise capital for SMEs
- **Fit the instrument to borrower economics**; conduct research and modelling to understand the timing and size of free cash flows in the chosen sector and region, bringing tenors and amortisation in line with underlying assets
- **Employ flexible or alternative models for debt**, such as revenue-based loans, grade periods, and interest-only phases to align with cash-flow timing
- **Consider phased capital deployment**, allocating adequate instruments across the project lifecycle, e.g. from concessional development grant to construction equity and commercial refinancing



Overview

Deal sourcing is the process of identifying and securing investment opportunities that fit the fund mandate. Taking a structured approach and utilising networks opens access to a broader market while reducing search time and costs. A significant share of SDG-related opportunities sit in smaller, distributed projects (around \$1-5 million in size). For funds targeting SMEs, pipeline friction is often a bottleneck, thus requiring effective mechanisms to find, pool, and implement projects at speed and scale.



Fund Spotlight: SDG loan fund

(Size: USD 1.111 billion)

Beyond funding the Class B first-loss shares, FMO as origination partner, feeding a pipeline target of 100-120 loans across ~80 markets from its existing and new transactions. This gives the fund immediate access to screened deal flow, standardised credit processes, and established monitoring and evaluation, materially shortening diligence and time-to-deploy.

Common challenges and pitfalls

- **Thin project pipeline due to lack of local capacity** for project development, which requires coordination across regulators, communities, and the private sector
- **Limited involvement from local ecosystem intermediaries**, such as banks, accelerators, and project developers, which slows origination and raising acquisition cost per deal
- **Capability and network gaps** within the fund manager and sector/regional expertise missing on investment or impact committees



Learnings and best practice

- **Interlock origination with technical assistance (TA)**, using design-stage grants and feasibility support to convert “near-bankable” projects into bankable
- **Standardise terms and structures** to shorten diligence and enable asset pooling for small tickets
- **Utilise local intermediaries for origination**, e.g. commercial banks with presence on the ground and reputable local project developers / accelerators as providers of credit, pipeline aggregators, or facilitators for asset pooling
- **Partner with experienced development banks** as co-origiators or arrangers to accelerate screening, underwriting, and monitoring
- **Select a fund manager with proven networks and track record** in the target region/sector



Overview

Governance is the “guard-rail” that protects both integrity and performance in blended funds. Clear decision rights, independent oversight, conflict-of-interest policies, and impact governance ensure that concessional tools are used appropriately and the fund stays on mandate.

Effective governance encourages collaboration while minimising friction. Alignment amongst LPs and between LPs and GPs is critical to achieving fund objectives. In parallel, the impact officer has a key role to play in enhancing clarity on impact assessment and ESG due diligence for investment decisions.



Fund Spotlight: Emerging Market Climate Action Fund (Size: EUR 450 million)

EMCAF’s governance hard-wires role clarity: Allianz Global Investors acts as AIFM/portfolio manager and holds IC seats, while the EIB is investment adviser leading market mapping, due diligence and E&S assessments to ensure alignment with EIB standards. The split preserves commercial accountability and embeds recognized E&S safeguards, which helped consolidate catalytic investors and crowd in private capital.

Common challenges and pitfalls

- **LP-GP misalignment** leading to impact and commercial underperformance or unilateral investor actions (e.g. stop-funding rights) that undermine fund structure
- **GP incentive structure designed at tranche-level over whole-fund outcomes**, with carry/hurdles tied to narrow outcomes
- **Unclear impact governance** and lack of internationally-recognised impact standards causing delays in vehicle development and obstacles in fundraising
- **Skills mismatch in sub-facilities** within the blended vehicle and lack of regional/risk expertise to tailor to on-the-ground realities



Learnings and best practice

- **Simple and transparent governance framework that embeds rigorous assessment of both commercial and impact objectives**, through either dedicated or integrated decision-making bodies
- **Ensure LP alignment within and across tranches** by clearly defining decision rights that are balanced across tranches (e.g. shared advisory committee, proportional veto rights)
- **Design GP incentive structures** (carry, hurdle rates) to align to whole-fund performance to avoid tranche “silos”
- **Select the right regional and risk-specific expertise** in each sub-facility within the governance structure, shortening time-to-decision



Overview

A robust monitoring and evaluation (M&E) and risk framework protects development intent and builds commercial confidence. Because blended finance uses scarce concessional resources, transparency and comparability are essential building block to maintain stakeholder trust and accountability. Frameworks should be designed with local actor input so that indicators, baselines, and mitigation measures reflect on-the-ground realities (policy, regulatory, social, and environmental contexts). Anticipating context-specific risks upfront enables tailored and targeted mitigation strategies and faster course-correction.



Fund Spotlight: &Green Fund

(Size: Scaling towards USD 500 million)

&Green finances deforestation-free commodity supply chains and pairs capital with a jurisdictional performance system (JPS) that tracks landscape-level risks (e.g., deforestation alerts, peat conversion). Each investment has a public investment case with KPIs (hectares protected/restored, smallholders integrated, GHG outcomes) and a time-bound ESG Action Plan tied to disbursement milestones.



Common challenges and pitfalls

- **Inconsistent monitoring and reporting practices** impact donors looking for comparability and private actors who need to meet varying reporting requirements
- **Shallow understanding of local context** leading to inefficient risk strategies and loss of social license to operate
- **Poor data collection and quality assurance processes** resulting in inadequate and unreliable evidence for impact and financial performance



Learnings and best practice

- **Standardise M&E framework across the facility:** define roles (GP, managers, DFIs, investees), align timelines, and combine quantitative KPIs with qualitative evidence
- **Agree on a common set of KPIs ex-ante,** using market-recognised frameworks such as the IFC Performance Standards, IRIS+ system, and the Ocean Impact Navigator (OIN)
- **Integrate credit risk assessment tools and dedicated expertise,** ensuring consistent evaluation of borrower quality and portfolio risk—critical for debt-focused funds
- **Establish robust data collection practices,** defining sources, methodology, frequency, and verification/assurance
- **Ensure transparency and accountability,** publishing methodologies and case-level summaries and communicating results to decision-makers regularly to inform real-time portfolio actions



Overview

In frontier or nascent markets, capital alone rarely closes the gap; operational support and capability-building activities often determine portfolio success and the system’s ability to sustain itself after concessional capital exits. Technical assistance (TA) can take many forms, such as mentorship, resource provision, training/upskilling, or policy and ecosystem support. The key is to tailor TA to local context, focusing on local development priorities, financial market development, and a general sound enabling environment.



Fund Spotlight: Eco.business Fund

(Size: Total assets USD 911 million)

The fund pairs its credit lines with a dedicated Development Facility that delivers diagnostics, training, and on-site technical support to both partner financial institutions and end-borrowers on topics including certification, resource-efficiency, and biodiversity safeguards. TA is tied to lending milestones, building borrower capacities and bank risk management simultaneously.

Common challenges and pitfalls

- **Poorly targeted TA** that is detached from investment thesis or the existing barriers to financing (e.g. TA on upskilling when the hurdle is permit/licensing)
- **Fragmented, duplicative TA** with overlaps among donors and limited local ownership or coordination
- **Ineffective capacity building due to misunderstanding of local dynamics** (politics, business environment), leading to clashes
- **No post-TA sustainability plan**, e.g. targeted intervention but lack of skilled personnel to maintain systems after grants end



Learnings and best practice

- **Inclusive, in-depth stakeholder consultation** as a process that parallels the fund life, not a one-off consultation; ensure local ownership where feasible
- **Tie TA to clear outcome logic** and measure TA effectiveness alongside investment KPIs
- **Use TA beyond project-level to strengthen the enabling environment**, supporting regulatory/policy reforms (e.g. accelerate licensing procedures for seaweed farms in Europe) and addressing obstacles faced by private investors
- **Build local financial-sector capacity** by ensuring consistency of blended vehicle with local financial industry development and involving local investors for crowding in domestic capital
- **Plan for handover and maintenance**, embedding responsibilities and budgets for system upkeep (e.g. data platforms, MRV routines, training programmes) beyond the TA grant period



Overview

Blended funds target a range of investors with very different mandates and fiduciary constraints, thus a clear narrative and a credible track record are crucial to convert interest into commitments. Standardised structures, a trusted GP, and transparent data build confidence and enable repeat commitments, especially for emerging market allocations. Timing also matters; having an experienced GP and anchor LP in place early is often decisive for first close.



Fund Spotlight: Emerging Africa Infrastructure Fund (Size: USD 750 million)

In 2016, Ninety One became EAIFF's fund manager, leveraging its deep Africa networks to identify pipeline, experienced credit and structuring teams to execute, and established monitoring/reporting systems to meet LP requirements. This combination underpinned successive fundraising rounds, allowing EAIFF to reach size and scale.

Common challenges and pitfalls

- **Insufficient GP credibility or experience** combined with a complex blended vehicle impacts a fund's ability to secure anchor commitments
- **Limited evidence of concrete pipeline** or lack of strong origination partners in fundraising conversations raise doubts about execution and slows process
- **Difficulty attracting multiple catalytic capital providers** under one impact agenda

Learnings and best practice

- **Lead with a simple, compelling market-failure narrative** and show how concessionality is temporary, with a path to a self-sustaining market
- **Highlight the fund manager's credibility and expertise** in the region/field; where a GP lacks track record, leverage a reputable co-sponsor or advisory bench
- **Conduct continuous investor dialogues**, iterating terms and taking a feedback-oriented approach to identify and address priority concerns
- **Pre-build pipeline** or secure originator to demonstrate strong potential and reduce perceived execution risk
- **Sequence fundraising** by first forming small coalitions to validate appetite, then widen the circle once anchors are secured

APPENDIX

TWO OUT OF THREE SEAWEED VALUE CHAIN SEGMENTS ARE BETTER SUITED TO DEBT THAN EQUITY

Assessing seaweed value chain segments vs. financing need components			Low	High
	 Farming	 Processing	 Applications	
Cash flow predictability	Medium (Seasonal working capital gaps but predictable contracts)	High (Stable demand once offtake agreed)	Medium / Low (Market-building, new product risk)	
Asset tangibility	High (Lines, boats, hatchery assets)	High (Dryers, warehouses, biorefinery)	Low (IP, marketing, brand)	
Technology maturity	Medium (Cultivation methods proven but still nascent in Europe)	Medium (Drying & /milling mature; biorefinery still emerging)	Low (Many products at pilot stage, high R&D spend, new markets)	
Risk profile	Medium (Permitting delays and some regulatory risk)	Medium / Low (Demand unstable before off-take secured)	High (Demand risk from uncertain consumer adoption, regulatory risk for some segments e.g. novel foods)	
Return profile	Low (Low-margin and mainly volume-driven)	Low (Processing margins exist but hinge on high utilisation and secure feedstock)	High (If products reach scale, high gross margins and enterprise multiples)	
Capital intensity & scale	Medium (Farm infrastructure capex, fragmented operators)	High (Especially high for biorefineries)	Low (Small-scale R&D, marketing and working capital)	
Implied financing need	Primarily debt Limited equity	Primarily debt Limited equity	Limited debt Primarily equity	

FOR BIVALVES, ALL VALUE CHAIN STEPS ARE BETTER MATCH WITH DEBT THAN EQUITY

Assessing bivalves value chain segments vs. financing need components			
	 Hatchery	 Production	 Processing
Cash flow predictability	Medium (Steady demand but volatility in seed survival rates)	Medium (seasonal but predictable contracts)	High (Demand is stable once supply contracts are secured)
Asset tangibility	High (Hatchery facilities, tanks, spat systems)	High (Boats, cages, rafts, ropes)	High (Processing plants, depuration tanks, cold storage)
Technology maturity	Medium (Proven techniques but variable disease resilience and survival rates)	Medium (Established farming methods but new offshore farming)	Medium (Mature but with incremental innovations in automation and ready-to-eat product lines)
Risk profile	Medium (Steady demand but disease risks)	Medium (Biological risk, weather, and regulatory changes)	Low (Main risk from supply fluctuations from farms, otherwise predictable demand)
Return profile	Low (Limited pricing power, returns are driven by scale)	Low (Commodity products; family-owned farms lack clear exit strategies for private capital)	Low (Low margins from simple processing e.g. canned, ready-to eat meals)
Capital intensity & scale	High (Hatcheries require significant upfront investments)	Medium (Moderate farm capex per site, low individual scale)	Medium (Facilities and consolidation hubs)
Implied financing need	Primarily debt Some equity	Primarily debt Limited equity	Primarily debt Limited equity

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