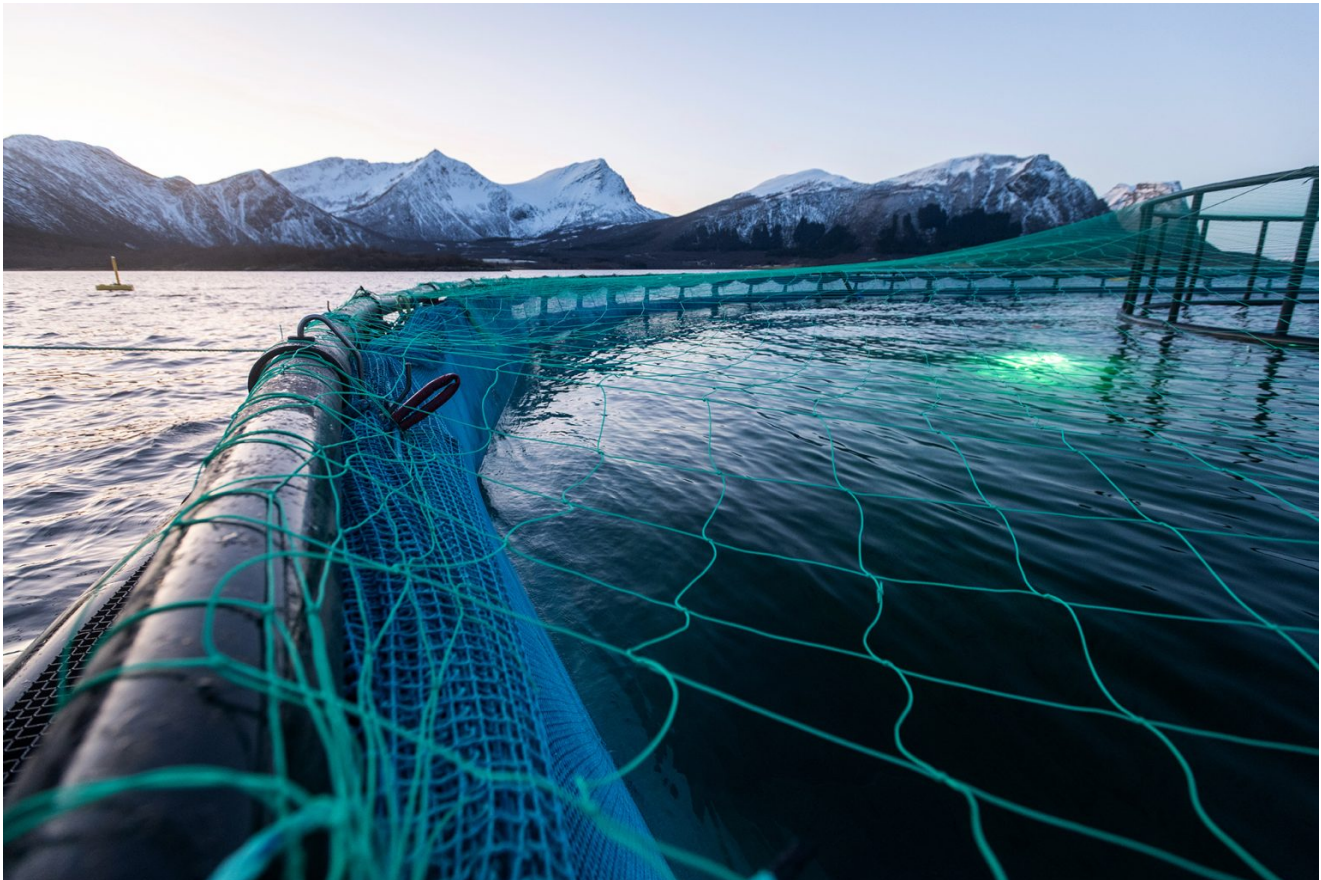


Harnessing nature for more sustainable food systems

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Lachszeit in Norwegen im Netzgehege, kontrollierte Aufzucht im Meerwasser Fjord see, wasser, berg, landschaft, natur, schnee, himmel, blau, anreisen, meer, winter, eis, anblick, küste, canada, ozean, fremdenverkehr, erkältung, beach, sommer, clear, landschaftidyll, schönheit, insel, aquakultur, aquafarming, aufzucht, kontrolliert, lachse, fische, fjord, norwegen, nahrungsquelle, tierisches eiweiß, ertrag, überfischung, netzgehege, sauber, klar, kälte, planbar, intensivhaltung, business, technologie
Aquaculture

Markus Wyss and Ian Carr emphasize the importance of nature-positive innovations to address the pressing environmental challenges

We currently face extraordinary crises and challenges that can be resolved partly through innovative approaches to harnessing nature. The global population is predicted to increase to close to 10 billion people by 2050. In parallel, living standards increase, and consumption patterns change, leading to over-exploitation of natural resources and waste accumulation, including plastic waste.

Global temperatures are increasing due to the accumulation of greenhouse gases in the atmosphere, which starkly increases the risk of natural disasters. Regarding biodiversity, one million plant and animal species are under threat of extinction, and the actual species extinction rate is likely 1,000-fold higher than before human interference.

These human-made global pressures also threaten food and water security and other ecosystem services and favour social unrest and political instability. It has been estimated that at least 44 trillion USD of economic value generation (over half of the global GDP) depend on nature and its services to people.

To preserve the foundation of our health and wealth and enable sustainable development, rapidly changing our relationship with nature is imperative. Innovation and bold action are required to change our consumption patterns, and to replace linear economic models (from finite fossil raw materials to products to waste) with regenerative approaches based on renewable bio-resources in which raw material consumption and waste generation are minimised and productivity is maximised.

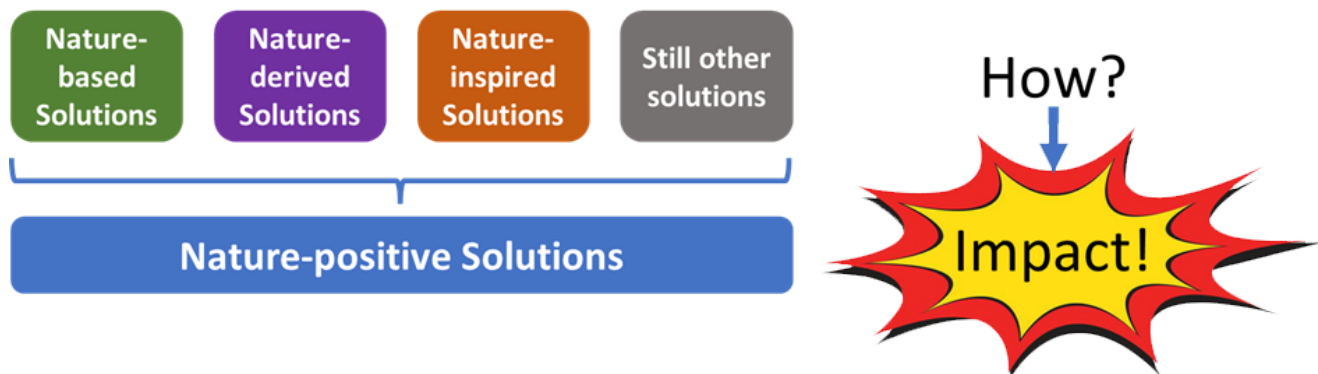


Fig. 1: Rather than arguing about how to achieve benefits for nature and whether a solution should be classified as nature-based, nature-derived or nature-inspired, potential solutions should be assessed and prioritised based on their positive impact on nature, regardless of how they are achieved.

The hype around nature-based solutions

Some have hailed nature-based Solutions (NbS) as the favoured approach to tackling the global environmental crises. NbS are defined as “actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits”. (1)

NbS use the power of functioning ecosystems as infrastructure to provide natural services to benefit society and the environment. Examples of NbS include the restoration of coastal ecosystems such as mangroves to protect communities and infrastructure from storm surges and erosion or planting trees or other vegetation in cities to moderate the impacts of heatwaves, capture stormwater, and abate pollution.

In contrast, Nature-derived Solutions (NdS) or nature-inspired solutions (NiS), such as industrial fermentation processes or biomimicry, do not qualify as NbS (Fig. 1). Likewise, the NbS standard currently can be and is applied only to ecosystem-based processes, but cannot be applied to commercial products, which unfortunately limits the potential impact.

The International Union for the Conservation of Nature (IUCN) released its Global Standard for NbS in 2020, (2) and NbS (but not NdS or NiS!) are explicitly mentioned in Targets 8 and 11 of the Kunming-Montreal Global Biodiversity Framework adopted at the end of 2022, (3) as the preferred means to mitigate climate change and to restore, maintain and enhance nature's contributions to people. As another example, NbS play a prominent role in the European Union's Climate Adaptation Strategy. (4)

Challenges and risks of NbS

NbS undoubtedly have their merits and should be given due attention. However, only focusing on NbS would bear significant risks. NbS are not, per se, better than technological solutions in addressing the current environmental challenges. Although NbS can and will contribute to limiting climate change, their potential is relatively small in contrast to what can be achieved by the rapid phase-out of fossil fuel use. (5)

In addition, to implement NbS at scale and avoid simply displacing environmental impacts, land would need to be freed up from other uses, through a shift towards plant-based diets and widespread adoption of a circular economy to decrease the need for raw materials.

In conclusion, given the urgency and scale of the challenges, we need to embrace all potential solutions. What matters most is the solutions' positive impact on nature and the environment, not whether or not they are NbS, NdS or NiS. Our entire focus should be on the most effective Nature-positive Solutions, based on rigorous science-based assessments! Nature-positive is a mindset for continuous improvement, inspiring steady and consistent sustainability improvements over time. The prospects of Veramaris

Let us now turn to an example that does not qualify as an NbS but harnesses nature to enable a unique food system transformation. An adequate dietary supply of long-chain polyunsaturated omega-3 fatty acids (particularly EPA and DHA), typically sourced from marine fisheries, is essential for people and many animals. Essential fatty acids offer many documented health benefits. It has been estimated that in Europe, almost a quarter million cardiovascular deaths per year are attributable to an omega-3 fatty acid-deficient diet. (6)

A growing population will need more fatty fish like salmon and mackerel as dietary sources of omega-3s. To complement the finite supply of fish from the open seas, aquaculture's contribution to global fish production is projected to grow to above 60% in 2030. To feed this growth of aquaculture, alternative sources of omega-3s are needed to supplement the limited supply of fish oil and fish meal from marine fisheries.

And that is where Veramaris (7) comes in. Veramaris harnesses marine microalgae in an industrial fermentation process to produce a renewable source of omega-3-rich oil, which can be used directly as a feed ingredient for the fish. Plant-derived sugars are used to grow the microalgae.

This alternative ingredient enables aquaculture to grow as a food system, independent of the limited supply of nutrients from existing marine supply chains. It thereby offers a viable alternative to adding further pressure on fragile marine resources, since the impacts of overfishing on biodiversity are well known.

Hence, Veramaris is an excellent example of a Nature-positive Solution that supports the health and welfare of farmed animals and the provision of healthy, omega-3-rich food to people, in a manner that respects planetary boundaries.

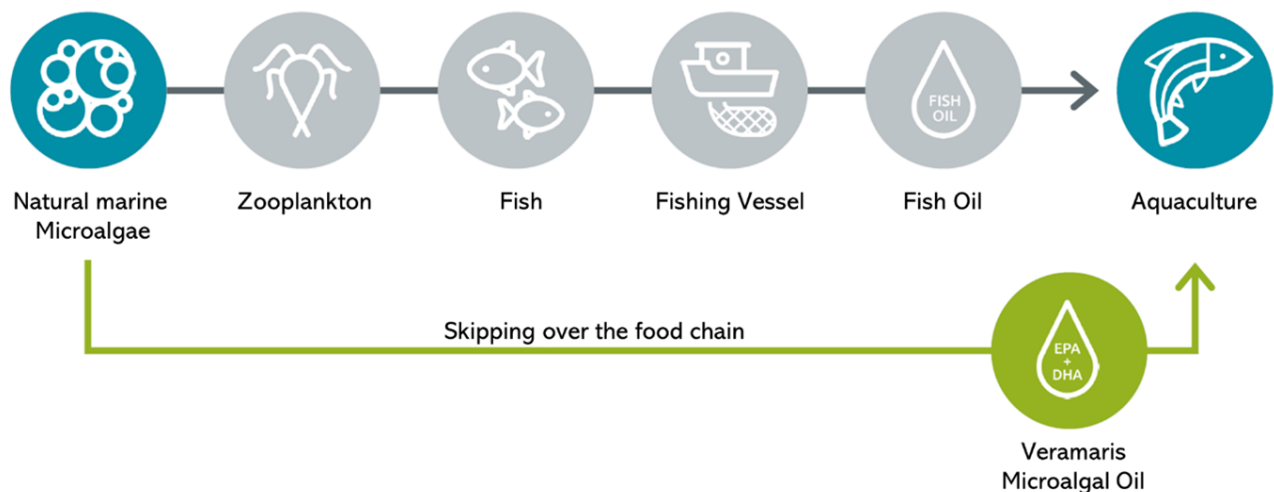


Fig. 2: The fermentation process of Veramaris shortcuts the natural food chain. One tonne of microalgal oil yields the same amount of omega-3s as up to 66 tonnes of wild catch!

Conclusions

Due to the urgency and scale of the global environmental and socio-economic crises, trade-offs between food security, health, wealth and the environment are inevitable. Most steps towards a more sustainable future will require compromises to be made. To counter the main challenges regarding climate and nature in a timely manner, the most efficient nature-positive solutions need to be prioritised, regardless of whether they are nature-based, nature-derived, nature-inspired, or non-natural.

We cannot afford to play one against the other – we need the best-suited and customised solutions or combinations of solutions to our challenges. Science-based assessments (8) should point the way to an equitable, nature-positive future in which the global human

population will live in harmony with nature and harness its powers through innovation. Policymakers are invited to promote Nature-positive Solutions of all kinds and create a legal framework favouring nature-positive innovations.

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