Understanding agricultural terms for fisheries management

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Executive Summary

Overview

Discussions around sustainable food systems have historically been biased towards agriculture and wild caught fish are relatively undervalued as a food type. This means fisheries receive less attention in policy discussions and less investment to support the adoption of sustainable management approaches than terrestrial agriculture. Adoption of terms used to describe best practice in terrestrial agricultural systems could deliver new opportunities for fisheries investment, by supporting increased visibility of fisheries best-practice in discussions around sustainable food systems. This report explores opportunities to extend some of the terminology and concepts used to describe sustainable agriculture to a marine and fisheries context, providing opportunities to raise the profile of fisheries in discourses around sustainable food production.

Key findings

Current uptake of terms used in terrestrial agricultural contexts in a fisheries context is limited, but there is evidence of opportunities for increased use.

The uptake of key terms such as regenerative, nature based solutions and agroecology are limited in a fisheries context in comparison to agriculture. However, there is evidence of potential for increased uptake of commonly used terrestrial terms; for example, the term 'regenerative' has had recent uptake by NGOs to describe innovative fisheries management approaches (e.g. Seas at Risk).

Clear parallels between sustainable fisheries and agriculture exist at the level of broad objectives, outcomes, and specific practices.

Across some of the key terms used for resilient agriculture, there are common key objectives; enhancing ecosystem services to promote productivity, prioritising long-term productivity over short-term profit, adopting multi-year management cycles, and improving livelihoods. Each of these objectives are also applicable to sustainable management in fisheries systems.

Beyond overarching objectives, similarities can be drawn between the intended outcomes of best-practice agricultural and fisheries management, and the specific types of practices implemented to achieve these outcomes. For example, common across both fisheries and agriculture is the potential for management to deliver carbon sequestration; in agriculture, carbon sequestration is linked to practices which increase soil organic carbon or above ground biomass (e.g. hedgerows and trees). In fisheries systems, management to avoid depletion of fish stocks supports ocean biogeochemical cycles, where fish faeces and dead organic matter support ocean carbon sequestration.

The adoption of terms more commonly applied to agricultural systems can increase the visibility of fisheries best practice and sustainability outcomes.

Four case studies illustrate examples of where parallels can or have been drawn between terms and concepts used in terrestrial agricultural systems and fisheries management. For example, in agriculture, nutrient based management practices such as reduced tillage are used to support a positive feedback loop between ecosystem services and production. In fisheries, ecosystem based fisheries management also supports a positive feedback loop between ecosystem services and production, by promoting the health of the wider marine ecosystem to support stock health and maintain productivity. Demonstrating how fisheries and agricultural management approaches work towards shared outcomes can increase the visibility of best practice management in fisheries and support more widespread implementation.

Conclusion

There are strong opportunities for fisheries to adopt terms and concepts commonly used to describe resilient management in agricultural systems. Demonstrating parallels between sustainable fisheries and agriculture can support better communication between fisheries and agricultural funders, and increase the visibility of best practice fisheries management in policy and funding decisions.

There are clear parallels between resilient management of fisheries and agriculture at the level of broad objectives, specific practices and associated outcomes. This provides an opportunity to increase the visibility of fisheries as a key component of sustainable food systems. Evidence of parallels between fisheries and agriculture can support improved communication between actors working primarily on fisheries, and those who have historically focused on terrestrial agriculture, including funding bodies and policymakers.

Recommendations

A series of next steps should be taken to socialise findings, stress-test the application of terms and further consolidate research. This can help to better understand potential risks or barriers in the adoption of terms, including any gaps.

	Recommendation
Stakeholder engagement	Socialise findings in this report through further stakeholder engagement, including with existing relationships and coalitions
	Engage with the public sector to understand potential uptake of terrestrial terms in policy discourse
	Diversify the conversation through engaging with farmers, fishers and local communities
Case studies and 'stress testing'	Stress-test the findings in this report against Walton Family Foundation's existing projects
Further research	Develop the business case for adoption of terrestrial terms
	Compare voluntary and regulatory disclosure requirements between fisheries and agriculture
	Track progress in uptake of agricultural terms, and how this effects fisheries investments

1. Introduction

Discussions around sustainable food production have historically focused on agriculture. Fisheries are relatively under-represented in debates around sustainability and sustainable food systems. For example, of the 16 UN Sustainable Development Goals, Life Below Water receives the least attention from policy makers and business leaders[1]. This report explores the opportunities to extend some of the terminology used to describe sustainable agriculture to a marine and fisheries context, to raise the profile of fisheries systems in discourses around sustainable food and ecosystem management.

Section 1 sets out the scope and broad context of the report. Section 2 then assesses the extent to which common terminology used to describe agriculture and terrestrial ecosystem restoration are currently applied to fisheries best practice. Section 3 then explores parallels between agricultural terms and fisheries best practice at the level of:

i) **broad goals** of sustainable food production;
ii) **specific outcome areas** to achieve those goals;
iii) management practices and **actions 'on the ground'.**

Section 4 provides illustrative case studies as examples of opportunities for links to be made between agriculture and fisheries production in discussions around sustainable food production. The report concludes with recommendations for socialising these findings with wider stakeholders, stress-testing the potential for terminology uptake, and conducting further research to validate and extend the findings presented here.

1.1 Scope

The focus of the report is on the potential application of terminology commonly used in agriculture to raise the profile of wild-caught fisheries in policy and funding discussions. It does not consider aquaculture or mariculture activities, where parallels with agriculture are recognised as being more mature, nor does it focus on interventions which prioritise conservation and restoration activities without links to food production outcomes.

The hypothesis of the report is that application of agricultural terminology to fisheries could increase their visibility in sustainable food system conversations, potentially leading to increased investment in sustainable fisheries management. The focus is on current and potential application of agricultural terms to fisheries. For a detailed explanation of how the commonly used terms are understood for the purpose of this report, refer to the glossary in Appendix 1.

1.2 Context

There is currently a lack of investment in sustainable fisheries, limiting uptake of sustainable practices

New and increased financing is required to increase uptake of sustainable fishing practices. Currently, a lack of consistent funding towards sustainable fishing reduces the capacity of fisheries to implement best practice management, and reduces their ability to maintain practices and ensure longevity of change.

Investment in fisheries is currently inhibited by several challenges including:

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[1] Burke (2021), SDGs which get the least attention globally.
https://www.netnada.com.au/post/sdgs-which-get-the-least-attention-globally

Undervaluation of wild caught fish as a food type	When wild caught fish are sustainably managed and ecosystem effects are considered, wild caught fish can be a **sustainable and nutritious food type**.[2] Fish have a particularly important role in providing an **affordable source of protein** in low and middle income coastal countries.[3] Higher income countries tend to value a **limited number of species,** creating sustainability challenges.[4] In broader discourses, fish are often framed as a natural resource rather than as food.
Lack of clear business case for companies to invest in fisheries	Fisheries are **globally important** for their role in food security, livelihood security, trade and development and can be **sustainable when integrated with effective resource management**.[5] However, fisheries investment lags behind aquaculture, which is more readily seen as a means to meet increasing consumer demand for sustainable seafood and viewed as an opportunity for impact investment.[6] Aquaculture systems are more bounded and inputs / outputs are easier to control than in fisheries, which may support a lower risk profile for investment, with shorter term returns. On the other hand, aquaculture production can have significant negative environmental impacts from water pollution, disease and escapes.
Lack of understanding of best practice in fisheries	Fisheries language is often bound up in **technical language and 'jargon'** that many outside of the fishing industry do not understand. This makes it difficult for NGOs, policymakers and members of the public without a technical background in fisheries to 'keep up' with the fisheries context, make sense of **sustainability claims**, and understand what constitutes '**best practice**'. Technical jargon can make critical issues in fisheries invisible for policymakers, limiting the willingness to engage, and reducing the effectiveness of policy interventions in encouraging good management practices.[7]
Knowledge gap in understanding of oceans in comparison to terrestrial realms	Alongside specific barriers to investment in fisheries, it is important to note the wider context of a **lower understanding of ocean biodiversity and ocean ecosystems in comparison to a terrestrial context**. It is estimated up to **two thirds of life living in the deep ocean is currently unknown** to science.[8] This is often due to issues of **access, data limitations and bias** towards charismatic terrestrial species which tend to attract greater public interest and funding. This bias translates into food systems, with **less understanding of the extent and nature of fisheries issues in comparison to agriculture**.

[2] Golden et al. (2021), Aquatic foods to nourish nations, Link
[3] Viana et al. (2023), Nutrient supply from small scale fisheries, Link
[4] The Guardian (2024), Goodbye cod, Hello Herring. Link
[5] WWF (2019), Risk and opportunity in the seafood sector, Business case for sustainability. Link
[6] Morgan Stanley (2023), Sustainable aquaculture expansion a 'major investment opportunity'. Link
[7] Stakeholder interview, January 2025
[8] NHM (2022), Two thirds of life in the seabed is unknown to science. Link

An increase in private sector investment in agriculture has improved productivity and sustainability in terrestrial food production

At the same time, there has been **an increase in investment and funding towards sustainable agriculture**. This has been driven by customer demand for sustainable products, meeting national and corporate level commitments to climate and nature, improving resilience of production, and offering long term investment returns. Behind farm level investment, the public sector is the second largest contributor to agricultural investment, with recent changes in government subsidies to support sustainable agricultural practice (e.g. the Sustainable Farming Incentive in the UK, the Environmental Quality Incentives Programme in the US). The private sector is increasingly recognised as critical to support the sustainable agricultural transition and fill the funding gap for sustainable food production, including through public-private partnerships.[9]

Investment is critical for the transition of the food sector to achieve climate, nature and inequality related goals[10] but **fisheries investments currently lag behind agriculture**. Investors view sustainable agriculture as a preferable investment opportunity to fisheries; investors are almost twice as interested in investing in sustainable agriculture than fisheries and oceans, and banks and other financial intermediaries report see fisheries as having significantly lower business potential for their clients than agriculture.[11] Fisheries remain less visible than terrestrial agriculture, with less clear understanding of opportunities and fewer examples of investment success, which further limits fisheries investments.

Exploring opportunities for the application of common agricultural terms to fisheries can support communication and coordination of efforts between fisheries and agriculture stakeholders including private and public sector funders, investors and policy makers

Adoption of terms commonly used to describe best practice agricultural management can deliver new opportunities for fisheries investment by supporting effective communication of fisheries within broader conversations around sustainable food production. **This report explores opportunities for fisheries to be better included in discussions around sustainable food production that have historically focused on agriculture.** It considers the extent to which common sustainable agriculture terminology is currently used to describe fisheries; explores parallels between goals, outcomes and practices in terrestrial and marine contexts; and evaluates the opportunities for links to be made between agriculture and fisheries production in discussions around sustainable food production.

Recommendations are made, which aim to support conversation between investors, practitioners and stakeholders on land and sea. Adopting common language can increase the visibility of best practice in fisheries management to drive market demand for sustainable seafood and create incentives for fishers to adopt sustainable practices.

[9] IISD (2022) State of Investments in Sustainable Agriculture. Link
[10] WBCSD (2024), Enabling private sector finance at scale to transition to sustainable agriculture and food systems, Link
[11] TNC (2019), Investing in Nature: Private finance for nature-based resilience, Link. Figure 3.2 and 3.3.

2. Uptake of common agricultural and terrestrial ecosystem terms in a fisheries context

2.1 Differences between agricultural and fisheries production contexts

There are fundamental differences between agriculture and marine fisheries

Agriculture and marine fisheries have some key **fundamental differences**. Wild caught fisheries are permeable and diffuse, pursue mobile species and, as a result, can be less responsive to individual management decisions compared to static and bounded farms (Table 1). Unlike in agriculture where land tenure is more secure, fisheries are often accessed by multiple fishers. This risks creating a 'tragedy of the commons' through the overexploitation of shared resources, leading to depletion of fish stocks and fisheries collapse.

Agriculture systems	Fisheries systems
Cultivation Agriculture is based on cultivation of static species of crops, or livestock species. Activities are based around growing, raising, rearing, planting, sowing and inputs / outputs are calculated and managed.	**Wild-caught** Fisheries are based on capture of wild, mobile species. Activities are based around tracking and capturing, without managed inputs like feed and fertiliser.
Spatial management Agriculture takes place within a spatially bounded and static production system. Activities implemented are likely to have a direct impact at local scales i.e. farm and surrounding landscape.	**Stock based management** Fisheries operate across highly permeable and wide ranging spatial boundaries and fisheries activities are highly mobile, especially in the deep seas. Management decisions are likely beyond the direct control of individual fishers and have impacts across broad scales (e.g. regional fisheries management organisations).
Tenure rights and private resource Although farmers face issues of secure tenure rights and land access, in agriculture, land is often owned or leased by farmers and products / produce are typically not shared nor mobile. This means farmers are likely and able to make decisions to ensure the long term viability of their farm. An exception is nomadic pastoral or common land grazing systems which use shared land resources. These systems share some similarities and challenges with shared fishing grounds, although land access and livestock movement is generally still more bounded.	**Shared and mobile resource** The mobility of fish species creates challenges for competition and ownership between fisheries actors. While fisheries areas are largely defined and access rights managed, fish are not bounded within these areas. This creates issues when negotiating fish quotas, and means fish protected in one area or national boundary can be overexploited in another. With climate change, fish have increasingly migrated polewards into new management areas, exacerbating risks of overexploitation and the 'tragedy of the commons'.

Table 1: *Key differences between agriculture and fisheries systems.*

2.2 Current uptake of agricultural and terrestrial ecosystem terms to describe marine fisheries

Despite fundamental differences between terrestrial and marine systems, there are examples of the adoption of common agricultural and terrestrial ecosystem terms to describe marine activities. For example, 'rewilding' is a term originally used to describe terrestrial conservation activities, but has been adopted to describe marine conservation activities and increase the visibility of ocean conservation efforts (Case Study 1), and there is growing recognition of the potential for fisheries to adopt the term 'regenerative' to increase the visibility of sustainable fisheries management (see Table 2).

CASE STUDY 1: ADOPTION OF 'REWILDING' IN A MARINE CONTEXT

Rewilding is an example of a terrestrial ecosystem management concept which has been adopted in a marine context to increase visibility and awareness of marine conservation.

Rewilding has gained traction in recent years as a flagship terrestrial conservation strategy, describing conservation interventions which restore natural processes with minimum human intervention (e.g. rewilding projects at the Knepp Estate, UK, Oostvardesplassen, Netherlands). There are some prominent recent examples of application of the term 'rewilding' to the marine realm (e.g. Charles Clover's book, Rewilding the Sea and marine rewilding projects set up by NGOs such as Rewilding Britain). This has helped increase the visibility of ocean conservation activities, with interventions such as no-take zones or native oyster restoration labelled as 'rewilding'.

Overall, however, **terms gaining traction in an agricultural and terrestrial ecosystem context have limited current uptake when describing marine activities though there is evidence of opportunities for increased use.** The following three terms have particularly gained traction in agriculture and terrestrial ecosystems in the past decade:

- **'Regenerative' agriculture.** This has no widely agreed upon definition, although there are broadly agreed principles including restoration of **ecosystem services in productive systems, enhanced and restored biodiversity** and **increased resilience** of farm productivity, including to impacts from climate change and biodiversity loss. Regenerative agriculture is often linked with improved soil management and health.[12]
- **Nature-based Solutions** refers to interventions that use the **protection, restoration or management of natural and semi-natural ecosystems** to address social, economic and environmental challenges and deliver human wellbeing, ecosystem services and resilience, and biodiversity benefits.[13]
- **Agroecology** refers to the application of **ecological principles to agriculture**, ensuring the regenerative use of natural resources and ecosystem services while addressing the need for **socially equitable food systems**.[14]

Table 2 shows further detail of these key terms in a terrestrial agriculture context, and the relative uptake of terms in the marine sphere.. Additional terms commonly used to describe sustainable management in agricultural systems and terrestrial ecosystems, and their current or potential application to fisheries, are detailed in Appendix 2.

[12] Adapted from SAI (2024), Regenerative Agriculture Framework. Link
[13] Adapted from Cohen-Shacham et al. (2019), Core principles for successfully implementing and upscaling Nature-based Solutions. Link
[14] Adapted from Agroecology Europe, the 13 Principles of Agroecology. Link

Key terrestrial term	System	Level of uptake	How term is being applied, including relevant practices
Regenerative	Terrestrial	'Regenerative agriculture' has a rapid increase in uptake and traction within agriculture over the past decade, and particularly since 2019[15]. It is used differently by a variety of stakeholders across NGOs, policy makers and companies.	Regenerative is applied to describe approaches to agriculture which build soil nutrients, enhance crop and livestock diversity and promote biodiversity on agricultural land. Practices commonly associated with a 'regenerative' farming approach include minimum tillage, fallow periods and crop rotations.
	Marine	There are some recent examples of the application of 'regenerative' to describe fisheries, although relatively few. An NGO report from October 2024 uses the term 'regenerative fisheries' (Seas at Risk) and Loring, 2023 explores the application of 'regenerative' to fisheries[16].	Where regenerative is used, it is mainly in reference to small scale fisheries initiatives or to 're-label' existing sustainable fisheries management actions (e.g. fishing at maturity using low impact methods).
Nature-based Solutions	Terrestrial	Nature-based Solutions has relatively high uptake in agriculture, particularly by NGOs and policymakers and has seen a significant increase in use over the past decade, and particularly since early 2019[17]. There is relatively high consensus on the definition of NbS, as defined by the IUCN.[18]	Nature-based solutions (NbS) are increasingly used in agriculture as an opportunity to deliver carbon removals whilst also contributing to delivering biodiversity goals and other co-benefits. On agricultural land, NbS includes interventions such as increasing above ground biomass through planting trees and hedgerows, or restoring biodiversity on marginal land.

[15] via Google Trends (search for term 'regenerative agriculture' from 01/01/2014 to 01/02/2025)
[16] Loring (2023), Can fisheries be "regenerative"? Adapting agroecological concepts for fisheries and the blue economy. Link
[17] via Google Trends (search for term 'nature-based solutions' from 01/01/2014 to 01/02/2025)
[18] IUCN (2020), Global Standard for Nature-based Solutions. Link

	Marine	NbS has limited current use in marine and fisheries contexts compared to terrestrial systems. This gap is increasingly well recognised, for example in the need for greater uptake of NbS in marine policies.[19]	NbS for fisheries include interventions to improve ecosystem function and fisheries productivity, such as ocean fertilisation to support phytoplankton blooms, restoration of coral reefs, sea grass or other fish breeding grounds, or introducing new (potentially artificial) habitat to restore lost or degraded habitat (e.g. artificial reefs to support wild mussel populations).[20]
Agroecology	Terrestrial	Agroecology is a longer-established term and concept, and has received increasing use over the past five years in particular[21]. It is often framed as a social or political movement. The use of agroecology is typically farmer led, rather than having extensive use by corporate or government actors.	There is growing consensus on the definition of agroecology, for example applying the 13 UN principles of agroecology. Agroecology practices include agroforestry, crop rotation, intercropping and biological pest control. Agroecological principles are most often applied in a small-scale farming context, as an alternative to large-scale industrial farming and food system.[22]
	Marine	There is evidence of agroecology being applied to fisheries contexts (e.g. FAO 2020), although relatively low uptake in comparison to terrestrial systems. There is interest in further developing the 13 principles of agroecology to better include water-related issues, including fisheries.	Several agroecological principles and practices have alignment with fisheries, such as principles of fairness and livelihoods concerns for fishers, animal (fish) welfare and encouraging a diverse assemblage of species to support wider ecosystem function.

Table 2: *Context and extent of uptake of commonly used agriculture terms in agriculture and fisheries contexts.*

[19] E.g. Riisager-Simonsen (2022), Marine nature-based solutions: where societal challenges and ecosystem requirements meet the potential of our oceans. Link
[20] Riisager-Simonsen (2022), Marine Nature based solutions: where societal challenges and ecosystem requirements meet the potential of our oceans. Link
[21] via Google Trends (search for term 'agroecology' from 01/01/2014 to 01/02/2025)
[22] e.g. IPES, 2018. Breaking away from industrial food and farming systems: Seven case studies of agroecological transition. Link

2.3 Extent of uptake and context for the use of three common agricultural and terrestrial ecosystem terms: regenerative, agroecology and nature-based solutions

'Regenerative', 'nature-based solutions' and 'agroecology' are terms which originated with reference to terrestrial contexts, and their uptake in fisheries is currently limited compared to application in agriculture. Further, there are few examples of fisheries best practice, and a lack of case studies demonstrating success. Figure 1, 2 and 3 illustrate the extent and context for current uptake of these terms in marine and fisheries systems, relative to their use in agriculture and wider food systems.

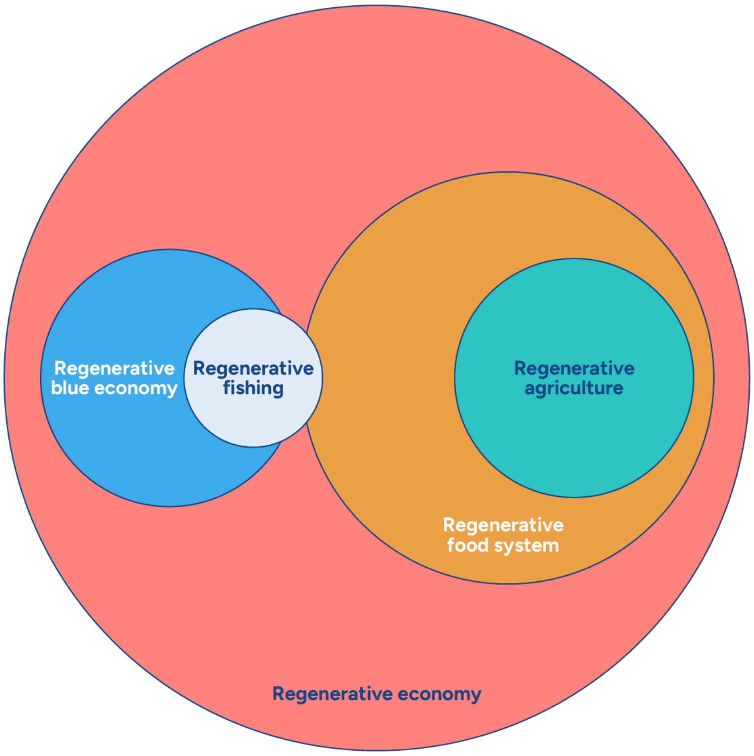

Figure 1: *Extent of uptake of the term 'regenerative' in reference to fisheries, relative to uptake in wider uptake in marine and terrestrial contexts, based on qualitative analysis of published literature.*

The size of the circles approximately represents the relative extent of current use of terms, and the position of circles represents the context in which terms are used.

'Regenerative fishing' currently has limited uptake and there is no clear definition of 'regenerative' as applied to fisheries. However, there is increasing recognition that the lack of current uptake could be a gap, with potential opportunities for the use of the term 'regenerative' in fisheries systems. For example, Loring. 2023 explores how regenerative design in agriculture can be applied to fisheries management.[23] Where 'regenerative' is used in relation to fisheries, this is primarily in conversations around the 'regenerative blue economy'. Here, regenerative is used to describe an integrated and inclusive economic model for oceans, where fisheries are one of several marine-based activities.[24]

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[23] Loring (2023), Can fisheries be "regenerative"?, Link

[24] E.g. IUCN, towards a regenerative blue economy; WEF regenerative blue economy

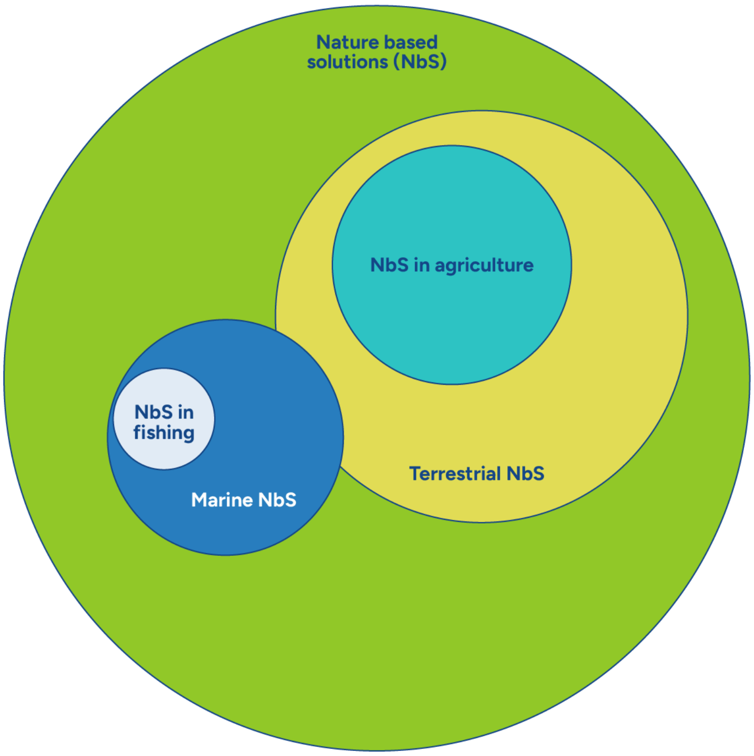


Figure 2: *Extent of uptake of nature-based solutions in relation to fisheries, relative to wider uptake in marine and terrestrial contexts, based on qualitative analysis of published literature.* **The size of the circles approximately represents the relative extent of current use of terms, and the position of circles represents the context in which terms are used.**

The term 'nature-based solutions' (NbS) has currently had limited application to fisheries, and the use of the term NbS to describe marine-based ecosystem interventions is less prevalent than the use of NbS in terrestrial systems. The term NbS has relatively high uptake by agriculture as a proportion of overall terrestrial NbS, which is used to describe interventions such as increasing natural habitat on agricultural land. There is increasing evidence of agricultural NbS supporting productive outcomes (e.g. wildflower margins can increase pollinator health).[25]

Evidence is available of NbS successfully delivering outcomes in marine contexts with benefits for fisheries productivity, for example restored seagrass in Dale Bay, Pembrokeshire provided a breeding ground for an estimated 160,000 fish and 200 million invertebrates while sequestering up to half a ton of carbon dioxide per hectare.[26] However, marine NbS is comparatively under-researched, and outcomes less well-defined than in terrestrial contexts.[27]

[25] E.g. FAO and TNC (2021), Nature based solutions in agriculture. Link
[26] Riisager-Simonsen (2022), Marine Nature based solutions: where societal challenges and ecosystem requirements meet the potential of our oceans. Link
[27] e.g. E.g. Riisager-Simonsen (2022), Marine nature-based solutions: where societal challenges and ecosystem requirements meet the potential of our oceans. Link

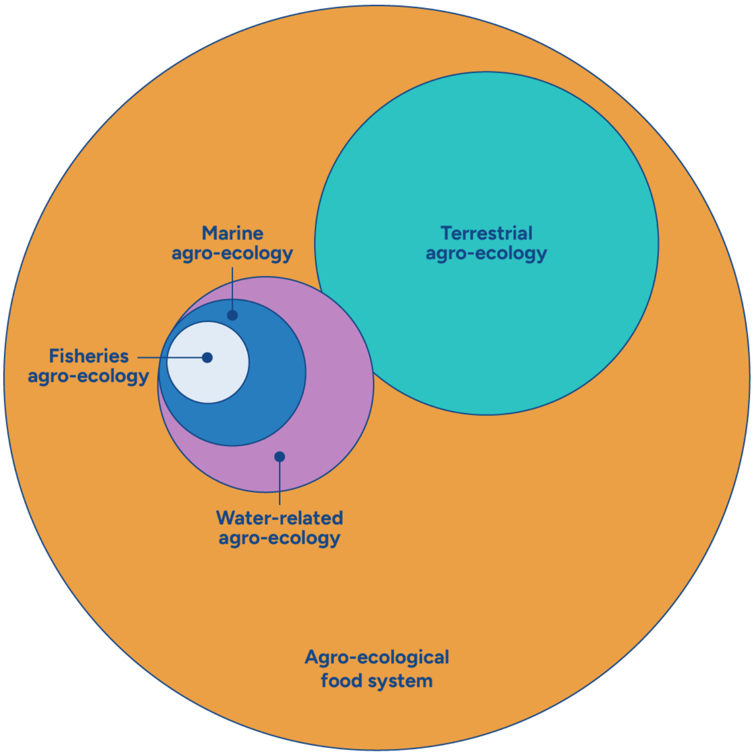


Figure 3: *Extent of uptake of agroecology by fisheries and marine systems, relative to uptake in agriculture, based on qualitative analysis of published literature.*
The size of the circles approximately represents the relative extent of current use of terms, and the position of circles represent the context in which terms are used.

The term 'agroecology' and its related principles were developed in relation to management of agricultural systems and continue to be primarily applied to terrestrial agricultural systems. There is growing recognition of the potential for agroecology to be adopted in fisheries and marine contexts, often due to synergies in the principles behind agroecology and fisheries (see Section 3 and Appendix 3).

3. Parallels between agricultural and terrestrial ecosystem terms and sustainable fisheries practice

3.1 Shared goals, outcomes and practices of best practice management in agriculture and fisheries

Regenerative, nature-based solutions and agroecology share broad objectives of developing resilient productive systems, which are also applicable to fisheries systems

Despite differences in their theories of change, **regenerative, nature-based solutions and agroecology** share a goal of moving beyond production approaches which minimise harm and towards cultivating **resilient productive systems with positive impact** on ecosystems, production and livelihoods. As explored above, these terms have to-date primarily applied to agricultural systems, but have potential to be applied to fisheries systems, with emerging examples of application to fisheries.

The three terms have some differences in elements of their theories of change[28] (Appendix 3) but share broad, cross-cutting objectives (see Figure 4 and Table 3):

- enhancing **ecosystem services to promote productivity**;
- working across **multi-year management** cycles;
- promoting **long term productivity** over short term profit;
- improved **livelihoods**.

These broad objectives - although drawn from terms that have primarily been applied in a terrestrial sphere - are also relevant and applicable to the sustainable management of fisheries systems. Table 3 shows how these objectives manifest across terrestrial agriculture and marine fisheries systems.

In the remainder of this report we use '**resilient'** to describe productive systems which share the values and broad principles of regenerative, nature based solutions and agro-ecology. This means systems which not only maintain the viability of production and are durable to shocks, but which also deliver **positive impact** for ecosystems, climate, productivity and livelihoods. **'Resilient'** is used to describe practices which go above-and-beyond maintaining the status quo to include the delivery of additional positive outcomes.

[28] For example, agroecology has a greater emphasis on supporting small scale production and food security than regenerative, which has greater adoption in industrial agricultural contexts.

Objective	Objective in practice - in terrestrial agriculture	Objective in practice - in marine fisheries systems
Enhancing ecosystem services to promote productivity	Farming practices are selected to **enhance underlying processes and ecosystem services** that support long term productivity and minimise the need for external inputs. For example, practices to enhance soil nutrient cycling reduce the need for fertiliser inputs, measures to enhance natural predators reduce the need for chemical pest control.	Fisheries management is designed so that fisheries **stocks are renewed and replenished** at greater than the rate at which they are fished. This includes ensuring habitat protection and maintaining biodiversity, which provide **ecosystem services** such as nutrient cycling and breeding grounds. In turn, healthy replenishment of fish stocks reduces fishing efforts and sustains and improves catch.
Prioritise long-term productivity over short-term profit	Agricultural systems adopt a **long-term outlook,** where resilience of production is prioritised over maximising short-term profit. This includes a shift away from practices which cause degradation of land in exchange for maximising short-term yield (e.g. monocultures, high input use), towards diverse systems which build resilience.	Fisheries systems adopt a **long-term outlook** to support long-term resilience of fish populations rather than short-term catch volume. This includes appropriate management of fish stocks to maintain stock and ecosystem health including fishing seasonally and adapting practices to reflect long term trends or external pressures, for example, using precautionary approaches or sustainable yield models.
Adopt multi-year management cycles	Production responds to ecological ebbs and flows across multi-year cycles, allowing time for **rest periods in fields** and grazing lands following periods of higher production. Crop cycles are managed over **multi-year cycles**, with crop rotations selected to enhance soil nutrient cycles and ecosystem health.	Production responds to ecological ebbs and flows across multi-year cycles, for example allowing **rest periods in fisheries areas** after periods of intensive fishing to allow stocks to recover. Fishing is managed over **multi-year cycles**, with target species and fishing patterns reflective of migration patterns or reproduction cycles which may fluctuate with oceanographic or climatic fluctuations.
Improved livelihoods	Farm systems and the broader farming sector are managed to ensure the resilience of **farmer livelihoods.** Any transition to resilient agricultural practices involves **adequate incentive and rewards** to farmers for the risks of transitioning practices (e.g. high capital costs, short term yield decline).	Fisheries systems and the broader sector ensure the resilience of **fisher livelihoods.** Social justice, livelihoods and food security may be particularly relevant in small scale fisheries contexts. Fishers also need to receive **adequate incentive and rewards** to transition to sustainable fishing practices, covering short term risks and costs (see section 4.4).

Table 3: *Common resilient productive system objectives and their applicability in agriculture and fisheries.*

Beyond broad objectives, parallels can also be drawn between outcomes and practices associated with resilient agriculture and fisheries management

Beyond the broad overarching objectives, there are also similarities that can be drawn between the intended outcomes of resilient agriculture and resilient fisheries management, and the broad types of practices that are implemented to achieve these outcomes. These links between outcomes and practices in agricultural systems and fisheries systems are explored in more detail through the case studies in Section 4 and in the table in Appendix 4, but a few illustrative examples are:

- In both agricultural and fisheries systems, resilient management approaches emphasise **minimising disturbance of underlying substrate** to promote **soil or seabed** health**.** In agriculture - and particularly in definitions of 'regenerative agriculture' - there is an emphasis on **reduced or minimum tillage** or ploughing to reduce disturbance of the soil, leading to improved soil nutrient and water retention, maintaining plant root structures, reduced erosion and avoided carbon emissions. A parallel can be drawn to efforts to avoid **disturbance of the sea floor** by bottom trawling, which damages seafloor habitats, disturbing rooted species such as sea grass and coral reefs, leading to loss of substrate and high levels of greenhouse gas emissions.

- Also common across both fisheries and agriculture is the potential of these systems to deliver carbon sequestration and contribute to climate goals. Carbon sequestration in agriculture is linked to practices which **increase soil organic carbon** or above ground biomass (e.g. hedgerows and trees). Soil organic carbon can be enhanced through the managed integration of rotational grazing livestock, where **manure can enhance soil nutrients** and increase plant species diversity in grazing land. Similarly, avoiding depletion of fish stocks is important for supporting **ocean biogeochemical cycles**, where **fish faeces and dead organic matter** support ocean carbon sequestration.[29]

- Another parallel can be drawn where management in both agriculture and fisheries aims to maintain and enhance **biodiversity**, often in support of the delivery of ecosystem services and benefits for productivity. In agriculture, this can look like the **maintenance or restoration of hedgerows or wildflower meadows**, providing habitat for pollinating species or natural predators of agricultural pests. In fisheries, **restoration of coastal breeding grounds** such as mangroves, seagrass and kelp forests can support larvae development and the resilience of fish stocks.

Further parallels that can be drawn between targeted outcomes and practices between agricultural and fisheries systems are detailed in the next section, as well as in Appendix 4 and Figure 4 below.

[29] Saba et al. (2021), Towards a better understanding of fish-based contribution to ocean carbon flux. Link

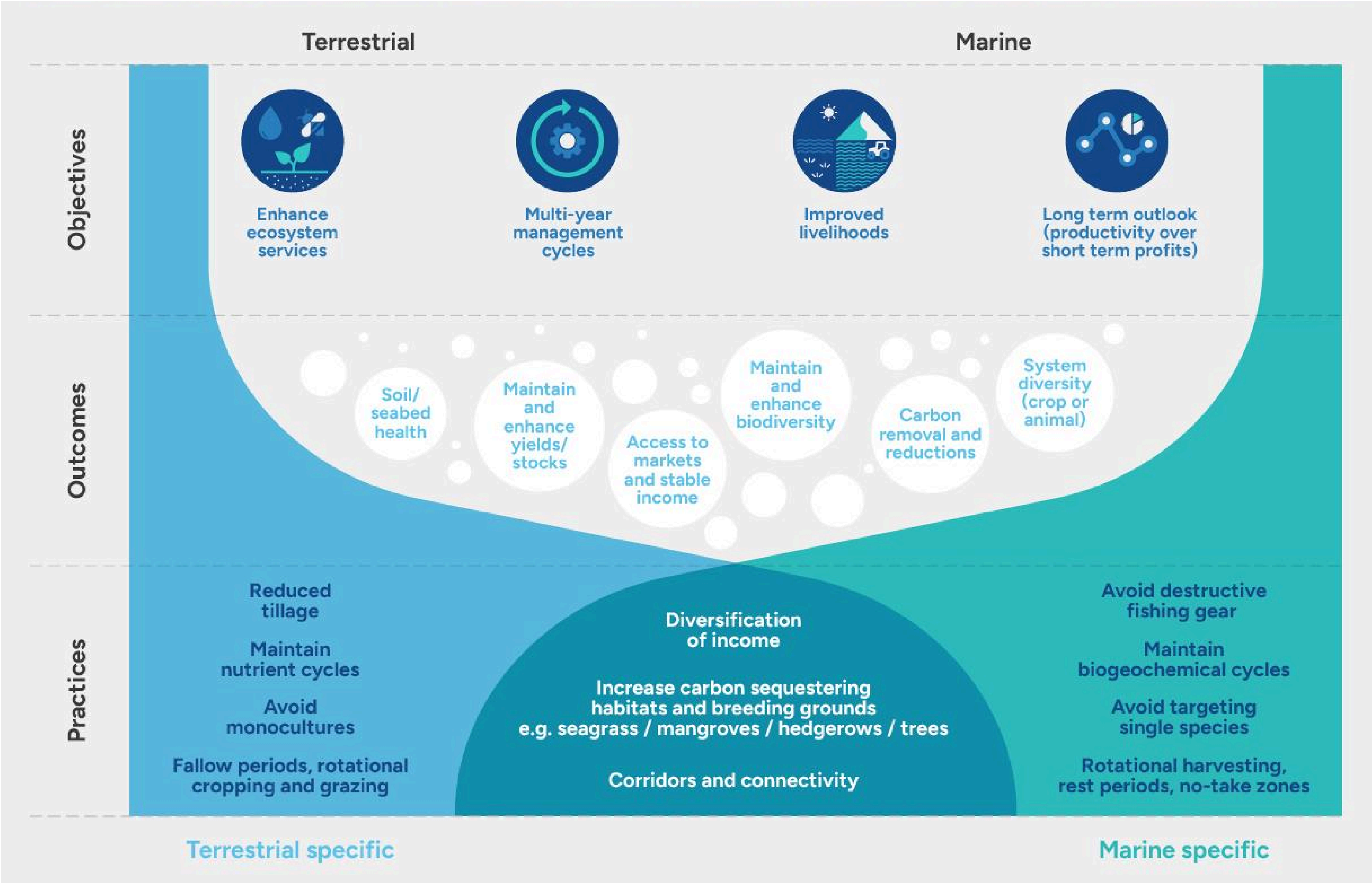


Figure 4: *Areas of commonality between resilient terrestrial and marine productive systems, at the level of goals, outcomes and practices.*

4. Opportunities for the uptake of resilient agricultural terms in a fisheries context: illustrative case studies

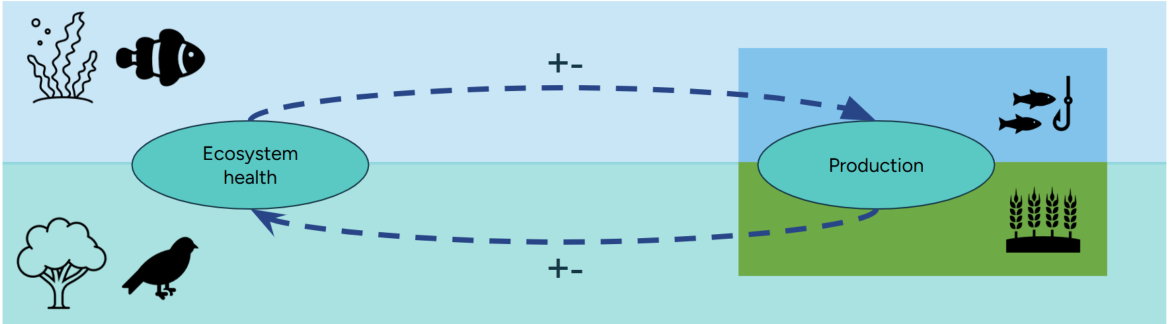
The adoption of terms more commonly applied to agricultural systems can increase the visibility of practices, outcomes and goals in fisheries

The previous sections have explored the current and potential application of terminology used for resilient agricultural systems to fisheries systems. In this section, this is illustrated by case studies which show examples of how the adoption of terms can increase the visibility of practices, outcomes and goals already demonstrated in fisheries management.

These examples are broadly aligned to each of the goals in Table 3. They are not comprehensive of all possible parallels, but demonstrate the potential for applying terms and concepts more commonly used for agricultural systems to promote enhanced visibility of fisheries best practices.

4.1 Using ecosystem based management to enhance ecosystem services to promote productivity

Shared objective: Enhancing ecosystem services to promote productivity	
Approach in agriculture	**Approach in fisheries**
Nutrient based management	*Ecosystem based fisheries management*



Management of both agricultural and fisheries systems can be based around enhancing underlying ecosystem services which support productivity.

In agriculture, nutrient based management approaches support a positive feedback loop between ecosystem and production. These are particularly linked to 'regenerative agriculture' which encourages practices such as reduced tillage, planting cover crops and reducing artificial inputs. These practices foster nutrient recycling and sustained soil health which underpin productivity.

In fisheries, ecosystem based fisheries management (EBFM) promotes the health of the wider marine ecosystem, habitats and species to support stock health and enhance productivity. While fisheries boundaries are more diffuse, EBFM works toward similar outcomes as nutrient based approaches in agriculture: promoting health of the wider ecosystem, habitats and environment in order to support productive outcomes. EBFM often involves moving beyond a single species approach to fisheries management, instead taking into account population dynamics, species interactions, and ecosystem pressures outside of fishing which may affect stocks.

EBFM is currently not widely used as a fisheries management strategy, and its benefits have limited recognition within and outside the fisheries sector.

Using the term 'regenerative' to describe fisheries can support the visibility of management practices such as EBFM which avoid depletion of fish stocks and supporting ecosystem services, allowing fisheries to self-regenerate. Communicating the parallel between EBFM in fisheries and nutrient based approaches in agriculture - and the shared outcome of promoting ecosystem health for resilient production in both systems - could support wider awareness and implementation of EBFM and other 'self-regenerating' management approaches in fisheries.

CASE STUDY 2: NATURE INCLUSIVE HARVESTING AS AN EXAMPLE OF EBFM

- Nature Inclusive Harvesting (NIH) draws on principles of EBFM to promote fisheries management approaches which move beyond a focus on single stocks, and towards a holistic multi-species management approach.
- The EU funded FutureMARES project is testing Nature Inclusive Harvesting (NIH) alongside conservation and restoration projects in 15 sites across Europe.[30] The aim is to understand the effects of NIH on improving the health of the marine ecosystem, and enhancing the resilience of the ecosystem and associated economies to climate change.
- The project found synergies, as well as potential conflicts between NIH, conservation and restoration efforts, demonstrating the need for a holistic and multi-stakeholder approach to EBFM. Interventions are most effective for safeguarding ecosystem functions and deliver ecosystem services when appropriately combined (e.g. active habitat restoration is best performed within MPAs).

4.2 Prioritise long-term productivity over short-term profit

Shared objective: Prioritise long-term productivity over short-term yields	
Approach in agriculture	**Approach in fisheries**
Accepting an initial reduction in yield at start of transition in production approach, then increased return on investment in medium to long-term due to recovery of productivity and reduced input costs.	*Lag-time for fish stocks to recover after a sustainability intervention (e.g. temporary closures of fishing areas), with short-term reduction in stocks but medium to long-term recovery allowing recovery of catch rates.*

Adopting resilient agricultural terms to describe fisheries can support greater understanding of the need for a long-term outlook in the transition from conventional to resilient management.

Transition of fisheries from conventional to more resilient management requires long term investment, and there may be a time lag before outcomes for marine ecosystems, fish stocks or fisheries productivity are achieved. However, despite short term economic costs, implementing

[30] FutureMARES [accessed Jan 2025], Nature based solutions and Nature inclusive harvesting. Link

measures to rebuild fish stocks can result in economic gains in the long term.[31]

There is a parallel in agricultural systems where there can be high initial costs of transition towards regenerative practices due to the need to purchase new machinery and crop or livestock varieties, and invest in training and capacity building, at the same time there may be a decline in yields as inputs are reduced. However, in the medium to long-term, as the new management practices are established, yields can recover and, in combination with reduced input costs, lead to improved profit margins. The World Business Council on Sustainable Development (WBCSD) found that crop farmers in the US can expect USD $40 per acre profit loss due to decreased crop yields and higher capital costs for transition over a 3-5 year transition period. However, as land is restored and input costs go down, return on investment is expected to increase. In the same study, farmers received a 5-25% return on investment after 3-5 years.[32]

Using resilient agricultural terms and examples as a parallel to fisheries transition can support understanding of lag times and high initial capital costs, and provide assurance of return on investment over time. In both fisheries and agricultural contexts, it can be difficult to understand which interventions are needed, how to choose interventions which suit the given biological, ecological and socio-economic context, when to expect return on investment, and what the rewards will be. Socio-economic concerns are often a barrier to transition for both farmers and fishers, where short term loss in yields are a threat to livelihoods. In order to support interventions to achieve long term economic gains and 'buffer' the transition, practitioners on the ground in both agricultural and fisheries systems must receive appropriate financial and technical support.

CASE STUDY 3: LAG TIME FOR SPILLOVER EFFECTS OF A MARINE PROTECTED AREA (MPA) IN SOUTHERN CALIFORNIA

- A MPA network of no-take zones was established in 2012 along the mainland coast of the Santa Barbara Channel, southern California. The area is fished heavily for lobster.
- The MPA was developed in collaboration with fishers with assurance provided that over time MPAs would benefit lobster catch.
- Results show that a 35% reduction in fishing area resulting from MPA designation was compensated for by a 225% increase in total catch after 6 years, thus indicating at a local scale that the trade-off of reducing fishing ground with no-fishing zones benefitted the fishery[33].
- In Santa Barbara, the channel remains active with 13 state managed and 9 federally managed Marine Protected Areas, developed in close collaboration with local communities.

[31] Teh and Sumaila (2020), Assessing potential economic benefits from rebuilding depleted fish stocks in Canada. Link.
[32] WBCSD (2023): Farmers stand to see increased crop yields and profits with 15-25% return on investment by transitioning to regenerative practices. Link.
[33] Lenihan et al (2021), Evidence that spillover from MPAs benefits the spiny lobster fishery in Southern California, Link.

4.3 Adopt multi-year management cycles

Shared objective: Adopt multi-year management cycles	
Approach in agriculture	**Approach in fisheries**
Rotational cropping systems to support diversity and restore soil nutrients	*Rotational harvesting or rotational closures to support recovery of stocks*

Adopting resilient agricultural terms to describe fisheries can support visibility of **multi-year management approaches.**

Sustainable fisheries often adopt rotational practices across multi-year management cycles to support recovery and restoration between periods of exploitation. For example, rotational zoning is used in fisheries management to subdivide the seabed into zones with different harvesting periods. This allows for larvae growth before stocks are fished. Fishing quotas for different fishing grounds for the same species can also be determined on a rotational basis, informed by frequent stock assessments to identify the state of the population at the different fishing grounds.

Resilient agriculture often involves similar principles of multi-year management. For example, rotational cropping of different crop species throughout the year allows restoration of soil nutrients between cropping periods and increases the overall diversity of the system. Similarly, rotational grazing can be used to allow grass and soils to recover between periods of intensive grazing; this 'mob grazing' is a common tenet of regenerative agriculture.

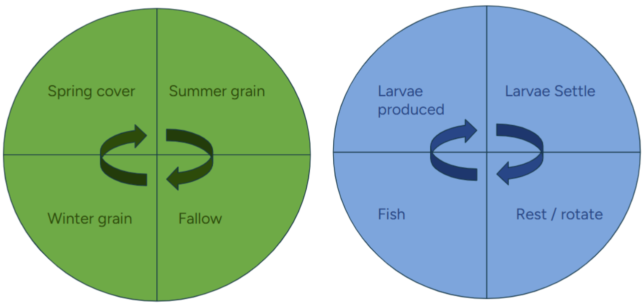


Figure 5: *Sustainable production in both terrestrial and marine contexts rely on periods of productivity followed by periods of rest to support recovery and restoration.*

CASE STUDY 4: ROTATIONAL SEA CUCUMBER HARVESTING IN AUSTRALIA'S GREAT BARRIER REEF

- Plaganyi et al. test the application of rotational harvest - commonly applied in terrestrial agricultural contexts - to marine resources.
- A rotational zone strategy was tested in the Great Barrier Reef through a three year rotational harvesting approach of sea cucumber.
- The modelling results in reduction in risk of local depletion, higher long term yield and improved economic performance of the fishery.

Rotational harvesting is particularly suited to sedentary species such as sea cucumbers

4.4 Improved livelihoods

Shared objective: Improved livelihoods	
Agriculture approach	**Fisheries approach**
Resilient agricultural management approaches - particularly 'agroecology' - often explicitly state livelihood resilience as an objective of the farming system. This may include: supporting land access and rights (particularly for smallholders), incorporating farmers in decision-making, financial support during transition, and ensuring safe and just working conditions.	*Resilient fisheries management approaches also often prioritise livelihood resilience, including: supporting access and tenure rights for fishing grounds (particularly for small-scale fishers), incorporating fishers and fishing communities in decision making, promoting food security and livelihoods as a central goal, and ensuring safe and just working conditions.*

Efforts for more sustainable farming - particularly agroecology - and for more sustainable fisheries both emphasise the importance of a just transition for farmers and fishers, and the importance of sustainable livelihoods for supporting sustainability outcomes. This includes improving issues prevalent in 'conventional' systems such as lack of secure access to land and fishing areas, lack of input in decision-making processes, forced or under-valued labour, food insecurity, and lack of fair access to markets.

CASE STUDY 5: INCOME DIVERSIFICATION AND MARKET INDEPENDENCE IN BRITTANY[34]

In Brittany, sustainable livelihoods are central to the success and maintenance of sustainable fishing practices amongst a small scale artisanal fishing community.

Brittany has historically been a sea-bass fishing community. In 1993 the rise of bottom trawlers and industrialised fishing threatened small scale fishing communities, who were not receiving a fair price at auction for fish caught using sustainable hook and line practices.

A community of small-scale artisanal fishers responded by setting up a new long line label for seabass. They use this to distinguish their lower-impact product from industrially caught fish, leading to opportunities for direct sale to customers who value high quality products, and receiving a higher price for their fish.

For this community, maintaining a sustainable fisheries model supports higher incomes, secure livelihoods and generational inclusion in fisheries. More needs to be done to ensure sustainable fishing models can outcompete harmful, industrial approaches by placing sustainable livelihoods at the centre of sustainable fishing practice.

[34] Seas at Risk (2024), Fisheries for a new era. Link.

5. Conclusions

There are strong opportunities for fisheries to adopt terms and concepts that are commonly used for agricultural systems, increasing visibility of fisheries in discussions around sustainable food production

Fisheries remain under-represented in conversations around sustainable food production, leading to a lack of consistent funding to sustainable fishing which results in piecemeal activities and a lack of capacity to implement best practice fisheries management. This report has explored the opportunities for fisheries to be better included in discussions around sustainable food production by exploring parallels between fisheries and agricultural management.

Our conclusions point towards clear parallels between fisheries and agriculture at the level of broad objectives, specific practices and associated outcomes. This provides an opportunity to communicate parallels between fishing and agricultural best practice, increasing the visibility of fisheries as a key component of sustainable food systems, and potentially catalysing greater fisheries investment. **Parallels between fisheries and agricultural terms may also influence willingness of investors to fund projects.** For example, drawing parallels between the lag time involved in establishing marine protected areas to restore fish stocks and that between shifting to more regenerative agricultural practices and recovered profit margin can help to manage the risk appetite and expectations amongst funders about timeframes and return on investment.

Despite operating in very different contexts (namely bounded agriculture vs diffuse fisheries, static agriculture vs mobile fish, open access vs private resource), there are **clear parallels between the overarching objectives of resilient agriculture and resilient fisheries** and in the outcomes and practices which underpin those goals. For example, rotational closures of fishing zones support recovery of fish stocks, much as rotational grazing of agricultural livestock supports the recovery of soils and grazing land. These parallels provide evidence that **common terrestrial terms have potential beneficial application to fisheries**.

Widespread adoption of terms commonly used to describe resilient agriculture can increase visibility of fisheries as a key contribution to sustainable food systems. Evidence of parallels between fisheries and agriculture can support **improved communication between actors working primarily on fisheries and those who have historically worked on agriculture, including funding bodies**, increasing the visibility of fisheries best practice. Increased visibility of fisheries may provide **new opportunities for fisheries investment**.

6. Recommendations for next steps: engaging key stakeholders in the fisheries and agricultural sectors

The findings in this report represent opportunities for actors working in the fisheries sector to adopt terms and concepts that are commonly used in agricultural and terrestrial ecosystems and consolidate understanding of similarities between resilient agricultural and fisheries systems. A series of next steps should be taken to socialise findings, stress-test the application of terms, and further consolidate research. This can help to better understand **potential risks or barriers in the adoption of terms**, including any **gaps**. Further research and stakeholder engagement can support moving findings **from theory to action**.

Recommendation		Questions and Approach
Stakeholder engagement	Socialise findings in this report through further stakeholder engagement, including with existing relationships and coalitions	● Build on existing coalitions and relationships to socialise findings in this report and understand the barriers and opportunities for uptake of terrestrial terms by fisheries stakeholders. ● Bring fisheries and agricultural communities together to facilitate cross-cutting and cross-sectoral conversations, explicitly discussing links and potential synergies. ● Understand and characterise risks in the adoption of resilient agricultural terms.
	Engage with the public sector to understand potential uptake of terrestrial terms in policy discourse	● Socialise findings with the public sector including policymakers and government. Explore opportunities for use of terrestrial terms to build supportive policies and increase the visibility of fisheries in food policy conversations. ● Explore potential of adoption of agricultural terms to support subsidy reform for oceans, adopting some of the language of farming subsidies (e.g. carbon sequestration, environmental protection, payment for ecosystem services)
	Diversify the conversation through engaging with farmers, fishers and local communities	● Engage with farming and fishing communities, organisations and cooperatives to gather a strong understanding of if and how the parallels drawn here between fisheries and agriculture apply in practice. ● Explore how to make the sustainability conversation 'stick' and opportunities for use of agricultural terms to create fisheries business opportunities. ● Explore priorities for a just transition from fishers' perspectives, and how learnings from agricultural systems may support this.
Case studies and 'stress testing'	Stress-test the findings in this report against Walton Family Foundation's existing projects	● Stress-test the language and findings in this report with internal stakeholders at Walton Family Foundation and against relevant projects. ● Explore how the adoption of terrestrial terms could support communications of existing projects, developing some key examples for publication.
Further research	Develop the business case for adoption of terrestrial terms	● Explore examples of how and to what extent shifts in language have influenced investment or policy, in both agriculture and fisheries, therefore exploring the business case for leveraging the parallels demonstrated in this research.

		This includes: ● Understand the role of terminology in shifting investor expectations, as opposed to e.g. numbers demonstrating returns on investment. ● Understand how shifts in terminology supports understanding of long term return on investment and true cost accounting for agriculture, and parallels in fisheries. ● Explore how shifts in terminology can support 'de-risking' of investment for financiers and demonstrate financial viability. Provide examples of 'de-risking' language in practice in agriculture, with application to fisheries.
	Compare voluntary and regulatory disclosure requirements between fisheries and agriculture	● Understand the role of voluntary and regulatory frameworks as providing incentives to invest in fisheries. ● Understand synergies or differences in disclosure recommendations for fisheries versus agriculture. ● Understand how use of agricultural terms in disclosure standards could increase visibility of fisheries, or increase usefulness of disclosure recommendations.
	Track progress in uptake of agricultural terms, and how this effects fisheries investments	● Define core metrics to measure progress in fisheries finance, and how this is linked to the use or uptake of agricultural terms. ● Define data requirements to understand progress, and what this looks like for different stakeholders objectives.

Appendix 1: Glossary of terms

Term	Definition - as defined in the context of this report
Agriculture	Describes food production on land.
Agroecology	Agroecology refers to the application of ecological principles to agriculture, ensuring the regenerative use of natural resources and ecosystem services while addressing the need for socially equitable food systems.[35]
Fisheries	Wild capture of fish from both large scale and small scale fisheries, and both coastal and deep ocean fisheries.
Funders, funding and financing	Refers to public, private and philanthropic funding, unless specified.
Marine	Refers to oceans in a wider context than fisheries and is used in opposition to terrestrial.
Nature-based Solutions (NbS)	NbS refers to interventions for the protection, restoration or management of natural and semi-natural ecosystems to address social, economic and environmental challenges and deliver human wellbeing, ecosystem services and resilience, and biodiversity benefits.[36] NbS is sometimes also written as nature based solutions or Nature based Solutions, but Nature-based Solutions has been used in this report to match the IUCN.
Regenerative	There is no common definition and it is used differently by different stakeholders. There are, however, broadly agreed principles of regenerative agriculture, focused on interventions which aim to restore soil health, enhance biodiversity and increase resilience of farm productivity to climate change.[37]
Resilient	We use 'resilient' in this report to describe productive systems which share the values and broad principles of regenerative, nature based solutions and agro-ecology. This means systems which not only maintain the viability of production and are durable to shocks, but which also deliver positive impact for ecosystems, climate, productivity and livelihoods. 'Resilient' is used to describe practices which go above-and-beyond maintaining the status quo to include the delivery of additional positive outcomes.
Rewilding	Describes conservation interventions which restore natural processes with minimum human intervention.
Sustainable	Sustainable refers to production systems which aim to maintain the long term viability of food production, and minimise potential harm to ecosystems, climate and livelihoods which may result from food production.
Terrestrial	Refers to the land and is used in opposition to marine and oceans. The term can include agriculture, but it also refers to broader ecosystems on the land. Agriculture is a subset of terrestrial activities.

[35] Adapted from Agroecology Europe, the 13 Principles of Agroecology. Link
[36] Adapted from Cohen-Shacham et al. (2019), Core principles for successfully implementing and upscaling Nature-based Solutions. Link
[37] Adapted from SAI (2024), Regenerative Agriculture Framework. Link

Appendix 2: Current uptake of a selection of common terms used in agricultural systems and terrestrial ecosystem management.

Term	Uptake of term in agriculture and terrestrial ecosystems	Uptake of term in fisheries
Regenerative	Detailed in Section 2 and Table 2	
Nature-based solutions		
Agroecology		
Sustainable	Broad concept referring to agricultural systems ability to maintain longevity of production. Lack of agreement on industry-wide definition. Greater focus on mitigating harm and sustaining production, rather than actively contributing to positive impact (compared to terms such as 'regenerative' or restoration). Often aligned with the Sustainable Development Goals.	Broad use of the term 'sustainable fishing' but lack of agreement on industry-wide definition and what 'sustainable' looks like in practice. Uptake amongst certification bodies, e.g. MSC What is sustainable fishing; policy, e.g. Cefas Sustainable fisheries, and FAO 2022 Improving fisheries management; NGOs, e.g. WWF We're working to create a better future for fishing and seafood; and academics, e.g. Costello et al. 2020 The future of food from the sea.
Nature-positive / Ocean-positive	Nature Positive is a goal defined by the Global Biodiversity Framework; 'Halt and Reverse Nature Loss by 2030 on a 2020 baseline and achieve full recovery by 2050' Provides basis / momentum for action from governments (e.g. implementation of conservation and protected areas) and private sector (e.g. corporate reporting requirements) to work towards global nature goals.	Ocean-positive is used to describe economic activities with positive ocean impacts. For fisheries, this often includes reduced use of fossil fuels, using low impact fishing gear, improving governance and management of fisheries systems. Uptake amongst NGOs, e.g. WWF 2023 Oceans practice strategy 2023-2030: Charting a course toward nature-positive for the ocean, and Marine Conservation Society Climate Emergency.
Blue economy / Green economy	Green economy is used to describe economic activities contributing to reduced carbon emissions, efficient use of	Blue economy is used as a parallel to the green economy for marine systems, focused on balancing economic development (including fishing) with

	resources, and prevention of biodiversity loss.	reducing impact on the marine environment. Uptake amongst NGOs e.g. WWF 'Financing a sustainable blue economy'; IUCN 2024 'Towards a regenerative blue economy'.
Climate-smart	Climate-smart agriculture is an approach to agriculture which aims to reduce and reverse the contribution of agriculture to greenhouse gas emissions and climate change. Goals include increased agricultural efficiency, adaptation and resilience to climate change, and reducing and/or removing greenhouse gas emissions.	Climate-smart fisheries is used to describe options for mitigation of climate impact of fisheries, and principles for carbon reduction, both at the practice level (e.g. shift from bottom trawling) and through strategic planning and management. Uptake amongst academics, e.g. Bell et al. 2020 Actions to Promote and Achieve Climate-Ready Fisheries: Summary of Current Practice, and Reay 2019 Climate smart cod; and NGOs, e.g. WWF, RSPB and MCS Shifting gears: achieving Climate smart fisheries.
Rewilding	Rewilding is used to describe restoration of terrestrial ecosystems in a way that restores natural processes with minimal human intervention and management.	Rewilding has been applied to marine conservation efforts, primarily advocating for areas with minimal human intervention (e.g. providing space for restoration). Uptake amongst NGOs; e.g. Rewilding Britain Five marine rewilding projects around Britain; newspapers, e.g. Food Navigator 2021 Call to rewild a third of UK waters presents opportunities for shellfish sector; and academics, e.g. European Consortium for Political Research From fish management to fish rewilding: a Finnish case analysis.
Sustainable intensification	Sustainable intensification refers to the idea of producing more food on less land. The aim is to increase productivity without increasing negative impacts on the environment, for example through areas of land put aside primarily as wildlife habitat whilst other areas are farmed semi-intensively.	Sustainable intensification has limited uptake for fisheries, but has been used to describe efficiency improvements in aquaculture. Uptake by policy, e.g. FAO 2014 Sustainable intensification of caribbean fisheries and aquaculture.

Appendix 2: *Summary of current uptake of a selection of terms used in agriculture and terrestrial ecosystem management in fisheries systems, with examples of use by different stakeholders.*

Appendix 3: Principles associated with terms commonly applied to agriculture and terrestrial ecosystem management to show alignment with fisheries

Nature-based Solutions, regenerative agriculture and agroecology - three terms with increasing uptake in sustainable agriculture - each have a range of definitions with different use amongst different stakeholders. However, each term is associated with certain 'core' principles which are common across uses of the terms. The table below describes these core principles and outlines potential parallel concepts or principles in a fisheries context.

Approach/ term	Principle or concept	Source	Principle description in agricultural and terrestrial ecosystems	Principle or concept in fisheries systems	Principle description
Nature-based Solutions	Protected areas	FAO	Protected areas limit or restrict human activity, including restrictions on agriculture.	Protected areas limit fishing activity, including no-take zones and fishing exclusion zones	Exclusion of fishing from an area allowing time for overfished stocks to recover. This can lead to 'spillover effects' with benefits for marine fisheries.
	Synergistic	WWF	Delivering ecosystem benefits in parallel with social and economic outcomes.	Delivering ecosystem benefits in parallel with social and economic outcomes.	Ecosystem restoration goals are balanced with maintaining the productivity of fisheries and livelihoods of fishers. Many NbS can be used to enhance production outcomes (e.g. ocean fertilisation to stimulate phytoplankton blooms).
	Inclusive, transparent and empowering governance process	IUCN Global Standard for Nature-based Solutions	NbS must adhere to prevailing legal and regulatory provisions and engage and empower local communities and other affected stakeholders.	Community engagement and decision making power in marine management approaches.	Governance of fisheries and marine management approaches needs to be participatory and inclusive, for example MPAs are often more effective when designed in collaboration with fishing communities.

	Economic viability	IUCN Global Standard for Nature-based Solutions	Activities carried out to protect the environment are economically viable.	Economic viability of marine based ecosystem management.	Activities to protect marine ecosystems are economically viable for fishing communities. For example, marine protected areas should be complemented with inclusive fisheries management approaches whereby fishing can operate synergistically to ecosystem protection.
	Managing activities adaptively based on evidence	IUCN Global Standard for Nature-based Solutions	Farmers carry out monitoring and evaluation drawing on scientific understanding and local knowledge. Once activities have been implemented, monitoring can help to understand the effectiveness of activities.	Monitoring processes in place which are context specific and promote transparency in fisheries management approaches.	Fisheries are difficult to monitor and data availability for oceans is limited compared to terrestrial contexts. Measurement should be context specific and supported with local knowledge.
	Net gain in biodiversity and ecosystem integrity	IUCN Global Standard for Nature-based Solutions	Going beyond reducing harm to proactively enhance the functionality and connectivity of the ecosystem.	Going beyond reducing harm to proactively enhance the functionality and connectivity of the marine ecosystem.	Complement strategies to reduce overfishing with active restoration approaches (e.g. of marine habitats), supporting breeding grounds and ecosystem restoration.
Regenerative agriculture	Build soil nutrients	Loring 2023	Building soil health, including microbial structure, carbon sequestration.	Protecting the seabed and enhancing nutrient cycles, including biogeochemical cycles. Nutrient Inclusive Harvesting (NIH)	Nutrient Inclusive Harvesting (NIH) is one fishing approach which aims to support biogeochemical cycles and ecosystem function in fisheries. Avoiding bottom trawling can support seabed health and carbon sequestration.

	Fallow / ley periods	Rehberger et al 2023; Dalle and de Blois	Rest periods between crop production cycles, with herbal leys for example left for multiple years to allow roots to grow enough to improve soil structure and fertility.	Biological rest period during reproduction phase (including fishing seasonally).	Fishers observe a rest period during species reproduction period to allow stocks to recover.
	Grow diverse crops	Groundswell	Inter-cropping, cover cropping, companion cropping and rotational cropping all increase the diversity of crops in a system compared to a repeated monoculture. This can build the soil microbiome and avoid depletion of single soil nutrients.	Fish for a diversity of species using a whole system approach to fisheries management. e.g. Ecosystem based fisheries management	Ecosystem based fisheries management can support a whole-system management approach, including through diversifying catch species and reducing the risk of species over-exploitation.
	Incorporate grazing animals	Groundswell	Livestock can recycle nutrients and improve soil health by aerating the soil.	Large fish can play a disproportionate role in regulating ocean biogeochemical cycles.	Fish are "carbon engineers" that transfer, store, and release carbon. Large marine animals such as whales and reef species can be important for nutrient recycling.
	Avoid soil disturbance	Groundswell	Soil structures can be maintained by reducing tillage to enhance nutrient and water retention, reduce erosion and avoid carbon emissions released during soil disturbance from ploughing.	Avoid seafloor disturbance	Avoiding fishing practices like bottom trawling that can avoid disturbance to benthic habitats and species, and avoid carbon emissions released during sea bed disturbance.
Agroecology	Economic Diversification	Agroecology Europe	Diversify on-farm incomes by diversifying what is produced and introducing value-add / initial processing activities on-farm.	Diversifying fisheries income by diversifying catch species	A multi-species approach to fisheries management (avoiding targeting single stocks) can support economic diversification as well as ecosystem health. For example, promoting the sale of invasive

					species as culinary delicacies.
	Social value and diets	Agroecology Europe	Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally and culturally appropriate diets.	Fish is recognised as an important source of food and also cultural identity in many contexts.	Fisheries communities place high social value on fishing practices as part of culture, tradition and identity
	Fairness	Agroecology Europe	Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment and fair treatment of intellectual property rights.	Sustainable livelihoods at the centre of sustainable fisheries.	Small scale fishers supported through fair trade, market access and livelihoods opportunities.
	Animal health and welfare	Agroecology Europe	Ensure animal health and welfare.	Fish health and welfare	Ensure high welfare for fish, including between catch and processing.
	Synergy	Agroecology Europe	Enhance positive ecological interaction, synergy, integration, and complementarity amongst the elements of agroecosystems (plants, animals, trees, soil, water).	Enhance positive ecological interaction, integration and synergies in marine ecosystems. Ecosystem based fisheries management	Fisheries take a whole system approach to management, including promoting habitat connectivity and diverse species assemblages. This may be promoted through ecosystem based fisheries management.
	Land and resource governance	Agroecology Europe	Recognise and support the needs and interests of family farmers, smallholders and peasant food producers as sustainable	Global commons	Support fishers to maintain and protect a global commons, through effective fisheries access, tenure and management. Encourage fishers

			managers and guardians of natural and genetic resources.		collaboration and responsible resource use.
	Co-creation and knowledge sharing	FAO Principles of Agroecology	Co-creation and sharing of knowledge: agricultural innovations respond better to local challenges when they are co-created through participatory processes.	Support sharing of local knowledge and involve communities in marine ecosystem and fisheries management approaches.	Indigenous and local knowledge is key to sustainable ecosystem and fisheries management. Cooperative management of shared stocks can help avoid over-exploitation of stocks.

Appendix 3: *Principles associated with nature-based solutions, regenerative, and agroecology and potential parallels in fisheries.*

Appendix 4: Parallels in outcomes and types of practices between terrestrial agriculture and marine fisheries contexts

Outcome	Practice - agriculture	Practice - fisheries
System diversity	Avoid monocultures and implement crop rotations (i.e. different crops planted after each other in the same area) and intercropping (i.e. growing different crops on the same land at the same time) to increase crop diversity and improve resilience as well as soil health.	Increase and diversify the number of species of fish that are caught to reduce the pressure on specific species which are currently overfished, as well as reduce losses of other fish which are often caught as bycatch and then wasted (Jacquet & Pauly 2022). Best practice should take account for species' reproductive cycles, and their trophic level (fishing down the food web). For example, the Pyramids of Life project explores the relationship between consumer demand, fishing pressure and ecosystem function.[38] Promoting the consumption of under-appreciated marine resources can help drive new fisheries management and reduce pressures on marine ecosystems.
Access to markets and stable income	Paying a premium for sustainably and regeneratively farmed products reduces risk for farmers and provides incentive for transition to production methods that may have lower environmental impacts but can reduce yields (e.g. reduced use of synthetic fertilisers).	Adoption of sustainable practices can provide fisheries with access to new markets: for example adoption of sustainable clam harvesting practices in a Vietnam fishery opened access to a new European market, leading to 165% in the value of landings.[39] There needs to be careful consideration of how mainstream labelling can exclude small scale fisheries due to high certification costs, and where financial support is needed.
Carbon removals and reductions	Adoption of practices to reduce on farm emissions e.g. reduced fertiliser application leading to reduced 'tractor passes' and associated fuel emissions.	Reduction of emissions from fishing vessels e.g. by increasing fuel efficiency or decreasing length of trips.

[38] University of York, Pyramids of Life. Link.
[39] MSC Sustainability Insights (2021), Sustainable fishing, higher yields and global food supply. Link

Carbon removals	Adoption of practices to increase carbon sequestration e.g. increasing above-ground biomass with trees and hedgerows, or increasing soil organic carbon.	The seabed is a potential carbon sink. Protection of carbon sequestering marine habitats e.g. seagrass and mangrove can enhance the carbon sink (FAO and The Nature Conservancy).
Soil health	Minimum tillage to reduce soil disturbance. Build soil nutrients by recycling nutrients, such as through the incorporation of crop residues, mulch, compost and green manure. Cover crops keep the soil covered and reduce erosion.	Avoid bottom trawling (Rewilding Britain 2024), or use lighter trawling gear (MSC) to reduce seabed disturbance and associated emissions (Andersen et al. 2024). Nutrient cycles can be maintained and restored by protecting large species, such as whales which carry nutrients across the ocean through their faeces (FAI Farms 2020).
Maintain and enhance habitats and species	Maintain and restore habitat on farm such as hedgerows and wildflower meadows, which provide habitat for pollinating species. On-farm habitat can act as corridors for species to move freely between farmed land and the wider landscape.	Restore coastal breeding grounds, natural refuges, feeding grounds and nursery areas, such as mangroves, seagrass, kelp forests, to support fish stocks (FAO and The Nature Conservancy; WRI 2023). Improving connectivity between breeding grounds and restoring fish migration pathways (FAO and The Nature Conservancy; WRI 2023).
Fallow or rest periods	Fallow periods can allow habitat to recover and provide breeding grounds for farmland species (e.g. birds).	No-take zones may allow time for overfished stocks to recover and overspill to occur (Guardian 2024; National Geographic Education; and FAO).

Appendix 4: *Parallels in outcomes and types of practices between terrestrial agriculture and marine fisheries contexts.*

Appendix 5: Methodology

This report was developed through evidence gathered from desk based research and key informant interviews.

Desk based research

We took a two phase approach to desk based research. Phase 1 involved collating an initial list of key research terms, based on terms and concepts which are common in sustainable agriculture and terrestrial ecosystem management.

We used boolean search strings (e.g. “regenerative” and “fishing”) using online search engines to understand the uptake of each term in a fisheries context (e.g. number and significance of search results), and the overarching context for use (e.g. type of stakeholder using the term). The intention of Phase 1 was to understand the extent of current uptake of terms commonly applied to terrestrial agricultural systems in fisheries contexts.

Phase 2 aimed to understand the context in which terms are used. This involved a more comprehensive review of key sources identified in Phase 1 to understand how terms are used, the context for uptake (e.g. geographies, scale and type of fisheries, species type) and the parallels that could be drawn between fisheries and agricultural contexts. Phase 2 also identified case studies that were useful in demonstrating parallels between fisheries and agricultural contexts, and which could be used to demonstrate potential for uptake of agricultural terms by fisheries.

Interviews

Interviews were used to gather further insights and verify findings with stakeholders working with the fisheries and agricultural sectors. We interviewed respondents from Transformational Investing in Food Systems, Blue Marine Foundation, Agroecology Coalition and an independent respondent previously working on sustainable farming and fisheries supply chains at a UK supermarket.