

**SMOKE &
MIRRORS
WIBBLES?**

AGROECOLOGY, REGENERATIVE AGRICULTURE, AND NATURE-BASED SOLUTIONS

**Competing framings of food system
sustainability in global policy
and funding spaces**

Lead Authors (IDS): Lúdia Cabral, Elizabeth Rainey, and Dominic Glover

Project Manager: Nicole Pita

IPES-Food Working Group: Molly Anderson, Emile Frison, Mamadou Goïta, Philip Howard, Melissa Leach, Desmond McNeill, Cecilia Rocha, Ricardo Salvador

Layout and graphic design: www.heartsnminds.eu

Approved by the IPES-Food Panel, October 2022.

Citation: IDS & IPES-Food, 2022. Agroecology, regenerative agriculture, and nature-based solutions: Competing framings of food system sustainability in global policy and funding spaces.

With support from:



**ROSA
LUXEMBURG
FOUNDATION**

CONTENTS

| | |
|---|-----------|
| Summary | 4 |
| 1 Introduction | 7 |
| 2 Analytical framework and methodology | 9 |
| 3 The emergence and contested definition of terms | 11 |
| 3.1 Agroecology | 11 |
| 3.2 Regenerative agriculture | 14 |
| 3.3 Nature-based solutions | 16 |
| 4. Bibliometric analysis | 17 |
| 5. Global policy spaces | 20 |
| 5.1 UN Food Systems Summit 2021 | 20 |
| 5.2 UN Climate Change Conference 2021 (COP26) | 24 |
| 5.3 Conference of the Parties to the Convention on Biological Diversity (CBD) | 26 |
| 5.4 Summary of findings | 29 |
| 6. Funding streams | 30 |
| 6.1 Corporations | 31 |
| 6.2 Philanthropy | 32 |
| 6.3 Development assistance | 33 |
| 6.4 Public research and innovation | 34 |
| 6.5 Summary of findings | 35 |
| 7. Discussion | 37 |
| 7.1 Common ground and differences between terms | 37 |
| 7.2 Actors, interests, and contestations in global policy spaces | 40 |
| 7.3 Transformative approaches to sustainability in global food systems | 42 |
| 8. Conclusion | 44 |
| Annex. Funding streams by actor – a synthesis of collected evidence | 46 |
| Endnotes | 57 |

SUMMARY

The terms ‘regenerative agriculture’ and ‘nature-based solutions’ have gained prominence in policy and funding spaces related to food systems. Global policy fora like the UN Food Systems Summit and the UN climate and biodiversity conferences have recently used these terms as bywords for sustainable development. They add to a collection of terms and ideas that claim to present sustainable solutions for food systems, including agroecology, climate-smart agriculture, sustainable intensification, conservation agriculture, zero-carbon agriculture, permaculture, biodynamic farming, organic agriculture, holistic resource management, and so on. Although there is broad agreement about the need to transform food systems and make them more sustainable, there are different interpretations about what that means in practice, and there is growing competition between different approaches and terminology.

This study was motivated by concerns that a narrow set of actors is driving debates and shaping policy processes related to the sustainable transformation of food systems. More specifically, there are concerns that the mainstreaming of agroecology—a concept that has long combined ecological and social aspects—and its amalgamation with other ideas linked to the sustainability discourse, result in emptying the concept of its social and political underpinnings.

This study aims to identify and critically analyze competing framings and narratives connected to *agroecology*, *regenerative agriculture*, and *nature-based solutions* in agriculture and food. It investigates how and why these terms have been taken up in recent global policy spaces and funding streams. The analysis is guided by a perspective centred on the knowledge politics of sustainability, which combines an emphasis on discourse—exploring how meaning is created, by whom, and whether it is disputed—with a focus on power dynamics—understanding whose knowledge counts, why, and to what effect.

This study focuses on three global policy spaces and 16 private and public funding providers connected to sustainability and food systems. The global policy spaces are the UN Food Systems Summit in 2021 (UNFSS), the UN Climate Change Conference in 2021 (COP26), and Part One of the Conference of the Parties to the Convention on Biological Diversity COP15 in 2021 (CBD). The choice of spaces reflects the fact that climate and biodiversity conferences increasingly address food systems, with nature-based solutions being systematically referenced. All three are high-level summit events with extensive lead-in processes and negotiations that took place over the course of 2021-2022. Also, these spaces have been criticized for being exclusive and more favorable to the ideas of corporate actors and this calls for further investigation.

The 16 funding sources comprise agrifood corporations, philanthropies, international development donors, and public funders of research and innovation. The study also includes a bibliometric analysis that gauges the significance of the three concepts in scientific literature published in English and identifies sources and historical trends in citations.

This study reviews secondary data (documents, websites, public announcements) that sheds light on the articulation of narratives within global policy spaces and funding circles; it does not analyze or provide evidence to ascertain the impact of actors’ policy narratives and funding streams. Gauging the effect of these narratives and funding pledges on food system dynamics and understanding who gains and who loses from such framings/funding initiatives necessitates an in-depth investigation of selected initiatives, which is beyond the scope of the present study.

The study's key findings are as follows:

Bibliometric analysis. Agroecology is by far the term with the highest number of counts in the literature. Regenerative agriculture is a more niche term with a significantly lower frequency. While the term nature-based solutions has widespread use across diverse research fields, when the bibliographic search is restricted to agriculture, farming, and food, the number of counts drops significantly to just above the scores of regenerative agriculture. The analysis also indicates that whereas agroecology peaked in the 2000s, nature-based solutions has seen a recent rise in citations, with more than 80 percent of citations occurring since 2018, suggesting the quickly growing popularity of the latter term in the literature.

Global policy spaces. The analysis confirms the rapid uptake of ideas about nature-based solutions, with the similar term 'nature-positive solutions' featuring quite strongly at the UNFSS. Although less pronounced at the CBD, nature-based solutions came up as somewhat controversial, with one country delegation equating the concept to 'carbon colonialism'. Agroecology, in turn, does not emerge as a distinctive or clearly defined concept in the UNFSS or COP26 main events and tends to be used as a general descriptor alongside other terminology. However, in the "Coalition on food system transformation through agroecology" that was created in the context of the UNFSS, agroecology is clearly defined with reference to the 13 principles of agroecology that were developed by the High-Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS). It also features in preparatory workshops to COP26 organized by the Koronivia Joint Work on Agriculture, an initiative launched under the United Nations Framework Convention on Climate Change (UNFCCC). Agroecology is also discussed in preliminary rounds of the CBD, with several member state parties proposing its inclusion in the formulation of biodiversity targets. In this space, agroecology is linked to agrobiodiversity and indigenous food systems, and is seen as an alternative to existing industrialized food systems. Regenerative agriculture was less visible across these policy spaces.

Funding streams. Notwithstanding its low prominence in global policy discussions, regenerative agriculture features strongly in the narratives of large agrifood corporations, which are setting targets related to their environmental footprints, partnering with international environmental organizations, and making substantial investments in research and development in this area. While the term regenerative is favoured over nature-based or nature-positive, it conveys similar ideas about building climate-resilient food systems and addressing (environmental) imbalances so that food systems can operate more efficiently.

The philanthropic organizations reviewed form a mixed ensemble. While the Rockefeller Foundation has engaged most explicitly with the idea of regenerative food systems, the McKnight Foundation has favoured agroecology, combining concerns with ecological balance and efficiency with a focus on livelihoods and equity. The selected international development donors also form a diverse group. Although adopting climate-smart agriculture as its preferred term, the World Bank's focus on climate resilience and environmental resource sustainability are in line with the approach taken by agrifood corporations and the Rockefeller Foundation. By contrast, the European Commission (EC) combines environmental and social dimensions of sustainability. A similar contrast is observed when comparing the US Agency for International Development (USAID) and the German Federal Ministry for Economic Cooperation and Development (BMZ). This suggests a dividing line between US-based and Europe-based actors, with the former embracing a narrower conception of sustainability that centres on the efficiency and resilience of natural systems, and the latter highlighting, in addition, the vitality of human systems and social outcomes. The Japan International Cooperation Agency (JICA) occupies a position between these poles.

Food systems-oriented research funding streams of the EC's Horizon Europe programme and the Canadian International Development Research Centre (IDRC) encourage interpretations of sustainability that connect environmental and equity goals and engage with ideas about transforming (rather than simply addressing inefficiencies in) food systems. In the United Kingdom (UK), the recently announced initiative on farming innovation by UK Research and Innovation (UKRI) and the Department for Environment, Food and Rural Affairs (DEFRA) suggests a closer alignment with US-based actors, which have a primary emphasis on system efficiency and resilience, rather than a more encompassing system transformation.

Common ground and differences between concepts. All three concepts express concern for the sustainability of natural environments and the need for approaches that restore and enhance the interacting elements of that environment in an integrated and holistic way that protects and promotes biodiversity. However, important differences between the terms are noticeable. One salient difference concerns human and social dimensions, which are usually strongly referenced in definitions of agroecology but not explicitly mentioned in relation to the other two terms. Agroecology focuses on human as well as natural systems. Its quest for environmental restoration and sustainability is inextricable from the pursuit of social inclusion, equity, or justice. By contrast, definitions of regenerative agriculture and nature-based solutions tend to have a more confined scope in that they refer primarily to natural systems and technical practices, emphasizing environmental restoration, preservation, and sustainability in ways that downplay human dimensions and socio-technical relations.

Actors, interests, and contested policy spaces. The adoption of the language of sustainability and terms like regenerative agriculture and nature-based and nature-positive solutions in global policy spaces (particularly UNFSS and COP26) has been linked to corporate interests and interpreted by some analysts as ‘corporate greenwashing’.¹ The backstage of policy spaces reveal a degree of contestation between sustainability framings, though these disputes do not transpire in final statements and documents. For example, several country delegations to the UNFSS objected that insufficient attention had been given to agroecology. Ten countries demanded that a session on agroecology be added to the agenda of the pre-summit meeting in Rome. In Part One of the CBD,¹ there was some push-back against the idea of ‘nature-based solutions’, regarded by some as sitting outside the Convention’s scope.

Transformative approaches to sustainability. Dominant framings of sustainability within global policy forums centre on environmental and climate-related concerns and goals, typically with an emphasis on managing the environment as part of improving system efficiency. They pay little attention to trade-offs between environmental and social goals or to inequities within food systems. Transformative perspectives on sustainability that combine environmental and climate concerns with a focus on social equity and plurality of knowledges are strong in academia and in advocacy spaces populated by social movements. For greater impact, they need a more widespread endorsement, although mainstreaming carries the risk of simplification and loss of their most transformative elements, as seen with agroecology.

Implications for policy advocacy. Transformative perspectives on sustainability in global food systems need to be strengthened. This requires attention to the intersection between environmental sustainability and social justice and to marginalized groups and how they feature in transitions to more sustainable futures. Research and advocacy organizations committed to transformative approaches to sustainability should continue supporting policy processes and spaces that are inclusive, participatory, and cognizant of power imbalances, including in the production of knowledge and framings of sustainability.

Implications for practice. Sustainability terminology and the worldviews and agendas that underpin it need constant scrutiny by looking at how the terms translate into actual practices. Agroecology has progressed the furthest in defining pathways towards food system transformation, guided by principles that have been widely legitimized in local and global policy spaces. Emphases on principles (rather than blueprints) and on inclusive and equitable processes are largely absent in discussions about regenerative agriculture and nature-based solutions, making these approaches ill-suited to address food system challenges in a transformative manner.



¹ Research on the use of these terms at the CBD ended before Part Two of the event, which will take place in December 2022, and was therefore confined to lead-up documentation and materials.

1 INTRODUCTION

The terms ‘regenerative agriculture’ and ‘nature-based solutions’ are quickly gaining prominence in policy spaces and funding streams related to food systems. Global policy forums, including the UN Food Systems Summit and the UN climate and biodiversity conferences, have recently used these terms as bywords for sustainable development. They add to a loose collection of terms and ideas that claim to represent sustainable solutions for food systems, including agroecology, climate-smart agriculture, sustainable intensification, conservation agriculture, zero-carbon agriculture, permaculture, biodynamic farming, holistic resource management, and so on. Although there is broad agreement about the need to transform food systems and make them more sustainable, there are different interpretations about what that means in practice and growing competition between different approaches and terminology. Each of these terms is highly contested in advocacy, policy, and academic spheres, both in their meaning and ownership.²

This study was motivated by concerns that a narrow set of actors is driving debates and shaping policy processes related to the sustainable transformation of food systems. More specifically, there are concerns that the mainstreaming of agroecology, a concept that has long combined ecological and social aspects, and its amalgamation with other ideas linked to the sustainability discourse, results in the emptying out of its social and political underpinnings. While years of negotiation have led to the adoption of an international definition of agroecology—centred on a set of elements and principles³—the term is often used loosely in global policy spaces, as this study illustrates.

This study identifies and critically analyzes competing framings and narratives connected specifically to agroecology, regenerative agriculture, and nature-based solutions. The study is interested in understanding how and why these terms have been taken up in recent global policy spaces and funding streams. It is guided by a framework of analysis centred on the knowledge politics of sustainability that combines an emphasis on discourse—exploring how meaning is created, by whom and whether it is disputed—with a focus on power dynamics—understanding whose knowledge counts, why, and to what effect. Although primarily focused on how the terms are used in policy and funding and in connection with the sustainable development agenda, the study also explores how they have been taken up in academic debates and how the ideas they embrace circulate between policy, funding, and research domains.

Are ideas about sustainable development being appropriated and subverted by powerful food system actors to the detriment of equity and justice? Some fear this is the case specifically for agroecology, threatening its co-optation and the loss of its more transformational elements.⁴ Agroecology has been championed by national and transnational social movements and activist scholars as a means (technical as well as political) of countering harmful environmental and social impacts of intensive farming and industrialized food production, which have come to dominate globalized food systems.⁵ The popularity of agroecology in global policy and funding streams (as detailed later in this paper) might mean that its ideas and aims are being embraced. Still, this trend could also indicate that the concept is being reinterpreted—watered down and subverted—to support farming approaches that depart from agroecology’s original ideals. Rosset and Altieri note that ‘[t]here is no better way to appease the demands of social movements and deflect their defense of agroecology—as an alternative to hegemonic capitalism—than to capture, co-opt and suppress its anti-systemic content’.⁶

This is, according to many activists and critics, what happened to the organic agriculture/farming movement. In the United States (USA), the organic agenda emerged as part of a counter-culture movement that gained prominence in the 1960s as the country awoke to environmental problems.⁷ The organic movement opposed the dominant industrialized farming model and its heavy use of toxic chemicals and advocated for healthier and environment-friendly alternatives. It later became mainstream and transformed into a profitable industry.⁸ While the mainstreaming of organics is, to some extent, a positive development—which raised standards in food production and consumption—there are concerns that benefits have not been equitably distributed, in that the success of organics has fed wealth concentration in food production and retailing as well as inequities in consumption.⁹ Organic food remains a pricey niche product, accessible to more affluent consumers only. Activists and scholars fear that agroecology might follow a similar pathway and wonder if it can be protected as a space of resistance to power and struggle for rights.

Acknowledging these concerns, we interrogate the meanings attributed to agroecology and two other concepts by looking at how they are articulated and used in prominent global policy spaces and funding streams. The study explores common ground and tensions between competing interpretations and claims of ownership and legitimate use in policy spaces and funding streams. While recognizing that pursuing sustainable development under uncertainty requires multiple and diverse solutions and pathways,¹⁰ the study reflects on the implications of conceptual pluralism in food systems that are permeated not only by unsustainable practices but also by deep and entrenched inequities.

Following this introduction, section 2 outlines the analytical framework, guiding questions, and methodology used in the report. Section 3 situates the three terms in historical context, briefly reviewing their evolution in scholarship and practice. Three empirical sections follow. Section 4 analyzes the frequency of occurrences in the literature for each of the three terms and offers a first snapshot of their use and relative popularity in the literature. Section 5 analyzes how the three concepts and related terms have been used and interpreted in recent global policy spaces: the UN Food Systems Summit in 2021 (UNFSS), the UN Climate Change Conference in 2021 (COP26), and Part One of the Conference of the Parties to the Convention on Biological Diversity COP15 in 2021 (CBD). Section 6 maps funding that flows to support agroecology, nature-based solutions, and regenerative agriculture, looking at a selection of private and public funding channels and actors. Section 7 discusses the knowledge politics of sustainability by reference to the analytical framework and questions. Section 8 concludes the paper by outlining key points and implications for policy advocacy and practice.

2 ANALYTICAL FRAMEWORK AND METHODOLOGY

To analyze the politics of knowledge, this study draws on a synthesis framework that focuses on interactions among actors, interests, and narratives within environmental and other policy processes.¹¹ Originally derived from a detailed review of literature on the politics of policy,¹² this framework asks who are the actors involved in policy debates, how are they connected, what are the underlying power dynamics, what narratives are deployed, and how are topics framed (Figure 1).

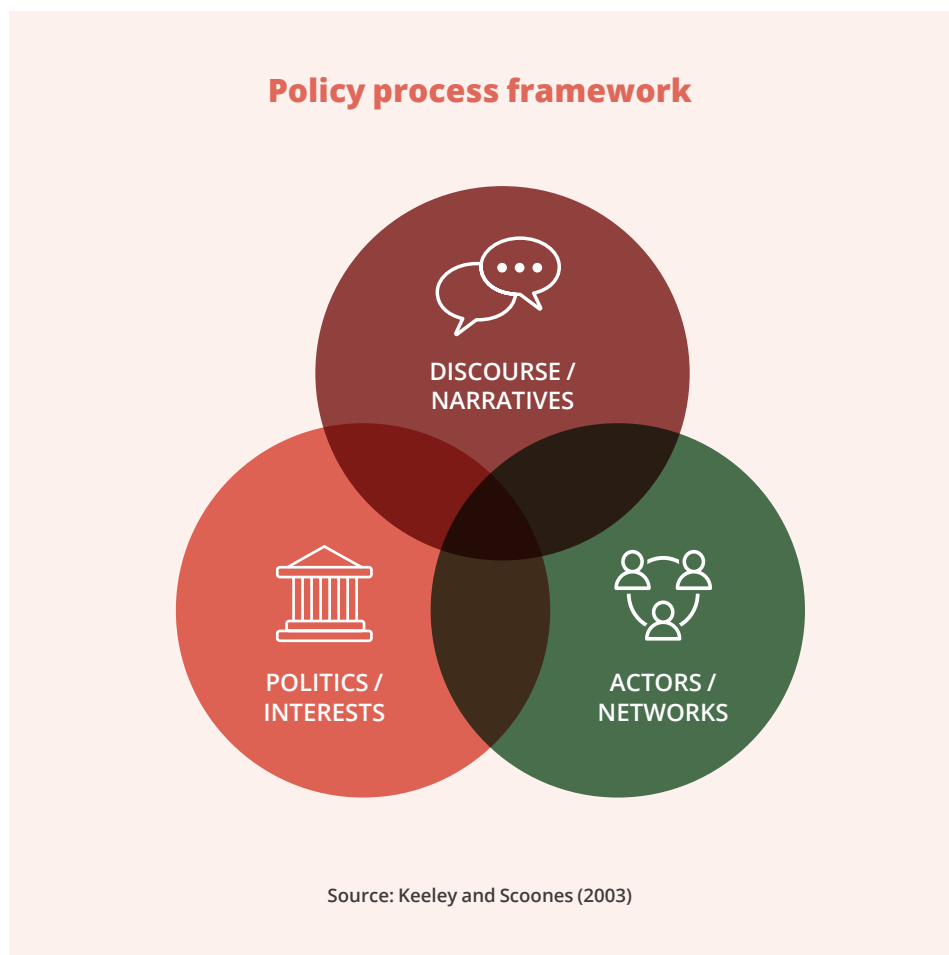


FIGURE 1

Narratives and framings are particularly relevant to this study because they relate to the representation and interpretation of facts, concepts, relationships, and processes. This study focuses on how the terms agroecology, regenerative agriculture, and nature-based solutions (in food and agriculture) are mobilized and debated by actors in global policy processes relating to sustainable food systems.

Narratives and framings are powerful and consequential. Roe (1991) highlighted how development narratives persist and become blueprints for action, irrespective of their underlying evidence base.¹³ Similarly, McNeill (2006) traced how development concepts (such as ‘sustainable development’) spread and became popular in academic, policy, and popular domains.¹⁴ McNeill argued that development ideas become influential because of their malleability, allowing for consensus between actors with different views or interpretations of the same idea. Discourse theory refers to such malleable concepts as ‘floating signifiers’, which are concepts that do not have fixed, intrinsic meaning but can be interpreted in different ways.¹⁵ There is both opportunity and hazard in the space which these malleable concepts open up for different social and professional groups to interact. On one hand, there is an opportunity for communication, cooperation and, potentially, mutual understanding. On the other hand, there is a danger that terms may be interpreted quite differently by different stakeholders, in incompatible and mutually incomprehensible ways, rendering terms less useful as coordinators of collective action.

The validity of rival interpretations is contested. Claims of validity are political. Cabral and Sumberg (2022) have highlighted narrative structure as functional in making claims about narrative content.¹⁶ The promoters of four ideas—the Rodale family’s regenerative organics, Masanobu Fukuoka’s ‘natural farming’, Wes Jackson’s ‘natural systems agriculture’, and Alan Savory’s ‘holistic natural resource management’—created narratives with ‘epic elements’ that served to amplify their respective ideas, claims, and their authority in policy debates. Epic elements included references to heroic figures driven by a sense of mission; the villains, threats, and obstacles they faced in pursuing their missions; and assertions of universal relevance. Origin stories are also important and are associated with individuals or organizations that come to be celebrated as legitimate creators or ‘founding fathers’ of those ideas (heroic figures are generally always men and this gender dimension is worth highlighting).

Besides the prestige that comes from being deemed the creator, legitimate interpreter, or custodian of a celebrated concept, other interests and agendas are also at stake. Power dynamics are associated with claims about the substance, validity, and ownership of concepts. We have emphasized power imbalances among participants in food systems and how discourse and narratives are crucial tools to exercise or resist power.¹⁷ Power may be motivated by business interests, ambitions to gain control of political spaces, or other stakes. The present study contributes to this agenda by extending our effort to identify positions of dominance and disadvantage in debates about sustainable approaches to food and agriculture, including how narratives and framings may exacerbate existing power imbalances.

Our perspective on the politics of knowledge prompts the following specific questions

- **Discourse:** What narratives are associated with each of the three concepts, and how are the concepts framed (understood or talked about)?
- **Actors:** Who are the actors and actor-networks that use these concepts? How do they appropriate them and claim legitimacy to speak for them?
- **Interests:** What interests underpin narratives and framings, and why do some narratives and framings dominate over alternatives? Who wins and who loses from particular framings?

To address these questions, we examine the articulation and discussion of the three concepts in recent global policy and funding spaces. We selected three global policy forums focused on sustainability and 16 private and public funding sources of relevance to food systems. The selected global policy spaces were the 2021 UN Food Systems Summit (UNFSS), the 2021 UN Climate Change Conference (COP26), and the preparations for the upcoming 2022 Conference of the Parties to the Convention on Biological Diversity (CBD). The 16 funding sources comprised agrifood corporations, philanthropic agencies, international development donors, and research funds (see section 6 for further details).

For each of these spaces (policy and funders), we assembled and reviewed material accessible through the web pages of the relevant actors and processes/events. Data consisted of documents linked to policy events and processes, funded programmes and projects, and other relevant written material published via these web pages. A bibliometric analysis was used to assess the significance of the three concepts studied within this body of literature and to identify sources and historical trends in policy debates about the three concepts. This paper should be read as a first step towards understanding the contested use of three main food system sustainability concepts.

3 THE EMERGENCE AND CONTESTED DEFINITION OF TERMS

This section situates the three selected terms in historical context and briefly reviews their evolution in scholarship and practice.



3.1 AGROECOLOGY

Agroecology has its origins in Indigenous Peoples food systems that span the globe. Indigenous Peoples food systems preserve and enrich their ecosystems and are interconnected with language, traditional knowledge, governance, and cultural heritage. Still, the first recorded academic use of agroecology concerning agriculture dates to the first half of the 20th century and is connected to pest management and soil biology concerns. Reviews of the concept's history mention its use by Russian agronomist Basil M. Bensin, who in the 1930s described ecological methods in research on commercial crops.¹⁸ Throughout the 1950s, studies on agroecology related to pest management, plant protection, soil biology,¹⁹ and agricultural meteorology.²⁰

The 1960s saw the publication of what is thought to be the first book titled *Agroecology*, by German ecologist and zoologist Wolfgang Tischler.²¹ His work analyzed the interactions among biological components of agroecosystems (plants, animals, soils, and climate) and the impacts of human agricultural management on these components and interactions. Similar work developed in the United States, France, and Italy during this period, contributing to the establishment of agroecology as a distinct scientific discipline.²²

In the 1970s and 1980s, agroecology became linked gradually to the search for alternatives to the industrial production systems associated with the Green Revolution. This alternative agriculture movement marshaled critical agronomists to question their discipline's foundations and consider the ecological and social consequences of input-heavy farming.²³ The associated term 'agroecosystems' was also coined in this period, highlighting the complexity and co-constitution of natural and social systems.²⁴ Ideas about 'natural ways of farming' also gained ground.²⁵

Agroecology began to embrace normative imperatives to protect natural systems and consider sustainability and the social distribution of benefits in agricultural production.²⁶ The concept gradually spread beyond the scientific community and became a social movement. Niederle et al. (2019) describe how, for example, in the aftermath of the military dictatorship in Brazil (1964-85), currents of agroecological thought influenced student movements and unions and gradually gained political meaning.²⁷

Agroecology further strengthened as a science and a movement throughout the 1990s, as the environmental agenda gained momentum, particularly in the USA and Latin America. Higher education programmes in agroecology were established in Europe and the USA. Non-governmental organizations translating the agroecological approach to farmers also emerged, such as *Assessoria e Serviços a Projetos em Agricultura Alternativa* (AS-PTA) in Brazil.²⁸

In the Latin American context specifically, agroecology developed practical coherence throughout the late 1980s and 1990s. Scientists and practitioners worked with local farmers to improve indigenous farming methods as alternatives to the Green Revolution paradigm of corporate-controlled technological packages.²⁹ According to Wezel et al., ‘practices such as conservation of natural resources, adapted soil fertility management and conservation of agrobiodiversity are the practical basis for the different agroecological movements in Latin America’.³⁰

As participatory methods in agricultural extensions gained ground,³¹ interactions between scientists and farmers emphasized inclusive knowledge systems and horizontal learning rather than top-down approaches to technology diffusion and innovation. The *campesino a campesino* (peasant-to-peasant) methodology, inspired by Paulo Freire’s pedagogy, emerged particularly in Cuba and contributed to the formation of a grassroots movement for agroecology, which became internationalized through the transnational peasant alliance *La Vía Campesina*.³²

A further significant evolution occurred in the 2000s, as the scope of agroecology broadened to encompass the whole food system, connecting production with processing, distribution, and consumption.³³ Francis et al. described agroecology as ‘the integrative study of the ecology of the entire food system, encompassing ecological, economic, and social dimensions’.³⁴ This enlargement of scope is noticeable also in the sphere of social agrarian movements and finds perhaps its most robust expression at the International Forum for Agroecology held at the Nyéléni Center in Sélingué, Mali: ‘we gather here at the Agroecology Forum 2015 to enrich Agroecology through dialogue between diverse food producing peoples, as well as with consumers, urban communities, women, youth, and other. (...) Agroecology is a way of life and the language of Nature that we learn as her children. It is not a mere set of technologies or production practices.’³⁵

Agroecology’s long history as a science, movement, and practice has been accompanied by much contestation. Wezel et al. urged researchers to be explicit in defining agroecology when they use the term. Its meaning and scope, however, continue to diverge across communities of knowledge and practice.³⁶

One area of dispute in the knowledge politics of agroecology concerns the relation and balance between its technical and political dimensions. Various authors have warned about the danger of co-optation and the loss of agroecology’s more transformational elements.³⁷ Agroecology has been championed by national and transnational social movements and activist scholars as a means—both technical and political—to counter harmful environmental and social impacts caused by intensive farming and industrialized food production methods, which dominate globalized food systems.³⁸ These advocates are concerned that agroecology’s mainstreaming in global policy and funding programmes results in the concept being reinterpreted and its political dimension watered down.

The FAO’s ‘10 elements of agroecology’ constitutes a major effort to establish that agroecology is not about technical-ecological principles alone but also social justice (see Figure 2). The FAO 10 elements emerged after a four-year inclusive and deliberative regional and international consultative process, which recognized and included the views of small-scale food producers and consumers. FAO explains that the ‘10 elements of agroecology’ constitutes a ‘fundamentally different’ approach to sustainable development, empowering producers and communities by emphasizing ‘co-creation of knowledge, combining science with the traditional, practical and local knowledge of producers’.³⁹ Rather than tweaking the practices of unsustainable agricultural systems, agroecology seeks to transform food and agricultural systems, addressing the root causes of problems in an integrated way and providing holistic and long-term solutions. This includes an explicit focus on social and economic dimensions of food systems. Agroecology places a strong focus on the rights of women, youth and Indigenous Peoples.

The High-Level Panel of Experts (HLPE) of the United Nations Committee on World Food Security (CFS) translated these 10 elements into a set of 13 operational principles to guide agroecological food system transformations and achieve resource-use efficiency, system resilience, and social equity and responsibility

(Figure 2).⁴⁰ The 13 principles are aligned with the 10 Elements of Agroecology adopted by the 197 FAO Members in December 2019. They also build on Steve Gliessman's five steps to agroecological transition,⁴¹ which include both incremental adjustments and transformative, systemic changes.⁴²

Overall, agroecology has come a long way in its evolutionary process and today represents much more than an approach to correct unsustainable food production practices. It embodies an alliance of science with practice and a social movement, calling for a profound rethinking of food systems centred on a merging of distributive justice with environmental soundness. Driven by a heterogeneous but cohesive epistemic community, this alliance has gained formal recognition in global food governance.⁴²

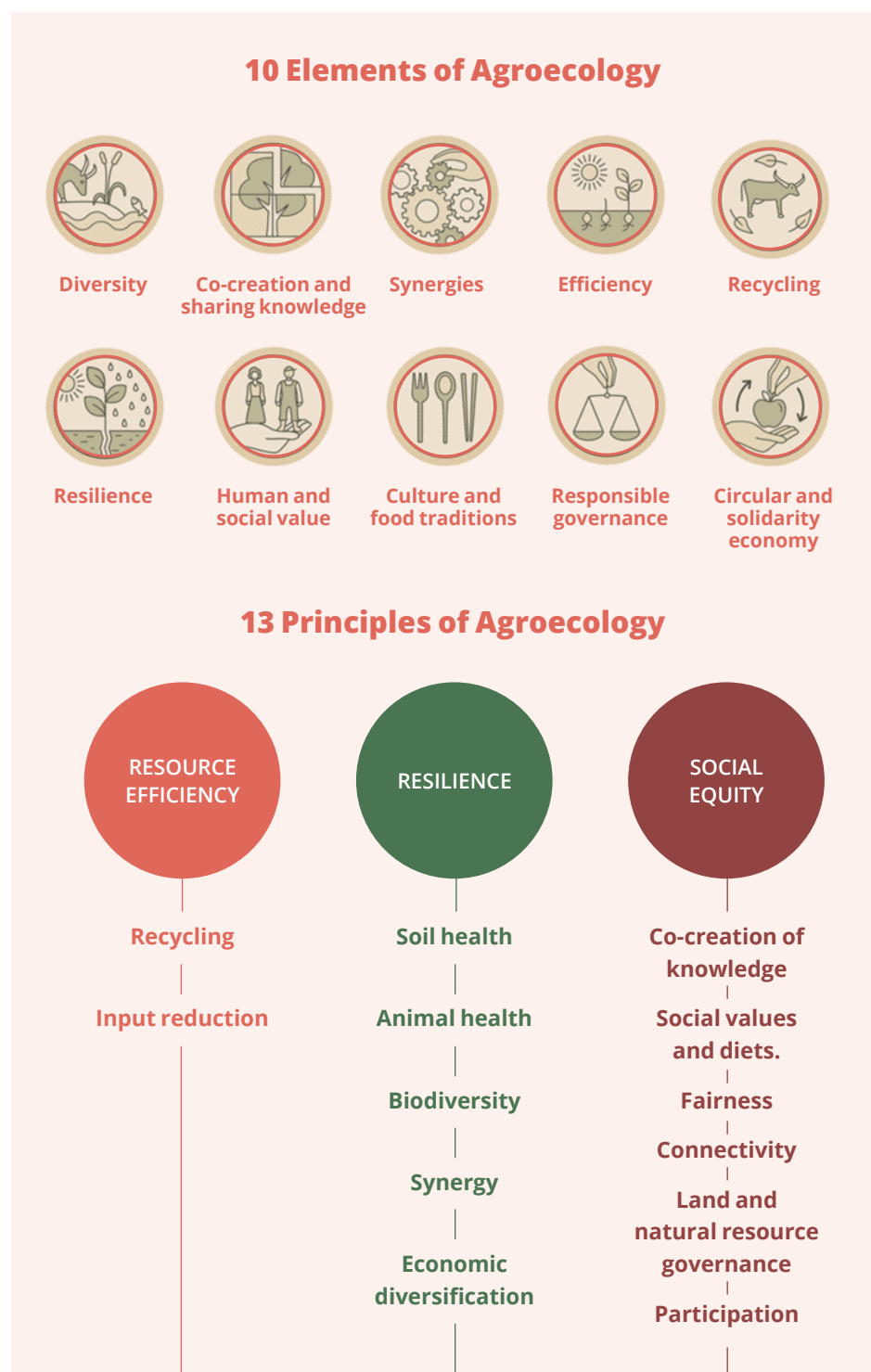


FIGURE 2

⁴² The five steps are: (i) increasing input use efficiency; (ii) substituting conventional inputs and practices with agroecological alternatives; (iii) redesigning the agroecosystem on the basis of a new set of ecological processes; (iv) re-establishing a more direct connection between producers and consumers; and (v) building a new global food system based on participation, localness, fairness and justice.



3.2 REGENERATIVE AGRICULTURE

Regenerative agriculture's origins are linked to the organic revolution in the USA, which emerged as part of the 1960s counterculture movement and the environmental awareness prompted by Rachel Carson's *Silent Spring*.⁴³ The organic movement opposed the heavy use of toxic chemicals in industrial farming and advocated for healthier and environment-friendly alternatives.⁴⁴ The term 'regenerative organic' was coined by the Rodale Institute^{III} in the early 1980s.⁴⁵ Rodale claims to operate the world's longest-running side-by-side farming system trial, which compares organic and conventional grain cropping systems in North America.⁴⁶

Regenerative organic 'takes advantage of the natural tendencies of ecosystems to regenerate when disturbed' and favours 'closed nutrient loops, greater diversity in the biological community, fewer annuals and more perennials, and greater reliance on internal rather than external resources'.⁴⁷ Richard Harwood, an agronomist who directed the Rodale Institute, elaborated on the scientific basis of regenerative agriculture and connected it to approaches such as organic and biodynamic farming.⁴⁸ Harwood highlights three key principles of regenerative agriculture: (1) interrelatedness of all parts of a farming system, including the farmer and farm family; (2) biological balances in the system; and (3) the need to maximize desired biological interactions while minimizing the use of materials and practices that disrupt those relationships.⁴⁹ Francis, Harwood, and Parr built on this work to emphasize the role of the approach in addressing production and food security concerns:

Technology that improves soil fertility and pest control using internal resources needs to be developed and tested on the farm. This could build toward increased local stability of production and eventually greater national security in the basic food supply.⁵⁰

The scientific framing of regenerative agriculture is comparable to agroecology and part of the same backlash against industrialized farming, yet the term remained somewhat under the radar for several years (cf. next section for bibliometric analysis).

In 2012, a paper authored by Christopher J. Rhodes, published by *Science Progress*, reengaged with the soil science behind regenerative agriculture (as well as permaculture). It argued that regenerative agriculture offers 'potentially the means to provide food and materials... and address the wider issues of carbon emissions, and resource shortages'.⁵¹ The paper showcased the Rodale Institute's farming system trial. It highlighted the benefits of regenerative agriculture compared with high-input farming methods in terms of lower energy use, greater carbon sequestration, and soil regeneration. A report published by the Rodale Institute a couple of years later⁵² offered similar evidence and claimed that regenerative agriculture presents 'a down-to-earth solution to global warming'.^{IV} A further paper by Rhodes connected regenerative farming with broader food availability concerns.⁵³

The term 'regenerative' has been picked up by US and international organizations and practitioners and gradually internationalized.⁵⁴ The Rodale Institute has been a vehicle for this internationalization through partnerships with experiments conducted outside the USA.⁵⁵ Another key organization is Regeneration International, established in 2017 as a non-profit organization with a mission to 'promote, facilitate and accelerate the global transition to regenerative food, farming, and land management for the purpose of restoring climate stability, ending world hunger, and rebuilding deteriorated social, ecological and economic systems'. Its definition of regenerative agriculture emphasizes soils and carbon while highlighting biodiversity, ecosystem health, and resilience.⁵⁶ Regeneration International, IPES-Food and others co-authored a call for food system transformation based on the 13 agroecology principles, agreeing that regenerative agriculture should include a social dimension.⁵⁷

III The Rodale Institute is the rebranded Soil and Health Foundation established in 1947 by Jerome Irvin Rodale. He was the owner of Rodale Press, the publishing house for the magazine *Organic Farming and Gardening* (first published in 1942) which still exists today as Organic Gardening.

IV The paper notes: 'Recent data from farming systems and pasture trials around the globe show that we could sequester more than 100% of current annual CO₂ emissions with a switch to widely available and inexpensive organic management practices, which we term "regenerative organic agriculture." These practices work to maximize

A different non-profit organization, the US Regenerative Agriculture Alliance, created in 2018, has a narrower remit on poultry systems. Still, it offers a more encompassing definition of regenerative agriculture that brings together ecological, social, economic, and spiritual dimensions.

We are focused on scaling up a systems-level regenerative poultry solution that restores ecological balance, produces nourishing food, and puts money back into the hands of farmers and food chain workers. To do so requires a completely new supply chain that integrates grassroots organizing of farmers with physical infrastructure and other regeneratively stacked enterprises.⁵⁸

Compared to agroecology, regenerative agriculture remains less studied. A systematic literature review by Schreefel et al. concludes that the term focuses on environmental dimensions of sustainability (related to soil health, resource management, climate change alleviation, nutrient cycling, and water management and availability), while socio-economic issues are defined only generally, and lack a framework for implementation.⁵⁹ The appeal of regenerative agriculture is likely due to the emphasis it places on the regeneration of natural resources – a strong but simple concept likely to speak to a large number of food system actors.⁶⁰ However, another issue with regenerative agriculture is that it fails to give credit to indigenous systems that prefigured its practices, and is being largely promoted by white males from the Global North.⁶¹

Today, agrifood corporations are driving narratives about regenerative agriculture. Significant investments are being made to align global food supplies with environmental concerns related to soils, carbon emissions, and biodiversity, with less progress on agrochemical dependency. Agrifood corporations seem to be rapidly embracing and investing in regenerative agriculture concepts, pushing their specific interpretations of what they should mean. Their interpretation sometimes means simply paying farmers to offset emissions. It usually does not include a strong focus (if any) on social aspects, confining the term's scope within narrow visions that do not encompass social justice and equity. Nonetheless, some private foundations, development agencies, and research funders that have adopted the language of regenerative agriculture do include social justice in their principles and programs, suggesting entry points and opportunities for advocates of food system transformation to influence them in a positive direction.



3.3 NATURE-BASED SOLUTIONS

Nature-based solutions is a comparatively broad term that has widespread use across diverse fields, typically in reference to climate change issues.⁶² Explicit connections with agriculture, farming and food are recent and often make reference to low-carbon farming and biodiversity conservation.⁶³ As with regenerative agriculture, there has been a rapid increase in the use of the 'nature-based' terminology in recent years (cf. next section), although the term 'is still in the process of being framed'.⁶⁴

The International Union for Conservation of Nature (IUCN) is one of nature-based solutions' major champions in policy and practice.⁶⁵ It has defined it as:

Actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.⁶⁶

Progress was made to build on this definition at the UN Environment Assembly in March 2022, where nature-based solutions were 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 and resilience and biodiversity benefits".⁶⁷

Nature-based solutions feature strongly in recent high profile policy spaces, as illustrated later in this report. A 2020 report by the World Economic Forum (WEF)⁶⁸ advocated for a major shift in thinking about the value of nature and for new business models enabled by 'Fourth Industrial Revolution technologies'. It sees these as having 'the potential to accelerate this shift towards a nature-positive development path and unlock nature's value while minimizing resource use'.

Despite its growing popularity, the term's breadth of use has led to confusion on what precisely constitutes a 'nature-based solution'. According to a report commissioned by the United Nations Convention to Combat Desertification seeking synergies to address the linked challenges of biodiversity loss, land degradation, and climate change,^v because of the perceived vagueness of the term, the report's authors did not include nature-based solutions in their comparative analysis with other approaches.⁶⁹

^v This report looks specifically at Sustainable Land Management, Ecosystem-based Adaptation and Ecosystem-based Disaster Risk Reduction.

4 BIBLIOMETRIC ANALYSIS

An analysis of the frequency of occurrences of the three terms in the literature offers additional insights on their relative popularity over time. This analysis was carried out by retrieving papers related to the terms from Scopus, a reputable global database for peer-reviewed literature published in English. This language caveat is important as, for example, agroecology means different things depending on the context where it is applied – more of a science in Germany, a set of practices in France and a combination of science, practice and movement in Brazil and other Latin American countries.⁷⁰

The selected papers contained the terms in the title, abstract, and keywords.^{VI} The results are summarized in Table 1.

Number of academic papers containing search terms

| SEARCH | TOTAL COUNT | FIRST PAPER USING TERM |
|---|-------------|------------------------|
| "agroecology" | 4,676 | 1953 ⁷¹ |
| "agroecology" and ("agriculture" or "farming") | 2,417 | 1986 ⁷² |
| "agroecology" and ("agriculture" or "farming" or "food") | 2,921 | 1986 |
| "nature based solutions" | 1,597 | 2012 ⁷³ |
| "nature based solutions" and ("agriculture" or "farming") | 156 | 2015 ⁷⁴ |
| "nature based solutions" and ("agriculture" or "farming" or "food") | 212 | 2015 |
| "natural systems agriculture" | 11 | 2002 ⁷⁵ |
| "regenerative agriculture" | 132 | 1986 |
| "regenerative agriculture" or "regenerative farming" | 143 | 1986 ⁷⁶ |

Source: Scopus (search date: 08.03.2022).

TABLE 1

VI Boolean operators ("and" and "or") were used to restrict the search results to papers with focus on agriculture, farming, or food.

The following findings are worth highlighting:

- **Agroecology** is by far the term with the highest number of counts, including when using Boolean operators to restrict the search to the fields of agriculture, farming, and food. It is also the term with the earliest references. The first couple of papers retrieved were published between the 1950s and 1970s and use agroecology in the context of agricultural meteorology.⁷⁷ The connection to farming systems emerged in the 1980s with a paper on Chinese organic agriculture in the seventeenth century published in the journal *Human Ecology*.⁷⁸ Authors such as Miguel Altieri and Steve Gliessman, who later become key references for agroecology scholarship, published papers on agroecology in the late 1980s, engaging with the fields of human ecology and alternative agriculture.⁷⁹ The term has become increasingly multi-faceted over time, with recent contributions highlighting its political character.
- **Regenerative agriculture** appears as a more niche term, with fewer counts. The first references, however, date back to the late 1980s and are contemporary with the first papers on agroecology applied to agriculture, with papers published in journals focused on alternative agriculture and agricultural economics.⁸⁰
- **Nature-based solutions** has widespread use across research fields, with the first references retrieved dating to the late 2000s with a paper focused on nature-based solutions to address climate change published in a conservation science journal.⁸¹ When the search is restricted to the agriculture, farming, and food spheres, the number of relevant papers drops significantly to just above the scores of regenerative agriculture. The first papers that connected with agricultural themes were published in the mid-2010s and engaged in debates on environmental sustainability and ecosystem management.⁸²
- A search was also carried out for the term 'natural systems agriculture', which is closely connected to nature-based solutions. This is a more specific term, and the search produced fewer counts. However, it is worth referencing the work published in the late 1990s by Wes Jackson, highlighting perennials' role as a nature-based solution for feeding the world.⁸³

Recent history of academic papers containing the three terms, from 2011-21

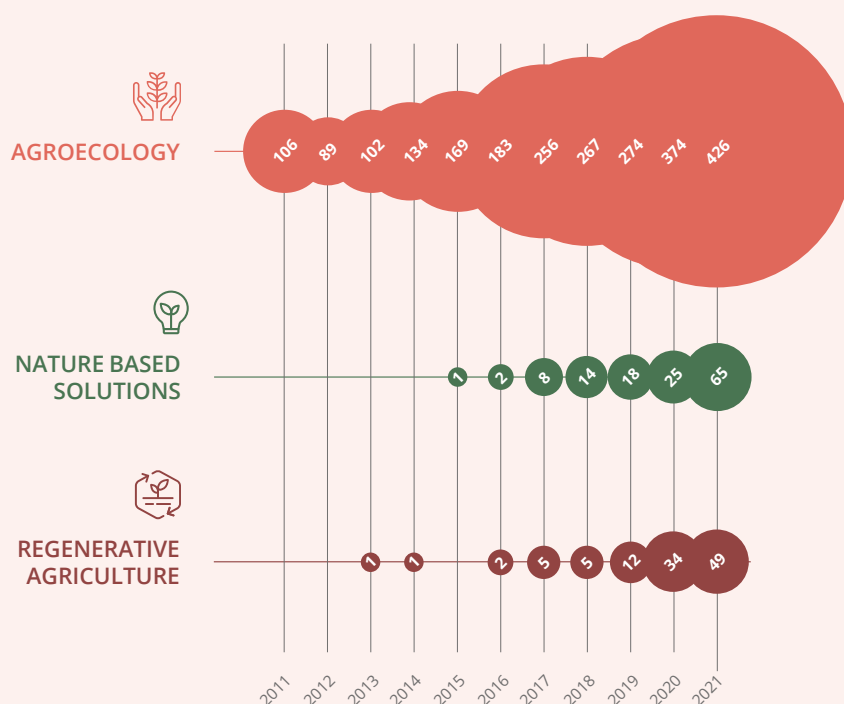


Figure 3 provides an illustration of trends over the last decade, illustrating the predominance of agroecology but the recent rapid expansion of the other terms, particularly nature-based solutions related to agriculture and farming. Section 5 of this report will provide further evidence of this trend by referencing global policy spaces that have adopted this concept.

FIGURE 3

To complement this analysis of academic sources and capture non-academic literature, a literature search was conducted using Google Scholar using the same combination of terms (Table 2). Google Scholar searchers cannot be reduced to specific sections of a paper but retrieve all papers where the terms appear at least once. Although this increases the number of counts and reduces the accuracy of results, some findings are worth highlighting as they complement the analysis above:

- **Agroecology** remains overwhelmingly the most referenced term of the three analyzed, but with the highest concentration of papers in an earlier period (particularly during the 2000s).
- **Nature-based solutions** have much lower counts when the term is combined with either agriculture or farming or food. However, there is a very rapid increase in the use of the term in recent years, with more than 80 percent of citations occurring since 2018.
- The number of papers referring to **regenerative agriculture** or farming is relatively low, but again the term is also trending, with more than 60 percent of papers produced since 2018.

**Number of papers containing search terms
retrieved from Google Scholar**

| SEARCH TERMS | TOTAL COUNT | COUNT SINCE 2018 | % SINCE 2018 |
|--|-------------|------------------|--------------|
| "agroecology" | 168,000 | 18,800 | 11% |
| "agroecology" and "agriculture" | 82,200 | 19,000 | 23% |
| "agroecology" and "farming" | 51,700 | 16,300 | 32% |
| "agroecology" and "food" | 80,100 | 18,200 | 23% |
| "nature based solutions" | 20,100 | 16,400 | 82% |
| "nature based solutions" and "agriculture" | 10,300 | 8,930 | 87% |
| "nature based solutions" and "farming" | 4,640 | 4,010 | 86% |
| "nature based solutions" and "food" | 11,200 | 9,560 | 85% |
| "natural systems agriculture" | 715 | 154 | 22% |
| "regenerative agriculture" | 5,030 | 3,150 | 63% |
| "regenerative farming" | 1,270 | 863 | 68% |

TABLE 2

Source: Google scholar (search date: 08.03.2022)

The following section examines the use of these terms in global policy spaces, revealing nuances in use and new emphases.

5 GLOBAL POLICY SPACES

The study explored the uses and interpretations of the three concepts (and related terms) in three recent global policy spaces: the 2021 UN Food Systems Summit (UNFSS), the 2021 UN Climate Change Conference (COP 26), and the 2022 Conference of the Parties to the Convention on Biological Diversity (CBD). These spaces were chosen because of their relevance to food system governance and considering concerns that they have been exclusive and biased towards corporate interests. This section analyzes each policy space, considering the actors involved and how they used the three concepts. The section concludes with a short synthesis of findings.

5.1 UN FOOD SYSTEMS SUMMIT 2021

The United Nations Food Systems Summit (UNFSS) was organized by the UN Secretariat in New York City and took place virtually on September 23, 2021.^{vii} Our analysis looked at the different stages in the organization of the Summit: the preparation stage that culminated with a pre-Summit event (July 2021), the Summit itself, and the post-Summit stage when outcome documents and declarations were published. The Pre-Summit aimed to ‘take stock of the progress made’ through the input process and ‘lay the groundwork’ for the Summit.⁸⁴ The Summit comprised several linked events and generated statements from member states describing their commitments on building ‘pathways’ to sustainable food systems.^{viii} These communiqués added to other statements submitted to the pre-Summit forum and posted on the UNFSS website.⁸⁵ Post-Summit, the UN Secretary General gave an overview and summary of the event,⁸⁶ which describes main takeaways and themes covered. It appears that, beyond this document and member-states’ statements, there are no concrete summaries of goals or reports available.^{ix}

Actors involved

The UNFSS mobilized a range of actors in its multistakeholder governance structures, as contributors and participants in different stages of the process. Agnes Kalibata, President of the Alliance for the Green Revolution in Africa (AGRA), was the UN Secretary General’s Special Envoy for the Summit. She integrated the Summit Advisory Committee of 30 members, including high-profile experts and representatives from 12 member states. The consultation process comprising national dialogues across dozens of countries was overseen by The Scientific Group,⁸⁷ which comprised 28 leading researchers and scientists from across different countries and areas of expertise, chaired by Joachim von Braun.^x The pre-Summit was attended by 500 people from 130 countries, who joined in person in Rome, and 22,000 delegates from 183 countries,

vii The UNFSS was the result of a partnership between the UN Secretariat and the World Economic Forum agreed upon in July 2019.

viii The process began with contributions from UN member states and other participants (between December 2020 and May 2021), which were organized into a sequence of Discussion Starter Papers, Public Fora and Synthesis Reports. From there, Solution Clusters were created to thematically refine and organize the discussions, and Levers of Change were used as cross-cutting themes to further categorize and prioritize the submissions.

ix Canfield, Duncan, and Claeys (2021) confirm that ‘...the outcomes and goals of the Summit, as well as the decision-making process were never clearly defined’ (p. 185).

x Dr von Braun was former Director General of the International Food Policy Research Institute and served on the World Economic Forum’s Council on Food Security. He is currently co-chair of AGRA’s Programs Committee. For further details on the profile of other group members, see <https://sc-fss2021.org/about-us/bios-of-members/>

who attended virtually. The Summit, held entirely virtually, resulted in ‘nearly 300 commitments from hundreds of thousands of people’⁸⁸ from 145 countries,⁸⁹ although more specific attendance details are not readily available.

Notable global corporate actors and philanthropic organizations that engaged with or held influence at the Summit include the World Economic Forum, Bill and Melinda Gates Foundation, Rockefeller Foundation, Nestlé, Tyson, Bayer, and the International Fertilizer Association. Although in some areas of the Summit corporations’ direct participation appears limited, they were allowed indirect engagement through industry and trade organizations such as the World Business Council for Sustainable Development and the International Fertilizer Association.⁹⁰ This strong corporate engagement led hundreds of organizations to boycott the event and between 25-28 July 2021, around 9,000 people gathered for a virtual counter mobilization to oppose the ‘corporate colonization of food systems and food governance’ through the UNFSS.⁹¹

Uses of agroecology, nature-based solutions, and regenerative agriculture

All three terms appear throughout The Scientific Group’s ‘Science and Innovations for Food Systems Transformation and Summit Actions’.⁹² This report was meant to provide a framework and scientific evidence that participants could access and reference in making their suggestions and commitments. The terms appear relatively equally throughout, and reference to other research on them (most notably agroecology) is also present. Like the rest of the Summit, the report includes a dedicated section to ‘Boost Nature Based Solutions and Production’, which features many papers on this topic.

Nature-based solutions. Rather than ‘nature-based’, the UNFSS strongly favoured the term ‘nature-positive’. Our analysis recorded few instances of the term nature-based, although one appeared (perhaps surprisingly) in the Secretary General’s Chair Summary and Statement of Action on the Summit. In that summary, one of the five primary Action Areas was identified as ‘Boost Nature-based Solutions’, deviating from the preferred use of ‘nature-positive’ in most of the Summit’s documentation. The Summit joined this term to various topics, such as nature-positive food systems; nature-positive agriculture; nature-positive approaches, practices, and solutions; nature-positive inputs; nature-positive production/production systems; nature-positive innovation, knowledge, and technology; nature-positive financing and business models; nature-positive supply chains; nature-positive pathways for development. The term was also used in some places to label specific production systems, such as nature-positive livestock and nature-positive insect farming.⁹³ The refinement of the definition throughout the Summit’s process is noticeable – from a concept linked mainly to environmental sustainability goals to a concept also encompassing food provision and healthy nutrition goals (Figure 4).

‘Nature-positive’ is also combined with other identifiers, such as ‘regenerative’, ‘low-carbon’, ‘net-zero’, ‘climate-adapted’, and ‘climate-resilient’. For example: ‘To match the need for an increase in food production with the Paris Agreement, it is critical to support the transition to nature-positive, low-carbon, and climate-resilient global food systems’.⁹⁴ In a few instances, the term is used interchangeably with ‘nature-friendly’⁹⁵ as well as ‘nature-based’. ‘Nature-based’ appears to have gathered some small amount of steam towards the later stages of the UNFSS process, although still at a far lower rate than ‘nature-positive’.

The UNFSS website links to an article published by the WEF, which offers this simple definition: ‘Nature positive means enhancing the resilience of our planet and societies to halt and reverse nature loss’.⁹⁶ The article also refers to the G7 2030 *Compact on Nature*, which was a meeting leading up to the CBD and COP26, and suggests that this was the first use of ‘nature-positive’ on a geopolitical level. In it, the G7 leaders stated:

Global system-wide change is required: our world must become not only net zero, but also nature positive, for the benefit of both people and the planet, with a focus on promoting sustainable and inclusive development. Nature, and the biodiversity that underpins it, ultimately sustains our economies, livelihoods and well-being – our decisions must take into account the true value of the goods and services we derive from it. The lives and livelihoods of today’s youth and future generations rely on this.⁹⁷

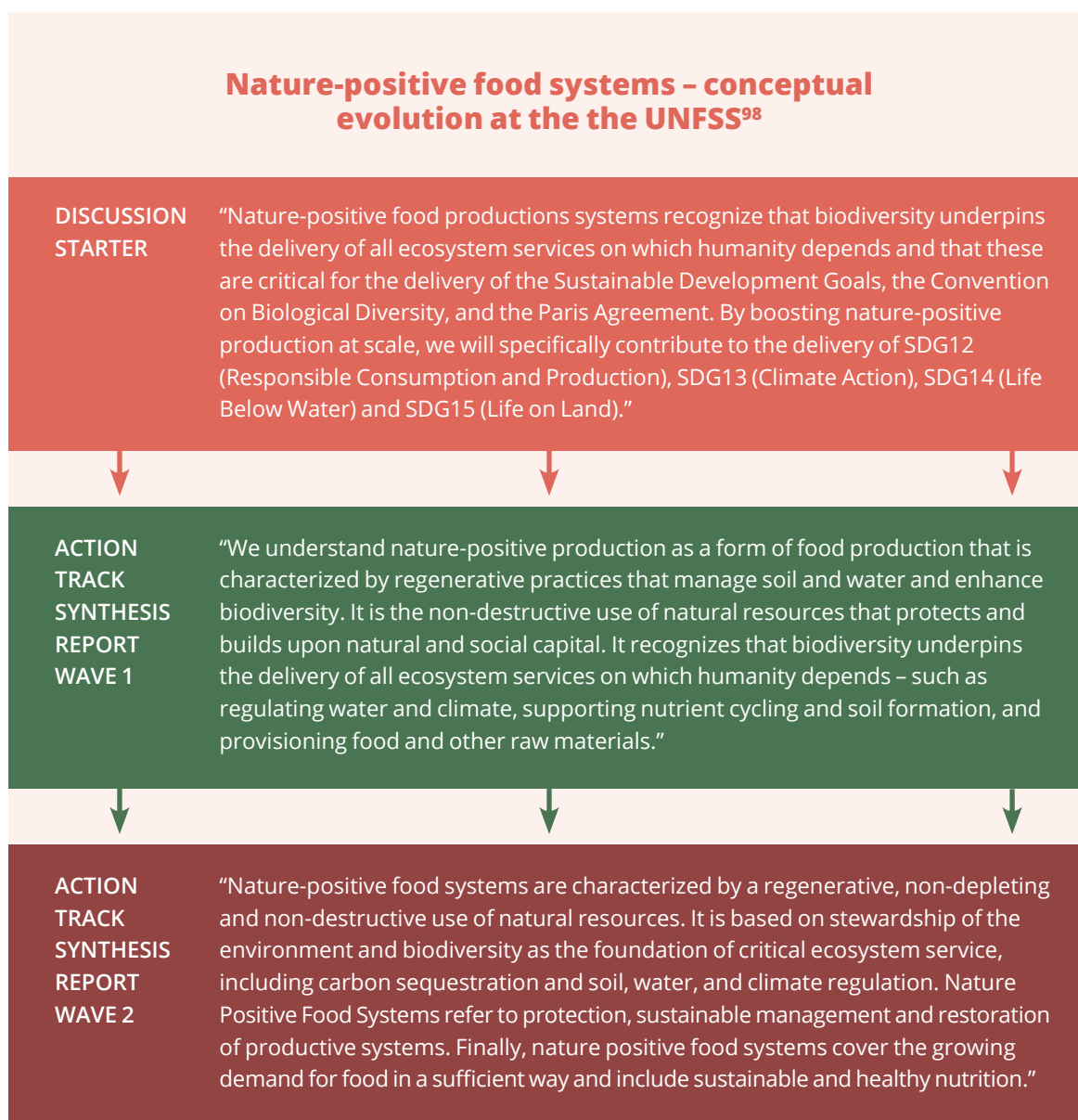


FIGURE 4

The article posits that this marks a shift in thinking from simple damage reduction (limiting negative impacts) to enhancing ecosystems (promoting positive impacts).

A nature positive approach enriches biodiversity, stores carbon, purifies water and reduces pandemic risk. In short, a nature positive approach enhances the resilience of our planet and our societies.⁹⁹

Agroecology. Although used less than nature-positive, agroecology and agroecological approaches were also discussed through all stages of the Summit. The term was often used as a descriptor and lacked a clear definition by the Summit. In one of the preparatory documents, however, the following definition is provided:

Agroecology... describes not just a scientific discipline that focuses on the ecology of agricultural environments, but serves as an important driver for strengthening social cohesion, reducing inequalities, and empowering local communities.¹⁰⁰

A long list of proposals under Action Track 3: Boost Nature-Positive Production is included in the final report.¹⁰¹ The report includes many and sometimes varying descriptions of agroecology as a means to creating sustainable food systems. Compassion in World Farming asked the world to eat more plants while CIFOR and the Global Alliance for the Future of Food asked for more investment in agroecology. Differing uses of the term agroecology appeared across the proposals that mentioned it. Many seemed to be focused on bringing businesses into agroecology, yet, while some contributors were producers' associations, agroecological approaches were mentioned mostly by research institutions, member states, and NGOs. One research institute, IMAGINE, stressed the importance of defining agroecology. FAO West Africa offered one of the clearest reasonings for including agroecology in the UNFSS:

Agroecology's holistic approach – incorporating the traditional knowledge and skills of the world's farming communities with cutting edge ecological, agronomic, economic, and sociological research, has the potential to support strong and sustainable agri-food systems that provide health and livelihood to both rural and urban communities; as well as environmental benefits.¹⁰²

Overall, agroecology is most often used to describe and support 'nature-positive' terminology. Even when placed in its own category, it was often coupled with regenerative agriculture or nature-positive. The term was also linked to discussions on indigenous knowledges and food systems, which was a common and pronounced theme of the Summit on its own.¹⁰³ This lumping of disparate terms may reflect a lack of depth in engagement with distinct concepts, or it could be a deliberate effort to subsume agroecology under a framing of sustainability where political dimensions (concerning distribution, justice, and voice) are intentionally overlooked.

Notwithstanding this, in parallel to the dialogues, and building on proposals made in Action Track 3, several countries expressed dissatisfaction that insufficient attention had been given to agroecology within the UNFSS process. Ten countries signed a letter to the UN Deputy Secretary General and the Special Envoy, demanding that a session on agroecology be added to the agenda of the pre-summit in Rome. This advocacy led to the creation of the Agroecology Coalition, a coalition on food system transformation based on the 13 principles of agroecology, thereby giving a precise meaning to the term agroecology in the context of the coalition.

Regenerative agriculture. Compared to the other two terms, regenerative agriculture was used the least often, and typically alongside agroecology. Like agroecology, regenerative agriculture often appeared in UNFSS material as a descriptor or, in some cases, as a component of the definition of nature-positive solutions. This term also sometimes seemed to be used interchangeably with 'sustainable agriculture'.

One of the spaces that used 'regenerative' and 'regenerative agriculture' most frequently was in the Levers of Change-Food Finance Architecture Executive Summary. It refers to regenerative/resilient/circular business models, assets, and value chains throughout.

This will shift finance away from capital-intensive, environmentally damaging, high-input assets in linear value chains and towards knowledge-based, regenerative and circular business models that are driven by value rather than volume and are more resilient, human-scale, diversified and in balance with nature.¹⁰⁴

5.2

UN CLIMATE CHANGE CONFERENCE 2021 (COP26)

The United Nations Climate Change Conferences are yearly conferences held by the United Nations Framework Convention on Climate Change (UNFCCC). They are the formal meeting of the UNFCCC Parties (Conference of the Parties, COP) to assess progress in dealing with climate change. The 26th conference took place in Glasgow, Scotland in November 2021 and is known as COP26. This study reviewed documentation and statements related to Mitigation, Adaptation, Finance, and Collaboration goals. Four initiatives connected to the Mitigation Goal were analyzed for their direct connection to the agricultural sphere. These are: (i) the Global Action Agenda for Innovation in Agriculture (also known as the #ClimateShot); (ii) the Forest, Agriculture & Commodity Trade (FACT) Dialogue; (iii) the Policy Action Agenda for a Just Transition to Sustainable Food and Agriculture; and (iv) the Independent Review on the Economics of Biodiversity, led by Professor Sir Partha Dasgupta.¹⁰⁵ In addition, the study also considered contributions to the debate put forward by the Koronivia Joint Work on Agriculture, an initiative created under the UNFCCC to recognize the importance of agriculture in climate change.

Actors involved

Hosted by the UK government, COP26 brought together a wide range of actors. The relevant initiatives reviewed by the study have mobilized government, international development, and corporate actors. For example, #ClimateShot was co-led by the UK's Foreign, Commonwealth, and Development Office (FCDO) and CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS). It was first launched at the Climate Adaptation Summit in January 2021 and then solidified at COP26 as 'an agricultural innovation race to save our planet'.¹⁰⁶ Other actors involved include corporate and development organizations such as the World Bank, The World Wide Fund for Nature (WWF), the World Food Programme, the UN Foundation, Rainforest Alliance, the World Economic Forum, the Asian Development Bank, the European Bank for Reconstruction and Development, CDC Group, Rabobank, the Environmental Defense Fund, GAIN, Bayer, and the Shell Foundation.

The FACT Dialogue is supported by the Tropical Forest Alliance (TFA), which the World Economic Forum hosts. Its aim is 'to accelerate the transition towards more sustainable land-use practices in a way that opens up new opportunities for investment, for jobs and livelihoods in forests, land use, and agriculture, and to ensure that the economies which have a sustainable relationship with forests are the ones that thrive and grow'.¹⁰⁷ FACT includes a 'multistakeholder taskforce' of actors, consisting of: producer companies, consumer companies, growers, finance institutions, local farmers, foresters, forest communities, and Indigenous Peoples, civil society organizations, academics, grassroots practitioners, global and local consumer brands, regional suppliers, and processors.¹⁰⁸

Uses of agroecology, nature-based solutions, and regenerative agriculture

Overall, the three terms were not used much at COP26. The Conference favoured more general terms, like 'nature', 'sustainable' and 'climate'. 'Nature-based' and 'nature-positive' did occur, used in apparently interchangeable ways and without clear definitions. Unlike at the UNFSS, there did not appear to be a clear preference for one of these terms over the other. However, the UK hosts of COP26 used 'nature-based' more often. For example, both terms appeared in a UK government summary document titled *COP26 Explained*, which referred to 'resilient and nature positive agriculture'.¹⁰⁹ The UK government pledged to spend 'at least £3bn of our international climate finance in the next 5 years on nature and nature based solutions' (equivalent to \$3.5 billion).¹¹⁰

Regenerative agriculture and agroecology appeared less often and not at all in the main declarations. Only when digging through discourses and inputs linked to agriculture topics at COP26 did we find limited uses of these terms. When discussing agriculture, which occurred during the two days dedicated to 'Nature and Land Use', the Conference favoured the term 'sustainable agriculture'. All these terms appeared most frequently under the agendas and outcomes related to the Mitigation Goal, as discussed in further detail below. Agroecology, however, did feature specifically as part of the Koronivia process.

Nature-based solutions. Nature-based, nature-positive, and related descriptors appeared across various COP26-related initiatives, but more prominently in relation to the Dasgupta Review on the Economics of Biodiversity and the FACT Dialogue.

The Dasgupta review provides various references to 'nature', 'nature capital', and related terms. A section discusses recommendations and support for 'nature-based solutions' specifically.¹¹¹ It also provides a definition: 'Action to protect, sustainably manage and restore natural or modified ecosystems while simultaneously providing benefits for human well-being and biodiversity, have been referred to as 'Nature-based Solutions'.¹¹² Agricultural nature-based solutions are discussed briefly: 'Restoration of agricultural systems to enable them to support biodiversity and multiple ecosystem services is an essential part of the global portfolio of natural assets and part of the conservation spectrum'.¹¹³ Only once was the term 'nature positive' used instead of 'nature based', which could support the theory that the UK (as host of COP26 and commissioner of the Dasgupta review) prefers the latter term.

'Nature positive production practices' and 'nature positive agricultural practices' are mentioned under the FACT theme of 'Research, Development and Innovation' in an 'Open Letter to COP26 Dialogue Ministers'.¹¹⁴ Also, the FACT taskforce has a 'Lead of nature-based solutions and food systems'. Also of note is TFA's use of the term and hashtag #ForestPositive and its suggestion for 'nature and carbon positive' support from businesses.¹¹⁵

In a searchable database of inputs from private and public stakeholders called the FACT Collaboration Panel, only three results for 'nature based' exist (two of them from WWF) and none for the other terms.¹¹⁶ Lastly, in the FACT Outputs,¹¹⁷ 'nature-based' is mentioned four times in the Latin America specific report,¹¹⁸ including: 'nature-based recovery package', 'nature-based solutions for priority biomes', 'increase action for nature based solutions', and 'economic action to support modern agriculture and proving that there are feasible nature-based solutions'.

Although 'nature' is used throughout #ClimateShot, 'nature-based/positive' is not used in the specific context of agriculture. Overall, there is more use of the terms 'climate-smart' 'climate resilience' 'biodiversity' 'conservation' and 'sustainable'. The notable exception is the 'priority initiative' of 'The 100 Million Farmers multi-stakeholder platform' where nature-positive is mentioned:

The 100 Million Farmers multi-stakeholder platform puts forward an actionable and transformative contribution to the Global Action Agenda for Innovation in Agriculture by catalyzing action through its regional 'lighthouse' projects to accelerate the transition towards net-zero, nature-positive food systems by 2030.¹¹⁹

Regenerative agriculture and agroecology are not prominent in #ClimateShot, with only a few brief mentions or references to these concepts. 'Regenerative' is used once in the description: 'The 100 Million Farmers multi-stakeholder platform, with its core objective to empower 100 million farmers to adopt regenerative and climate-smart practices by 2030, is closely aligned with the ambitions of the Global Action Agenda for Innovation in Agriculture'.¹²⁰ 'Agroecology' is not mentioned in '100 Million Farmers', but a CGIAR report of a 'rapid evidence-based review to assess the quality and strength of evidence for the impact of agroecological approaches on climate change mitigation and adaptation in low- and middle-income countries'¹²¹ appears to have been created to support the project.

Agroecology is mentioned once in relation to the FACT Dialogue, but there is no use of regenerative agriculture or related terms. None of the terms appear in the Output reports for Africa or Asia. In the most prominent of the documentation regarding FACT,¹²² there is no use of any of the terms. As a spinoff of COP26, however, the World Business Council for Sustainable Development (WBCSD), a global business platform bringing together over 200 international companies, announced Regen10 as 'an ambitious

collective action plan to scale regenerative food production systems, worldwide, in a decade... By 2030, it is hoped that over 50% of the world's food can be produced in a way that drives positive outcomes for people, for nature, and for climate'.¹²³

In contrast to the above, agroecology features strongly in a report produced by the Koronivia Joint Work on Agriculture, based on a workshop series that preceded COP26. This series focused on 'strategies and modalities to scale up implementation of best practices, innovations, and technologies that increase resilience and sustainable production in agricultural systems' and brought together representatives of intergovernmental organizations (such as FAO, IFAD, and UNEP), parties to the Convention, the private sector, civil society, research organizations, and representatives of farmers. A keynote address by the Special Rapporteur on the right to food describes agroecology in the following terms:

a holistic approach that makes access to knowledge and resources a central issue to be solved, as well as power dynamics and accountability of people, businesses, and governments, while also increasing biodiversity and restoring carbon, nitrogen and phosphorus cycles.¹²⁴

The report also notes how several participants agreed that agroecology is the best approach to a new food production system because it aims to achieve 'adaptation, resilience and mitigation objectives while also contributing to biodiversity conservation, food security, nutrition, and social objectives in an integrated manner'.¹²⁵

5.3 CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

The fifteenth Conference of Parties to the Convention on Biological Diversity (CBD) is a two-stage event unfolding between 2021 and 2022. Part One was held virtually in October 2021 (postponed from 2020 due to the Covid-19 pandemic) and Part Two will take place in person in December 2022 in Montreal, Canada. The Conference aims to 'convene governments from around the world to agree to a new set of goals for nature over the next decade'.¹²⁶ The Post-2020 Global Biodiversity Framework is expected to be the significant result of the 2022 Conference, laying out plans until 2030 as a means to achieve the vision of 'Living in harmony with Nature' by 2050.¹²⁷ The ongoing process of developing the framework—notably the meetings of the Open-ended Working Group—features detailed discussions by participating stakeholders on targets and terms related to biodiversity.

Actors involved

Although the CBD itself gives prominence to the roles of Indigenous Peoples, local communities, and traditional knowledge, the Convention is an agreement among states, so the proceedings of CBD summits centre on state negotiations. Non-state actors, acting as 'observers', may contribute proposals that can then be supported by states. The Conference includes state representatives from over 150 countries.^{x1} UN bodies and agencies relevant to agriculture include FAO and the International Fund for Agricultural Development (IFAD). Other participants comprise a diverse range of international and regional organizations, including: the African Union Development Agency-NEPAD, Friends of the Earth Europe, Greenpeace, the Global Industry Coalition, the Inter-American Institute for Cooperation on Agriculture, the International Seed Federation, the International Fertilizer Association, the International Fund for Animal Welfare, the International Indigenous Forum on Biodiversity, the International Planning Committee for Food Sovereignty, The Nature Conservancy, the World Economic Forum, and WWF. Universities from different countries are also involved, including the Chinese Academy of Sciences, Cornell University, and the London School of Economics, among others.

^{x1} Note that the USA is not a party to the CBD, but is recognized to seek to influence CBD meetings via its allies.

While the CBD website highlights a joint commitment by 50 companies^{XII} to its 'Action Agenda',¹²⁸ a large corporate presence as seen at the other conferences is lacking. These influences may be less visible—for example, in corporate ties to state representatives at the Conference—and this is perhaps a topic for further research. Instead, most proposals from non-state actors during relevant negotiations came from environmental and similar NGOs. Relating to food and agriculture and this study's selected concepts, the most relevant and frequent non-state contributors were WWF, Conservation International, Center for Biological Diversity, BirdLife International, Friends of the Earth International, International Indigenous Forum on Biodiversity, and Global Youth Biodiversity Network.

Some states have made notable pushes for greater protection of nature during negotiations at the Conference, including Bolivia, Costa Rica, Canada, New Zealand, the EU, and the UK, among others. On the other end, countries like Brazil and Argentina have expressed concerns over measures that would affect agricultural and economic growth.^{129 XIII}

Uses of agroecology, nature-based solutions, and regenerative agriculture

Most notable discussions at the CBD relevant to the present study revolve around the post-2020 Global Biodiversity Framework. During a meeting of the Open-ended Working Group (Aug 23-Sept 3, 2021), state and other representatives participated in debates on the framework's 13 thematic targets. Documentation from these meetings reflects diverse opinions on how to collectively define the biodiversity framework. Both nature-based solutions and agroecology were proposed as additions to the targets' formulation, although the inclusion of the former term was controversial. Draft text for Target 10 includes a proposal to include explicit reference to 'applying agro-ecological principles and relevant biodiversity-friendly practices'. Regenerative agriculture was not mentioned in this space.

Nature-based and nature-positive solutions were not prominent in the Conference's Part 1 high-level statement, known as the Kunming Declaration. This summary of the first part of the Conference only included a footnote, which stated that 'ecosystem-based approaches may also be referred to as nature based solutions'.¹³⁰ Much more detailed and explicit debate regarding nature-based solutions can be found in the proceedings of the Open-ended Working Group meetings, where references to nature-based solutions have not been linked exclusively to agriculture, but have occurred generally in relation to climate change policy responses. It appears that the term was considered controversial and its inclusion in the Conference deliberations was disputed:

Some parties expressed the term nature-based solutions should be re-instated...while other Parties expressed opposition to the use of some terms, including nature-based solutions which they said was outside the scope of the Convention.¹³¹

A comment by the Namibian delegation in another report further reflects the controversy:

If the term [nature-based solutions] [sic] is reintroduced into the text please...add, in brackets, [carbon colonialism] as an alternative understanding of this contentious concept, which has not been agreed in the CBD.¹³²

The most widely used and contested inclusion of the term was found in negotiations for Target 8 related to mitigation and adaptation approaches. Several participants recommend changes to the original text,¹³³ which only includes 'ecosystem-based approaches'. Australia, for example, suggests replacing this term with 'nature-based solutions', while others wish to include both and/or expand the terms i.e.: 'equitable and rights-based nature-based solutions and ecosystem-based approaches' (WWF), 'nature-based solutions with ecosystem-based and human rights approaches' (China),^{XIV} and 'nature-based solutions with social/ sociocultural and environmental safeguards and ecosystem-based approaches' (the EU). The inclusion of nature-based solutions was also supported by the delegations of Chile, Mexico, New Zealand, Norway, the UK, and Switzerland.

XII These 50 companies comprise mostly brands from the fashion and beauty industry, including Guerlain Paris, Christian Dior Parfums, Yves Rocher, and Natura.

XIII The USA contributed in some places as a 'non-party' having not signed the original 1992 treaty.

XIV China identified this suggestion as pending further discussion.

Agroecology received no mention in the Kunming Declaration and featured almost exclusively in the meeting on Targets 1-10, most notably under Target 10, which related to the sustainable management of agriculture, aquaculture, and forestry.¹³⁴ Suggestions that the term agroecology be added to the framing of the target came from various country delegations and international organizations. For example:

- Bolivia: ‘agroecological approaches, ecosystem approaches, and indigenous food systems that conserve, restore and sustainably use of *[sic]* biodiversity’ (p. 10).
- EU: ‘ensuring that [X] per cent of agricultural land is managed under agro-ecology or other biodiversity-friendly practices’ (p. 10).
- Switzerland: ‘such as agro-ecological and other innovative approaches’ (p. 11).
- Friends of the Earth International: ‘agroecological approaches and indigenous food systems that generate positive interactions with biodiversity, while phasing out all unsustainable production forms, such as systems based on monoculture production and on agrochemical and excessive natural fertilizer inputs’ (p. 12).
- Global Youth Biodiversity Network (GYBN): ‘promotion of sustainable traditional management systems and agroecological practices’ (p. 12).

Bolivia also proposed to include the term under Target 12 (on access to green and blue spaces), by adding ‘... including agroecological urban agriculture for both human and nature health, food security, secure livelihoods, reunite peoples with Mother Earth, and well-being/living well in urban areas and other densely populated areas’ (p. 15). Namibia offered the sole use of agroecology in other meetings by suggesting its inclusion in Target 7 (on pollution that is harmful to biodiversity and ecosystem functions and human health), suggesting that pollution be reduced by ‘eliminating the use of biocides by using agro-ecological approaches’.¹³⁵

Beyond the Working Group, recommendations for food and agriculture’s inclusion in the CBD can be found in the Framework for Action on Biodiversity for Food and Agriculture. Created by FAO to inform the larger post-2020 framework, these lists several agricultural practices that contribute to ‘biodiversity for food and agriculture’. Agroecology was included alongside ‘sustainable agriculture’, ‘conservation agriculture’, ‘pollinator-friendly practices’, ‘permaculture’, ‘organic agriculture’, ‘agroforestry’, ‘restoration practices’, and ‘ecosystem approaches’.

Other agriculture-related events surrounding the CBD made little to no use of the three terms. For example, FAO co-hosted a two-day Global Dialogue on the Role of Food and Agriculture to discuss the post-2020 framework in July 2021. From the summary,¹³⁶ ‘sustainable agriculture’ is the preferred expression. In another side-event co-organized by the Alliance of Biodiversity International and CIAT, there is very limited use of the terms. From the short summaries available¹³⁷ only ‘nature positive solutions’ is mentioned, with no use of agroecology or regenerative agriculture. This seems at odds with its theme of ‘Sowing Diversity, Harvesting Security’, and its promoted inclusion of ethnically diverse farmers, a seed exchange and discussion of seed conservation, and emphasis on the importance of ‘community-based’ and ‘traditional’ knowledges.

Overall, the terms ‘biodiversity’, ‘ecosystem[-based] services’, and ‘sustainable agriculture’ were used when discussing food and agriculture in the most visible spaces at the CBD. Nature-based solutions, although discussed throughout negotiations on the post-2020 framework, did not make it into high-level documentation or Conference statements. However, the exclusion of these terms from these spaces does not reflect the dialogues and divisions that arose at the CBD on the topic of nature-based solutions and, to a lesser degree, agroecology (regenerative agriculture was not found at all). It will be important to monitor whether and how these discussions and concepts feature in the adaptation of the post-2020 framework in Part Two of the Conference in 2022.

5.4

SUMMARY OF FINDINGS

The following patterns emerge regarding the use of the three concepts across the selected global policy spaces:

- **Nature-based solutions** related to food systems appeared in all spaces but are more prominent at the UNFSS, where the term ‘nature positive’ was preferred. Although the use of the concept was less pronounced at Part One of CBD and was mentioned only in a footnote in the Conference’s high-level statement (the Kunming Declaration), it is significant that it featured considerably in discussions about the formulation of biodiversity targets where it appeared as controversial. Although less visible at COP26 (much like the other two concepts), nature-based solutions seemed uncontentious in this space and the term was specifically referenced in the Dasgupta Review on the Economics of Biodiversity and the FACT Dialogue hosted by the World Economic Forum.
- **Agroecology** appeared as most relevant in preparatory rounds of the CBD when compared to COP26 and the UNFSS, with several parties proposing its incorporation in the formulation of biodiversity targets; in this space, agroecology was linked to agrobiodiversity and indigenous food systems and seen as an alternative to monoculture production systems that are excessively reliant on agrochemicals. Both at the UNFSS and COP26, agroecology did not seem to be a distinctive or clearly defined concept but tended to be used as a general descriptor alongside other terminology. There were, however, instances throughout the UNFSS where agroecology was used with more depth and articulated not only as a pathway to environmental sustainability but also to social cohesion, reduction of inequalities, and empowerment of local communities and their knowledge systems; these perspectives were not reflected in high profile statements and outcome documents. It is worth noting here that civil society organizations and social movements aligned with the ‘food sovereignty’ agenda criticized the UNFSS as a space that co-opted agroecology and other ‘transformation narratives’ used by their movements.¹³⁸
- **Regenerative agriculture** is the least prominent concept in the selected policy spaces. It had no mention in the CBD and in the UNFSS and COP26 was often used alongside other terminology (including agroecology) without any specific definition.

6 FUNDING STREAMS

This study mapped the landscape of current funding streams to support agroecology, nature-based solutions, and regenerative agriculture. Although a comprehensive survey of funding sources and volume of resources was beyond the scope of the study, we identified four (private and public) funding channels and, for each of these, leading actors financing research, investment, and development interventions within food systems. The four selected channels are: (1) private funds and investments by large corporate actors (including companies involved in different aspects of agrifood production and retailing); (2) philanthropic aid by international foundations; (3) development assistance by multilateral and bilateral publicly funded donors; and (4) international, regional, and national research funds. Table 3 lists the selection of actors that provided the basis for the analysis.

Funding channels and selected actors

| CHANNEL | SELECTED ACTORS |
|--------------------------------|---|
| Corporate investments | Nestlé |
| | Unilever |
| | Syngenta |
| | General Mills |
| | Walmart |
| Philanthropic aid | Rockefeller Foundation |
| | Bill and Melinda Gates Foundation |
| | McKnight Foundation |
| Development assistance | World Bank |
| | European Commission – Directorate-General for International Partnerships (DG INTPA) |
| | Federal Ministry for Economic Cooperation and Development (BMZ) and German Development Agency (GIZ) |
| | Japan International Cooperation Agency (JICA) |
| | United States Agency for International Development (USAID) |
| Public research and innovation | EC Horizon Europe |
| | UK Research Councils |
| | International Development Research Centre (IDRC) |

TABLE 3

We explored whether and how these actors are engaging with the three concepts, considering different modalities of engagement, such as: advancing the narrative related to the concepts, funding scientific research and technology, financing training and other development interventions related to the concepts, and supporting businesses (e.g., sourcing food from farmers using regenerative practices) that are aligned with the concepts. Our main findings are discussed in this section and elaborated in the Annex to this report, where more detailed notes and sources are discussed at greater length.

A caveat to this work is that the development assistance actors and research funds reviewed are quite large and complex, each having multiple programmes and thematic foci. The mapping exercise only focused on high-level strategies and narratives. Information was gathered via the organizations' webpages as well as annual reports and strategic plans (where these were available), and, for development assistance actors and private foundations, lists of grantees, country programmes and projects. The findings reported here should therefore be taken as exploratory and indicative of lines for further inquiry.

6.1 CORPORATIONS

The selected agrifood corporations are strongly pushing forward the narrative on regenerative agriculture and food systems. Nestlé, for example, announced plans to implement regenerative agriculture 'at scale' following the UNFSS.¹³⁹ And Walmart's CEO announced: 'We want to play an important role in transforming the world's supply chains to be regenerative'.¹⁴⁰

Some corporations offer quite precise definitions of what they understand as regenerative agriculture. Nestlé defines it as 'an approach to farming that aims to conserve and restore farmland and its ecosystem. It delivers benefits to farmers, environment, and society'.¹⁴¹ Unilever states that 'the overarching goal of regenerative agriculture is to go further than the 'do no harm' principle and actively improve the local environment through holistic management measures to improve and restore soil health, water quality and biodiversity'.¹⁴²

Corporate initiatives related to regenerative agriculture are tightly connected to environmental sustainability concerns, particularly on farms they source from, such as deforestation, carbon emissions, soil degradation, and biodiversity loss. For example, Walmart pledges to have many deforestation-free products in its supply chain by 2040 (e.g. palm oil, beef, and soy). Syngenta aims to reduce operational carbon intensity by 50% by 2030. General Mills aims to practice regenerative agriculture on 1 million acres of farmland by 2030. Of the five corporations analyzed, Syngenta has possibly the most questionable stance on sustainability, as innovation efforts seem to be primarily concerned with achieving the 'lowest residues [from agro-chemicals] in crops and the environment'.¹⁴³ Social dimensions of sustainability are not usually talked about in connection to regenerative agriculture, though Nestlé, for example, has separate initiatives related to child labour and gender and youth empowerment.

Corporations are starting to make substantial investments in this area, with individual pledges in the region of \$ 1-2 billion. Funded activities include research and development, monitoring of forests and oceans, training of farmers, payment of premium prices for crops grown sustainably, etc. They are forming partnerships with large environmental organizations, research institutes, and other actors. For example, Walmart's transition to regenerative agriculture falls under its land management goals and includes partnerships with The Nature Conservancy, WWF, and Conservation International on projects such as sustainable seafood monitoring and integrated cattle ranching.¹⁴⁴ Syngenta is also partnering with The Nature Conservancy to restore soil health in the Brazilian Cerrado, working with farmers to capture carbon in their soils. Unilever joined USAID, FAO, and Google in creating the Forest Data Partnership to create a deforestation mapping system.¹⁴⁵ General Mills entered partnerships with the National Fish and Wildlife Foundation¹⁴⁶ and The Nature Conservancy¹⁴⁷ and has a pilot project with a French dairy cooperative.¹⁴⁸

It is also worth mentioning Regen10 (cf. section 5.2), the initiative launched at the time of COP26 by WBCSD, a global business platform of over 200 international companies. This is set to work with 500 million farmers with \$60 billion per year pledged to finance the transition to regenerative food systems.

6.2 PHILANTHROPY

The three philanthropic organizations reviewed present a more varied picture in relation to their use of the concepts. The Rockefeller Foundation refers to regenerative agriculture most explicitly, although a clear definition of what it means by regenerative is not readily available. In a statement leading up to the UNFSS, the Managing Director said: 'We need an inclusive approach that transforms the global food system to be nourishing and regenerative'.¹⁴⁹ Its Food Systems Vision Prize is a significant platform to advance the narrative on regenerative agriculture – it invites organizations across the world to 'develop a vision of the regenerative and nourishing food system that they aspire to create by the year 2050'.^{xv} Furthermore, Rockefeller's brand-new Good Food Strategy initiative is set to invest US\$105 million to 'increase access to healthy and sustainable foods for 40 million underserved people around the globe'.¹⁵⁰ This is its largest ever investment in food and nutrition, and the launch mentions funding to support data collection on the impacts of regenerative systems among its upcoming projects, making it an interesting case to track and explore further in terms of its framing, drivers, and impact.^{xvi}

The McKnight Foundation focuses on agroecology. Its Collaborative Crop Research Program (CCRP) aims to define, promote, research, and implement agroecological approaches with farmers in Africa and South America.¹⁵¹ Its approach to 'agroecological intensification'^{xvii} takes a 'holistic, ecosystem approach to agriculture, supporting research and partnerships that lead to increased crop productivity, improved livelihoods, better nutrition, and increased equity' (ibid). The programme supports regional agroecology knowledge hubs in Africa to promote action-research activities related to agroecological intensification.¹⁵² For example, in Niger, projects involving researchers (local and international), NGOs and farmers include projects that focus on 'cereal and legume seed production, biological pest control, systems diversification and soil fertility enhancement via legume and crop-tree-livestock integration, use of locally available resources as fertilizer (including sanitized human urine and more recently, also solid human waste), and processing and marketing of nutritious products derived from the primary harvest'.¹⁵³ CCRP is another initiative worth investigating further for framing, drivers, and impact on the ground.^{xviii}

The Gates Foundation makes little direct reference to any of the concepts despite its funding related to agriculture and farming being tightly aligned with the climate and environmental conservation agendas. Agricultural research and funding at the Gates Foundation focus largely on 'improved seeds', intensification, and climate adaptation for small farmers.¹⁵⁴ At the 2019 UN Climate Action Summit, the Foundation announced \$310 million in funding for improved crop varieties for smallholders facing the impacts of climate change.¹⁵⁵ A grant worth \$286,740 was allocated in 2021 to the United Nations Environment Programme for a study on the synergies and trade-offs between agricultural transformation and conserving nature and biodiversity.¹⁵⁶ It is worth noting that initiatives funded by Gates, notably the Alliance for Science at Cornell,^{xix} have openly expressed skepticism about agroecology and its ability to address food insecurity.¹⁵⁷

VX Three winners of the prize explicitly mention regenerative agriculture. They include: a vision for a 'regenerative and nourishing food oasis' in the city of Lima, Peru, a regenerative agricultural system with the Lakota Indigenous People in the United States, and creating a 'regenerative and nourishing food system' in Lagos, Nigeria.

VXI It is worth noting that the term agroecological appears linked to the announcement of this initiative as a synonym of regenerative, but the later term is more recurrent.

VXII McKnight clarifies that 'intensification' does not equate to use of synthetic fertilizers and pesticides but means doing more through agroecology.

VXIII It is worth noting that Gates funded two rounds of CCRP but stopped funding it in 2013.

XIX The Alliance for Science is a global communications initiative based at the Boyce Thompson Institute, an independent non-profit research institute affiliated with Cornell University. The Bill & Melinda Gates Foundation is its main funder.

6.3

DEVELOPMENT ASSISTANCE

The World Bank's agriculture sustainability agenda centres on climate-smart agriculture, defined as 'an integrated approach to managing landscapes—cropland, livestock, forests, and fisheries—that addresses the interlinked challenges of food security and accelerating climate change.'¹⁵⁸ Climate-smart agriculture absorbs more than half of the Bank's funding to agriculture and serves as an umbrella term for 'precision farming' and regenerative or conservation agriculture.¹⁵⁹ The Bank has rolled out the concept to country programmes and produced climate-smart agriculture country profiles in partnership with various international organizations including USAID, and CGIAR centres such as the International Center for Tropical Agriculture (CIAT). Activities under climate-smart agriculture initiatives aim to reduce emissions (for example, from livestock farming), improve water-use efficiency, conserve soils and biodiversity and improve climate resilience. Nature-based solutions and agroecology are terms occasionally used in connection with an approach that is strongly focused on environment and climate change-related goals. For example, a programme on youth inclusion in rural areas in Morocco includes a pilot to promote agroecology to improve climate resilience. In this programme, farmers receive support to adopt climate-smart practices and agroecology is therefore equated to climate-smart agriculture.

The European Commission's (EC) Directorate-General for International Partnerships^{xx} primarily uses the term 'sustainable' to describe its agricultural programme, with funding focused on development projects impacting small-scale farmers. Regenerative and agroecology appear in connection to more confined country interventions. Regenerative agriculture features in upcoming programming in Bolivia, Peru, and Pakistan. The scaling up of agroecology is highlighted in a joint programme involving multiple European countries in Laos (2020-25). In this programme, agroecology is presented as an alternative to the 'principles of the green revolution' criticized for its negative environmental impacts and increased farmers' vulnerability. In West Africa, the EC supports the ECOWAS Agroecology Programme, together with the *Agence Française de Développement* (AFD). Environmental and social dimensions of alternative models (such as agroecology at scale) are emphasized:

These [alternative] models represent key options to intensify specialty agricultural production over the long term, provide a decent income for farmers, ensure food security, limit the conversion of forests to cropland, limit the use of external inputs (fertilizers, pesticides), mitigate Greenhouse Gasses (GHG) emissions from agriculture and contribute to increasing carbon storage in soils (agricultural, grassland, and forest). Furthermore, there is a need to develop more quality and climate-resilient rural infrastructures (such as rural roads, and water and sanitation systems) in order to improve living conditions of the rural population and the workforce and to facilitate market access and the development of agricultural value chains.¹⁶⁰

Although not specific to agriculture, nature-based solutions are mentioned under the Theme of Climate Change, Environment, Energy, in line with the EU Biodiversity Strategy for 2030.¹⁶¹

Similar to the EC, BMZ and GIZ also favour the notion of sustainable agriculture. GIZ defines it in some detail¹⁶² and includes organic and agroecological methods. Focus is placed on soil health, renewable inputs, nutritional quality, safe labour and fair wages, and other social-cultural considerations in agriculture. GIZ also states the need to innovate and promote sustainable farming techniques.¹⁶³ Examples of funded projects include improving water management practices in Bolivia, increasing agro-biodiversity in East Timor, and soil restoration in the Sahel region of Africa. BMZ directly calls for agroecological approaches and defines them to include social justice:

The long-term goal is a socially just and ecologically sustainable transformation of agricultural and food systems.¹⁶⁴

XX This is the EC entity responsible for formulating the EU's international partnership and development policy, with the goals of reducing poverty, ensuring sustainable development, and promoting democracy, human rights, and the rule of law across the world.

USAID in turn is aligned with the World Bank's emphasis on climate-smart agriculture. Its Feed the Future (FTF) initiative oversees the agency's food security and agriculture projects, with a stated objective to 'end global hunger, poverty, and malnutrition in a sustainable way'.¹⁶⁵ FTF promotes 'climate-smart and regenerative agriculture', 'sustainable intensification', business models that value and account for natural resources', 'nature-positive impacts', and 'sustainable productivity' in its updated strategic plan.¹⁶⁶ Its use of terminology seems more in line with US-based corporations, which is unsurprising given that USAID aims to promote US business and innovation alongside supporting farmers and food security in the countries where it operates.

JICA appears to have a more middle-of-the-road position when compared to the other bilateral donors. Like GLZ, it adopts the language of sustainable agriculture and promotes the reduction of agrochemical inputs, better water and soil management, and limiting deforestation from farming. And much like USAID, it emphasizes yields, production expansion, and private sector development. Examples of projects include: promoting and expanding 'clean' (organic) agriculture in Laos;¹⁶⁷ supporting 'market-oriented agriculture' with smallholder farmers in Zimbabwe, Ethiopia, and Malawi;¹⁶⁸ improving rice production and yields for domestic consumption in Liberia.¹⁶⁹ Other projects also focus on high-yielding rice production, some in partnership with AGRA as part of the Coalition for African Rice Development initiative.¹⁷⁰

6.4 PUBLIC RESEARCH AND INNOVATION

Horizon Europe is the main funding programme for research and innovation for the European Union, amounting to €95.5 billion (\$100 billion) for 2021-27.¹⁷¹ Its strategic plan highlights restoring biodiversity and ecosystems to achieve food security and a clean and healthy environment as the main research objective.¹⁷² It defines a food system-focused impact cluster 'Food, Bioeconomy, Natural Resources, Agriculture and Environment' (worth just over \$9 billion) that combines environmental concerns with social inclusion from farm to fork. When discussing food and agriculture, terms recurrently used in the strategic plan include sustainable, bio-based, biodiversity, circular, nature-based, climate-neutral, and climate-smart.

The cluster [Food, Bioeconomy, Natural Resources, Agriculture and Environment] will support a circular, zero-carbon industry as well as nature-based innovations to provide sustainable and climate-smart agriculture and forestry as well as a circular climate neutral, sustainable bio-based industry that provides bio-based materials and products with low ecological footprint, preventing and mitigating pollution, including plastic pollution.¹⁷³

Agroecology is mentioned (3 entries) but is less prominent in the strategy's narrative (and there is no reference to regenerative agriculture). The strategy refers, however, to Agroecology Living Labs that have since been launched as a European Partnership to accelerate the transition towards agroecology throughout Europe.

The Commission has proposed this partnership because agroecology can make a powerful contribution to addressing the climate, biodiversity, environmental, economic, and social challenges the world is facing. As such, it is mentioned as one of the sustainable practices to promote and scale-up in the European Green Deal and in the Farm to Fork and Biodiversity strategies, which highlight the potential of agroecology to reduce the use of pesticides, fertilizers, and antimicrobials.¹⁷⁴

The EU Standing Committee on Agricultural Research has established a new Strategic Working Group on Agroecology (SWG-AE), that will be responsible for developing the partnership proposal, which is expected to be implemented from 2023-24.

Like the EC, IDRC, a Canadian organization that funds research and innovation in developing countries in connection to Canada's development policy, also combines climate and social inclusion concerns in its food-related research priorities. It expresses a focus on 'climate-resilient food systems'¹⁷⁵ and addressing

hunger, malnutrition, food insecurity, disease, antimicrobial resistance, and social, cultural, and economic inequalities in developing countries. But for IDRC the terms regenerative and agroecology are favoured. Examples of relevant initiatives include a three-year study of the trade-offs of implementing agroecology in West Africa with total funding of CAD \$1.9 million (\$1.5 million);¹⁷⁶ research on regenerative and gender-inclusive agribusiness in Latin America for 30 months and CAD \$1.5 million (\$1.2 million);¹⁷⁷ CAD \$888k (\$685k) towards research and support over 30 months for women-led urban agroecological farming initiatives in Gaza.¹⁷⁸

Finally, the UK-based research councils include a wide range of thematic research funding streams. The 2021-22 UKRI budget totals £7.9 billion (\$9.6 billion), of which £19.6 million (\$23.9 million) have been allocated to environmental research and £47.5 million (\$58 million) to 'Transforming the UK Food System for Healthy People and a Healthy Environment'. A search of the UKRI website resulted in two funding opportunities with agroecological approaches, eight mentions of regenerative agriculture, and 53 instances of nature-based solutions. Examples of relevant funding include a £1 million fund for interdisciplinary research grants of £100-200k (\$122-244k) each to identify 'innovative solutions' for future agroecological practices;¹⁷⁹ a £2 million (\$2.4 million) fund for grants up to £625k (\$762k) for creating 'healthy, resilient and sustainable agricultural soils';¹⁸⁰ £2.5 million (\$3 million) for grants of £625k (\$762k) for improving and expanding resilient 'treespaces' in the UK;¹⁸¹ a £24 million (\$29 million) total investment in four projects aimed at tackling nutrition, food systems, and climate change, including one based on regenerative agriculture.¹⁸² A recent partnership with the UK Department for Environment, Food & Rural Affairs (DEFRA) establishes collaborative research and development competitions from DEFRA's Farming Innovation Programme, with funding of over £20 million (\$24 million).

The aim is to find projects that will drive improvements in productivity, profitability and sustainability across the sector. As well as mitigating emissions and helping the sector adapt to the effects of climate change.¹⁸³

6.5 SUMMARY OF FINDINGS

In sum, key findings from our mapping of funding channels and selected actors are that:

- Agrifood corporations are strongly pushing the narrative on regenerative agriculture. They are articulating ways to address outstanding environmental concerns (with deforestation, emissions, soil degradation, biodiversity loss, etc) in agrifood science, production, processing, and retailing. While the term regenerative is preferred to nature-based or nature-positive (amply used at the UNFSS), it conveys similar ideas about building climate-resilient food systems and addressing environmental imbalances so that food systems can operate more efficiently. Agrifood corporations are setting targets related to their environmental footprint and making heavy investments in research and development in this area, while partnering with international organizations such as WWF and The Nature Conservancy.
- The philanthropic organizations reviewed here form a mixed ensemble. While Rockefeller has engaged most explicitly with regenerative food systems, in line with the approach taken by agrifood corporations, McKnight has favoured agroecology and combined concerns with ecological balance and efficiency, with a focus on livelihoods and equity. Gates' position is more ambiguous. Its agricultural funding is aligned with the climate agenda, but it does not seem to explicitly engage with any of the three concepts. While it has previously funded McKnight, it is also the main funder for the Alliance for Science at Cornell University, which has voiced skepticism about agroecology.
- Compared to agrifood corporations and philanthropies, development donors seem to be lagging behind in the use of relatively newer terms such as nature-based, nature-positive, and regenerative. They use more established terminology such as sustainable agriculture, climate-smart agriculture, and agroecology.

- The selected donors form a diverse group when it comes to approaches to food system sustainability. Although adopting climate-smart agriculture as its preferred term, the World Bank's focus on climate resilience and environmental resource sustainability are in line with the approach taken by agrifood corporations and Rockefeller. By contrast, the EC combines environmental and social dimensions of sustainability. In one country programme (Laos), agroecology is regarded as an alternative to a model based on green revolution principles. A similar contrast is observed when comparing USAID and BMZ/GIZ, suggesting a dividing line between US-based and Europe-based actors, with the former embracing a narrative of sustainability centred on efficiency and resilience of natural systems, and the latter also highlighting imbalances related to human systems and social outcomes. JICA appears to have a position between these two poles. Like BMZ/GIZ, it adopts the language of sustainable agriculture and promotes the reduction of agrochemical inputs, better water and soil management, and limiting deforestation from farming. Like USAID, it emphasizes yields, production expansion, and private sector development.
- Food system-focused research funding streams by the EC's Horizon Europe and IDRC use framings of sustainability that connect environmental and equity goals and engage with ideas about transforming (not simply addressing inefficiencies in) food systems. The EC's Agroecology Living Labs and Strategic Working Group on Agroecology are spaces to watch in which these comprehensive framings are likely to be applied and fleshed out further still.
- In the UK, the initiative recently announced by UKRI and DEFRA on farming innovation suggests a closer alignment with US-based actors and their primary emphasis on system efficiency and resilience, rather than more encompassing system transformation.

7 DISCUSSION

The empirical analysis in the previous sections provides detailed evidence of how the three terms are used flexibly and, to some degree, interchangeably. Can we necessarily read significance into the fact that one policy space or funding organization has preferred one term over another? This section discusses commonalities between the concepts and contestations over meaning. To further explore contrasts between perspectives, it considers narratives of sustainability accompanying these terms and juxtaposes it with transformative approaches discussed in the academic literature.

7.1 COMMON GROUND AND DIFFERENCES BETWEEN TERMS

The scholarly, policy, and funding spheres reviewed in this paper encompass multiple interpretations of each of the three terms, including a degree of variation in scope and emphasis. The interpretation of a concept is not always clearly articulated. On several occasions, however, definitions are provided. Table 4 juxtaposes some of these.

There is a degree of common ground between these definitions. They all express concern for the sustainability of the natural environment and the need for approaches that restore and enhance the various elements of that environment (plants, soils, water, and atmosphere) in an integrated or holistic fashion that protects and promotes biodiversity. In some of these definitions, there is an explicit reference to low use of external farm inputs and understandings of agroecosystems as potentially self-sustaining, circular systems that may be balanced internally following principles that are ecological in a scientific and technical sense. This common ground can be traced back to the origins of the concepts (cf. section 3), all connected, more or less explicitly, to the environmental awakening in the mid-20th century that came to influence agricultural research and practice from the 1980s onwards, in the aftermath of the first Green Revolution.

A selection of definitions in academic, policy, and funding spheres

| | ACADEMIC | GLOBAL POLICY SPACES | FUNDING |
|--|---|--|--|
|  Agroecology | <p>'the integration of research, education, action, and change that brings sustainability to all parts of the food system: ecological, economic, and social. It's transdisciplinary in that it values all forms of knowledge and experience in food system change. It's participatory in that it requires the involvement of all stakeholders from the farm to the table and everyone in between. And it is action-oriented because it confronts the economic and political power structures of the current industrial food system with alternative social structures and policy action.'¹⁸⁴</p> | <p>'Agroecology's holistic approach – incorporating the traditional knowledge and skills of the world's farming communities with cutting-edge ecological, agronomic, economic, and sociological research, has the potential to support strong and sustainable food systems that provide health and livelihood to both rural and urban communities; as well as environmental benefits.'¹⁸⁵</p> | <p>'Agroecological intensification means improving the performance of agriculture through integration of ecological principles into farm and system management. Depending on the context, improved performance may mean any or all of the following: improved efficiency, increased productivity, enhanced use of local resources, better diets, improved livelihoods, and increased equity with associated increases in resilience and environmental service provision from farmed landscapes.'¹⁸⁶</p> |
|  Regenerative agriculture | <p>'Regenerative farming systems provide one approach that could improve both the production potential of the soil and the environment in which the farm operates. By reducing or eliminating the use of chemical pesticides and external sources of fertilizer, non-chemical methods could help increase the biological potential of the soil environment.'¹⁸⁷</p> | <p><i>Infrequently used and lacking a clear definition.</i></p> | <p>'the overarching goal of regenerative agriculture is to go further than the 'do no harm' principle and actively improve the local environment through holistic management measures to improve and restore soil health, water quality and biodiversity.'¹⁸⁸</p> |
|  Nature-based solutions | <p>'mimic natural processes and build on land restoration and operational water-land management concepts that aim to simultaneously improve vegetation and water availability and quality, and raise agricultural productivity...'¹⁸⁹</p> | <p>'Action to protect, sustainably manage and restore natural or modified ecosystems while simultaneously providing benefits for human well-being and biodiversity.'¹⁹⁰</p> | <p><i>Infrequently used and lacking a clear definition.</i></p> |

Nonetheless, there are important differences between the terms, which are noticeable even before associating them with specific actors and policy spaces (as one should, for they do not exist in isolation). One salient difference concerns human and social dimensions of food systems, which are evident in recent framings of agroecology but not mentioned explicitly in relation to the other two concepts. Agroecology focuses on human as well as natural systems (related to social, economic, and cultural dimensions). Its quest for environmental restoration and sustainability is intertwined with the pursuit of social and cultural wellbeing, expressed in terms of inclusion, equity, or justice. Definitions of agroecology vary greatly,¹⁹¹ but they tend to emphasize experiential knowledge linked to local contexts, as well as bottom-up, participatory processes for harnessing grassroots knowledge. In Gliessman's definition, agroecology is also overtly political, in that it confronts established power structures of an industrialized food system that is perceived as both unsustainable and inequitable.

By contrast, definitions for regenerative agriculture and nature-based solutions, as seen in COP26 and the UNFSS, tend to have a more confined scope in that they refer primarily to environmental and climate concerns. Human and social dimensions are treated as exogenous, typically appearing in the narrow guise of economic performance metrics. There is an emphasis on the technically and economically efficient exploitation of natural resources in ways that maximize benefits while preserving resources and minimizing environmental damage. The focus is on biophysical features such as soil fertility, crop yields, greenhouse gas emissions, water use efficiency and carbon sequestration and storage.

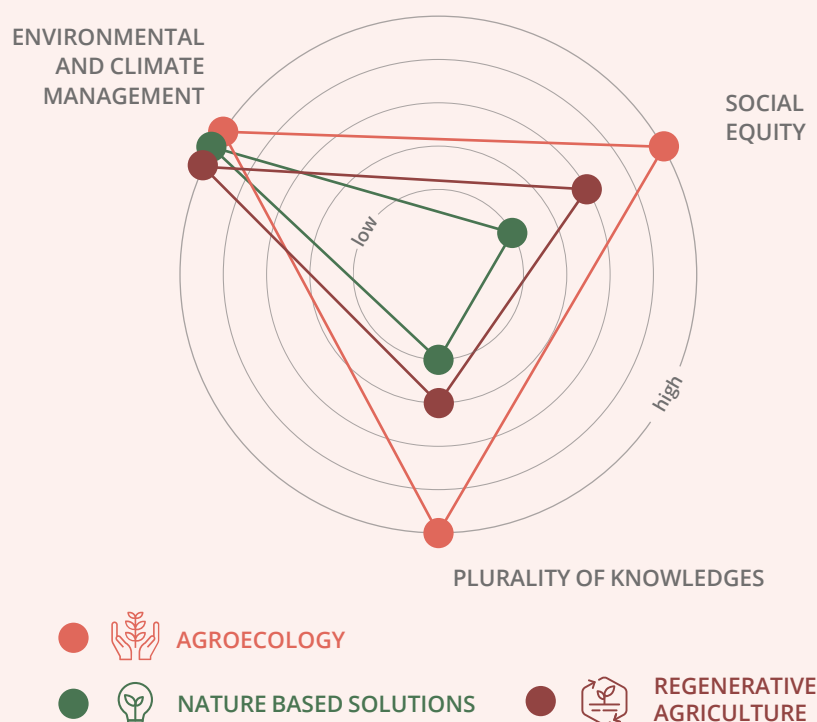
Another salient difference lies in the fact that, at the international level, a four-year consultation process led by the FAO resulted in defining agroecology by a set of necessary elements to achieve multiple objectives. As a result, in 2019 the FAO and its 197 member nations adopted the '10 elements of agroecology' thereby providing an internationally agreed definition and yardstick for agroecology.¹⁹² The High Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS) report No. 14¹⁹³ subsequently translated these 10 elements into 13 operational principles of agroecological transformation, intended to guide the necessary transformation to a sustainable, agroecological food system and achieve these multiple objectives (see Figure 2).

Although there is much variation in the use of concepts and considerable overlaps between them, there are elements that clearly separate agroecology, on one hand, from regenerative and nature-based solutions, on the other. It is the emphasis within the agroecology discourse of matters of social justice and equitable distribution of power and resources that stands out when compared with the neglect of these themes within the regenerative agriculture and nature-based solutions narratives. Another significant difference is that agroecology is the only one of the three terms that have attained an internationally sanctioned definition, legitimized through a consultative process led by the FAO and endorsed by the HLPE of the CFS.

Figure 5 summarizes the terms' relative positions vis-à-vis three key dimensions of transformative sustainability: environmental and climate management, social equity, and plurality of knowledges. The arrows indicate the possibility of movement up and down the axes, depending on how strong or weak the dimension associated with each axis is in the definitions and practices related to each term. For example, some interpretations of regenerative agriculture suggest attention to socio-economic issues, though these are not evident in the narratives used by agrifood corporations. American agricultural technology company Indigo Ag, for example, has adopted a notion of regenerative agriculture centred on carbon farming and markets—since 2019, it has monetized the sustainability agenda, generating carbon credits by measuring the carbon that farm fields have in their soil and selling these credits to companies that want to reduce their carbon footprint.

Agroecology, regenerative agriculture and nature-based solutions vis-à-vis three dimensions of transformative sustainability

FIGURE 5



7.2 ACTORS, INTERESTS, AND CONTESTATIONS IN GLOBAL POLICY SPACES

Dominant framings of these concepts in policy spaces are determined by the actors participating in those spaces and the agendas they seek to advance. Our analysis of global policy spaces suggests that large agrifood corporations, some international philanthropic organizations, and some aid agencies (notably those based in the US) are adopting the language of regenerative agriculture, nature-based, and nature-positive solutions. The use of these terms is strong in global policy spaces where these actors' have engaged the most, particularly the UNFSS. Other studies provide useful elements for an interpretation of some of the underlying motivations.¹⁹⁴

Critical analysis of UNFSS governance suggests a bias in this forum towards the interests of multinational corporations, philanthropies, and export-oriented countries.¹⁹⁵ Several authors have argued that the UN Secretariat in New York has been much more accommodating of corporate interests when compared to the Rome-based UN agencies.¹⁹⁶ The UNFSS received pushback and criticism for this approach throughout the pre-Summit process. The Liaison Group of the People's Autonomous Response to the UNFSS provides a detailed report on 'corporate capture' and the problem of 'multistakeholderism',¹⁹⁷ which treats large

and powerful corporations and rich foundations as non-governmental actors alongside civil society and grassroots organizations.¹⁹⁸ Agribusinesses and large philanthropic organizations with links to big corporations occupied leadership positions at the Summit.^{XXI} Agrifood corporations loomed large at the UNFSS,^{XXII} whereas indigenous and peasant groups were underrepresented:

In Action Track 3 – ‘Boost nature-positive production’ for example, there is only one indigenous group present in the mapping of game changing solutions, in contrast with 29 private sector corporations, 26 multistakeholder leadership teams, 9 NGOs, 6 Member countries, 7 research institutes, 6 UN agencies, 5 producers associations and a few other individuals and 2 academic institutions.¹⁹⁹

Canfield, Duncan, and Claeys²⁰⁰ also criticized the main report produced by the UNFSS’ Scientific Group²⁰¹ as narrowly focused on technological and policy innovations ‘rooted in science’ rather than larger, structural elements of food systems, like social and ecological considerations. They argued that: ‘The Scientific Group of the Summit may play a significant role in shaping food systems in ways that are amenable to the corporate-philanthropic network’.²⁰²

Contestations existed throughout the UNFSS itself between its (seemingly) simultaneous embrace of agroecological methods alongside the advancement of corporate interests and traditional agribusiness approaches.²⁰³ These contestations come to light in the final report on Member State Dialogues, which synthesized exchanges and contributions from member states over the course of the pre-Summit:

The shaping of pathways by inter-sectoral committees has proved to be a challenging process in some countries, despite having collected a good level of information during multistakeholder dialogues. In some cases, this is due to divergence between different ministries’ views, for example, with some supporting agroindustry and the big private sector and others supporting agroecology and the small producers.²⁰⁴

Similar contestations were noticeable in COP26, which was also criticized for failing to incorporate a more diverse set of approaches and players.

It’s outrageous that so little time at COP26 has been devoted to agroecological farmers. The programme is very weak. If they are promoting nature we must talk about farming. Agroecological farming can nurture biodiversity, sequester carbon and regenerate the planet by looking after our soil, creating habitat and planting trees. (Jyoti Fernandes, Landworkers’ Alliance)²⁰⁵

I think the exclusiveness at this COP is a great example of the way agricultural policy is created, with tokenized input from farmers, Indigenous People, (and) civil society more broadly... If ClimateShot were truly committed to making food systems sustainable and supporting farmers, it would aim to boost agroecology, Indigenous rights, and traditional knowledge. (Jessie MacInnis, vice-president of National Farmers Union, Canada)²⁰⁶

Friends of the Earth International has been particularly vocal at the preparatory stages of the CBD in calling for agroecological approaches and rejecting nature-based solutions. While it sees the former as aligned with the goals of protecting nature and biodiversity and the rights of Indigenous Peoples and local communities,²⁰⁷ it offers a strong critique to the latter, which it sees as:

a concept so broad and vague that it can refer to anything from peatland restoration to monoculture plantations; a bad idea dressed up in acceptable terminology and beautiful imagery; a wolf in sheep’s clothing.²⁰⁸

Overall, agroecology is less prominent than nature-based solutions and regenerative agriculture in the global policy spaces we studied and is hardly visible as a distinctive concept in high-profile statements and outcome documents. It received attention during the preparatory stages of UNFSS and the CBD, with contributions from country delegations (such as Bolivia, Namibia, and Switzerland) and international NGOs,

XXI Examples include Amina Mohammed, the Chair of the Summit Advisory Committee who also serves on the Board of the Global Development Program of the Bill and Melinda Gates Foundation, and Agnes Kalibata, the UN Special Envoy to the UNFSS and President of AGRA, which is largely funded by the Gates Foundation.

XXII Large and powerful corporate and development actors at the Summit included: the Rockefeller Foundation, the World Economic Forum, Bayer, Nestlé, Tyson, Shell, the World Business Council on Sustainable Development, and the International Fertilizer Association, among others.

however, these contributions did not make it into the final statements and other proceedings. It remains to be seen whether Part Two of the CBD will be different.

There are concerns that these global policy spaces have not been inclusive enough and have been shaped by the interests of corporate actors. Outside of these spaces, social movements have voiced concerns about ‘corporate greenwashing’ and have accused companies, including several who have been active in these spaces, of seeking to profit from the environmental crisis.²⁰⁹ Nonetheless, contestations did emerge inside these spaces, particularly in the preparatory stages. Pushback on narrow framings of sustainability has been particularly noticeable backstage of the CBD and COP26 compared to the UNFSS.

7.3

TRANSFORMATIVE APPROACHES TO SUSTAINABILITY IN GLOBAL FOOD SYSTEMS

This study was motivated by concerns that a narrow set of actors is driving debates and shaping policy processes that regard the sustainable transformation of food systems. For example, concerns that the mainstreaming of agroecology (and its amalgamation with other ideas linked to the sustainability discourse) results in the emptying of its social and political underpinnings:

The question is whether agroecology, in the hands of the mainstream, will be stripped of all but its most simplistic technical content and left as an empty concept that can mean almost anything to anyone, much as happened decades ago with “sustainable development”.²¹⁰

While the engagement with agroecology and sustainability by the corporate and aid sectors should be good news (although some argue it lacks substance or, worse even, it is misleading), the question is whether it goes far enough. Corporations, large philanthropies like the Rockefeller Foundation (and BMGF to some extent), and aid agencies like the World Bank and USAID (and JICA to some extent), tend to frame efficiency and profitability as key aspects of sustainability. Their approaches to technological innovation for sustainability overlook inequities in the production of and access to technology.

A fuller version of sustainability discussed in the literature combines environmental dimensions with the human, social and cultural aspects and sees these two domains as interlinked.²¹¹ It also seeks to understand trade-offs between environmental and equity goals and account for both planetary boundaries and human needs.²¹² And a transformative approach to innovation is inclusive and open to a plurality of knowledges and interrogates the distributional impacts of preferred innovations and policy solutions.²¹³ All these dimensions are considered in the 13 principles of agroecology put forward by the HLPE of the CFS.

When it comes to global food system governance, the reformed UN Committee on World Food Security (CFS) is regarded as one of the best examples of inclusive global policy-making in food systems.²¹⁴ Its reduced role in the UNFSS does not bode well for food system transformation, in that it raises concerns about the inordinate influence of corporate interests in global food system governance, an issue that has been discussed at length in the literature.²¹⁵

Compared to the UNFSS and COP26, the CBD appears to be relatively more attuned with this more encompassing version of sustainability, given the emphasis it places on the diversity of social identities and forms of knowledge. And yet there is scope for improvement in this space too. Its perspective on Indigenous Peoples role in relation to managing biodiversity, for example, has been criticized for reflecting inherited colonial discourse:

The recognition of Indigenous Peoples role in nature conservation borders on the notions inherited from colonial discourse – imagining Indigenous People as being ‘closer to nature’, and their knowledge and practices being somehow inherently sustainable or automatically positive for biological diversity conservation. This corresponds to the ‘othering’, stereotyping, and homogenising of non-white, non-Western subjects within colonial discourse.²¹⁶

Some funding streams also appear, on the surface at least, to be prioritizing transformative perspectives, while strengthening equity and justice in food systems and knowledge production. The McKnight Foundation's knowledge hubs and the European Agroecology Living Labs are examples of efforts that seem to be generally more geared towards establishing inclusive knowledge processes.

While it is important to clarify the differences between competing framings on food system sustainability by looking at how the terms are used and by whom (as this study has done), the question which then arises is: how do these framings get translated into policies and practices and what type of change do they enable?

The common ground between the three concepts, which was discussed above, could give a misleading sense of alignment. By moving beyond the reification of individual terms and towards uncovering their underlying principles and values, as well as the practices that they enable, it is important to consider: (i) the distinction between environmental and social dimensions of sustainability in the definition of priorities and goals; (ii) the recognition of the interlinkages between the environment and the social, including trade-offs between goals; (iii) the distinction between sustainability outcomes and the pathways to get there.

Pathways towards sustainability can in turn be assessed for their transformative character. The STEPS Centre draws attention to the directionality of pathways (in terms of the goals they set to achieve), their diversity (whether they consider a variety of contexts and values), and distributional character (how particular pathways affect inequities in the distribution of wealth, power and resource access).²¹⁷ Leach et al. add an emphasis on democracy, questioning whether pathways encompass equity of opportunity for voice and inclusion.²¹⁸

8 CONCLUSION

Key findings emerging from the analysis are as follows.

- A loose collection of terms invokes the incorporation of sustainability concerns into food systems. Regenerative agriculture, nature-based, and nature-positive solutions are not entirely new ideas, but they are concepts that are quickly gaining traction alongside agroecology in global policy forums and funding circles. The frequent conflation and cursory use of these terms creates ambiguity and confusion about what distinguishes competing ideas.
- Terms quickly accumulate baggage as actors appropriate and use them in prominent policy spaces. Agrifood corporations are driving narratives about regenerative and nature-positive food systems, in ways that support the achievement of marginal gains within the existing agro-industrial system, without fundamentally challenging the status quo. The corporations are establishing partnerships with knowledge actors, global environmental organizations, and philanthropies, and mobilizing significant financial investments to support their own agendas.
- Our analysis of funding streams highlights recent initiatives that aim to regenerate food systems. Sizeable amounts of funding are being mobilized towards making food systems more sustainable and, specifically, addressing climate change-related goals. While in some cases the scale of the effort is underwhelming (e.g. Syngenta's pledges to lower chemical residues in crops), some corporations are signaling significant changes (e.g., Walmart's pledge to use 'deforestation-free' products throughout its supply chain, though not until mid-century).
- Framings of sustainability articulated by these actors in global policy and funding spaces indicate an understanding of sustainability centred on environmental and climate-related concerns and goals. While environmental diligence is welcome and urgently needed, these framings pay no attention to trade-offs between environmental and social goals or to pervasive inequities running through food systems, including in processes for generating knowledge and innovation. These narrow interpretations of sustainability ignore arguments about how ecological and social features of food systems are intertwined and pay no attention to plurality of knowledges and distributional justice.²¹⁹
- Agroecology has pioneered the integration of ecological principles with human needs through inclusive and equitable processes.²²⁰ Though the use of the term agroecology has become widespread, not all its essential components have been given enough attention. Activists' concerns that global policy debates and influential development actors are stripping agroecology of its substance and reducing it to a set of mere technical principles seem to be justified. Also, the bundling of agroecology with several other, more loosely defined sustainability concepts could undermine its distinctive social and political underpinnings.
- Perspectives on sustainability, which look beyond climate resilience, equilibrium, and system efficiency towards a more thoroughgoing transformation of food systems, are prominent in academic scholarship and advocacy spaces populated by social movement actors.²²¹ For greater impact, transformative approaches would need more widespread exposure and endorsement, although mainstreaming carries the risk of simplification and loss of their most transformative elements.

- Some policy spaces and funding streams are more amenable than others to transformative approaches to sustainability. European donors and research funders appear to be more open to these perspectives than their US-based peers, though there are exceptions. The vision of sustainable food systems advanced by UKRI-DEFRA, for example, resembles the thinner version of sustainability adopted by US-based organizations and corporate actors.
- Compared to UNFSS and COP26, the CBD appears a more promising space for advocates of transformative perspectives on sustainability to advance their narratives. The risk is that any success in this forum will be less impactful globally than would be the case in forums such as the UNFSS and COP26, which have a higher public profile. Also, while attention given to agrobiodiverse and Indigenous Peoples food systems in the CBD space evidently recognizes interlinkages between human and natural systems, perspectives on the role of Indigenous People as managers of landscapes and biodiversity have been criticized for being imprinted with a colonial viewpoint that limits Indigenous Peoples agency.
- Knowledge spaces and action-research initiatives that seek to generate transformative innovations need attention. Experiences such as the European Agroecology Living Labs and the McKnight Foundation's regional agroecology hubs across Africa warrant further study. And, although not reviewed by this study, Latin American countries, such as Brazil, have extensive experience with collaborative work between researchers and practitioners in the agroecology field,²²² which can be shared productively with researchers and social movements in other countries.

The following implications for policy advocacy and practice are derived from the above:

- Regarding policy advocacy, there is a need to strengthen transformative perspectives on sustainability in global food systems, drawing attention to the intersection between environmental sustainability and social justice and to marginalized groups and how they feature in just transitions to more sustainable futures. Research and advocacy organizations committed to transformative approaches to sustainability should continue to support policy processes and spaces that are inclusive, participatory, and cognizant of power imbalances. In global food system governance, the reformed CFS has reached the furthest in creating inclusive debate mechanisms and enabling the participation of a range of players, particularly those representing the relatively powerless. Corporate-friendly 'multistakeholderism' in global food governance needs to be interrogated for its representation as well as legitimacy to indicate directions towards just and sustainable futures.
- Regarding practice, sustainability terminology and the worldviews and agendas that underpin it need to be subject to constant scrutiny by looking at how the terms translate into actual practices. The interchangeable use of terms makes it hard to identify approaches that result in truly transformative practices. Agroecology has progressed the furthest in defining a pathway towards food system transformation guided by a set of principles that have been widely legitimized in global (as well as local) policy spaces. Emphases on principles (rather than blueprints) and on inclusive and equitable processes are so far largely absent in discussions about regenerative agriculture and nature-based solutions, making these approaches ill-suited to address food system challenges in a transformative manner.

ANNEX. FUNDING STREAMS BY ACTOR – A SYNTHESIS OF COLLECTED EVIDENCE

Channel
CORPORATE
INVESTMENTS

Actor
NESTLÉ

Web sources

<https://www.nestle.co.uk/en-gb/csv/planet/regenerative-agriculture>

<https://www.nestle.com/sites/default/files/2021-09/regenerative-agriculture.pdf>

<https://www.nestle.com/sustainability>

Overview of initiatives related to the three concepts: goals, activities, resources

Nestlé appears very invested in advancing the narrative and funding regenerative agriculture. Following the UNFSS, Nestlé announced plans to implement regenerative agriculture ‘at scale’.

Activities include providing training for farmers in sustainable practices, paying premium prices for products grown under sustainable conditions, and funding of its own research institute.

Amounts indicated for these projects include CHF 1.2 billion (~US\$1.3 billion) over the next five years and a separate CHF 1.7 billion (~US\$1.8 billion) annually for research and development.

Further details

Nestlé defines regenerative agriculture as “an approach to farming that aims to conserve and restore farmland and its ecosystem. It delivers benefits to farmers, environment and society”. Some potential areas of further interest include Nestlé’s research on low-carbon, high-yield, drought and disease resistant coffee; its ‘income accelerator program’; and an announcement to remove child/forced labour in its supply chain. There are also specific mentions of promoting agroforestry and youth and gender empowerment.

Channel
CORPORATE
INVESTMENTS

Actor
UNILEVER

Overview of initiatives related to the three concepts: goals, activities, resources

Unilever’s goal to ‘regenerate nature’ is focused primarily on eliminating deforestation in their supply chain by 2023. A broader aim is to reach ‘100% sustainable sourcing’ for key agricultural crops, including palm oil, cocoa, tea, soy, and paper. There are also notable narratives on promoting regenerative agriculture, farmer ‘livelihood programmes and human rights’.

At COP26, Unilever joined USAID, FAO, and Google in creating the Forest Data Partnership to create a deforestation mapping system. Unilever has also published a set of regenerative agriculture principles and guide, in which they

Web sources

<https://www.unilever.com/planet-and-society/>

<https://www.unilever.com/news/news-search/2021/how-we-are-protecting-forests-and-those-who-depend-on-them/>

specify that “the overarching goal of regenerative agriculture is to go further than the ‘do no harm’ principle and actively improve the local environment...through holistic management measures to improve and restore soil health, water quality and biodiversity.

An overall investment of \$1.1 billion in a Climate and Nature Fund will support projects focused on tackling deforestation and climate change mitigation.

Further details

While deforestation and forests appear most prominently in Unilever’s materials, the 2021 Annual Report notes a broader goal to: “Help protect and regenerate 1.5 million hectares of land, forests and oceans by 2030.”

There are specific projects relating to each of Unilever’s primary commodities, for example: ‘deforestation free palm oil’, soil health programs with soy farmers in the USA, and replanting 465,000 native trees in cocoa-producing areas. Other sustainability-related programmes include ‘waste-free’ initiatives (making all products recyclable, reusable, or compostable and reducing—though not eliminating—virgin plastic); creating ‘water stewardship programmes in ‘water-stressed’ areas by 2030; net zero emissions in supply chain by 2039 and in operations by 2030; and including the carbon footprint of every product on its packaging.

Channel CORPORATE INVESTMENTS

Actor SYNGENTA

Web sources

<https://www.syngenta.com/en/sustainability>

<https://www.syngenta.com/en/sustainability/good-growth-plan/strive-carbon-neutral-agriculture>

<https://www.syngenta.com/en/sustainability/good-growth-plan>

<https://www.syngenta.com/sites/syngenta/files/sustainability/reporting-sustainability/Syngenta-ESG-Report-2020.pdf>

Overview of initiatives related to the three concepts: goals, activities, resources

Syngenta’s sustainability approach and funding strategy is based on its Good Growth Plan, which aims to address regenerative/sustainable/carbon-neutral agriculture, climate change, biodiversity loss, soil health, and ‘lower crop residues’. In the plan’s four defined targets—each linked to associated UN Sustainable Development Goals—carbon emissions reduction and agricultural innovation are two of the aims.

Carbon projects include partnering with The Nature Conservancy to restore soil health in the Brazilian Cerrado, working with farmers to capture carbon in their soils (carbon credit markets are specifically mentioned), and reducing operational carbon intensity by 50% by 2030. Innovation efforts seem to be primarily occupied with reducing residues, thereby achieving the ‘lowest residues in crops and the environment’.

Funding of \$2 billion has been committed from 2020-2025 “to increase agricultural productivity in a sustainable and responsible way to advance regenerative agriculture”.

Further details

Funding in 2020 was listed at \$490 million, with much of that going towards the acquisition of biologicals company Valagro and R&D research on ‘crop protection’.

Syngenta has committed to ‘2 agricultural innovation breakthroughs’ per year, and only projects that result in such a breakthrough (i.e. in 2020 a more efficient livestock feed and reduced pesticide residues on rice) will count towards the \$2 billion target.

Syngenta takes part in the Science Based Targets Initiative, which assists companies in calculating targets in line with the Paris climate agreement.

Channel
CORPORATE
INVESTMENTS

Actor
GENERAL MILLS

Web sources

<https://www.generalmills.com/how-we-make-it/healthier-planet>

<https://www.generalmills.com/how-we-make-it/healthier-planet/environmental-impact/regenerative-agriculture-for-farmers>

<https://globalresponsibility.generalmills.com/HTML1/tiles.htm>

Overview of initiatives related to the three concepts: goals, activities, resources

Regenerative agriculture is a major focus for General Mills. After reaching 100% sustainable sourcing for 10 priority ingredients in 2020, broader targets were announced including the promotion of regenerative agriculture. The company aims to practice regenerative agriculture on 1 million acres of farmland by 2030.

It has entered partnerships with the National Fish and Wildlife Foundation, The Nature Conservancy and has a pilot project with a French dairy cooperative. Other initiatives include a 'General Mills Regenerative Agriculture Self-Assessment' for farmers, regenerative-focused 'farmer classrooms', an ecosystem services market for agriculture.

Funding explicitly mentioned includes a donation (of ~\$100,000) to a nonprofit regenerative farming fellowship program. Other funding amounts were not easily identified.

Further details

Deforestation is a major sub-goal under their 100% sustainable sourcing initiatives. Other goals include: water stewardship programs by 2025, 100% recyclable or reusable packaging by 2030, zero waste to landfills by 2025, 100% renewable energy by 2030, reducing greenhouse gas emissions across the value chain by 30% by 2030 and net-zero by 2050.

General Mills takes part in the Science Based Targets Initiative.

Channel
CORPORATE
INVESTMENTS

Actor
WALMART

Web sources

<https://corporate.walmart.com/newsroom/2020/09/21/walmart-sets-goal-to-become-a-regenerative-company>

<https://corporate.walmart.com/newsroom/2021/09/01/driving-regeneration-in-agriculture>

<https://www.walmartsustainabilityhub.com>

Overview of initiatives related to the three concepts: goals, activities, resources

Walmart aims to become a 'regenerative company', which it defines as a business that moves beyond sustainability to 'center nature and humanity'.²²³ This includes goals for zero emissions by 2040 (following participation in the UN's 'Race to Zero' leading up to COP26), deforestation-free products in its supply chain (e.g. palm oil, beef, soy), and preserving an acre of land for everyone it develops.

Pushing for wider adoption and the transition to regenerative agriculture falls under its land management goals, and includes partnerships with The Nature Conservancy, WWF and Conservation International on projects such as sustainable seafood monitoring and integrated cattle ranching. A recent investment was also announced in a vertical farming start-up. The Walmart Foundation lists many grantees under 'Sustainability', including the Rainforest Alliance and Soil Health Institute.

While specific investment amounts in this area were not found for the company or Foundation, a notable metric often referenced is to protect, manage and restore 50 million acres of land and 1 million square miles of ocean by 2030.

Further details

The zero emissions target by 2040 is without the use of carbon offsets, but doesn't include the full supply chain.²²⁴

As Walmart's CEO says, "We want to play an important role in transforming the world's supply chains to be regenerative".

In Dec 2020, Walmart joined a letter to the Biden administration urging the US to rejoin the Paris climate agreement.

Walmart has conserved 1.5 million acres of land through a partnership with Acres for America.

Aims to source 20 key commodities more sustainably, including deforestation-free products (as a member of the Forest Positive Coalition), by 2025. Relies on product certifications like Rainforest Alliance and Fair Trade US to support sustainable sourcing of palm oil, coffee, pulp and paper, farm-raised seafood, wild-caught seafood, cotton, bananas and pineapples. Most of these products haven't reached 100%, and none in all Walmart's global locations.

Walmart was the 1st retailer to have its emissions target approved by the Science Based Targets Initiative.²²⁵

Channel **PHILANTHROPIC**

Actor **ROCKEFELLER**

Web sources

<https://www.rockefellerfoundation.org/commitment/food/>

Overview of initiatives related to the three concepts: goals, activities, resources

The Rockefeller Foundation describes an aim to create 'a more nourishing, regenerative, and equitable food system'. In a statement leading up to the UNFSS in 2021 the Managing Director said: "We need an inclusive approach that transforms the global food system to be nourishing and regenerative...".

Its focus is on science and technological approaches, such as with the Alliance for a Green Revolution in Africa (\$250 million in funding as of 2016) and other projects focused on seed modification and related agricultural inputs.

The strongest evidence thus far for such an approach appears in the Food Systems Vision Prize, which selected 10 'visionaries' to receive \$200,000 each for food systems transformations, of which three include regenerative approaches. Rockefeller launched another funding initiative in March 2022 called the Good Food Strategy that will provide \$105 million to 'increase access to healthy and sustainable foods' for underserved people globally. This is its largest ever investment in food and nutrition and the launch mentions funding to support data collection on the impacts of regenerative/agroecological systems among its upcoming projects.

Further details

Food Systems Vision Prize winners that mention regenerative agriculture: a vision for a 'regenerative and nourishing food oasis' in the city of Lima, Peru, a regenerative agricultural system with the Lakota Indigenous People in the United States, and creating a 'regenerative and nourishing food system' in Lagos, Nigeria. However, based on the final report for the Prize, there is not a clear understanding of what Rockefeller means by 'regenerative'.

Outside of the Prize, funding for regenerative agriculture includes grants of \$75,000 to the Stone Barns Center for Food and Agriculture and \$100,000 to EcoAgriculture International, Inc. This is all a much smaller total amount than the \$250 million given just to AGRA over the years.

Rockefeller contributed funds to create a new asset class on the New York Stock Exchange, called Nature Asset Companies, which are meant to support 'investments in nature' in the form of social enterprises that provide ecosystem services. The President of RF says "...we are proud to have been an early supporter of [this] approach to identifying new and sustainable ways for countries to safeguard their lands and waterways while creating a market to preserve natural assets".

Rockefeller is part of the Global Energy Alliance for People and Planet that launched at COP26 to finance green energy transitions. The aim is to raise a total of \$100 billion from public and private sources. Rockefeller's contribution is not disclosed.

Ikea Foundation and Rockefeller together committed \$1 billion to 'fight climate change and end poverty'.

Channel **PHILANTHROPIC**

Actor **BILL AND** **MELINDA GATES** **FOUNDATION**

Overview of initiatives related to the three concepts: goals, activities, resources

Agricultural research and funding at the Gates Foundation focuses largely on 'improved seeds', intensification, and climate adaptation for small farmers.²²⁶ The Foundation is well known to have many critics in the food sovereignty movement that claim it pushes 'green revolution' practices over agroecological ones to the detriment of farmers in regions where it operates.²²⁷

Support for regenerative or agroecological programmes appears very limited (the only identified funding for such projects is for the McKnight Foundation, see next entry).

In 2019 at the UN Climate Action Summit, the Foundation announced \$310 million in funding for improved crop varieties for smallholders facing the impacts of climate change (Bill & Melinda Gates Foundation 2019). Recipient organizations include AGRA and the Cornell Alliance for Science (\$22 million to date and which labels agroecology as 'restrictive' and a 'threat to food security'). Although little could be found supporting alternative approaches, a recent grant for \$286,740 to the United Nations Environment Programme in 2021 will fund a study on the synergies and trade-offs between agricultural transformation and conserving nature and biodiversity.

Further details

It is worth noting that more agroecological or related projects may possibly be funded by the Gates Foundation but they are not easily found. This is based on searches for agroecology, regenerative agriculture and related terms on the Gates website, which returned zero results. However, the McKnight Foundation received a grant in 2013 that specifically notes on the Gates website that it is for agroecological research. Nonetheless, these terms do not appear in the main spaces and are not easily found in Gates's materials and grantee list.

Channel **PHILANTHROPIC**

Actor **MCKNIGHT** **FOUNDATION**

Overview of initiatives related to the three concepts: goals, activities, resources

Agroecology takes a central role in the funding strategy of the McKnight Foundation. Its Collaborative Crop Research Program (CCRP) aims to define, promote, research, and implement agroecological approaches with farmers in Africa and South America.

Agroecological intensification in 'thematic intervention areas' includes projects on agrobiodiversity (including seeds), soil health, pest and disease management, enhanced food systems (i.e. promoting circular economies and agroecology markets), 'farmer centered research' and policy.

Web sources

<https://www.ccrp.org>

<https://www.mcknight.org/programs/international/>

The CCRP received two 5-year grants from the Gates Foundation totalling over \$51 million in 2008 and 2013. As of 2011, McKnight had dedicated \$100 million to the CCRP agroecological agenda, with \$74 million already committed. More recent funding data was not confirmed.

Further details

“Since 2013, McKnight has supported 30 farmer research networks ranging in size from 15 to more than 2,000 farmers”

Grants provided support ‘agroecology hubs’ in Africa, including at two universities. Other non-monetary resources available from McKnight include several agroecology frameworks for research and project implementation, such as Agroecological Markets Theory of Change and the CCRP Infinity Loop.

Channel DEVELOPMENT ASSISTANCE

Actor WORLD BANK

Web sources

<https://www.worldbank.org/en/topic/climate-smart-agriculture>

<https://openknowledge.worldbank.org/handle/10986/35799>

Overview of initiatives related to the three concepts: goals, activities, resources

The World Bank focuses on ‘Climate-Smart Agriculture’, which it defines as an integrated approach to address both food security and climate change. Climate-smart agriculture also serves as an umbrella term for ‘precision farming’ and regenerative/conservation agriculture.

Activities from investments in climate-smart agriculture include emissions reductions plans in livestock farming in Bangladesh, improving water-use efficiency and soil conditions in China, biodiversity conservation in the Philippines, and a pilot project to promote agroecology to improve climate resilience in Morocco.

In 2020, 52% of World Bank financing for agriculture went towards climate-smart agriculture (Ibid). Climate-smart agriculture Investment Plans in place in Bangladesh, Zimbabwe, Zambia, Lesotho, Mali, Burkina Faso, Ghana, Côte D'Ivoire, Morocco, and the Congo are reported as totalling more than \$2.5 billion. Funding for nature-based solutions is also highlighted, with a total funding amount of \$1.18 billion from 2019-2020 identified for ‘projects supporting biodiversity’.

Further details

WB also funds CGIAR, which has created climate-smart agriculture Country Profiles.

The World Bank defines climate-smart agriculture as “an integrated approach to managing landscapes—cropland, livestock, forests and fisheries—that addresses the interlinked challenges of food security and accelerating climate change”.

Channel
DEVELOPMENT
ASSISTANCE

Actor
EUROPEAN
COMMISSION
– DIRECTORATE-
GENERAL FOR
INTERNATIONAL
PARTNERSHIPS (DG
INTPA)

Web sources

https://ec.europa.eu/international-partnerships/topics/investing-sustainable-agriculture-and-food-systems_en

https://ec.europa.eu/international-partnerships/programmes/desira_en

Overview of initiatives related to the three concepts: goals, activities, resources

DG INTPA primarily uses the term sustainable agriculture, with funding focused on development projects impacting small-scale farmers. Regenerative agriculture features in upcoming programming in Bolivia, Peru and Pakistan and agroecology in a project in Laos, but overall, ‘sustainable’ is used most often to describe agricultural programming.

Research (including a partnership with CGIAR) and implementation of sustainable agriculture projects have received €270 million since 2017. For example, an investment of €4.15 million will fund a joint project with FAO and GIZ to protect biodiversity and increase sustainable agricultural practices in Mongolia. In another joint programme in Laos, an (estimated) investment of €15 million in agriculture and rural development will also include aims to implement ‘agroecology at large scale’.

Further details

Its Strategic Plan offers little discussion of agriculture, but one of the key performance indicators is to work on climate action via agriculture programming (among others). Although not specific to agriculture, nature-based solutions makes an appearance under the Theme of Climate Change, Environment, Energy, in line with the EU Biodiversity Strategy for 2030/

Channel
DEVELOPMENT
ASSISTANCE

Actor
GERMAN
DEVELOPMENT
AGENCY (GIZ) AND
FEDERAL MINISTRY
FOR ECONOMIC
COOPERATION
AND
DEVELOPMENT
(BMZ)

Web sources

https://ec.europa.eu/international-partnerships/topics/investing-sustainable-agriculture-and-food-systems_en

https://ec.europa.eu/international-partnerships/programmes/desira_en

Overview of initiatives related to the three concepts: goals, activities, resources

In the German aid system BMZ defines policy and GIZ is the implementing agency. Both spaces were looked at together.

BMZ “promotes resilience and food security through systemic approaches to low-emission and climate-resilient agriculture”.

BMZ explicitly mentions agroecological approaches, which includes improved efficiency and diversification as well as social elements. It states: “The long-term goal is a socially just and ecologically sustainable transformation of agricultural and food systems”.

GIZ supports sustainable agriculture, which it defines in some detail and includes organic and agroecological methods. Focus is placed on soil health, renewable inputs, nutritional quality, safe labour and fair wages, and other social-cultural considerations in agriculture. GIZ also states the need to innovate and promote sustainable farming techniques.

The agency currently lists 39 active agriculture-focused projects and many others that include sustainable approaches. Examples of funded projects include improving water management practices in Bolivia, increasing agro-biodiversity in East Timor, and soil restoration in the Sahel region of Africa.

While funding varies by project, some sample investments include €66 million for sustainable fisheries and aquaculture projects in five countries, €206.7 million for ‘soil protection and rehabilitation for food security’ in seven countries, and €125 million to support innovation in sustainable agriculture worldwide.

Further details

Total funding amounts for GIZ were not found, although all project totals could be added up to create a figure. This was beyond the scope/time limits of this study.

Channel
DEVELOPMENT
ASSISTANCE

Actor
JAPAN
INTERNATIONAL
COOPERATION
AGENCY (JICA)

Web sources

https://www.jica.go.jp/english/our_work/thematic_issues/agricultural/overview.html

https://www.jica.go.jp/project/english/subject/agriculture/12_1.html

Overview of initiatives related to the three concepts: goals, activities, resources

JICA's discussion of sustainable agriculture—including lowering agrochemical inputs, better water and soil management, and limiting deforestation from farming—includes a large overall focus on increasing production. Agricultural programme goals are based on the SDGs of End Poverty and End Hunger and include mentions of biomass energy production, 'variety improvement', seed/fertilizer procurement, and promoting private sector entry into markets in its stated objectives.

60 past/present projects are listed in Asia, Africa, and Latin America under the agricultural focus area (14 of which are active as of 2022). Examples include: promoting and expanding 'clean' (organic) agriculture in Laos; supporting/promoting 'market-oriented agriculture' with smallholder farmers in Zimbabwe, Ethiopia, and Malawi; improving rice production and yields for domestic consumption in Liberia. Other projects also focus on high-yielding rice production, some in partnership with AGRA as part of the Coalition for African Rice Development initiative.

Although detailed project descriptions are available, specific funding amounts were not found.

Further details

Ag projects are listed under the Agricultural and Rural Development thematic focus area.

The additional rice yield projects are in the Philippines, Timor-Leste, Ethiopia, Liberia, Nigeria, Sudan, Tanzania, and Zambia.

Several loan amounts were identified for agricultural value chain enhancements with the private sector, including \$50 million for a project in Brazil in 2018, \$163 million with the Asian Development Bank to create sustainable value chains for smallholder Asian farmers also in 2018, and \$65 million in 2021 in southern Africa.

Channel
DEVELOPMENT
ASSISTANCE

Actor
UNITED STATES
AGENCY FOR
INTERNATIONAL
DEVELOPMENT
(USAID)

Overview of initiatives related to the three concepts: goals, activities, resources

USAID's Feed the Future (FTF) initiative oversees the agency's food security and agriculture projects, with a stated objective to "end global hunger, poverty, and malnutrition in a sustainable way". FTF promotes 'climate-smart and regenerative agriculture', 'sustainable intensification', business models that value and account for natural resources, 'nature-positive impacts', and 'sustainable productivity' in its updated strategic plan. USAID overall frequently mentions 'sustainable development', but without much detail and usually not in association with agriculture. The programme has received criticism for a lack of clear definitions, metrics and reporting and for not meeting its goals (i.e. of the 19 countries participating in FTF, eight recently saw undernourishment increase [FoodTank, 2021]).

Web sources

<https://www.feedthefuture.gov>

Overall, FTF has provided \$18 billion in funding since 2012, with an additional \$5 billion committed in 2021. For 2021, USAID's annual report lists agriculture programmes (under its Economic Growth agenda) net cost as nearly \$850,000 (and \$786,000 in 2020).

Further details

A concurrent aim alongside FTF's work with smallholder farmers to improve food security and resilience is to promote U.S. businesses and 'innovations'.

The main metric for the FTF is the # of individuals in the agricultural system that have applied 'improved management practices/technology' via USAID assistance (reported as 7.9 million in 2020).

Other projects outside of agriculture focus on biodiversity and land conservation. The metric used for these programmes measures the # of people experiencing economic benefits from sustainable natural-resource management and/or biodiversity conservation, listed as 511,965 in 2020.

The Powering Agriculture programme aimed to provide clean and improved energy solutions for smallholders and 'mobilized' \$105 million in funding through 2020.

Channel PUBLIC RESEARCH AND INNOVATION

Actor EC HORIZON EUROPE

Web sources

https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

<https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/3c6ffd74-8ac3-11eb-b85c-01aa75ed71a1>

<https://op.europa.eu/en/publication-detail/-/publication/eef524e8-509e-11eb-b59f-01aa75ed71a1/language-en/format-PDF/source-190728921>

Overview of initiatives related to the three concepts: goals, activities, resources

Horizon Europe is the main funding programme for research and innovation for the European Union. Its strategic plan highlights restoring biodiversity and ecosystems in order to achieve food security as a main research objective. When discussing food and agriculture, terms used in the strategic plan include sustainable, bio-based, biodiversity, circular, agroecological and climate-neutral and climate-smart.

Horizon's overall budget is €95.5 billion for 2021-27, with €8.95 billion set aside for 'Food, Bioeconomy, Natural Resources, Agriculture and Environment' (for comparison, 'Climate, Energy and Mobility' has a budget of €15.1 billion and Health a budget of EUR 8.2 billion). There is also an overall target for 35% of the budget to go towards 'climate objectives'.

Further details

Horizon's budget is organized into four 'pillars' that are based on five 'mission areas'.

The five mission areas are: adaptation to climate change, cancer, healthy waterways, climate-neutral & smart cities, and soil health & food (a main mission based on soil health and food aims for 75% of all European soils to be healthy and productive by 2030).

Calls for funding proposals related to the Soil Health and Food mission include: Safe & Sustainable Food Systems, Rescuing Biodiversity to Safeguard Life on Earth, Climate Neutral, Sustainable and Productive Blue Economy, and Accelerating Farming System Transitions. There is also a separate call for proposals for 'Food' under the 'Innovative Europe' pillar.

The four budget pillars are: Excellent Science

Global Challenges and Industrial Competitiveness

Innovative Europe and Widening Participation

Strengthening the European Research Area

(The listed budgets for food and agriculture, climate/energy and health all fall under the budget pillar for Global Challenges)

Channel
**PUBLIC RESEARCH
AND INNOVATION**

Actor
**UK RESEARCH
COUNCILS (UKRI)**

Web sources

<https://www.ukri.org/what-we-offer/our-main-funds/strategic-priorities-fund/>

<https://www.ukri.org/?s=agroecological>

<https://www.ukri.org/?s=regenerative+agriculture>

<https://www.ukri.org/?s=nature+based+solutions>

Overview of initiatives related to the three concepts: goals, activities, resources

UKRI includes a wide range of thematic research councils and funding. The 2021-22 UKRI budget totals £7,908 million, of which £19.6 million will go towards environmental research within the Strategic Priorities Fund (£830 million total across 34 themes). £47.5 million is dedicated specifically to 'Transforming the UK Food System for Healthy People and a Healthy Environment'. (For comparison, £18.7 million is dedicated to 'UK Climate Resilience' research and £10.5 million on land use research.)

A search of the UKRI website resulted in two funding opportunities with agroecological approaches, eight mentions of regenerative agriculture, and 53 instances of nature-based solutions.

Examples of related funding opportunities include: a £1 million fund for interdisciplinary research grants of £100-200k each to identify 'innovative solutions' for future agroecological practices; a £2 million fund for grants up to £625k for creating 'healthy, resilient and sustainable agricultural soils'; £2.5 million for grants of £625k for improving and expanding resilient 'treescapes' in the UK; a £24 million total investment in four projects aimed at tackling nutrition, food systems, and climate change, including one based on regenerative agriculture.

Further details

Under the current strategic plan, research for 'safe and nutritious food' is listed under the Biotechnology and Biological Sciences Research Council and 'sustainable agriculture' under the Natural Environment Research Council. It also describes efforts towards a net-zero and 'sustainable circular' economy and protecting nature and biodiversity.

Channel
**PUBLIC RESEARCH
AND INNOVATION**

Actor
**INTERNATIONAL
DEVELOPMENT
RESEARCH CENTRE
(IDRC)**

Overview of initiatives related to the three concepts: goals, activities, resources

Canada's IDRC funds projects and research on 'global development challenges'. Research priorities are associated with relevant SDGs. This includes a focus on 'climate-resilient food systems' and addressing hunger, malnutrition, food insecurity, disease, antimicrobial resistance, and social, cultural and economic inequalities in developing countries. A search for projects under this category resulted in 155 entries; a sub-search provided 41 entries* related to agroecology and/or regenerative agriculture. Examples include; a three year study of the trade-offs of implementing agroecology in West Africa with a total funding of CAD \$1.9 million; research on regenerative and gender-inclusive agribusiness in Latin America for 30 months and CAD \$1.5 million; CA \$888k towards research and support over 30 months for women-led urban agroecological farming initiatives in Gaza. In the most recent quarterly financial reports available, spending on Climate-Resilient Food Systems totalled CA \$57,833 in 2021 (second highest of the six reported categories after Education and Science).

Web sources

<https://www.idrc.ca/en/fundinghttps://idrc.ca/en/program/climate-resilient-food-systems>

https://idrc.ca/en/search?search_api_fulltext=agroecology

<https://www.idrc.ca/en/about-idrc/transparency/quarterly-financial-reports>

Further details

*Not all results were projects, but rather a combo of projects, publications, and other informational content.

For more on spending, including total for food systems spending per quarter, see the fourth link in the next column.

Research focus area on Climate Resilient Food Systems is associated with the SDGs 2, 3, 5, 12, and 13. The other focus areas are Global Health, Education and Science, Democratic and Inclusive Governance, and Sustainable Inclusive Economies.

Another project of interest is a joint initiative with the Rockefeller Foundation with a total funding amount of CA \$53,330 called 'Catalyzing Change for Healthy Sustainable Food Systems' to collect evidence for addressing malnutrition in Africa.

ENDNOTES

- 1 Grain, 'Corporate Greenwashing: "Net Zero" and "Nature-Based Solutions" Are a Deadly Fraud', 2021, <https://grain.org/en/article/6634-corporate-greenwashing-net-zero-and-nature-based-solutions-are-a-deadly-fraud>.
- 2 Peter Newell and Olivia Taylor, 'Contested Landscapes: The Global Political Economy of Climate-Smart Agriculture', *The Journal of Peasant Studies* 45, no. 1 (2 January 2018): 108–29, <https://doi.org/10.1080/0306615.2017.1324426>; Eric Holt-Giménez and Miguel A. Altieri, 'Agroecology, Food Sovereignty, and the New Green Revolution', *Agroecology and Sustainable Food Systems* 37, no. 1 (1 January 2013): 90–102, <https://doi.org/10.1080/10440046.2012.716388>.
- 3 A. Wezel et al., 'Agroecology as a Science, a Movement and a Practice. A Review', *Agronomy for Sustainable Development* 29, no. 4 (1 December 2009): 503–15, <https://doi.org/10.1051/agro/2009004>; FAO, *The 10 Elements of Agroecology: Guiding the Transition to Sustainable Food and Agricultural Systems* (Rome, Italy: FAO, 2018), <https://www.fao.org/documents/card/en/c/19037EN/>; HLPE, 'Agroecological and Other Innovative Approaches for Sustainable Agriculture and Food Systems That Enhance Food Security and Nutrition' (High Level Panel of Experts on Food Security and Nutrition, 2019), <https://www.fao.org/3/ca5602en/ca5602en.pdf>.
- 4 Omar Felipe Giraldo and Peter M. Rosset, 'Agroecology as a Territory in Dispute: Between Institutionality and Social Movements', *The Journal of Peasant Studies* 45, no. 3 (19 March 2018): 545–64, <https://doi.org/10.1080/03066150.2017.1353496>.
- 5 Avery Cohn et al., eds., *Agroecology and the Struggle for Food Sovereignty in the Americas* (London: International Institute for Environment and Development, 2006); Peter M. Rosset and Miguel A. Altieri, *Agroecology: Science and Politics* (Fernwood Publishing, 2017).
- 6 Rosset and Altieri, *Agroecology*, 126.
- 7 Rachel Carson, *Silent Spring*, New Edition (London: Penguin Classics, 2000).
- 8 Brian K. Obach, *Organic Struggle: The Movement for Sustainable Agriculture in the United States* (The MIT Press, 2015), <https://doi.org/10.7551/mitpress/9780262029094.001.0001>.
- 9 Brian K. Obach, *Organic Struggle*.
- 10 Melissa Leach, Ian Scoones, and Andy Stirling, eds., *Dynamic Sustainabilities: Technology, Environment, Social Justice*, Pathways to Sustainability Series (London: Earthscan, 2010); Melissa Leach et al., 'Equity and Sustainability in the Anthropocene: A Social-Ecological Systems Perspective on Their Intertwined Futures', *Global Sustainability* 1 (ed 2018), <https://doi.org/10.1017/sus.2018.12>.
- 11 James Keeley and Ian Scoones, *Understanding Environmental Policy Processes: Cases from Africa* (Earthscan, 2003).
- 12 James Keeley and Ian Scoones, 'Understanding Environmental Policy Processes: A Review', IDS Working Paper 89 (Brighton: Institute of Development Studies, 1999).
- 13 Emery Roe, 'Development Narratives, or Making the Best of Blueprint Development', *World Development* 19, no. 4 (1 April 1991): 287–300, [https://doi.org/10.1016/0305-750X\(91\)90177-J](https://doi.org/10.1016/0305-750X(91)90177-J).
- 14 Desmond McNeill, 'The Diffusion of Ideas in Development Theory and Policy', *Global Social Policy* 6, no. 3 (1 December 2006): 334–54, <https://doi.org/10.1177/1468018106069204>.
- 15 Jacob Torfing, *New Theories of Discourse: Laclau, Mouffe and Zizek* (Oxford: Blackwell, 1999), <http://prism.talis.com/sussex-ac/items/569699>.
- 16 Lídia Cabral and James Sumberg, 'The Use of Epic Narratives in Promoting "Natural Agriculture"', *Outlook on Agriculture* 51, no. 1 (2022), <https://journals.sagepub.com/doi/10.1177/00307270221077708>.
- 17 IPES-Food, 'From Uniformity to Diversity: A Paradigm Shift from Industrial Agriculture to Diversified Agroecological Systems' (International Panel of Experts on Sustainable Food Systems, 2016), http://www.ipes-food.org/images/Reports/UniformityToDiversity_FullReport.pdf; Desmond McNeill, 'Reflections on IPES-Food: Can Power Analysis Change the World?', *IDS Bulletin* 50, no. 2 (2019): 27–35; Molly Anderson et al., 'Introduction: Valuing Different Perspectives on Power in the Food System', *IDS Bulletin* 50, no. 2 (2019): 1–12.
- 18 Wezel et al., 'Agroecology as a Science, a Movement and a Practice. A Review'; Rosset and Altieri, *Agroecology*.
- 19 Wolfgang Tischler, 'Ergebnisse Und Probleme Der Agrarökologie', *Landwirtschaft. Fakultät Kiel* 3 (1950): 71–82.
- 20 H. Nishiuchi, 'On Agroecology (as an Advancing Direction of Agricultural Meteorology.)', *Journal of Agricultural Meteorology* 8 (1953): 65–67, <https://doi.org/10.2480/agrmet.8.65>.
- 21 Wolfgang Tischler, *Agrarökologie* (Jena, Germany: Gustav Fischer Verlag, 1965).
- 22 Wezel et al., 'Agroecology as a Science, a Movement and a Practice. A Review'.
- 23 Miguel A. Altieri, *Agroecology: The Scientific Basis of Alternative Agriculture* (Division of Biological Control, University of California, Berkeley, 1983); FAEAB and AERJ, 'Anais Do II Encontro Brasileiro de Agricultura Alternativa' (II Encontro Brasileiro de Agricultura Alternativa, Petrópolis: Federação das Associações de Engenheiros Agrônomos do Brasil and Associação dos Engenheiros Agrônomos do Estado do Rio de Janeiro, 1984).
- 24 Gordon R. Conway, 'The Properties of Agroecosystems', *Agricultural Systems* 24, no. 2 (1 January 1987): 95–117, [https://doi.org/10.1016/0308-521X\(87\)90056-4](https://doi.org/10.1016/0308-521X(87)90056-4).
- 25 M. Fukuoka, 'The Natural Way of Farming', *Tokyo: Japan Publications*, 1985.
- 26 D.C. Mountjoy and S.R. Gliessman, 'Traditional Management of a Hillside Agroecosystem in Tlaxcala, Mexico: An Ecologically Based Maintenance System', *American Journal of Alternative Agriculture* 3, no. 1 (1988): 3–10, <https://doi.org/10.1017/S0889189300002058>; Miguel A. Altieri, 'Beyond

- Agroecology: Making Sustainable Agriculture Part of a Political Agenda', *American Journal of Alternative Agriculture* 3, no. 4 (1988): 142–43, <https://doi.org/10.1017/S0889189300002411>.
- 27 Paulo André Niederle et al., 'A trajetória brasileira de construção de políticas públicas para a agroecologia', *Redes (St. Cruz do Sul Online)* 24, no. 1 (3 January 2019): 270–91, <https://doi.org/10.17058/redes.v24i1.13035>.
- 28 Niederle et al., 'A trajetória brasileira de construção de políticas públicas para a agroecologia.'
- 29 Miguel A. Altieri and J. Trujillo, 'The Agroecology of Corn Production in Tlaxcala, Mexico', *Human Ecology* 15, no. 2 (1987): 189–220, <https://doi.org/10.1007/BF00888380>; Jean Marc von der Weid, 'As Práticas Inovadoras: Identificação, Sistematização, Difusão', *Proposta: Experiências Em Educação Popular* 36 (1988): 8–13.
- 30 Wezel et al., 'Agroecology as a Science, a Movement and a Practice. A Review', 506.
- 31 Robert Chambers, *Rural Development: Putting the Last First* (London: Longman Scientific & Technical, 1983); Robert Chambers, Arnold Pacey, and Lori Ann Thrupp, eds., *Farmer First: Farmer Innovation and Agricultural Research* (Rugby, 1989), <http://dx.doi.org/10.3362/9781780440149>.
- 32 Rosset and Altieri, *Agroecology*.
- 33 Stephen R. Gliessman, *Agroecology: The Ecology of Sustainable Food Systems* (New York, USA: CRC Press, Taylor & Francis, 2007); C. Francis et al., 'Agroecology: The Ecology of Food Systems', *Journal of Sustainable Agriculture* 22, no. 3 (17 July 2003): 99–118, https://doi.org/10.1300/J064v22n03_10.
- 34 Francis et al., 'Agroecology', 100.
- 35 The International Planning Committee for Food Sovereignty, 'Declaration of the International Forum for Agroecology, Nyéléni, Mali: 27 February 2015', *Development* 58, no. 2 (1 June 2015): 163–64, <https://doi.org/10.1057/s41301-016-0014-4>.
- 36 Imogen Bellwood-Howard and Santiago Ripoll, 'Divergent Understandings of Agroecology in the Era of the African Green Revolution', *Outlook on Agriculture* 49, no. 2 (1 June 2020): 103–10, <https://doi.org/10.1177/0030727020930353>.
- 37 Giraldo and Rosset, 'Agroecology as a Territory in Dispute'; Rosset and Altieri, *Agroecology*.
- 38 Cohn et al., *Agroecology and the Struggle for Food Sovereignty in the Americas*; Rosset and Altieri, *Agroecology*.
- 39 FAO, *The 10 Elements of Agroecology*, 2.
- 40 HLPE, 'Agroecological and Other Innovative Approaches for Sustainable Agriculture and Food Systems That Enhance Food Security and Nutrition'.
- 41 Gliessman, *Agroecology*.
- 42 FAO Commission on Genetic Resources for Food and Agriculture, *The State of the World's Biodiversity for Food and Agriculture* (Rome, Italy: FAO, 2019), <https://www.fao.org/3/CA3129EN/CA3129EN.pdf>; FAO, 'Agroecology Knowledge Hub. What Is Agroecology?', Food and Agriculture Organization of the United Nations, accessed 17 February 2022, <http://www.fao.org/agroecology/overview/en/>.
- 43 Carson, *Silent Spring*.
- 44 Obach, *Organic Struggle*.
- 45 Rodale Institute, *The Story of Rodale Institute: Pioneer of the Organic Movement in America Since 1947*, 2016, <https://www.youtube.com/watch?v=FoHws3VvtrM>.
- 46 Rodale Institute, 'Regenerative Organic Agriculture and Climate Change: A down-to-Earth Solution to Global Warming' (Rodale Institute, 2014).
- 47 Rodale Institute, 7.
- 48 Ken E. Giller et al., 'Regenerative Agriculture: An Agronomic Perspective', *Outlook on Agriculture* 50, no. 1 (1 March 2021): 13–25, <https://doi.org/10.1177/0030727021998063>.
- 49 Richard R. Harwood, 'International Overview of Regenerative Agriculture', in *Resource-Efficient Farming Methods for Tanzania* (Emmaus, PA: Rodale Press, 1983).
- 50 Charles A. Francis, Richard R. Harwood, and James F. Parr, 'The Potential for Regenerative Agriculture in the Developing World', *American Journal of Alternative Agriculture* 1, no. 2 (ed 1986): 73, <https://doi.org/10.1017/S0889189300000904>.
- 51 Christopher J. Rhodes, 'Feeding and Healing the World: Through Regenerative Agriculture and Permaculture', *Science Progress* 95, no. 4 (1 December 2012): 443, <https://doi.org/10.3184/003685012X13504990668392>.
- 52 Rodale Institute, 'Regenerative Organic Agriculture and Climate Change: A down-to-Earth Solution to Global Warming'.
- 53 Christopher J. Rhodes, 'The Imperative for Regenerative Agriculture', *Science Progress* (1933-) 100, no. 1 (2017): 80–129, <https://doi.org/10.2307/26406369>.
- 54 Africa Regenerative Agriculture Study Group, 'Regenerative Agriculture: An Opportunity for Businesses and Society to Restore Degraded Land in Africa' (International Union for Conservation of Nature, 2021), https://www.iucn.org/sites/dev/files/regenerative_agriculture_in_africa_report_2021.pdf.
- 55 Oakland Institute, 'Regenerative Agriculture in Senegal', [oaklandinstitute.org](https://www.oaklandinstitute.org/regenerative-agriculture-senegal), 15 November 2015, <https://www.oaklandinstitute.org/regenerative-agriculture-senegal>.
- 56 Regeneration International, 'What Is Regenerative Agriculture?', 16 February 2017, <https://regenerationinternational.org/why-regenerative-agriculture/>.
- 57 IPES Food et al., 'A Unifying Framework for Food Systems Transformation: A Call for Governments, Private Companies & Civil Society to Adopt 13 Key Principles' (IPES Food, 2021), https://www.ipes-food.org/_img/upload/files/sfsENhq.pdf.
- 58 Regenerative Agriculture Alliance, 'A Regenerative Agriculture Industry Alliance for Thriving Businesses, People and Planet', 2022, <https://www.regenagalliance.org/>.
- 59 L. Schreefel et al., 'Regenerative Agriculture – the Soil Is the Base', *Global Food Security* 26 (1 September 2020): 100404, <https://doi.org/10.1016/j.gfs.2020.100404>.
- 60 Duru, Michel, Jean-Pierre Sarthou, and Olivier Therond, 'L'agriculture régénératrice: summum de l'agroécologie ou greenwashing?', *Cahiers Agricultures* 31 (2022) <https://doi.org/10.1051/cagri/2022014>.
- 61 Joe Fassler, 'Regenerative Agriculture Needs a Reckoning', *The Counter*, 3 May 2021, <https://thecounter.org/regenerative-agriculture-racial-equity-climate-change-carbon-farming-environmental-issues/>.

- 62 Kathy MacKinnon and Valerie Hickey, 'Nature-Based Solutions to Climate Change', *Oryx* 43, no. 1 (January 2009): 15–16; Leslie Mabon, 'Nature-Based Solutions and the Green Economy', COP26 Briefing Series (London: The British Academy, 2021), <https://www.thebritishacademy.ac.uk/publications/nature-based-solutions-and-the-green-economy/>; Dóra Almássy, 'Realising the Potential of Nature-Based Solutions for a Transformative Societal Change', COP26 Briefing Series (London: The British Academy, 14 January 2022), <https://doi.org/10.5871/bacop26/9780856726781.001>.
- 63 Emmanuelle Cohen-Shacham et al., 'Nature-Based Solutions to Address Global Societal Challenges', IUCN: Gland, Switzerland 97 (2016): 2016–36; Haibin Chen et al., 'A Two-Step Strategy for Developing Cultivated Pastures in China That Offer the Advantages of Ecosystem Services', *Sustainability* 8, no. 4 (April 2016): 392, <https://doi.org/10.3390/su8040392>.
- 64 Cohen-Shacham et al., 'Nature-Based Solutions to Address Global Societal Challenges', xii.
- 65 IUCN, 'No Time to Lose – Make Full Use of Nature-Based Solutions in the Post-2012 Climate Change Regime' (International Union for Conservation of Nature, 2009), https://www.iucn.org/sites/dev/files/import/downloads/iucn_position_paper_unfccc_cop_15.pdf.
- 66 IUCN, 'Defining Nature-Based Solutions' (International Union for Conservation of Nature, 2016), 1, https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2016_RES_069_EN.pdf.
- 67 UNEP, 'UN Environment Assembly concludes with 14 resolutions to curb pollution, protect and restore nature worldwide', 2 March 2022, <https://www.unep.org/news-and-stories/press-release/un-environment-assembly-concludes-14-resolutions-curb-pollution>.
- 68 Diane B. Holdorf et al., 'What Is "nature-Positive" and Why Is It the Key to Our Future?', World Economic Forum, 23 June 2021, <https://www.weforum.org/agenda/2021/06/what-is-nature-positive-and-why-is-it-the-key-to-our-future/>; WEF, 'Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy' (Cologny/Geneva Switzerland: World Economic Forum in collaboration with PwC, 2020), https://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf.
- 69 Yvonne Walz et al., 'Coherence and Alignment among Sustainable Land Management, Ecosystem-Based Adaptation, Ecosystem-Based Disaster Risk Reduction and Nature-Based Solutions' (United Nations University - Institute for Environment and Human Security, November 2021), 32, <https://doi.org/10.53324/MWGP9896>.
- 70 Wezel et al., 'Agroecology as a Science, a Movement and a Practice. A Review'.
- 71 Nishiuchi, 'On Agroecology (as an Advancing Direction of Agricultural Meteorology)'.
- 72 W. Dazhong and D. Pimentel, 'Seventeenth Century Organic Agriculture in China: II. Energy Flows through an Agroecosystem in Jiaying Region', *Human Ecology* 14, no. 1 (1986): 15–28, <https://doi.org/10.1007/BF00889208>.
- 73 T.M. Lynch-Caris, J. Weaver, and D.K. Kleinke, 'Biomimicry Innovation as a Tool for Design', 2012.
- 74 G. Capotorti et al., 'Setting Priorities for Urban Forest Planning. A Comprehensive Response to Ecological and Social Needs for the Metropolitan Area of Rome (Italy)', *Sustainability (Switzerland)* 7, no. 4 (2015): 3958–76, <https://doi.org/10.3390/su7043958>.
- 75 T.S. Cox et al., 'Breeding Perennial Grain Crops', *Critical Reviews in Plant Sciences* 21, no. 2 (2002): 59–91, <https://doi.org/10.1080/0735-260291044188>.
- 76 Francis, Harwood, and Parr, 'The Potential for Regenerative Agriculture in the Developing World'.
- 77 Nishiuchi, 'On Agroecology (as an Advancing Direction of Agricultural Meteorology)'.
- 78 Dazhong and Pimentel, 'Seventeenth Century Organic Agriculture in China'.
- 79 Altieri and Trujillo, 'The Agroecology of Corn Production in Tlaxcala, Mexico'; Mountjoy and Gliessman, 'Traditional Management of a Hillside Agroecosystem in Tlaxcala, Mexico'; Altieri, *Agroecology*.
- 80 Daw, 'Experiences in Success - Case Studies in Growing Enough Food Through Regenerative Agriculture - Tull, k, Sands, m'; Francis, Harwood, and Parr, 'The Potential for Regenerative Agriculture in the Developing World'.
- 81 MacKinnon and Hickey, 'Nature-Based Solutions to Climate Change'.
- 82 Capotorti et al., 'Setting Priorities for Urban Forest Planning. A Comprehensive Response to Ecological and Social Needs for the Metropolitan Area of Rome (Italy)'; Chen et al., 'A Two-Step Strategy for Developing Cultivated Pastures in China That Offer the Advantages of Ecosystem Services'.
- 83 W. Jackson, 'Natural Systems Agriculture: The Truly Radical Alternative', in *Recovering the Prairie*, ed. R. F. Sayre (Madison: Univ Wisconsin Press, 1999), 191–99, <http://www.webofscience.com/wos/woscc/full-record/WOS:000086566100012>.
- 84 UNFSS, 'UNFSS: Pre-Summit', 2021, <https://www.un.org/en/food-systems-summit/pre-summit>.
- 85 UNFSS, 'UNFSS: Documents and Reports', United Nations, 2021, <https://www.un.org/en/food-systems-summit/documentation>.
- 86 UNFSS Secretary-General's Chair, 'UNFSS Secretary-General's Chair Summary and Statement of Action on the UN Food Systems Summit', United Nations, 23 September 2021, <https://www.un.org/en/food-systems-summit/news/making-food-systems-work-people-planet-and-prosperity>.
- 87 UNFSS and The Scientific Group, 'UNFSS: Science and Innovations for Food Systems Transformation and Summit Actions' (United Nations, 2021).
- 88 UN, 'Nearly 300 Commitments from Civil Society, Farmers, Youth and Indigenous Peoples and Member States Highlights Summit's Inclusive Process to Accelerate Action', 24 September 2021, <https://www.un.org/en/food-systems-summit/news/nearly-300-commitments-civil-society-farmers-youth-and-indigenous-peoples-and>.
- 89 Agnes Kalibata, 'Indigenous Peoples Are the Best Stewards of Our Environment - the Rest of Us Pale in Comparison', *The Independent*, 5 November 2021, <https://www.independent.co.uk/climate-change/opinion/cop26-farmers-food-indigenous-peoples-climate-crisis-b1951423.html?r=9522>.
- 90 Kirtana Chandrasekaran et al., 'Exposing Corporate Capture of the UNFSS through Multistakeholderism', Liaison Group of the People's Autonomous Response to the UN Food Systems Summit (Food Systems 4 People, 23 September 2021), <https://www.foodsystems4people.org/multistakeholderism-report/>; Canfield, Duncan, and Claeys, 'Reconfiguring Food Systems Governance'.
- 91 Food Systems 4 People, 'No to corporate food systems! Yes to food sovereignty', 2021.
- 92 UNFSS and The Scientific Group, 'UNFSS: Science and Innovations for Food Systems Transformation and Summit Actions'.
- 93 UNFSS Action Track 3, 'UNFSS Action Track 3: Boost Nature-Positive Food Production at Scale - Synthesis Report Wave 1' (United Nations, 23 February 2020), <https://foodsystems4people.org/members/ophelie-hemonin/activity/2979/>.
- 94 UNFSS Action Track 3, 'UNFSS Action Track 3: Boost Nature-Positive Food Production at Scale - Synthesis Report Wave 1', 69.
- 95 UNFSS Action Track 3, 'UNFSS Action Track 3: Boost Nature-Positive Food Production at Scale - Discussion Starter'.
- 96 Diane B. Holdorf et al., 'What Is "nature-Positive" and Why Is It the Key to Our Future?', World Economic Forum, 23 June 2021, <https://www.weforum.org/agenda/2021/06/what-is-nature-positive-and-why-is-it-the-key-to-our-future/>.

- 97 G7 Leaders, 'G7 2030 Nature Compact' (Cornwall, United Kingdom: European Council / Council of the European Union, 2021), 1, <https://www.consilium.europa.eu/media/50363/g7-2030-nature-compact-pdf-120kb-4-pages-1.pdf>.
- 98 UNFSS Action Track 3, 2; UNFSS Action Track 3, 'UNFSS Action Track 3: Boost Nature-Positive Food Production at Scale - Discussion Starter' (United Nations, 10 December 2020), 4, https://www.un.org/sites/un2.un.org/files/unfss-at3-discussion_starter-dec2020.pdf; UNFSS, 'UNFSS Action Track 3: Boosting Nature-Positive Production - Synthesis Report Wave 2' (United Nations, 20 May 2021), 4, <https://foodsystems.community/members/jessica.colston/activity/6000/>.
- 99 Holdorf et al., 'What Is "nature-Positive" and Why Is It the Key to Our Future?'
- 100 UNFSS, 'UNFSS Levers of Change - Human Rights; Unlocking the Transformative Potential of a Human Rights-Based Approach', Executive Summary (United Nations, 2021), 13, <https://foodsystems.community/food-systems-summit-compendium/unfss-pre-summit-overview/the-deputy-secretary-general-statement-to-member-states/>.
- 101 UNFSS Action Track 3, 'UNFSS Action Track 3: Boost Nature-Positive Food Production at Scale - Discussion Starter', 61–89.
- 102 UNFSS, 'UNFSS Action Track 3: Boosting Nature-Positive Production - Synthesis Report Wave 2', 87.
- 103 UNFSS, 'UNFSS Levers of Change - Human Rights; Unlocking the Transformative Potential of a Human Rights-Based Approach'; UNFSS Secretary-General's Chair, 'UNFSS Secretary-General's Chair Summary and Statement of Action on the UN Food Systems Summit', United Nations, 23 September 2021, <https://www.un.org/en/food-systems-summit/news/making-food-systems-work-people-planet-and-prosperity>.
- 104 UNFSS et al., 'UNFSS Levers of Change - Food Finance Architecture: Financing a Sustainable, Nutritious Food System' (United Nations, n.d.), 8.
- 105 Partha Dasgupta, *The Economics of Biodiversity: The Dasgupta Review: Full Report*, Updated: 18 February 2021 (London: HM Treasury, 2021).
- 106 COP26, 'Climateshot.Earth', Climateshot, 2022, <https://www.climateshot.earth>.
- 107 COP26, 'COP26 Explained', 2021, <https://ukcop26.org/wp-content/uploads/2021/07/COP26-Explained.pdf>.
- 108 COP26, 'COP26: FACT Dialogues in Latin America: Multi-Stakeholder Consultation' (Brazil and Argentina, March 2021), https://www.tropicalforestalliance.org/assets/Uploads/20210319_FACT_Report_Brazil_Argentina_29March2021_CLEAN-003.pdf.
- 109 COP26, 'COP26 Explained', 7.
- 110 COP26, 11.
- 111 Dasgupta, *The Economics of Biodiversity*, 451.
- 112 Dasgupta, 456.
- 113 Dasgupta, 454.
- 114 Forest, Agriculture & Commodity Trade, 'COP26: Open Letter to COP26 FACT Dialogue Ministers for Discussion on Joint Statement at the Front of the FACT Roadmap - October 6th Ministerial Roundtables', 6 October 2021, <https://www.tropicalforestalliance.org/assets/FACT-MSTF-Letter-to-Ministers-Oct-1.pdf>.
- 115 Forest, Agriculture & Commodity Trade, 'COP26: How Can Businesses Support FACT?', 2021, <https://www.tropicalforestalliance.org/assets/How-can-Businesses-Support-FACT.pdf>.
- 116 Forest, Agriculture & Commodity Trade, 'COP26: FACT Collaboration Portal', 2021, <https://www.factdialogueportal.org/>.
- 117 Forest, Agriculture & Commodity Trade, 'COP26: FACT Outputs', 2021, <https://www.tropicalforestalliance.org/en/collective-action-agenda/cop26/outputs>.
- 118 COP26, 'COP26: FACT Dialogues in Latin America: Multi-Stakeholder Consultation'.
- 119 COP26, 'COP26: #ClimateShot - The 100 Million Farmers Multi-Stakeholder Platform', 2021, 1, https://www.climateshot.earth/s/ClimateShot-Global-Action-Agenda-Initiative_100Mfarmers.pdf.
- 120 COP26, 2.
- 121 S Snapp et al., 'Agroecology and Climate Change Rapid Evidence Review: Performance of Agroecological Approaches in Low- and Middle- Income Countries.' (Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), 2021), <https://cgispace.cgiar.org/handle/10568/113487>.
- 122 Forest, Agriculture & Commodity Trade, 'COP26: Open Letter to COP26 FACT Dialogue Ministers for Discussion on Joint Statement at the Front of the FACT Roadmap - October 6th Ministerial Roundtables'.
- 123 WBCSD, 'Regen10 to Work with over 500 Million Farmers to Scale Regenerative Food Production by 2030', World Business Council for Sustainable Development (WBCSD), 2021, paras 1–2, <https://www.wbcd.org/ugc8e>.
- 124 UNFCCC, 'Koronivia Joint Work on Agriculture: Sustainable Land and Water Management, Including Integrated Watershed Management Strategies, to Ensure Food Security' (Subsidiary Body for Scientific and Technological Advice, United Nations Framework Convention on Climate Change, 2021), 4.
- 125 UNFCCC, 9.
- 126 UNEP, '“High Level Policy Forum and Dialogue - Collaboration and Cooperation: The Role of Communities, Science and NGOs in Biodiversity Conservation and Utilization” Successfully Held in Kunming, China', UN Environment Programme, 29 October 2021, http://www.unep-imp.org/newsInfo_306.html.
- 127 COP15, 'COP15: Report of the Conference of the Parties to the Convention on Biological Diversity on Its Fifteenth Meeting (Part I)', 15 October 2021, <https://www.cbd.int/doc/c/d707/6fca/f76569ac6b47ae9930a3b251/cop-15-04-en.pdf>.
- 128 Convention on Biological Diversity, 'COP15: Commitment to Sourcing with Respect for People and Biodiversity', 29 June 2021, <https://www.cbd.int/action-agenda/contributions/action/?action-id=60d23409fdbd000001442b32>.
- 129 Laurie Goering, 'What Is the COP15 Biodiversity Summit, and Why Is It so Important?', *Thomson Reuters Foundation*, 11 October 2021, sec. News, <https://news.trust.org/item/20210616131101-kf2j0/>.
- 130 High-Level Segment of the UN Biodiversity Conference 2020 (Part 1), 'COP15: Kunming Declaration', 13 October 2021, 4, <https://www.cbd.int/doc/c/df35/4b94/5e86e1ee09bc8c7d4b35aaf0/kunmingdeclaration-en.pdf>.
- 131 Convention on Biological Diversity, 'COP15: Report by the Co-Leads of Contact Group 3, Targets 9-13; Meeting People's Needs through Sustainable Use and Benefit-Sharing', 2 September 2021, 2, <https://www.cbd.int/doc/c/c/2df7/b027/df61d0d6d40702f37b60aabe/wg2020-03-cg-03-report-en.pdf>.

- 132 Convention on Biological Diversity, 30–33.
- 133 Convention on Biological Diversity, 'COP15: Report by the Co-Leads of Contact Group 2, Targets 1 to 8: "Reducing Threats for Biodiversity"', 7 September 2021, 29, <https://www.cbd.int/doc/c/630c/b3b6/123a8b952cf5995dd584d18c/wg2020-03-cg-02-report-en.pdf>.
- 134 Convention on Biological Diversity, 'COP15: Report by the Co-Leads of Contact Group 3, Targets 9–13; Meeting People's Needs through Sustainable Use and Benefit-Sharing', 9.
- 135 Convention on Biological Diversity, 'COP15: Report by the Co-Leads of Contact Group 2, Targets 1 to 8: "Reducing Threats for Biodiversity"', 28.
- 136 FAO, *Regenerative Agriculture: Good Practices for Small Scale Agricultural Producers* (Rome, Italy: FAO, 2021), <https://www.fao.org/publications/card/en/c/CB6018EN/>.
- 137 Keyu Bai, 'Sowing Diversity, Harvesting Security: Alliance Scientists Participate in the UN Biodiversity Conference (COP15)', Alliance of Bioversity International and the International Center for Tropical Agriculture, 20 October 2021, <https://alliancebioversityciat.org/stories/sowing-diversity-harvesting-security-alliance-cop15>; UNEP, 'High Level Policy Forum and Dialogue - Collaboration and Cooperation: The Role of Communities, Science and NGOs in Biodiversity Conservation and Utilization' Successfully Held in Kunming, China'.
- 138 Canfield, Duncan, and Claes, 'Reconfiguring Food Systems Governance'.
- 139 Nestlé, 'Nestlé: Annual Report 2021' (Nestlé, 2021), <https://www.nestle.com/sites/default/files/2022-03/2021-annual-review-en.pdf>; Nestlé Scientists Discover Unique Low Carbon and Drought Resistant Coffee Varieties', 19 April 2021, <https://www.nestle.com/media/news/nestle-scientists-discover-unique-low-carbon-drought-resistant-coffee-varieties>.
- 140 Walmart, 'Walmart Sets Goal to Become a Regenerative Company', 21 September 2020, <https://corporate.walmart.com/newsroom/2020/09/21/walmart-sets-goal-to-become-a-regenerative-company>.
- 141 Nestlé, 'Regenerative Agriculture: Living Soils for Healthy Food' (Nestlé, n.d.), <https://www.nestle.com/sites/default/files/2021-09/regenerative-agriculture.pdf>.
- 142 Unilever, 'The Unilever Regenerative Agriculture Principles with Implementation Guides', 2021, 41, <https://assets.unilever.com/files/92ui5egz/production/489410442380812907bc3d97be02ccda1a44ab4b.pdf>.
- 143 Syngenta, 'Strive for Carbon Neutral Agriculture', accessed 23 March 2022, <https://www.syngenta.com/en/sustainability/good-growth-plan/strive-carbon-neutral-agriculture>.
- 144 John Laney, 'Driving Regeneration in Agriculture' (Walmart, 1 September 2021), <https://corporate.walmart.com/newsroom/2021/09/01/driving-regeneration-in-agriculture>; Walmart, 'Walmart Environmental, Social and Governance FY2021 Summary' (Walmart, 2021), <https://corporate.walmart.com/esgreport/>.
- 145 Unilever, 'Working Together to Protect Nature', 29 November 2021, <https://www.unilever.com/news/news-search/2021/working-together-to-protect-nature/>.
- 146 General Mills, 'Global Responsibility 2021', 2021, <https://globalresponsibility.generalmills.com/HTML1/tiles.htm>.
- 147 General Mills, 'General Mills and NFWF Announce Partnership to Accelerate the Adoption of Regenerative Agriculture', 11 May 2021, <https://www.generalmills.com/news/press-releases/general-mills-and-nfwf-announce-partnership-to-accelerate-the-adoption-of-regenerative-agriculture>.
- 148 General Mills, 'Supporting Dairy Farmers in France', 24 November 2021, <https://www.generalmills.com/news/stories/supporting-dairy-farmers-in-france>.
- 149 Rockefeller Foundation, 'Food Systems Game Changers Lab Announces Global Open Call for Innovative Ideas to Transform Global Food Systems in Support of First-Ever UN Food Systems Summit', 24 March 2021, para. 2, <https://www.rockefellerfoundation.org/news/global-open-call-for-first-ever-un-food-systems-summit/>.
- 150 Rockefeller Foundation, 'Rockefeller Foundation Commits USD 105M to Make Healthy Foods Accessible', 24 March 2022, para. 1, <https://nnn.ng/rockefeller-foundation-commits-2/>.
- 151 McKnight Foundation, 'AEI What & Why', accessed 24 March 2022, <https://www.ccrp.org/how-we-work/agroecological-intensification/>.
- 152 See <https://www.ccrp.org/how-we-work/agroecological-intensification/> for details on knowledge hubs based in Kenya, Malawi, Niger and Tanzania.
- 153 McKnight Foundation.
- 154 Enock Chikava, 'The World Food System Is Under Threat. It Doesn't Have to Be That Way.', Bill & Melinda Gates Foundation, 18 March 2022, <https://www.gatesfoundation.org/ideas/articles/war-in-ukraine-and-global-food-crisis>.
- 155 Bill & Melinda Gates Foundation, 'Agriculture: 2019 Progress', 2019, <https://www.gatesfoundation.org/ideas/2019-year-in-review/agriculture>.
- 156 Bill & Melinda Gates Foundation, 'Committed Grants: United Nations Environment Programme', December 2021, <https://www.gatesfoundation.org/about/committed-grants/2021/12/inv030313>.
- 157 Alliance for Science, 'Relying on Agroecology Will Jeopardize Africa's Food Security, Ag Official Warns', 3 December 2020, <https://allianceforscience.cornell.edu/blog/2020/12/relying-on-agroecology-will-jeopardize-africas-food-security-ag-official-warns/>.
- 158 World Bank Group, 'Climate-Smart Agriculture', 5 August 2021, 4, <https://www.worldbank.org/en/topic/climate-smart-agriculture>.
- 159 World Bank Group, 'World Bank Group Climate Change Action Plan 2021–2025' (World Bank Group, 2021), <https://openknowledge.worldbank.org/handle/10986/35799>.
- 160 EU Joint Programming, 'European Joint Programming for Lao People's Democratic Republic 2021–2024', 2021, 15, https://ec.europa.eu/international-partnerships/system/files/mip-2021-c2021-9087-laos-annex_en.pdf.
- 161 European Commission, 'Strategic Plan 2020–2024' (Directorate-General for International Cooperation and Development, 2020), https://ec.europa.eu/info/system/files/devco_sp_2020_2024_en.pdf.
- 162 GIZ, 'What Is Sustainable Agriculture?' (Bonn and Eschborn, Germany: Deutsche Gesellschaft für and Internationale Zusammenarbeit (GIZ), 2015), <https://www.giz.de/en/downloads/giz2015-en-what-is-sustain-agric.pdf>.
- 163 GIZ, GIZ, 'Fund for the Promotion of Innovation in Agriculture', 2020, <https://www.giz.de/en/worldwide/94538.html>.
- 164 German Federal Ministry for Economic Cooperation and Development (BMZ), 'Climate Change and Rural Development: Climate Policy Engagement in the Agriculture and Food Sectors', January 2021, 1.
- 165 USAID, 'Fiscal Year 2021 Agency Financial Report', 12 November 2021, 15, https://www.usaid.gov/sites/default/files/documents/USAID_FY2021_AFR_508.pdf.

- 166 Feed the Future, 'U.S. Government Global Food Security Strategy: Fiscal Year 2022-2026', 18 October 2021, 28-32, https://cg-281711fb-71ea-422c-b02c-ef79f539e9d2.s3.us-gov-west-1.amazonaws.com/uploads/2021/10/Global-Food-Security-Strategy-FY22-26_508C.pdf.
- 167 *Maps of JICA Major Projects* (Japan International Cooperation Agency (JICA)), accessed 7 April 2021, https://libportal.jica.go.jp/library/Data/PlanInOperation-e/Africa/630_Mozambique-e.pdf.
- 168 Japan International Cooperation Agency, 'Project for Smallholder Horticulture Farmer Empowerment through Promotion of Market-Oriented Agriculture (Ethio-SHEP)', 12 May 2019, <https://www.jica.go.jp/project/english/ethiopia/010/index.html>; Japan International Cooperation Agency, 'Project for Market-Oriented Smallholder Horticulture Empowerment and Promotion (MA-SHEP)', 12 August 2021, <https://www.jica.go.jp/project/english/malawi/006/index.html>; Japan International Cooperation Agency, 'Clean Agriculture Development Project', 21 February 2022, <https://www.jica.go.jp/project/english/laos/026/index.html>.
- 169 Japan International Cooperation Agency, 'Improving Rice Production for Smallholders Project', 15 July 2021, <https://www.jica.go.jp/project/english/iberia/002/outline/index.html>.
- 170 Japan International Cooperation Agency, 'Agricultural and Rural Development: Coalition for African Rice Development', accessed 27 March 2022, https://www.jica.go.jp/english/our_work/thematic_issues/agricultural/card.html.
- 171 European Commission, 'Horizon Europe', accessed 30 March 2022, https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en.
- 172 European Commission, Horizon Europe: *Strategic Plan 2021-2024* (Directorate-General for Research and Innovation, 2021), <https://doi.org/10.2777/083753>.
- 173 European Commission, 13.
- 174 European Commission, 'Horizon Europe'.
- 175 IDRC, 'Climate-Resilient Food Systems', accessed 30 March 2022, <https://idrc.ca/en/program/climate-resilient-food-systems>.
- 176 IDRC, 'Navigating Trade-Offs in Agroecology in West Africa's Food Systems', accessed 30 March 2022, <https://idrc.ca/en/project/navigating-trade-offs-agroecology-west-africas-food-systems>.
- 177 IDRC, 'Regenerative Agribusiness and Investment with a Gender Lens in the Amazonia and Central America Dry Corridor', accessed 30 March 2022, <https://idrc.ca/en/project/regenerative-agribusiness-and-investment-gender-lens-amazonia-and-central-america-dry>.
- 178 IDRC, 'Gaza Food Connections - towards Resilient Women-Led Urban Agroecological Farming Initiatives', accessed 30 March 2022, <https://idrc.ca/en/project/gaza-food-connections-towards-resilient-women-led-urban-agroecological-farming-initiatives>.
- 179 UKRI, 'Molecule to Landscapes: Building Interdisciplinary Capabilities', 24 March 2022, <https://www.ukri.org/opportunity/molecules-to-landscapes-building-interdisciplinary-capabilities/>.
- 180 UKRI, 'Collaborating for Health, Resilient and Sustainable Agricultural Soils', 7 September 2021, <https://www.ukri.org/opportunity/collaborating-for-healthy-resilient-and-sustainable-agricultural-soils/>.
- 181 UKRI, 'UKRI and Defra Open Two New Collaborative R&D Competitions', 2022, <https://www.ukri.org/news/ukri-and-defra-open-two-new-collaborative-rd-competitions/>.
- 182 UKRI, 'Healthier Food, Healthier Planet: Transforming Food Systems', 28 December 2020, <https://www.ukri.org/news/healthier-food-healthier-planet-transforming-food-systems/>.
- 183 UKRI, para. 8.
- 184 Steve Gliessman, 'Defining Agroecology', *Agroecology and Sustainable Food Systems* 42, no. 6 (3 July 2018): 599, <https://doi.org/10.1080/21683565.2018.1432329>.
- 185 UNFSS, 'UNFSS Action Track 3: Boosting Nature-Positive Production - Synthesis Report Wave 2', 87.
- 186 UNFSS, 'UNFSS Action Track 3: Boosting Nature-Positive Production - Synthesis Report Wave 2', 87.
- 187 Charles A. Francis, Richard R. Harwood, and James F. Parr, 'The Potential for Regenerative Agriculture in the Developing World', *American Journal of Alternative Agriculture* 1, no. 2 (ed 1986): 73, <https://doi.org/10.1017/S0889189300000904>.
- 188 Unilever, 'The Unilever Regenerative Agriculture Principles with Implementation Guides', 41.
- 189 F. Miralles-Wilhelm, *Nature-Based Solutions in Agriculture – Sustainable Management and Conservation of Land, Water, and Biodiversity* (Virginia: FAO and The Nature Conservancy, 2021), <https://doi.org/10.4060/cb3140en>.
- 190 Dasgupta, *The Economics of Biodiversity*, 456.
- 191 Imogen Bellwood-Howard and Santiago Ripoll, 'Divergent Understandings of Agroecology in the Era of the African Green Revolution', *Outlook on Agriculture* 49, no. 2 (1 June 2020): 103–10, <https://doi.org/10.1177/0030727020930353>.
- 192 FAO, *The 10 Elements of Agroecology: Guiding the Transition to Sustainable Food and Agricultural Systems* (Rome, Italy: FAO, 2018), <https://www.fao.org/documents/card/en/c/19037EN/>.
- 193 HLPE, 'Agroecological and Other Innovative Approaches for Sustainable Agriculture and Food Systems That Enhance Food Security and Nutrition' (High Level Panel of Experts on Food Security and Nutrition, 2019), <https://www.fao.org/3/ca5602en/ca5602en.pdf>.
- 194 Chandrasekaran et al., 'Exposing Corporate Capture of the UNFSS through Multistakeholderism'; Matthew Canfield, Molly D. Anderson, and Philip McMichael, 'UN Food Systems Summit 2021: Dismantling Democracy and Resetting Corporate Control of Food Systems', *Frontiers in Sustainable Food Systems* 5 (2021), <https://www.frontiersin.org/article/10.3389/fsufs.2021.661552/>.
- 195 Canfield, Duncan, and Claeys, 'Reconfiguring Food Systems Governance'.
- 196 Canfield, Duncan, and Claeys; Lorenzo Cotula, 'Food Systems Summit: Implications for Global Food Governance', International Institute for Environment and Development, 30 September 2021, <https://www.iied.org/food-systems-summit-implications-for-global-food-governance>; Nicholas Nisbett et al., 'Equity and Expertise in the UN Food Systems Summit', *BMJ Global Health* 6, no. 7 (1 July 2021): e006569, <https://doi.org/10.1136/bmjgh-2021-006569>.
- 197 Nora McKeon, 'Transforming Global Governance in the Post-2015 Era: Towards an Equitable and Sustainable World', *Globalizations* 14, no. 4 (7 June 2017): 488, <https://doi.org/10.1080/14747731.2016.1244757>.
- 198 Chandrasekaran et al., 'Exposing Corporate Capture of the UNFSS through Multistakeholderism'.

- 199 Chandrasekaran et al., 8.
- 200 Canfield, Duncan, and Claeys, 'Reconfiguring Food Systems Governance'.
- 201 UNFSS and The Scientific Group, 'UNFSS: Science and Innovations for Food Systems Transformation and Summit Actions'.
- 202 Canfield, Duncan, and Claeys, 'Reconfiguring Food Systems Governance', 186.
- 203 Chandrasekaran et al., 'Exposing Corporate Capture of the UNFSS through Multistakeholderism'; Canfield, Duncan, and Claeys, 'Reconfiguring Food Systems Governance'; Matthew Canfield, Molly D. Anderson, and Philip McMichael, 'UN Food Systems Summit 2021: Dismantling Democracy and Resetting Corporate Control of Food Systems', *Frontiers in Sustainable Food Systems* 5 (2021), <https://www.frontiersin.org/article/10.3389/fsufs.2021.661552>.
- 204 UNFSS, 'UNFSS: Member State Dialogues - Synthesis Report 3' (United Nations, September 2021), 13, <https://www.un.org/en/food-systems-summit/documentation>.
- 205 Phoebe Wetson and Jonathan Watts, 'The Cow in the Room: Why Is No One Talking about Farming at Cop26?', *The Guardian*, 9 November 2021, <https://www.theguardian.com/environment/2021/nov/09/the-cow-in-the-room-why-is-no-one-talking-about-farming-at-cop26-aqe>.
- 206 Marc Fawcett-Atkinson, 'Focus on Food Technology at Climate Conference Ignores What Most of the World's Farmers Need, Experts Say', *Canada's National Observer*, 8 November 2021, <https://www.nationalobserver.com/2021/11/08/news/focus-food-technology-climate-conference-ignores-what-most-worlds-farmers-need>.
- 207 Friends of the Earth International, 'Convention on Biological Diversity', *Friends of the Earth International* (blog), accessed 15 March 2022, <https://foei.org/what-we-do/forests-and-biodiversity/convention-on-biological-diversity/>.
- 208 Kirtana Chandrasekaran et al., 'Nature Based Solutions: A Wolf in Sheep's Clothing' (Friends of the Earth International, 2021), 3, https://www.foei.org/wp-content/uploads/2021/11/Nature-based-solutions_a-wolf-in-sheeps-clothing.pdf.
- 209 Grain, 'Corporate Greenwashing: "Net Zero" and "Nature-Based Solutions" Are a Deadly Fraud', 2021, <https://grain.org/en/article/6634-corporate-greenwashing-net-zero-and-nature-based-solutions-are-a-deadly-fraud>.
- 210 Peter M. Rosset and Miguel A. Altieri, *Agroecology: Science and Politics* (Fernwood Publishing, 2017), 121.
- 211 Melissa Leach et al., 'Equity and Sustainability in the Anthropocene: A Social-Ecological Systems Perspective on Their Intertwined Futures', *Global Sustainability* 1 (ed 2018), <https://doi.org/10.1017/sus.2018.12>; Melissa Leach, Ian Scoones, and Andy Stirling, eds., *Dynamic Sustainabilities: Technology, Environment, Social Justice, Pathways to Sustainability Series* (London: Earthscan, 2010).
- 212 Kate Raworth, *Doughnut Economics: Seven Ways to Think like a 21st-Century Economist* (London: Random House Business Books, 2017).
- 213 Melissa Leach et al., 'Transforming Innovation for Sustainability', *Ecology and Society* 17, no. 2 (2012), <https://doi.org/10.5751/ES-04933-170211>.
- 214 Nora McKeon, 'Global Food Governance', *Development* 64, no. 1 (1 June 2021): 48–55, <https://doi.org/10.1057/s41301-021-00299-9>.
- 215 Jennifer Clapp, 'The Trade-Ification of the Food Sustainability Agenda', *The Journal of Peasant Studies* 44, no. 2 (4 March 2017): 335–53, <https://doi.org/10.1080/03066150.2016.1250077>; Jennifer Clapp et al., *Corporate Power in Global Agrifood Governance*, Food, Health, and the Environment (Cambridge: The MIT Press, 2009), <https://doi.org/10.7551/mitpress/9780262012751.001.0001>; Jennifer Clapp, Indra Noyes, and Zachary Grant, 'The Food Systems Summit's Failure to Address Corporate Power', *Development* 64 (3) (2021): 192–98, <https://doi.org/10.1057/s41301-021-00303-2>; Doris Fuchs and Agni Kalfagianni, 'Private Food Governance: Implications for Social Sustainability and Democratic Legitimacy', in *Corporate Social Responsibility and Regulatory Governance: Towards Inclusive Development?*, ed. Peter Utting and José Carlos Marques (London: Palgrave Macmillan UK, 2010), 225–47, https://doi.org/10.1057/9780230246966_10; McKeon, 'Transforming Global Governance in the Post-2015 Era'.
- 216 Elsa Reimerson, 'Between Nature and Culture: Exploring Space for Indigenous Agency in the Convention on Biological Diversity', *Environmental Politics* 22, no. 6 (1 November 2013): 1003, <https://doi.org/10.1080/09644016.2012.737255>.
- 217 STEPS Centre, 'Innovation, Sustainability and Development: A New Manifesto' (Brighton: STEPS Centre, 2010), <https://steps-centre.org/publication/innovation-sustainability-development-a-new-manifesto/>.
- 218 Melissa Leach et al., 'Food Politics and Development', *World Development* 134 (1 October 2020): 105024, <https://doi.org/10.1016/j.worlddev.2020.105024>.
- 219 Leach, Scoones, and Stirling, *Dynamic Sustainabilities*; Leach et al., 'Equity and Sustainability in the Anthropocene'; Raworth, *Doughnut Economics*; Leach et al., 'Transforming Innovation for Sustainability'.
- 220 Miguel A. Altieri, 'Beyond Agroecology: Making Sustainable Agriculture Part of a Political Agenda', *American Journal of Alternative Agriculture* 3, no. 4 (1988): 142–43, <https://doi.org/10.1017/S0889189300002411>.
- 221 Saturnino M. Borras, Marc Edelman, and Cristóbal Kay, 'Transnational Agrarian Movements: Origins and Politics, Campaigns and Impact', in *Transnational Agrarian Movements Confronting Globalization* (Oxford: Wiley-Blackwell, 2008), 1–36.
- 222 Paulo Petersen, Eros Marion Mussoi, and Fabio Dal Soglio, 'Institutionalization of the Agroecological Approach in Brazil: Advances and Challenges', *Agroecology and Sustainable Food Systems* 37, no. 1 (1 January 2013): 103–14, <https://doi.org/10.1080/10440046.2012.735632>.
- 223 Laney, 'Driving Regeneration in Agriculture'.
- 224 Kyla Mandel, 'Walmart Has a Plan to Tackle the Climate Crisis. Can It Pull It Off?', *The Guardian*, 23 September 2021, <https://www.theguardian.com/environment/2021/sep/13/walmart-climate-change-plan-can-it-work>.
- 225 Mandel.
- 226 Chikava, 'The World Food System Is under Threat. It Doesn't Have to Be That Way.'
- 227 Abdallah Ramadhani Mkindi et al., False Promises: *The Alliance for a Green Revolution in Africa (AGRA)*, ed. Barbara Hime (Biodiversity and Biosafety Association of Kenya, Brot für die Welt, FIAN Germany, German NGO Forum on Environment and Development, INKOTA-netzwerk e.V., Institut de Recherche et de Promotion des Alternatives en Développement, PELUM Zambia, Rosa Luxemburg Stiftung Southern Africa, Tanzania Alliance for Biodiversity, Tanzania Organic Agriculture Movement, 2020), https://www.rosalux.de/fileadmin/rls_uploads/pdfs/Studien/False_Promises_AGRA_en.pdf; Jan Urhahn, 'Bill Gates's Foundation Is Leading a Green Counterrevolution in Africa', *Jacobin*, 27 December 2020, <https://www.jacobinmag.com/2020/12/agribusiness-gates-foundation-green-revolution-africa-agra>; Million Belay and Bridget Mugambe, 'Bill Gates Should Stop Telling Africans What Kind of Agriculture Africans Need', *Scientific American*, 6 July 2021, <https://www.scientificamerican.com/article/bill-gates-should-stop-telling-africans-what-kind-of-agriculture-africans-need1/>.

ACKNOWLEDGEMENTS

The authors thank the working group at IPES-Food overseeing this study (Molly Anderson, Emile Frison, Mamadou Goïta, Philip Howard, Melissa Leach, Desmond McNeill, Cecilia Rocha, Ricardo Salvador) for their useful contributions and the stimulating discussions that informed this report. They also thank Nicole Pita at the IPES-Food Secretariat for her invaluable role in managing the interactions and keeping everyone on track. Any errors of omissions in this report are the authors' responsibility and should not be attributed to IPES-Food or the Institute of Development Studies.

ABOUT IPES-FOOD

The International Panel of Experts on Sustainable Food Systems (IPES-Food) seeks to inform debates on food systems reform through policy-oriented research and direct engagement with policy processes around the world. The expert panel brings together environmental scientists, development economists, nutritionists, agronomists, and sociologists, as well as experienced practitioners from civil society and social movements. The panel is co-chaired by Olivier De Schutter, UN Special Rapporteur on extreme poverty and human rights, and Maryam Rahmanian, independent expert on agriculture and food systems.

www.ipes-food.org

ABOUT IDS

The Institute of Development Studies (IDS) delivers world-class research, learning and teaching that transforms the knowledge, action and leadership needed for more equitable and sustainable development globally. Through equitable and sustainable partnerships, we work with governments, philanthropic foundations, non-governmental organisations, academics, and civil society to transform approaches to progressive social, political and economic change in ways that ultimately make a difference to people's lives.

www.ids.ac.uk

Sponsored by the Rosa Luxemburg Stiftung with funds of the Federal Ministry for Economic Cooperation and Development of the Federal Republic of Germany. This publication or parts of it can be used by others for free as long as they provide a proper reference to the original publication.

The content of the publication is the sole responsibility of IPES-Food and does not necessarily reflect the position of the Rosa Luxemburg Stiftung or the Institute of Development Studies.

With support from:

