BIODIVERSITY AND CLIMATE ACTION IN AGRICULTURE AND FOOD SYSTEMS

Opportunities for Building Synergies

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Biodiversity and Climate Action in Agriculture and Food Systems: Opportunities for Building Synergies
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1. INTRODUCTION

The climate and biodiversity crises are not only major global challenges on their own, but also compound one another. Both crises – and their societal and environmental impacts – are inextricably linked. Climate change and its associated ecosystem disruption are key drivers of biodiversity loss.[1] The loss of biodiversity, in turn, reduces ecosystems' capacities to weather the effects of climate change and provide vital services.[2] Global biodiversity also plays a role in climate regulation and carbon sequestration.[3]

These links are even stronger within agriculture and food systems. Biodiversity loss is closely tied to food systems, posing a significant concern for both ecosystems and human wellbeing. Despite the importance of biodiversity for sustaining food systems, the global food system is the primary driver of biodiversity loss. Agriculture, especially over the last 50 years, stands out as the main driver of habitat loss, accounting for 80% of all global land-use changes, primarily through the conversion of natural ecosystems for crop production and pastures.[4] The impact habitat loss and fragmentation on biodiversity can vary substantially across biomes and geographies.[5] However, in 65% of terrestrial ecosystems, land-use pressures have been associated with a loss of biodiversity intactness that exceeded the threshold[6] identified as 'safe operating space' for biodiversity in the Planetary Boundary framework.[7]

The expansion of agriculture also harms freshwater and marine ecosystems. Farming activities often affect water quantity and quality through water extraction, water runoff and soil erosion, and chemical pollution.[8] Water depletion and contamination impact native vegetation aquatic ecosystems,[9] with direct consequences for wildlife in both freshwater and marine systems. Furthermore, the dominance of a few livestock species, especially cows and pigs, has altered the distribution of global biomass. Livestock constitute 60% of all mammal species by biomass, compared to 4% represented by wild mammals and 36% by humans.[10] In marine ecosystems, overexploitation is one of the main drivers of biodiversity loss, together with climate change and pollution.[11] Indirectly, food systems also drive biodiversity loss through their contribution to climate change – changing habitat conditions and affecting the resilience of entire ecosystems.[12]

In addition, the global food system currently threatens 24,000 of the 28,000 species at risk of extinction[13] and drivers linked to agriculture account for 70% of the loss of terrestrial biodiversity projected by 2050.[14] Furthermore, the UN Food and Agriculture Organization warns that this loss directly threatens the world's food supply and the livelihoods of millions of people in the industry.[15] Understanding the interconnectedness of biodiversity loss and food systems is crucial for developing sustainable practices that safeguard both environmental well-being and the security of our global food supply.

While efforts to address climate and biodiversity crises have historically operated in silos, there are several entry points for alignment and opportunities to build synergies. International climate and biodiversity policy regimes have been developed in parallel under different conventions, with different implementation levels and funding mechanisms at global and national levels which has also led separate communities of practice in the civil society and private sector with siloed approaches to these interconnected crises.[16] However, all three Rio Conventions – the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), and the United Nations Conventions to Combat Desertification (UNCCD) – acknowledge the need for policy coherence across conventions, frameworks, and Parties' national strategies. For example, the UNFCCC's Paris Agreement recognizes the importance of biodiversity but does not further integrate biodiversity into its text or most of its decisions for implementation. For its part, CBD's Global Biodiversity Framework highlights climate change and its role in driving biodiversity loss while including multiple targets on climate change adaptation and mitigation. And the UNCCD's objectives for Land Degradation Neutrality (LDN) include maintaining or improving the sustainable delivery of ecosystem services, land productivity to enhance global food security, increasing the resilience of land and the populations dependent on it, and reinforcing and promoting responsible and inclusive land governance. However, these synergies must be translated into national and local actions through inclusive and multistakeholder approaches to ensure concurrent progress towards global goals.

Agriculture and food systems provide several opportunities for holistic action to address both biodiversity loss and climate change. Sustainable agriculture and land use is a shared area of work between the three Rio Conventions. A food systems approach acknowledges that food and agriculture are among the main drivers of climate change, land degradation, and biodiversity loss, but can also be important levers of change, thus reinforcing the interconnections between the three Rio Conventions. Therefore, integrating food systems measures (e.g., agroecological practices, addressing food waste and loss, and transitioning to sustainable, healthy, and culturally appropriate diets) in National Biodiversity Strategies and Action Plans (NBSAPs) and Nationally Determined Contributions (NDCs) can deliver multiple climate and biodiversity benefits while improving food security and societal wellbeing.[17] This contributes to delivering on both the GBF Targets – specifically Targets 7, 10, and 16 – and climate targets under the Paris Agreement.[18]

The objective of this paper is to explore the links between climate change and biodiversity in agriculture and food systems and present opportunities for building synergies across policy processes to address the two crises in a holistic manner.

2. THE LINKS BETWEEN FOOD, BIODIVERSITY, AND CLIMATE CHANGE

Agriculture and food systems, biodiversity, and the climate are deeply intertwined. Food systems are responsible for 27% of global greenhouse gas emissions.[19] They are also heavily reliant on ecosystem services such as water supply for agriculture production, nutrient cycling across both in marine and terrestrial ecosystems, and climate stability.[20] Current food systems are also driving severe impacts on biodiversity and climate change,[21] jeopardizing the very ecosystems upon which food systems depend.

Because biodiversity loss and climate change are mutually reinforcing, the effects of food systems on these crises extend beyond their direct impacts. Biodiversity plays an important role in mitigating climate change and ensuring ecosystems resilience against climate impacts. Marine and terrestrial ecosystems are natural sinks for anthropogenic carbon emissions, with a gross sequestration of 5.6 gigatons of carbon per year, accounting for approximately 60% of global anthropogenic emissions.[22] When food systems cause biodiversity loss, they also jeopardize ecosystems functions and their capacity to contribute to climate change mitigation through carbon sequestration.

At the same time, climate change exacerbates biodiversity loss. Climate change is projected to drive the transformation of over 40% of global ecoregions, even under the more stringent emissions reduction scenarios.[23,24] The loss and fragmentation of habitats inherent in this climate-driven transformation is expected to drive species extinction.[25] Studies show that, across ecoregions, species richness declines with increasing global warming because many species are unable to cope with the rapid pace of climate change and its impacts on local environmental conditions.[26] By driving climate change, food systems alter and degrade habitats which causes species to shift their distribution ranges or, when they fail to adapt, to go extinct altogether.[27]

Main drivers of biodiversity loss and climate change in agriculture and food systems

Current food systems exert a profound influence on both biodiversity and the climate, with impacts stemming from across the entire food value chain, from production to consumption (Figure 1).[28] The negative effects on ecosystems can be assessed through three primary categories of drivers: the overexploitation of natural resources, environmental pollution, and unsustainable consumption patterns.

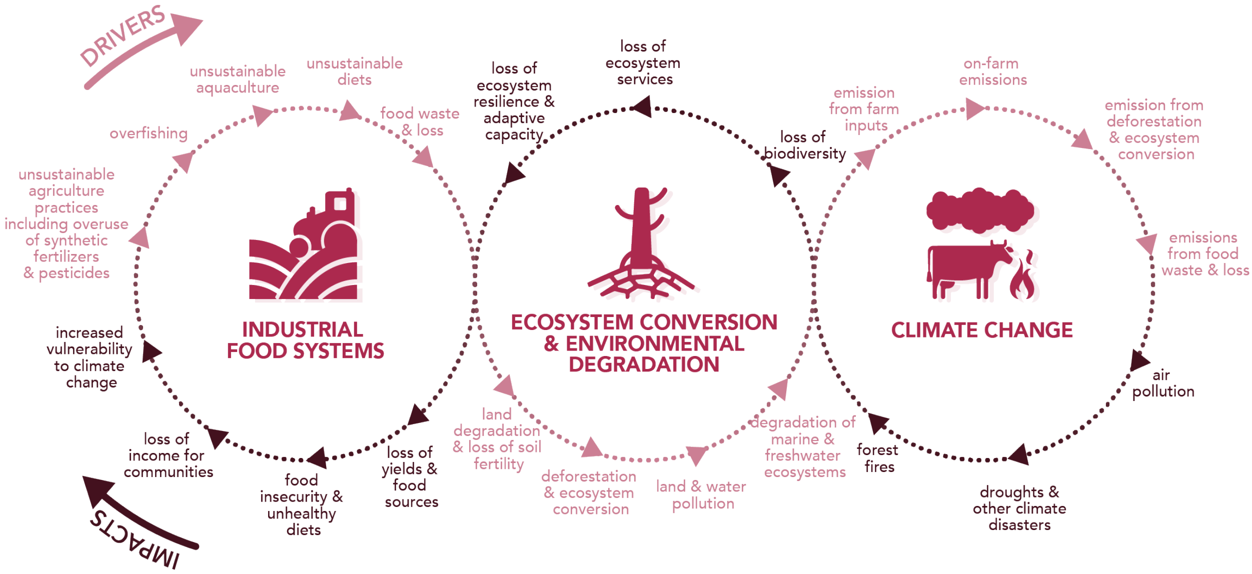

Figure 1. Links between current agriculture and food systems, biodiversity loss and climate change, with the associated drivers and impacts. Source: Authors' own illustration.

Overexploitation of natural resources

The overexploitation of natural resources in global food systems drives biodiversity loss and climate change through ecosystem conversion, habitat degradation and fragmentation, soil nutrient depletion, overfishing, and excessive water extraction. These practices strain ecosystems, deplete critical resources, and disrupt natural processes essential for maintaining biodiversity and climate resilience.

Food production causes 70% of the loss of terrestrial biodiversity and 50% of the loss of freshwater biodiversity,[29] as it depletes ecosystems and threatens species with extinction. Over the past 50 years, the conversion of natural ecosystems for crop production or livestock pasture has been the main driver of habitat loss which, in turn, is the main driver of biodiversity loss in terrestrial environments including forests and peatlands.[30,31] For example, 90% of global deforestation is caused by the conversion of forest ecosystems into agricultural land.[32] The agricultural use of fires on deforested landscapes and tropical pastures is a key driver of the widespread forest fires in the Amazon rainforest, with climate change-induced droughts creating favorable conditions for the fires to spread deeper into the forest, as well as into the Cerrado biome.[33] Through land conversion, food production directly reduces the diversity of marine and terrestrial habitats, threatens or destroys the breeding, feeding and/or nesting of birds, mammals, insects, fish, and microbial organisms.[34]

Approximately 70% of global freshwater withdrawals are attributed to agriculture, ranging from 44% in high-income countries to 90% in low-income countries.[35] This high demand for water in agriculture often leads to over-extraction of surface and underground water. As a result, agriculture is the main driver for wetlands conversion worldwide,[36] with direct impacts on the species inhabiting these critical habitats and on the ecosystem services that wetlands deliver.[37]

Fisheries, which have expanded geographically and into deeper waters, have caused over 30% of marine fish stocks to be overfished while nearly 60% are fished at maximum capacity.[38] As fish are harvested at unsustainable rates amid other stressors, key species decline, triggering a cascade of effects throughout the food web. This imbalance can result in the overpopulation of certain prey species and the decline of others, ultimately jeopardizing the resilience and functionality of marine ecosystems.[39]

Healthy marine ecosystems play a vital role in carbon sequestration, with over 1 million metric tons of anthropogenic carbon dioxide being dissolved in the ocean every hour.[40] Overfishing disrupts these marine ecosystems, reducing their capacity to absorb carbon dioxide from the atmosphere. This exacerbates climate change by increasing greenhouse gas concentrations. Furthermore, the unsustainable extraction of fish and other marine organisms alters nutrient cycles and can contribute to ocean acidification which, in turn, affects shell-forming species, with disruptive effects on marine food webs.[41]

Environmental pollution

Environmental pollution from food systems degrades water, air, and soils through nutrient runoff, pesticide drift, and toxic emissions, which harms ecosystems, biodiversity, and public health. Poor land-use management – including the overuse and poor application of synthetic fertilizers as well as poor waste management – worsens pollution by degrading soil on agricultural land and sources of clean water vital for food production and security.

Chemical pollution from food production is responsible for approximately 32% of soil acidification, 78% of eutrophication, and one fifth of air pollution worldwide.[42] In Europe, Russia, Canada, Japan, and the eastern United States, ammonia emissions from agriculture are the largest relative contributor to air pollution by fine particulate matter and the leading cause of mortality attributable to air pollution.[43]

Additionally, FAO estimates that agriculture is the biggest source of soil pollution in East Asia, South and Southeast Asia, the Pacific, Eastern Europe, the Caucasus, Central Asia, Latin America, and the Caribbean.[44] Soil contaminants can reduce the number of organisms by causing toxicity or by entering the food chain and causing disease and mortality in terrestrial and aquatic organisms.[45]

In Europe, 80% of soils on agricultural land contain pesticide residues, and approximately 65-75% exceed critical nitrogen thresholds, above which agricultural runoff is expected to cause surface water eutrophication.[46] The eutrophication of water bodies leads to increased frequency and severity of algal blooms, mass fish death, and so-called 'dead zones' in coastal ecosystems.[47]

Insecticides play a critical role in exacerbating these environmental issues by directly impacting both vertebrate and invertebrate populations. Invertebrates, particularly pollinators like bees and butterflies, are highly susceptible to insecticide exposure, which can disrupt their reproductive cycles, reduce their populations, and ultimately affect ecosystem services such as pollination and soil health.[48] Vertebrates, including amphibians, birds, and small mammals and apes, can suffer from acute poisoning, reduced fertility, or immune system suppression when exposed to insecticides through contaminated food, water, or habitat.[49,50] The bioaccumulation of these chemicals through the food chain further amplifies their effects, leading to long-term ecosystem imbalances, biodiversity loss, and a reduction in the overall resilience of the natural ecosystem.[51]

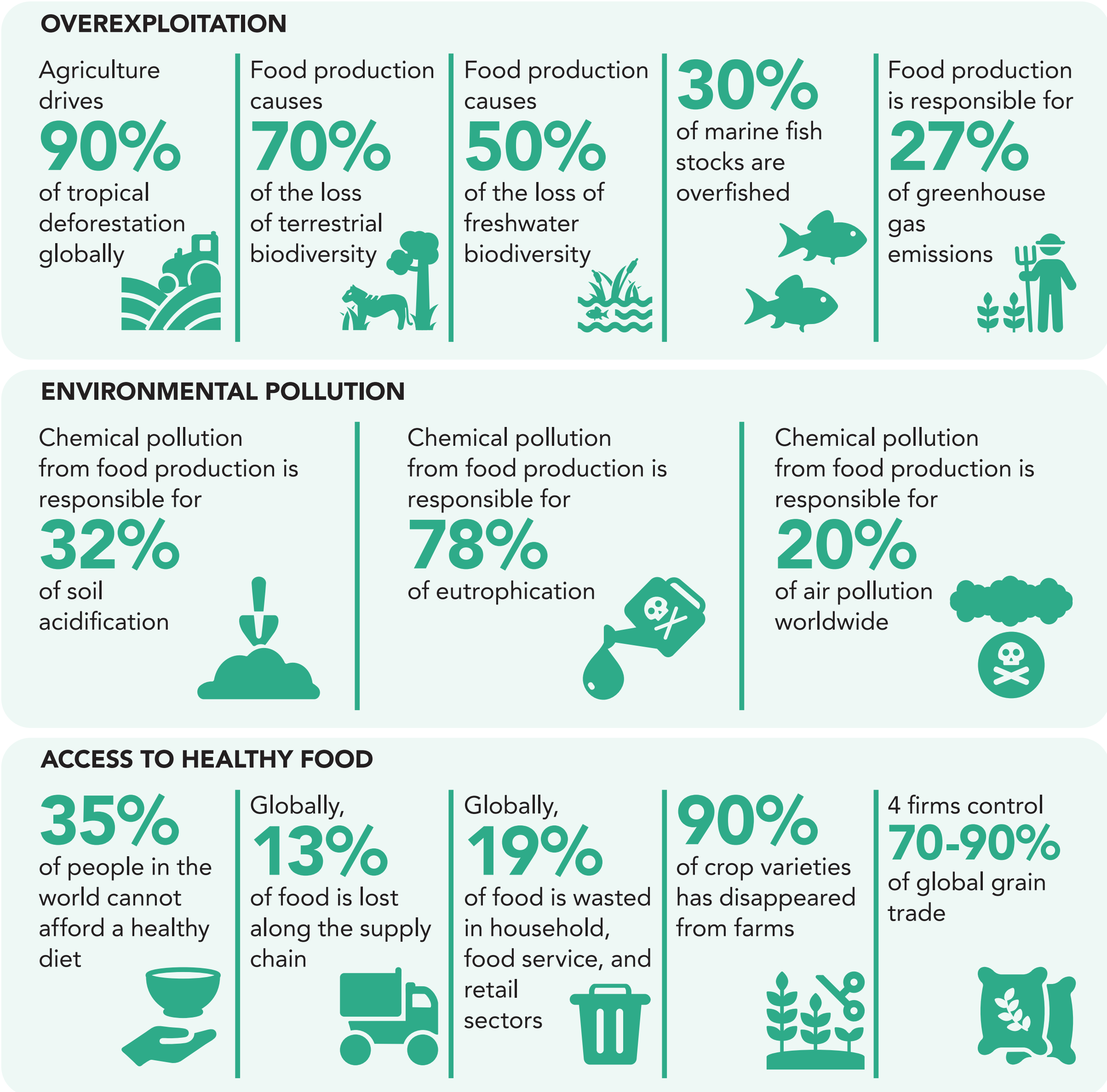

Figure 2. In numbers: Impacts of current agriculture and food systems

Food access and consumption patterns

Food consumption patterns reinforce unsustainable production practices and inequality. The current food systems face three major societal challenges: unequal access to safe and nutritious food, disproportionate power dynamics, and the effects of environmental degradation on the most vulnerable parts of society.

Malnutrition continues to be an urgent issue for many poor and marginalized communities worldwide. In recent years, the problem has been magnified by pandemics, armed conflicts, and extreme weather events.[52] For example, between 713 and 757 million people may have faced hunger in 2023, which is one out of 11 people in the world, and one out of every five in Africa. More than 2.8 billion people (~35% of world population) were not able to afford a healthy diet in 2022.[53]

Simultaneously, around 2.2 billion adults, or 42% of the global adult population, were overweight or obese as of 2020—figures that could rise to 3.3 billion and 54%, respectively,

by 2035.[54] The rising rates of obesity and diet-related diseases—including diabetes, cardiovascular disease, hypertension and some cancers—are caused by increasing global consumption of highly processed food products as well as food products that are high in refined carbohydrates, saturated fat, and sodium.[55]

Dietary quality and food security are also affected by the reliance on a limited number of crops. Over the past century, 90% of crop varieties have disappeared from farmers' fields, and half of the breeds of many domesticated animals have been lost. As a result, 75% of all food production and consumption is concentrated on just 12 plant species and five animal species.[56] The prevalence of minimum dietary diversity for women is consistently low and varies widely (from 36% to 89%) across 37 low- and middle-income countries.[57] This means that food groups like fruits, vegetables, pulses, nuts and seeds that are rich in micronutrients and vitamins or better adapted to local environmental conditions are produced and consumed in insufficient quantities[58] – altering consumption patterns of communities that traditionally consumed food using crops species that are more culturally compatible and environmentally suitable to their locale.

Meanwhile, the 13% of food that is lost along the supply chain and 19% of food that is wasted in household, food service, and retail sectors, place undue stress on the environment while remaining a missed opportunity to feed hundreds of millions affected by hunger.[59] 28% of the world's agricultural land area and approximately one-fourth of the agriculture industry's water and fertilizer use is used to produce food that will never be eaten.[60,61] Furthermore, food discarded into landfills is a significant source of methane, a potent greenhouse gas with a warming impact nearly 80 times greater than carbon dioxide.[62,63] Wasted food represents a missed opportunity to promote food security. Consider that at the household level alone, over one billion meals worth of edible food are thrown away each day, which is enough to give each of the 783 million people affected by hunger around the world in 2022 at least one additional daily meal.[64]

The supply of 58% of seeds, 78% of agrochemicals, 50% of agricultural machinery, and 72% of animal pharmaceuticals is dominated by six companies each.[65] Only four firms control 70-90% of global grain trade.[66] This dominance reinforces existing power imbalances and promotes farming and food production models that are both socially and environmentally unsustainable, leading to harmful impacts on society and the environment. Concentration in the agri-food industry has made farmers ever more reliant on a handful of suppliers and buyers. This concentration squeezes farmers' incomes and erodes their ability to choose what to grow, how to grow it, and for whom.[67]

Agribusiness corporations exert significant influence on global food governance in multiple ways, including public-private partnerships, lobbying, research sponsorship, political donations, and participation in negotiations of trade and investment agreements. This influence can undermine principles of inclusivity, fairness, and transparency in governance processes, lead to weak and ineffective outcomes of governance initiatives, and result in a lack of corporate accountability when it comes to the negative impacts of industrialized food production on people and the planet.[68]

By driving biodiversity loss and accelerating climate change, unsustainable food systems negatively impact peoples' livelihoods. For example, ecosystem conversion can deteriorate water quality and loss of mangroves could expose hundreds of millions of people to floods and cyclones made worse by climate change.[69] People with low adaptive capacity and those whose livelihoods rely on ecosystems are disproportionately affected by biodiversity loss and climate change.[70] For instance, Indigenous people and local communities including farmers that depend on ecosystem services for food, fiber, and medicines could lose access to these due to biodiversity loss.[71] High biodiversity and functioning ecosystems, on the other hand, increase peoples' resilience to climate change and guarantee that people can sustainably resort to ecosystems services for their livelihoods.

3. AGRICULTURE AND FOOD SYSTEMS IN INTERNATIONAL BIODIVERSITY AND CLIMATE POLICY PROCESSES

Historically, global efforts to address climate change and biodiversity loss have operated in silos. International climate and biodiversity policy regimes have evolved in parallel under different conventions, with different implementation and funding mechanisms but with complementary goals at global and national levels. The CBD and the UNFCCC provide the foundation for coordinated global action to protect the planet's ecosystems and mitigate the impacts of climate change both inextricably linked. However, both conventions operate through separate frameworks for implementation, monitoring, reporting, finance, and stocktaking (Figure 3).

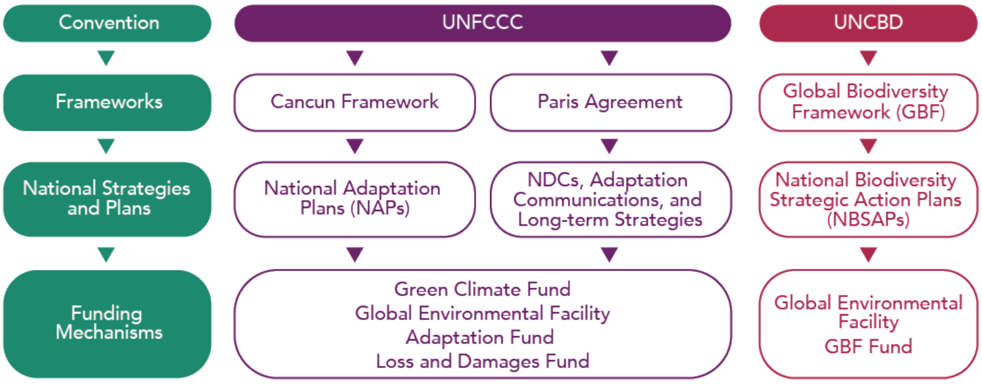

Figure 3. Biodiversity and climate policy processes. Authors' own illustration.

However, agreements and frameworks adopted under these two conventions complement each other, and their effective implementation and success are interdependent. The Cancun Adaptation Framework and Paris Agreement were two key milestones for climate action under the UNFCCC. While the Cancun Adaptation Framework aimed to enhance action on adaptation, including through international cooperation and coherent consideration of matters relating to adaptation, the Paris Agreement set clear global binding climate targets – with both increasingly converging in implementation at the national level. Under the CBD, the GBF – the adoption of which marked a big step towards a globally supported, integrated and holistic framework in support of biodiversity – formulates 23 action-oriented targets that guide policy makers to achieve four well-defined long-term goals.

All related frameworks provide an architecture for countries to produce and regularly update planning documents that outline their contributions and actions to global climate and biodiversity goals. For climate goals, countries submit NDCs with an Adaptation Communication component or separate National Adaptation Plans (NAPs) to the UNFCCC. For global biodiversity goals, countries develop NBSAPs under the CBD. These documents serve as roadmaps for national efforts to address climate change mitigation, adaptation, and biodiversity loss, while also providing a basis for international cooperation and support.

Agriculture and food systems is one area where climate and biodiversity policymaking converge most prominently, but policy has remained focused on adaptation and food security. Over the past three decades, several processes and work programs under UNFCCC and the CBD have considered relevant interventions and modalities to address issues pertaining to agriculture, land use, food security, and natural ecosystems (Figure 4). Initially, discussions centered predominantly on adaptation strategies. However, there is now an increasing acknowledgment of the intricate connections between climate change, biodiversity loss, and agricultural practices.

1992

United Nations Framework Convention on Climate Change

Framework for global cooperation to combat climate change by stabilizing greenhouse gas concentrations in the atmosphere to prevent dangerous human interference with the climate system.

United Nations Convention on Biological Diversity (UNCBD)

- International treaty aimed at conserving biodiversity, promoting sustainable use of its components, and ensuring fair and equitable sharing of benefits arising from genetic resources.
- Established the National Biodiversity Strategies and Action Plans (NBSAPs) process - providing national-level strategic direction on the protection and management of biodiversity

Establishment of the Global Environmental Facility (GEF)

Established to provide funding for projects that address global environmental issues, including biodiversity loss, climate change, and land degradation, primarily in developing countries.

2000

Cartagena Protocol

Governs the movements of living modified organisms (LMOs) resulting from modern biotechnology from one country to another.

2001

Establishment of the Adaptation Fund

Established under the Kyoto Protocol, it finances concrete climate adaptation projects and programs in developing countries.

2002

Decision VI/5. Agricultural Biological Diversity

Adopted a plan of action for pollinator conservation and addressing issues like genetic use restriction technologies, soil biodiversity, and animal genetic resources. The decision emphasizes the importance of sustainable use of genetic resources for food and agriculture, while also recognizing the potential impacts of trade liberalization on agricultural biodiversity.

2006

Decision VIII/23. Initiative on Biodiversity for Food and Nutrition

Established to promote the sustainable use of biodiversity in programs that contribute to food security and improved human nutrition.

2010

Cancun Adaptation Framework

Establishment of the National Adaptation Plan (NAP) process - designed to identify a country's medium- and long-term adaptation needs

Establishment of the Green Climate Fund (GCF)

Established to support developing countries in their transition to low-emission and climate-resilient development pathways.

Decision X/34. Agricultural Biodiversity

Adoption of the decision that stresses the importance of agricultural biodiversity for food security and nutrition, in the face of climate change and limited natural resources.

Aichi Biodiversity Targets

Adoption of 20 global objectives established to address biodiversity loss and promote sustainable use of natural resources by 2020. Organized under five strategic goals, they aimed to reduce pressures on biodiversity, improve conservation status, and enhance ecosystem benefits.

Nagoya Protocol

Adopted to provide a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources.

2015

The Paris Agreement

Establishment of Nationally Determined Contributions (NDCs) - serving as the primary mechanism for countries to outline their climate action plans.

Global Goal on Adaptation (GGA)

Established under the Paris Agreement - seeks to enhance adaptive capacity, bolster resilience, and reduce vulnerability to climate change

2017

Koronivia Joint Work on Agriculture (KJWA)

Designed to advance discussions on how agriculture can contribute to both increased food security and climate change adaptation.

2022

Sharm el-Sheikh Joint Work on Agriculture and Food Security

Emphasizes the importance of protecting food security and ending hunger, recognizing the vulnerability of food production to climate change.

Kunming-Montreal Global Biodiversity Framework

Establishment of the framework that aims to create food systems that work in harmony with nature and promotes sustainable practices across the spectrum of food production, including agriculture, aquaculture, fisheries, and forestry.

Decision 15/28. Biodiversity and Agriculture

Adoption of the decision that emphasizes the promotion of ecosystem-based approaches to conserve, restore, and sustainably manage soil biodiversity.

2023

First Global Stocktake

Established to evaluate collective progress towards global climate goals every five years.

UAE Framework for Global Climate Resilience

Adoption of the framework for the Global Goal on Adaptation to reduce vulnerability and build adaptive capacities with targets and indicators.

Global Biodiversity Framework Fund

Established to help countries achieve the Kunming-Montreal Global Biodiversity Framework goals and targets with a strategic focus on strengthening national-level biodiversity management, planning, policy, governance, and finance approaches.

Figure 4. Key moments for agriculture and food systems in international climate and biodiversity policy regimes

Key milestones in this evolving landscape include the establishment of significant protocols such as the Nagoya Protocol on access to genetic resources and the Cartagena Protocol on biosafety, as well as the adoption of the Paris Agreement. More recently, the Sharm el-Sheikh joint work on agriculture and food security and the Kunming-Montreal Global Biodiversity Framework (GBF) have further emphasized the need for integrated approaches to these linked challenges.

Agriculture and food systems in international climate policy regime

From an early stage, the Parties to the UNFCCC recognized the importance of safeguarding food security and adapting agricultural systems in the face of climate change. However, the mitigation potential of food systems has generally been absent from UNFCCC decisions. For example, Article 2 of UNFCCC explicitly states the importance of ensuring that food production is not threatened while working towards the stabilization of greenhouse gas concentrations.[72] Article 4 of the UNFCCC calls upon parties to control, reduce, or prevent anthropogenic emissions of greenhouse gases and urges cooperation in preparing for the impacts of climate change, specifically mentioning the need for planning in the agricultural sector.[73]

Similarly, the Cancun Adaptation Framework, under decision 1/CP.16, recognizes adaptation as a global challenge encouraging countries to plan and implement adaptation strategies in key sectors, including agriculture and water resources, promoting a country-driven, gender-sensitive approach that considers vulnerable groups and communities under their NAPs.[74] NAPs are national frameworks designed to identify a country's medium- and long-term adaptation needs, develop strategies to address climate vulnerabilities, build adaptive capacity and resilience, and integrate climate change adaptation into new and existing policies, programs, and activities.[75]

The Paris Agreement, a major milestone in global climate action, recognized the impacts of climate change on food security but missed an opportunity to consider a holistic view of role of agriculture and food systems in meeting the 1.5°C and 2°C targets. The Paris Agreement makes specific reference to the need for safeguarding food security and ending hunger in its preamble. Article 2.1 of the Paris Agreement aims to strengthen the global response to climate change, emphasizing the necessity of doing so in a manner that does not threaten food production.[76] While it addresses the vulnerabilities of food production systems to the adverse impacts of climate change, the role of food systems to mitigate climate change is not included in the text of the Agreement.

In formulating their own contributions to the Paris Agreement targets, governments also largely lack a holistic approach to agriculture and food systems. NDCs serve as country-specific blueprints that outline national climate strategies, encompassing both emission reduction targets and measures, and adaptation plans. NDCs are submitted by parties to the UNFCCC and must provide information necessary to facilitate clarity, transparency and understanding (ICTU), which includes quantifiable information on baselines, timeframes for implementation, planning processes, and other methodological approaches.[77]

While most (94%) of 146 updated NDCs mention food, only 3% (5 NDCs) consider measures across several intervention areas in agriculture and food systems.[78] While NDCs often propose land mitigation actions such as conservation, restoration and reforestation of ecosystems, measures related to food loss and waste and food consumption patterns are generally absent from these commitments, indicating an area for potential future focus in climate negotiations and national planning.[79]

The Global Stocktake at COP28 in 2023, for the first time, mentions food systems but fails to incorporate a systems approach to address climate change in agricultural and food systems. The Global Stocktake has been established to evaluate collective progress towards global climate goals every five years. It serves as a mechanism for countries and stakeholders to assess overall advancement in meeting the Paris Agreement objectives, identify gaps in climate action and support, and inform the development of more ambitious NDCs. The first Global Stocktake concluded at COP28 in 2023, revealing significant gaps in climate action while identifying opportunities for improvement.[80]

The outcome text, particularly in its adaptation section, reflects a growing recognition of the interconnectedness between climate action and sustainable food production. Paragraphs 55 and 63(b) call for integrated, multi-sectoral solutions, focusing on land use management, sustainable agriculture, and resilient food systems development. The text emphasizes climate-resilient food and agricultural production, improvements in food supply and distribution, and the promotion of sustainable and regenerative production methods while ensuring equitable access to adequate food and nutrition.[81]

While the mitigation section does not explicitly mention food systems, it addresses closely related topics. Paragraphs 33-36 cover crucial areas such as nature, ecosystems, oceans, and sustainable lifestyles, including sustainable patterns of consumption and production. These elements are intrinsically linked to food and land use, highlighting the holistic approach needed to address climate change in the context of agriculture and food security.[82]

The Global Goal on Adaptation (GGA) text also sets a target which could help drive further focus on food systems and adaptation in the future. The Global Goal on Adaptation, established under Article 7 of the Paris Agreement, seeks to enhance adaptive capacity, bolster resilience, and reduce vulnerability to climate change, thereby contributing to sustainable development.[83] During COP28, the UAE Framework for Global Climate Resilience was adopted as a comprehensive framework for the GGA.[84] CMA5 in Dubai also established a two-year UAE – Belém work program, on the development of indicators for measuring progress achieved towards the targets outlined in the framework.[85]

Paragraph 9 of the UAE Framework for Global Climate Resilience sets seven targets for building climate resilience across sectors of the economy. These targets relate to water supply, public health, ecosystems and biodiversity, infrastructure and human settlements, poverty and livelihoods, and cultural heritage. While all these targets are relevant for agriculture and food systems, the framework includes a specific target for achieving climate-resilient food and agricultural production, along with the sustainable supply and distribution of food.[86]

The UAE Framework for Global Climate Resilience also emphasizes the importance of increasing sustainable and regenerative agricultural practices while ensuring equitable access to adequate food and nutrition for all individuals.[87] Furthermore, it sets a target for "reducing climate impacts on ecosystems and biodiversity, and accelerating the use of ecosystem-based adaptation and nature-based solutions, including through their management, enhancement, restoration and conservation and the protection of terrestrial, inland water, mountain, marine and coastal ecosystems" which directly overlaps with agriculture and food systems interventions.

Other key decisions under the UNFCCC have also acknowledged the potential of agriculture in addressing climate change. The initiation of the Koronivia Joint Work on Agriculture (KJWA) was a significant milestone in to advancing discussions on agriculture within the UNFCCC framework – focusing on dialogues and knowledge sharing. Established at COP23 in 2017, the KJWA was designed to advance discussions on how agriculture can contribute to both increased food security and climate change adaptation.[88] Decision 4/CP.23, which established the KJWA, mandated the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI) to jointly address agriculture-related issues. This collaborative approach recognizes the vulnerabilities of agriculture to climate change and the need to develop comprehensive strategies for addressing food security in the face of these challenges.[89]

The Sharm el-Sheikh joint work on agriculture and food security adopted at COP27 marks the transition from discussion to implementation.[90] Decision 3/CP.27 states that this four-year joint work program builds on the outcomes of the KJWA, and other UNFCCC efforts related to agriculture, while introducing future topics.[91] It highlights farmers, especially smallholders and pastoralists, as central to driving change and stresses the need for solutions tailored to national circumstances.[92]

Agriculture and food systems in international biodiversity policy regime

Unlike the climate policy regime, the international agreements on biodiversity have more holistically considered the role of agriculture and food systems in preserving and restoring biodiversity. The CBD recognizes the link between biodiversity, agriculture, and food systems, emphasizing their importance in meeting the food, health, and other needs of the growing world population. This acknowledgment is explicitly stated in the CBD's preamble, which highlights the essential nature of access to and sharing of both genetic resources and technologies. Furthermore, the convention's core objectives directly relate to agriculture and food systems, aiming to balance conservation efforts with the sustainable use of biodiversity to fulfill human needs, particularly in food production.[93]

In its early days, agreements under the CBD, including the Cartagena Protocol, addressed key areas related to food systems. This includes the intersection of biotechnology, agriculture, and environmental protection. The Cartagena Protocol was adopted in 2000 and aims to safeguard biological diversity from potential risks associated with living modified organisms (LMOs) produced through modern biotechnology, particularly in the context of transboundary movements.[94] It encompasses LMOs intended for direct use as food or feed, or for processing, thereby impacting a wide range of agricultural commodities. In addition, it establishes regulations governing the handling, transportation, packaging, and labeling of LMOs, which have profound implications for the management and trade of genetically modified agricultural products in the international market.[95]

Furthermore, in 2002, Decision VI/5 on Agricultural Biological Diversity adopted a plan of action for pollinator conservation, addressing several important issues such as genetic use restriction technologies, soil biodiversity, and animal genetic resources. The decision emphasizes the significance of sustainably using genetic resources for food and agriculture while also recognizing the potential impacts of trade liberalization on agricultural biodiversity.[96]

In March 2006, the CBD took a significant step forward by formally establishing the initiative on biodiversity for food and nutrition through decision VIII/23 A of the Conference of the Parties. This initiative aims to promote the sustainable use of biodiversity in programs that contribute to food security and improved human nutrition, acknowledging the intrinsic link between biodiversity and human wellbeing.[97]

Moreover, in 2010, the Nagoya Protocol was adopted, giving special consideration to the importance of genetic resources covered by the CBD including those related to crops. The Protocol aims to provide legal clarity and transparency regarding access to genetic resources while ensuring equitable sharing of benefits – both monetary and non-monetary – derived from their utilization, establishing a framework for fair compensation to countries and communities that contribute these vital resources.[98] Notably, the protocol's preamble acknowledges the critical role of genetic resources for food and agriculture in ensuring global food security, promoting sustainable agricultural development, alleviating poverty, and addressing the challenges posed by climate change.[99]

In the same year, Decision X/34 was adopted, highlighting the crucial role of agricultural biodiversity in ensuring food security and nutrition, especially in the context of climate change and limited natural resources.[100] Additionally, the 20 Aichi Targets were established to tackle biodiversity loss and promote the sustainable use of natural resources by 2020. Among these, Targets 5 to 8 included relevant elements regarding the interface of biodiversity and climate change, explicitly referring to agriculture, fisheries, land use and nutrient excess flow.[101]

The GBF in 2022 marked a key milestone in the CBD's approach to agriculture and food systems. The framework, the result of a four-year consultation and negotiation process, builds upon the CBD's previous Strategic Plans and aligns closely with the Sustainable Development Goals (SDGs). At its core, the GBF envisions a world living in harmony with nature by 2050, supported by four overarching goals (1) protect and restore; (2) Prosper with Nature; (3) Share Benefits Fairly and (4) Invest and Collaborate. These goals are strengthened by 23 targets to be met by 2030. These targets are all directly or indirectly related to food systems.[102]

Acknowledging the importance of food systems, the GBF promotes sustainable practices across the spectrum of food production, including agriculture, aquaculture, fisheries, and forestry, including by addressing pesticides and other chemicals and nutrients lost in nature (Target 5 and Target 10). It calls to reduce equitably the global footprint of consumption and overconsumption as well as halving food waste (Target 16). Importantly, it stresses the need to protect vital ecosystem services that support food production, like healthy soils and pollination. Moreover, the framework calls for transformative changes in food systems to tackle a primary driver of biodiversity loss: the conversion of natural ecosystems (Target 1).[103]

Furthermore, the framework calls to integrate biodiversity and its multiple values in all policies, including agriculture and food (Target 14), eliminate or repurpose harmful subsidies, increase positive incentives (Target 18) and ensure financial flows from all sources (e.g., domestic, international, public and private) are in line with the objective to halt and reverse biodiversity loss (Target 19).[104] These targets could have profound impacts on food systems worldwide as their achievement could promote sustainable agricultural practices, enhance food security, and improve nutrition through crop diversification. Furthermore, aligning financial flows from all sources with biodiversity objectives could attract private investment, support smallholder farmers, and encourage innovation in sustainable business models.

Under the Article 6 of the CBD, parties are to submit NBSAPs, which provide national-level strategic direction on the protection and management of biodiversity within a country and are the main tool guiding the GBF at national level. Each CBD Party is expected to review or update its NBSAP to align it with the GBF.[105] Parties are expected to submit their revised/updated NBSAPs or updated national objectives ahead of the 16th meeting of the COP in the fourth quarter of 2024. In cases of capacity limitations, parties may submit revised targets in lieu of the full revised and updated NBSAP.[106] As of September 30, 2024, 64 Parties submitted revised NBSAPs and/or National Targets.[107] All these NBSAPs and Targets have integrated, to various degrees, policy measures in agriculture and food systems.[108]

Beyond the GBF, Decision 15/28 on Biodiversity and Agriculture, emphasizes the promotion of ecosystem-based approaches to conserve, restore, and sustainably manage soil biodiversity. It recognizes the multifaceted challenges facing soil health, including the loss of soil organic carbon, the impacts of climate change, soil degradation, and the need to control soil-borne diseases. The decision also highlights the importance of enhancing soil nutrients, ensuring food security and safety, and addressing water scarcity and disaster risk.[109]

Agriculture and food systems in international climate and biodiversity finance mechanisms

Finance mechanisms for climate and biodiversity under UNFCCC and CBD are increasingly taking a holistic approach to financing agriculture and food systems interventions. Global Climate Fund (GCF) and Global Environment Facility (GEF) – the two main funding mechanisms that channel finance from developed countries to developing countries to projects and programs addressing climate and biodiversity – employ multifaceted approaches that combine capacity building, innovation, finance mobilization, and knowledge sharing to create resilient and sustainable food systems in vulnerable regions.[110]

GCF offers support in four areas for transformative climate action in agricultural and food sector in developing countries.[111] This includes strengthening countries' capacities to develop integrated agricultural plans aligned with their NDCs and National Adaptation Plans and investing in innovative business models, technologies, and financing instruments with scaling potential, catalyzing public and private investments, and promoting the dissemination of best practices and methodologies for transformational climate investments, leveraging partnerships to extend successful practices into new areas.

Similarly, the GEF addresses the interconnected challenges of food security, ecosystem resilience, and climate change adaptation, particularly in vulnerable regions. During its sixth replenishment cycle, the GEF partnered with the International Fund for Agricultural Development (IFAD) to launch the Integrated Approach Program on Food Security (IAP-FS), also known as the Resilient Food Systems (RFS) program.[112] This initiative aims to promote sustainable management and resilience of ecosystems and their various services, including land, water, biodiversity, and forests, to tackle food insecurity in Sub-Saharan Africa. The program operates across 12 African countries, safeguarding the long-term productive potential of critical food systems in response to changing human needs.[113] Building on this foundation, the GEF's seventh replenishment cycle introduced the Food Systems, Land Use, and Restoration Impact Program (FOLUR). This program supports efforts to embed productive lands within landscapes that provide ecosystem services while protecting the natural ecosystems and soil on which they depend. FOLUR seeks to transform food and land use systems, helping countries reconcile competing social, economic, and environmental interests by moving away from unsustainable sectoral approaches towards sustainable, holistic landscape approaches that protect biophysical processes and resources, absorb greenhouse gas emissions, provide nutritious and affordable food for the growing number of people worldwide, and strengthen the resilience and prosperity of rural populations.[114]

More recently, the Global Biodiversity Framework Fund (GBFF) was established under the GEF in response to decisions made during the CBD COP15 in 2023. Its main goal is to help countries meet the objectives of the GBF. The fund aims to improve national biodiversity management, planning, policy, governance, and financial strategies. So far, the GBFF has approved and funded four projects in Gabon, Brazil, and Mexico, with a total allocation of nearly USD 40 million.[115]

4. OPPORTUNITIES AND RECOMMENDATIONS

The landscape of environmental governance is gradually moving away from the traditional siloed approach characterized by parallel governing bodies and independent frameworks. At UNFCCC COP28, 18 countries endorsed the Joint Statement on Climate, Nature, and People, emphasizing the central role of nature in climate action. The statement promotes aligning national climate and biodiversity plans for integrated action. It aims to foster synergies between the Paris Agreement and the GBF by encouraging coordinated implementation of NDCs, National Adaptation Plans, Long-Term Strategies, and NBSAPs. The statement also supports engagement with Land Degradation Neutrality targets and National Drought Plans.37

Furthermore, a resolution adopted by the United Nations Environment Assembly (UNEA) in March 2024, calls for enhancing national actions to tackle global environmental challenges through improved cooperation among various environmental bodies. The resolution recognizes that environmental issues are interconnected and cannot be effectively tackled in isolation. By encouraging Member States to promote synergies and collaboration in implementing multilateral environmental agreements, the resolution advocates for a more integrated approach to environmental governance.[116]

This shift towards a unified approach not only promises greater efficiency in addressing environmental challenges but also reflects a growing recognition of the connected nature of our global crises and the need for equally connected governance structures to address them. Agriculture and food systems provide the most suitable area to strengthen these synergies.

Holistic policy interventions in agriculture and food systems

Transformed agriculture and food systems that embrace sustainable production and consumption patterns could feed more than 10 billion people while also benefiting both biodiversity and climate.[117]

Pathways for agriculture and food systems transformation entail holistic, context-specific interventions considering the totality of food systems and their interactions with other natural and human systems.[118] This includes nature-positive food production, building sustainable, just and resilient supply chains, and shifting to healthy and sustainable consumption practices – all enabled by governance policies that ensure inclusive policymaking and implementation and equitable access to sufficient healthy food for all. These policy measures closely align with many climate and biodiversity actions (Figure 5).

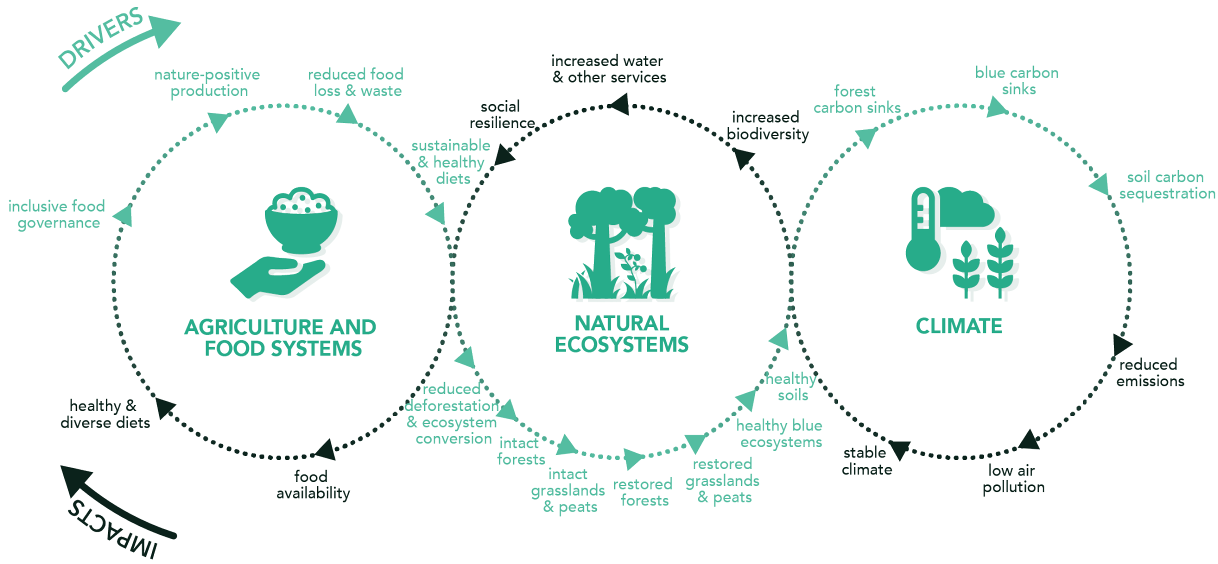

Figure 5. Nature-positive agriculture and food systems loop. Source: Authors' own illustration.

Nature-positive food production

A shift to nature-positive food production – which uses natural resources in a regenerative, non-depleting, non-destructive manner – can not only help to address the biodiversity crisis, but also yield climate mitigation and adaptation benefits, enhance food security, and improve the health and wellbeing of current and future generations. Nature-positive food production aims to maintain and enhance ecological processes and functions through the applied production practices.[119] Nature-positive food production relies on regenerative actions that are adapted to and reflect local environmental, economic, and social conditions including culture, knowledge, food traditions, and traditional management practices associated with Indigenous Peoples and local communities.[120]

In the agriculture sector, agroecological farming systems clearly identify and target key ecological functions and aim to integrate these various elements carefully into the farming systems creating multiple levels of positive interactions and not just substituting external inputs and engaging in isolated, singular interventions.[121] Some of these practices include intercropping and polycultures; minimum or no-till soil management; conserving genetic diversity of varieties, cultivars, breeds, landraces, and species, and securing equitable and fair access to these resources; precision agriculture; companion planting and vermiculture; using cover crops and green manure; crop residue retention; agroforestry and silvopasture; organic agriculture; conservation agriculture; rotational grazing and cropping; integrated nutrient, pest, and water resource management; field boundary vegetation and riparian and wetland buffer zones; and mixed farming that integrates trees, crops, animals, and aquaculture.[122] Similarly, climate-responsive agricultural practices like improved soil management, water-efficient irrigation, and stress-tolerant crop varieties that target emissions reduction and climate resilience as part of climate-smart agriculture can have biodiversity benefits.[123]

In the fisheries sector, scaling sustainable practices (such as selective harvesting, adopting fishing gears that reduce by-catch, limiting trail fishing to minimize impacts on the sea-floor ecology, and temporal and spatial habitat protection in aquatic and marine ecosystems) can conserve genetic diversity of fish and other marine and aquatic organisms, rebuild overfished stocks, and reduce pollution.[124] Furthermore, nature-positive measures not only help restore depleted fish populations but also enhance the overall health of marine and aquatic ecosystems, benefiting both biodiversity and fishing communities.[125]

Sustainable governance of land and seascapes

Ensuring the sustainable governance of ecosystem services in both land and seascapes –including natural ecosystems and those dedicated to food production – is essential for transforming food systems. Approaches for sustainably governing terrestrial, aquatic, and marine resources – such as agroecology, and adaptive management in locally managed marine areas – can help mitigating the risks of human-induced ecosystem degradation, resources depletion, and climate change.[126] Sustainable ecosystems governance also plays a crucial role in ensuring equitable access to resources, promoting sustainable food production practices, and safeguarding food safety and security. Sustainable ecosystems governance must be inclusive of diverse stakeholders and, where possible, utilize traditional management practices and knowledge of Indigenous Peoples and local communities.[127]

Measures that enhance sustainable governance of natural ecosystems and ecosystem services in agriculture and food systems include integrated spatial planning at the landscape, seascape, and watershed level to avoid, reduce, and mitigate ecosystem conversion, overexploitation, and unequitable and unfair use of natural resources. Additionally, implementing buffer zones for natural or semi-natural species habitats within and around food production areas and implementing and expanding protected and conservation areas, especially in intact ecosystems can support biodiversity conservation and restoration.[128] Enabling measures that can support farmers to shift to nature-positive production practices include strengthening and harmonizing land and water tenure systems and direct technical assistance for producers—especially smallholders—and economic incentive programs such as payment for ecosystem services programs; safeguarding or restoring connectivity between ecosystems; reducing pollution; controlling invasive species; and co-developing and adopting sustainable food production practices.[129] In addition, measures such as seed governance can promote biodiversity, improve resilience, and ensuring equitable resource management.[130]

Crucially, financial resources should be redirected toward measures fostering sustainable governance of land and seascapes. Economic incentives from both public and private sources can accelerate the adoption of restoration practices in production systems. Repurposing harmful agricultural subsidies could unlock billions annually for nature-positive agriculture,[131] while payments for ecosystem services programs offer an additional tool for mobilizing financial resources.[132]

Ecosystem restoration

Restoration of terrestrial, aquatic, and marine ecosystems – such as agricultural lands, forests, wetlands, or mangroves – can help recover lost ground by re-establishing ecological balance in areas degraded by human activities and recovering the lost habitats of many endangered species. In addition, ecosystems restoration can provide large climate benefits – both in mitigation and adaptation – and yield socio-economic benefits for local communities.[133]

Restoration needs to be prompt and focus on restoring or reconnecting damaged or fragmented ecosystems, enhancing ecological integrity, and recovering ecosystem functions and services. In the context of food production specifically, less productive areas can be restored to natural habitats for biodiversity conservation. On productive lands, sustainable food production practices such as agroecology can help to restore ecosystems and biodiversity.

Reducing food loss and waste

Reducing food loss and waste can save natural resources and alleviate pressure on ecosystems from food production as well as enhance food security. To disincentivize food waste in gastronomy, retail, and at the household level, regulators and decision makers can introduce food waste strategies, set up pay-as-you-throw schemes, or revisit how food expiration dates are set.[134] Manufacturers and retailers can adjust package sizes and redistribute unsold or uneaten foods through surplus food management systems that channel surplus food to food banks, social supermarkets, or animal feed.[135]

Food loss can be reduced through measures related to storage (e.g., expanding cold storage facilities, hermetic storage, warehouse receipt systems), distribution and transportation (e.g., appropriate packaging materials and techniques, localization of food systems), or processing and handling (e.g., promotion of processing methods and technologies such as drying, smoking, salting, fermenting, pickling, or canning).[136]

Shift to sustainable and healthy diets

Promoting nutritious diets that are underpinned by sustainable and diversified food production adapted to local ecosystems and sociocultural contexts to reduce food systems' emissions, with significant potential to deliver additional health benefits. Diets dominated by a few staple crops, such as rice, wheat, and maize – while providing sufficient calories – lack essential micronutrients. Combined with high consumption of animal proteins and ultra-processed foods, unhealthy diets continue to drive the rise of diet-related diseases, especially among the poorest countries and social groups. Measures that can encourage sustainable food consumption and environmentally responsible food choice include the mandatory disclosure of environmental information necessary to drive sustainable consumption, environmental labeling, food demand management to reduce overconsumption and waste, sustainable public procurement practices, and encouraging dietary shifts.[137]

Inclusive and equitable food systems governance

Agriculture and food systems issues are complex and interconnected and need inclusive, participatory approaches to governance at both national and local levels, including mechanisms such policy councils where deliberative dialogue can take place. Collaboration between citizens and government officials creates a forum for advocacy and policy development to co-create sustainable and just food systems.[138] Such multi-stakeholder collaboration can enable sustainable food systems transformation when special attention is given to those who are traditionally excluded from decision-making, engaging different food systems stakeholder groups (e.g., from public and private sectors, civil society organizations, NGOs, consumers, organizations representing producers, food systems workers, youth organizations, international and donor communities, academia and knowledge institutions, media, as well as community-based, grassroots, and Indigenous Peoples groups).[139] This collaboration also helps to realize shared objectives, manage common resources, and/or ensure the protection, production, or delivery of an outcome of collective and/or public interest.[140]

Entry points in climate and biodiversity policy processes for building synergies through agriculture and food systems

While neither the Paris Agreement nor the Global Stocktake provides targets or guidance for integrating food systems measures in national policies, the GBF sets clear targets related to agriculture and food systems. These targets and complementary functions of the two agreements can inspire a more synergistic approach climate and biodiversity action at the national level. Through multistakeholder and collaborative approaches, governments can ensure sectoral policies for climate, biodiversity, and food under NDCs, NAPs, and NBSAPs, and other national policies are aligned and geared toward contributing the global goals for climate and nature. Policy measures across food systems – covering land use, supply chains, food security, land use and urban planning, water resource management, disaster risk management, strategic development, budgeting, and health and wellbeing – can play a critical role in achieving national and global climate and biodiversity goals.

While governments often have some level of national planning that seeks to bring together sectoral plans, there is an opportunity to mainstream NDCs and NBSAPs in planning by clearly identifying actions needed in agriculture and food systems to ensure policy coherence and achieve the intended benefits.[141] Close coordination is needed across sectors to develop coherent policies that mutually address climate and biodiversity goals while reducing contradictory outcomes where positive outcomes in one domain might negatively impact another. Box 1 shows key opportunities to build synergy between NDC, NAPs, and NBSAPs processes for agriculture and food systems transformation.

Box 1. Entry points to build synergies across policy processes.

CBD COP16: CBD COP16 is a momentous opportunity for countries to adopt the GBF monitoring systems and start work on implementation including monitoring indicators related to agriculture and food systems across relevant targets under the GBF and to use the revision process for the NBSAPs as an important moment to translate climate commitments and plans under NDCs and NAPs into concrete actions and connect them to NBSAPs.

UNFCCC COP30: Countries will continue to revise and update their NDCs ahead of COP30 in 2025. This provides an opportunity for them to identify biodiversity targets and plans under NBSAPs and align them to climate measures in agriculture under NDCs. The following milestones in reviewing these processes and in reporting on their progress provide opportunities to identify and integrate synergistic measures for climate change mitigation, adaptation, and agriculture and food systems, including for finance and capacity management for their implementation.

National reporting under CBD and UNFCCC: In 2026, countries will begin preparing their Second Biennial Transparency Reports under the UNFCCC which include their emissions inventories, NDC progress, climate change impacts, adaptation and means of implementation under the Paris Agreement and will prepare their 7th National Reports under the CBD. Taking stock of progress on climate change and biodiversity in agriculture and food systems in the above milestones will allow to identify policies with synergistic outcomes, increasingly aligning NDCs and NBSAPs.

Global Review and Global Stocktake: The CBD's SBI and Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) are collaborating to prepare for the Global Review of the GBF. This partnership can propose holistic approaches with relevant indicators to measure progress in sustainable food production and recommend additional indicators for monitoring agricultural impacts on biodiversity. Their recommendations will guide the Global Review and support negotiations on agriculture and biodiversity targets. Similarly, CMA and Parties can explicitly consider and strengthen the linkages between NDCs and agriculture and food systems beyond production and how to leverage synergies in updating NDCs and in future Global Stocktake.

GEF and GCF financing programs: These funds are increasingly prioritizing agricultural projects that provide benefits for climate resilience, biodiversity conservation, and sustainable food systems. To access these funding opportunities, countries should develop integrated agricultural initiatives such as climate-smart practices, biodiversity conservation, and sustainable water management. Aligning these projects with NDCs, NAPs, and NBSAPs is also essential. Projects should demonstrate measurable impacts on emissions reduction, resilience for smallholder farmers, and food security. Engaging diverse stakeholders will enhance effectiveness, while ensuring that donors clearly designate each project's primary objective will help avoid double-counting of financial contributions.

Operationalizing the Global Goal on Adaptation: Ahead of COP30 in Brazil in 2025, as countries continue to discuss and decide on the indicators to monitor progress on the seven targets under the UAE Framework for Global Climate Resilience, there is an opportunity to identify and include holistic indicators for adaptation in the agriculture and food systems that enable monitoring progress toward all seven targets of the Framework.

Implementation of COP28 Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action: Adopted in December 2023, while voluntary, the declaration commits signatory countries to a food systems approach to climate change and biodiversity calling to scale up adaptation and resilience for farmers, fishers, and food producers; to promote food security and nutrition through social protection systems, school feeding programs and more; and to support workers in agriculture and food systems to maintain inclusive, decent work.[142] The declaration sets a 2025 target to integrate agriculture and food systems into their NDCs as well as NBSAPs, NAPs, and Long Term Strategies.

Global and regional multistakeholder initiatives: Countries can improve agricultural policy synergies by engaging with initiatives like the NDC Partnership and NBSAPs Accelerator Partnership. In supporting governments in defining the processes, policies, and plans required to deliver NDC goals and NBSAPs targets, these initiatives can link experts with governments to develop holistic measures and plans delivering on multiple climate and biodiversity outcomes and link NDC measures with NBSAP priorities and targets in the agriculture and food systems. They can also promote knowledge and information sharing across sectors and ministries leveraging synergies and helping countries to learn from and support each other with knowledge tools and peer-to-peer exchanges. In supporting countries to align their NDC measures with available financial resources and investor and donor interests, the Partnership can attract finance to holistic projects and programs.

CONCLUSION

The links between the biodiversity and climate crises by way of agriculture and food systems are well documented in scientific literature, international and national policy regimes still need to catch up in translating the scientific findings into concrete policy targets and actions. Fortunately, with increasing recognition of the need for holistic policymaking and financing at the international and national level, existing policy processes provide several entry points to align interventions for achieving biodiversity and climate goals through a food systems approach.

The path towards transformation requires concerted efforts towards mainstreaming biodiversity, meaning that engagement and coordination are needed at the national level, so that environment, food, and development planning processes are considered holistically and not in silos. Policy targets in NDCs and NBSAPs should be linked to national development and finance plans, mainstreaming actions through inter-ministerial coordination and multistakeholder processes.

Systematically considering traditional and local knowledge, while investing and scaling up bottom-up initiatives and local action through agroecology and other innovative approaches would increase food security and resilience while harnessing the power of nature as a multiplier solution to the crises of climate change, biodiversity loss, and land degradation. Donor countries should increase the amount of climate finance and finance for nature in a coherent manner to avoid unintended negative consequences and generate benefits for climate, biodiversity, and food simultaneously. Meanwhile, all countries should focus on key policy levers to avoid incentivizing disruptive behaviours, including harmful subsidies in food systems.

A growing number of research and civil society organizations are working to develop policy and technical guidance and tools to support this more holistic policymaking. These tools are made available for policymakers to translate scientific findings into actionable measures that contribute to national and global biodiversity and climate targets while supporting a just and equitable transition to nature-positive and resilient agriculture food systems. As global biodiversity and climate regimes continue to converge, these tools can accelerate their alignment by fostering bottom-up, holistic policymaking that advances multiple global goals for nature, people, and climate.

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[141] Climate Focus, WWF and partners are developing a guidance tool that will allow policymakers and other stakeholders to identify synergistic policy measures to address biodiversity and climate in agriculture and food systems.

[142] See COP28 Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action

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