Beyond Boundaries:

A Pan-Political Vision for Food and Land Transformation

Working Paper **10 January 2025**

Lucie Adenäuer and Freerk Boedeltje

Note

The opinions presented in this paper are those of the authors alone. They do not reflect the views of the UN Sustainable Development Solutions Network (SDSN), its programmes and staff, or any organization, agency, or programme of the United Nations system.

Abstract

Climate change and environmental disruptions have triggered a planetary emergency of unprecedented scale. This crisis exposes the shortcomings of fragmented national-level approaches, leaving countries and societies ill-prepared to cope with such shocks. It also highlights the inadequacy of current efforts to protect the planet's ecosystems. As global challenges intensify, the responsibility for building resilience is increasingly pushed across borders, with the most vulnerable and disadvantaged communities bearing the heaviest burdens. This Working Paper explores the critical role of adaptation, examining its limitations and the necessary contributions of public policy and best practices to drive transformative change in food and land systems. Given the interconnected nature of ecosystems, a pan-political adaptation strategy is essential to effectively address climate change and reshape global food and land systems.

Keywords: Food and land system, climate adaptation, pan-political strategy, limitations

About the SDSN

The UN Sustainable Development Solutions Network (SDSN) has been operating since 2012 under the auspices of the UN Secretary-General. The SDSN mobilizes global scientific and technological expertise to promote practical solutions for sustainable development, including the implementation of the Sustainable Development Goals (SDGs) and the Paris Climate Agreement. We aim to accelerate joint learning and promote integrated approaches that address the interconnected economic, social, and environmental challenges confronting the world.

For more information, visit www.unsdsn.org.

Table of Contents

1. Introduction: Understanding the Climate Adaptation Challenge

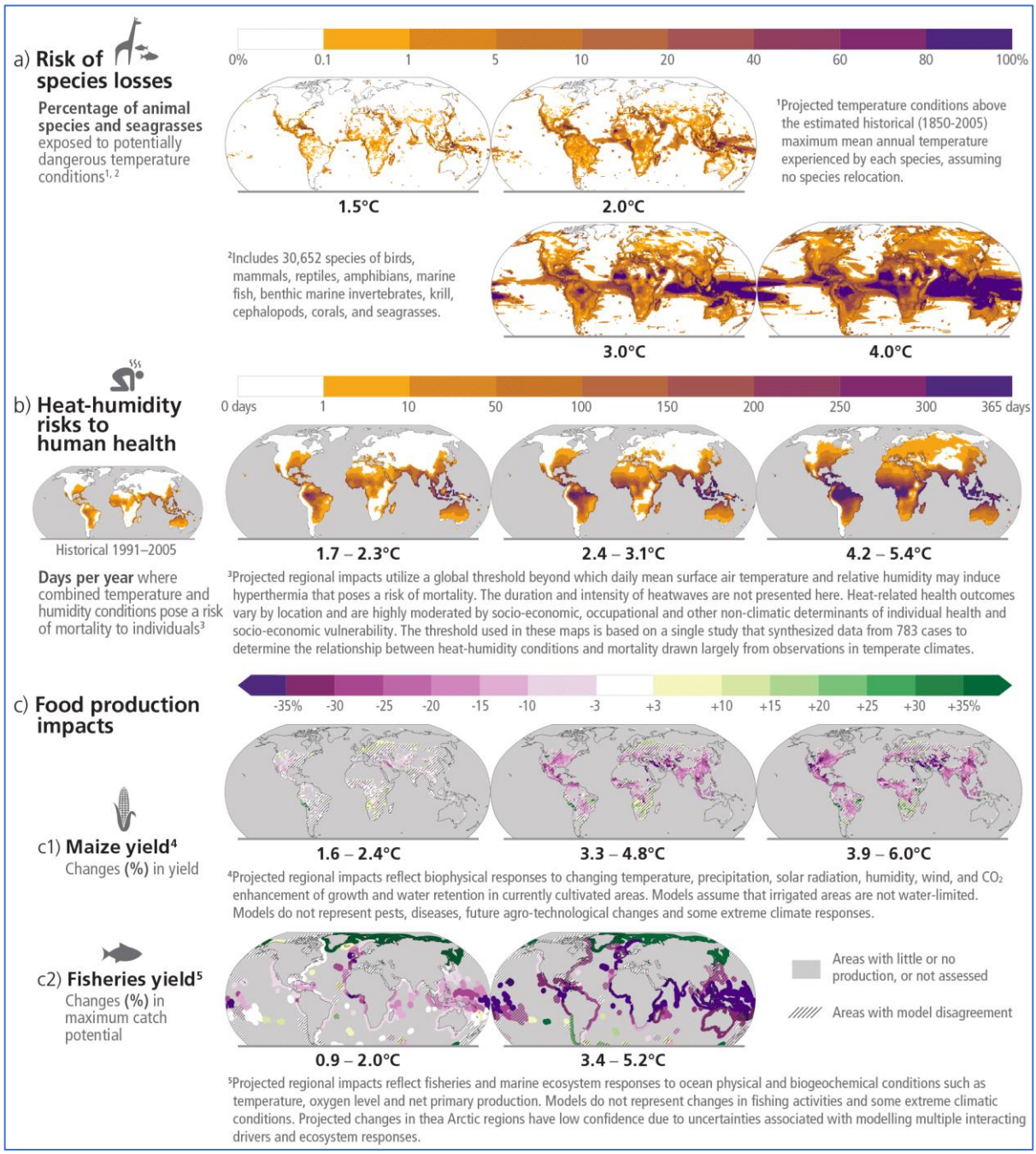
In the modern era, humanity's technological capabilities have reached unprecedented heights, but the rapid pace of environmental degradation is a stark reminder of the unsustainability of our current trajectory. Driven by the relentless demand for resources, human activity is reshaping the natural world at an alarming rate. This depletion and pollution of finite resources not only threaten ecosystems but also undermine the very foundations of human survival (Johnson, 2020; van Houtum and Bueno Lacy, 2020). Global crises like climate change, characterized by long-term uncertainty and potentially irreversible impacts, are becoming ever more visible, with widespread consequences such as wildfires, coastal erosion, droughts, and flooding that threaten communities, agriculture, and ecosystems alike. The scale of these challenges—from biodiversity loss and soil degradation to air and marine pollution—underscores the urgent need for transformative action (IPBES, 2019; The Guardian, 2023).

Despite existing environmental policies, the crisis continues unabated, revealing the inadequacies of current approaches. Agricultural support programs, in particular, have fallen short of achieving sustainability goals, with significant inefficiencies and misallocations of public resources (OECD, 2022). This Working Paper argues for a re-evaluation of agricultural policies, calling for their repurposing to meet modern environmental challenges. A new action-based climate adaptation strategy is needed, one that recognizes the interconnectedness of natural systems and fosters holistic adaptation measures to safeguard the quality of life for future generations. A successful adaptation framework would bridge the gap between policymakers and stakeholders such as farmers, planners, and civil society, supported by research that delivers targeted data and informed policy analyses.

Recent research by Armstrong et al. (2022) provides compelling evidence that even if global warming is limited to below 2°C, as outlined in the Paris Agreement, it still risks triggering multiple climate tipping points, leading to substantial changes in Earth's systems and human well-being. Tipping elements such as the Greenland and West Antarctic ice sheets and coral reefs are likely to collapse at warming above 1.5°C, potentially causing a sea-level rise of up to 5 meters. Such changes will dramatically alter water balances, intensify salinization, and accelerate land degradation processes (Armstrong et al., 2022; Olsson et al., 2019). These shifts in wind and precipitation patterns will exacerbate droughts, intensify storm surges, and degrade soils, severely impacting biodiversity and human livelihoods. Vulnerability to these changes is highest among the 3.3–3.6 billion people living in regions already at high risk from climate change (IPCC, 2023).

Human health is also increasingly at risk from climate-induced events, with extreme heat waves contributing to rising levels of disease, displacement, malnutrition, and mental health challenges, all of which lead to increased mortality (IPCC, 2023). Future generations face an even hotter and more hostile world, with studies indicating that a global temperature rise of 1.5°C will expose millions of people to extreme conditions that surpass the thresholds for human workability and survivability, particularly in tropical and urban regions (Andrews et al., 2018; Suarez-Gutierrez et al., 2020).

Figure 1. Examples of climate change impacts across natural and human systems without additional adaptation



Source: IPCC AR6 Synthesis Report, 2023

This rapid environmental deterioration signals the urgent need to rethink systems dependent on fossil fuels, intensive agriculture, and the unchecked exploitation of natural resources. The ecological breakdown is already affecting millions of lives globally (OECD, 2020a). Although the industrialized world is often the focal point of discussions on environmental degradation, the interconnectedness of natural systems means that these crises transcend borders, affecting the entire planet. The concept of the 'tragedy of the commons'—which describes the overuse of shared resources leading to their depletion—is particularly relevant to understanding the dynamics of climate change and its global implications (Hardin, 1968; Ostrom, 1990, Frischmann, B.M., A. Marciano & G.B. Ramello, 2019). As the interconnected environmental crisis escalates, it is clear that coordinated, global action is essential to address this planetary emergency.

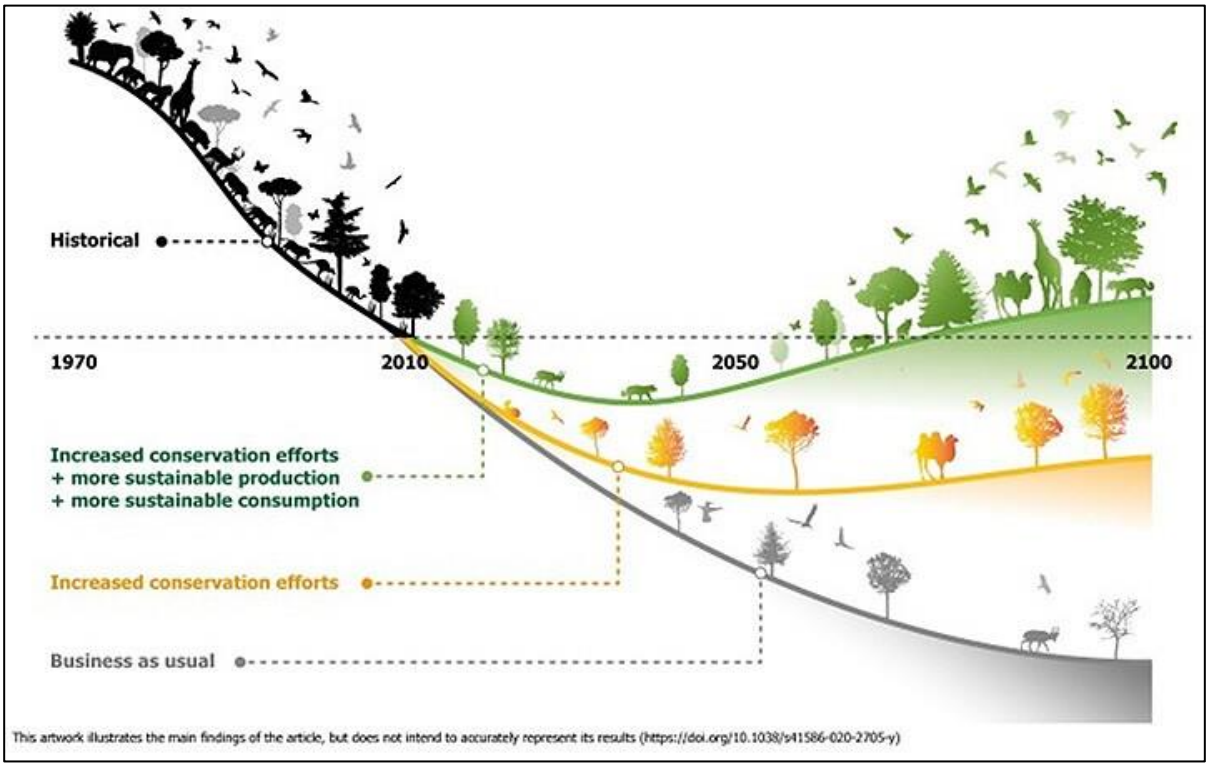
2. Intergenerational Inequalities and Climate Adaptation in Global Agriculture

Intergenerational inequalities are deepening existing disparities in income, wealth, gender, and race worldwide, with ecological crises disproportionately impacting disadvantaged and impoverished communities. Many regions in the Global South are particularly vulnerable to climate change due to low adaptive capacity. Communities facing environmental shocks often suffer from precarious incomes, limited access to social services, and minimal ability to adapt to climate-induced crises (OECD 2019). As a result, addressing global adaptation and risk management is crucial to protect the most vulnerable populations and ensure a sustainable quality of life for future generations.

Climate change exacerbates poverty and food insecurity, especially in vulnerable regions (Ignaciuk and Mason-D'Croz, 2014). Under a 1.5°C global warming scenario, countries such as Indonesia, Guatemala, and Nicaragua will experience up to 1% of their land exposed to extreme heat, while countries like India, Thailand, and Ethiopia may see up to 26% of their land at risk, severely affecting land productivity (Lenton et al., 2023). As the frequency of climate-related shocks—extreme weather events, changing temperatures, and rising sea levels—increases, the agriculture, forestry, and other land use (AFOLU) sectors will become more vulnerable. This leads to higher agricultural commodity prices and reduced food security, visible by the mid-21st century (Ignaciuk and Mason-D'Croz, 2014; IPCC, 2023).

The ongoing environmental crisis is driving migration trends, with people moving from rural areas to cities and coastal plains, and increasing international migration (Figure 2). The World Bank estimates that by 2050, 200 million people could be displaced as climate refugees, and 35% of arable land in sub-Saharan Africa could become unsuitable for agriculture. Alongside human displacement, numerous ecosystems and species face stress and extinction. This latent problem calls for increased global cooperation to mitigate the negative effects of ecological crises.

Figure 2. Illustration of environmental crisis scenarios



Source: Leclère et al. (2020)

Given the heavy reliance of vulnerable populations on agriculture, the sector must adapt to ensure its sustainability in the face of climate extremes. Climate adaptation strategies can help farmers become more resilient to the effects of climate change, enhancing agricultural productivity, reducing losses, and improving food security. These strategies fall into five key areas (Ignaciuk and Mason-D'Croz, 2014; IPCC, 2020; Climate Watch, 2023):

- **Soil Management:** Sustainable practices like crop rotation, cover cropping, and conservation agriculture help maintain soil fertility.
- **Water Management:** Technologies like drip irrigation, rainwater harvesting, and water-efficient crops conserve water resources.
- **Crop Diversification:** Growing multiple crops on the same land reduces the risk of crop failure due to climate-related issues.
- **Climate-Smart Agriculture:** Practices such as agroforestry, integrated pest management, and conservation tillage mitigate climate impacts.
- **Improved Storage and Processing:** Innovations like cold storage and better packaging reduce food losses and improve availability.

To close the gap between climate strategy and policy, we must explore 'good practices' that enhance sustainable policy design and action. These need to foster the use of adaptation measures and to inform and encourage political decisions.

Downscaling climate data to address risks in vulnerable areas: Environmental emergencies have traditionally been measured and addressed at global and national levels, but only recently has attention shifted to local and ecoregional scales. Capturing spatial variations is essential for designing effective policies that tackle specific local challenges. A key difficulty lies in the collection and dissemination of climate data. In many parts of the Global South, cross-border environmental cooperation often occurs informally at the local level, such as in efforts to develop response capacities for droughts and floods, rather than through official treaties. Streamlining these efforts remains a challenge. Therefore, downscaling climate data collection to the local level while synthesizing existing information is crucial. This approach enables the development of tailored, measurable policies that directly address regional issues. Strengthening partnerships between stakeholders and local research institutions can support knowledge exchange and policy decentralization.

Managing water resources and biodiversity: Water access is one of the most pressing challenges future generations will face. Policy frameworks must focus on ensuring the fair distribution of water resources, implementing projects that promote energy and water efficiency, and protecting biodiversity. Pollution from rivers, especially in the Global South, is a critical issue, with millions of tons of plastic waste entering the oceans each year (Nature, 2020). Improving infrastructure for waste management and water recycling can mitigate this damage. Engaging local communities in maintaining these systems promotes knowledge transfer and fosters long-term sustainability.

Building institutional mechanisms in an interconnected world: Local governments and communities often lack the institutional capacity to tackle environmental crises, despite being responsible for much of the food production in low- and middle-income countries (FAO, 2015). By empowering smallholder farmers and local food systems, governments can help to improve food security, improve employment opportunities, reduce rural poverty, and promote more sustainable and equitable food systems (IAASTD, 2009; Holt-Giménez and Shattuck, 2011). Agroecological approaches, which increase crop yields, improve soil health, and enhance biodiversity, offer a sustainable path forward (Altieri, 1999;

Pretty et al., 2011). The promotion of adaptation measures enhances the development of sustainable and resilient food production systems.

Strengthening countries' global commitments: Many developing countries struggle to mobilize sufficient financial resources for climate adaptation. International climate finance is critical in helping these nations meet their adaptation goals, but challenges such as limited funding and complex application processes remain. Simplifying access to climate finance and building capacity for developing countries to articulate their needs can improve the effectiveness of global climate commitments. Including funding plans in international agreements can also support technology transfer and capacity building, enabling these countries to better implement their adaptation strategies.

As the ecological crisis deepens, there is an urgent need to rethink resource management, especially in agriculture. The increasing awareness of environmental degradation must be matched with financial and institutional support to ensure sustainable solutions. The interconnectedness of global ecosystems means that these challenges cannot be tackled in isolation. Addressing the crisis requires not only national action but also global cooperation, with policies that respect planetary boundaries and promote a balanced relationship between economies and the environment (OECD, 2020a). Climate adaptation in agriculture is essential to securing the future of food systems, protecting livelihoods, and building resilience against an uncertain climate future.

3. Key Barriers to Systemic Climate Adaptation: Challenges at the National and Global Levels

Despite broad international recognition of the importance of climate adaptation, as emphasized by bodies like the UN and OECD, this global awareness has not consistently translated into impactful national policies. Many governments remain hesitant to fully implement international adaptation strategies, often due to domestic political pressures, as they prioritize the interests of their electorates over international commitments. Several key barriers to adaptation at the national level include limited resources, insufficient engagement from the private sector and civil society, inadequate financing (including for research), low public awareness of climate issues, lack of political will, slow or limited integration of adaptation science, and a general lack of urgency.

A significant gap exists between the estimated costs of climate adaptation and the actual financial resources allocated to it. Most adaptation funding comes from public sources, with only a small fraction of global climate finance directed toward adaptation efforts. The overwhelming majority is allocated to mitigation. While global climate finance has been on the rise since 2015, current levels of adaptation funding—both public and private—are insufficient to meet the growing needs, particularly in developing countries (IPCC, 2023). This shortfall is further demonstrated by the fact that 62% of developed countries do not include food systems-related measures in their Nationally Determined Contributions (NDCs). In developing countries, only 4% of the quantified financial needs in their commitments are dedicated to transforming and strengthening the resilience of food systems. Agriculture and food, despite accounting for a third of human-induced greenhouse gas emissions and being among the sectors most directly affected by climate change, are often sidelined at global climate conferences like COP.

Another reason for the slow pace of adaptation lies in the complexity of climate change itself. Addressing climate adaptation requires coordinated actions from a diverse set of actors with varying interests, priorities, and capacities, making it difficult to achieve global consensus on effective

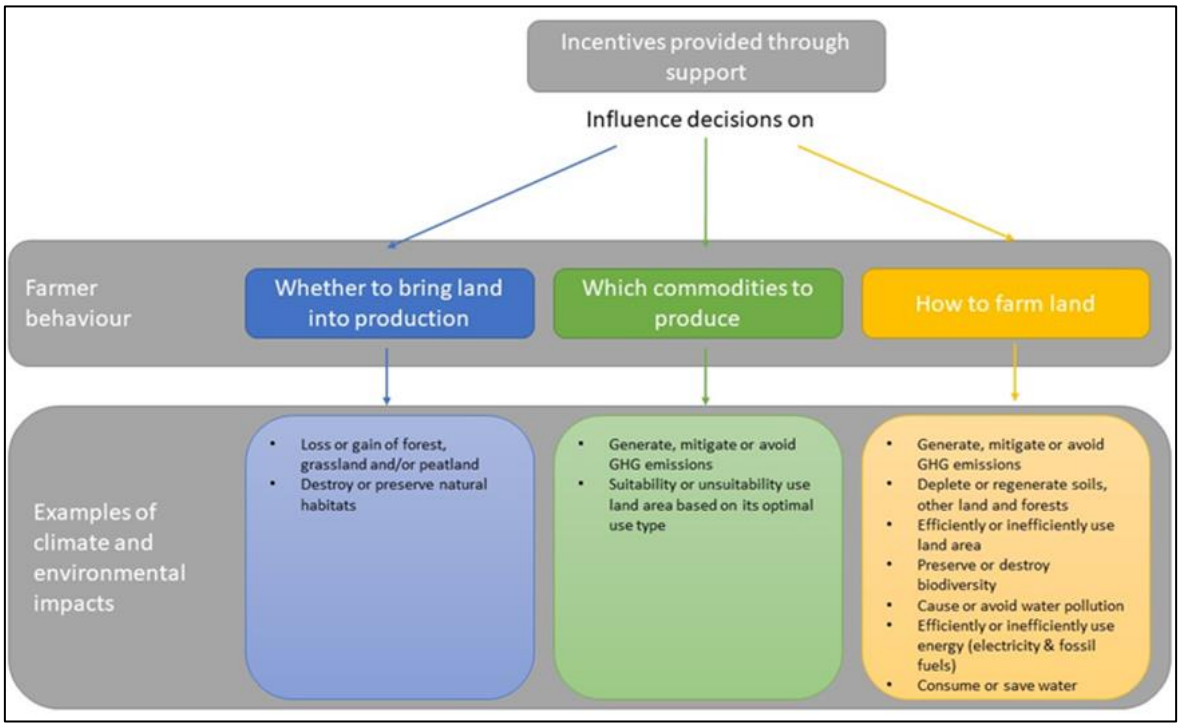
measures. Furthermore, many high-emission countries are reluctant to adopt transformative policies, viewing such actions as potentially harmful to their economic growth and national prosperity. The pledges made by countries are frequently conditional on the commitments of others, leading to a "collective action dilemma" where each actor waits for others to take the first step. Discussions between nations often focus on ensuring that no country is placed at an economic or social disadvantage when implementing certain policies (Agnew, 1994). This approach limits the scope for alternative futures and perpetuates a division between progress within nation-states and uncertainty beyond them (Agnew, 1994). In fact, the emphasis on national interests, often at the expense of global considerations, has only strengthened this so-called "territorial trap" (van Houtum and Bueno Lacy, 2020).

Climate change adaptation also presents challenges of scale. Industrialized countries are by far the largest contributors to the environmental crisis, yet the impacts are felt disproportionately by vulnerable populations across the globe. Even with the establishment of a loss and damage fund at COP27, individual countries are often unwilling or unable to account for the global consequences of their domestic actions. This disconnection between national policies and global responsibilities continues to hinder the implementation of effective adaptation measures worldwide.

4. The Role of Public Policy in Agricultural Adaptation to Climate Change

In the context of agriculture, where adaptation to climate change provides both public and private benefits, public policy plays a crucial role in addressing climate risks (Wreford et al., 2010). Public policies are essential in setting the incentives that shape farmers' decision-making processes. These policies influence key agricultural choices, such as whether to bring land into production, which crops to cultivate, and how to manage farmland. By guiding these decisions, public policy helps to foster climate resilience within the agricultural sector, promoting sustainable practices that mitigate climate risks and support long-term productivity (Figure 3).

Figure 3. The role of public policy in agricultural adaptation



Source: GIZ (2021)

Public support for the land sector is typically driven by a range of objectives, including food security, rural poverty alleviation, support for rural livelihoods, provision of public goods, increasing export revenues, and achieving climate and environmental goals (OECD, 2022). However, current forms of public support often encourage unsustainable and high-risk agricultural practices, exacerbating environmental degradation. For example, public subsidies can incentivize the conversion of marginal lands into production, leading to habitat destruction and land degradation. Additionally, subsidies tied to specific commodities, such as beef, dairy, and rice—which collectively contribute to 80% of emissions from agricultural practices—strongly influence farmers' production choices. Furthermore, subsidies on agricultural inputs like electricity, fossil fuels, water, and fertilizers can lead to inefficient resource use, such as overuse or poor timing in application (GIZ, 2021).

To ensure that public policy promotes adaptation rather than intensifies agriculture's negative environmental impacts, incentives must be carefully aligned. The first priority should be to protect the most vulnerable parts of the agricultural sector and rural communities that have limited capacity to adapt. The second key policy response is the provision of high-quality data and information on climate risks and vulnerabilities. The third focus is on enhancing public goods delivery through sustainable agricultural production and land use practices (Wreford et al., 2010).

However, repurposing public support for agriculture is politically challenging and often met with resistance. To overcome these barriers, three key recommendations can guide policymakers in redesigning support systems:

1. **Understand the scale and impact of current support**
   Policymakers must gather detailed information on the scale, cost, and impact of existing and planned support programs. This involves assessing government spending, tax expenditures, and the social, environmental, and economic impacts of current policies. Alternative options must also be evaluated in terms of cost-effectiveness, implementation challenges, and monitoring capabilities. Budgetary support should be reoriented toward public goods and general services to enhance the sector's performance, alongside implementing effective pricing systems for agricultural emissions (OECD, 2022).

2. **Repurpose support to reduce emissions without compromising development goals**
   Public policy must prioritize emission reduction while simultaneously addressing other critical development objectives. This requires identifying and maximizing synergies between environmental, economic, and social goals while minimizing trade-offs. Emphasis should also be placed on phasing out market price support to discourage unsustainable practices (OECD, 2022).

3. **Anticipate opposition and engage with stakeholders**
   Redirecting agricultural support is politically sensitive, often facing opposition from powerful interest groups. Policymakers must seek common ground with industry lobbies to move away from business-as-usual practices. Regulating lobbying and ensuring transparency in decision-making processes can help build public trust. Additionally, targeting income support to those most in need and enhancing resilience to risks, weather events, and natural disasters are crucial steps in achieving a sustainable and equitable transition (OECD, 2022).

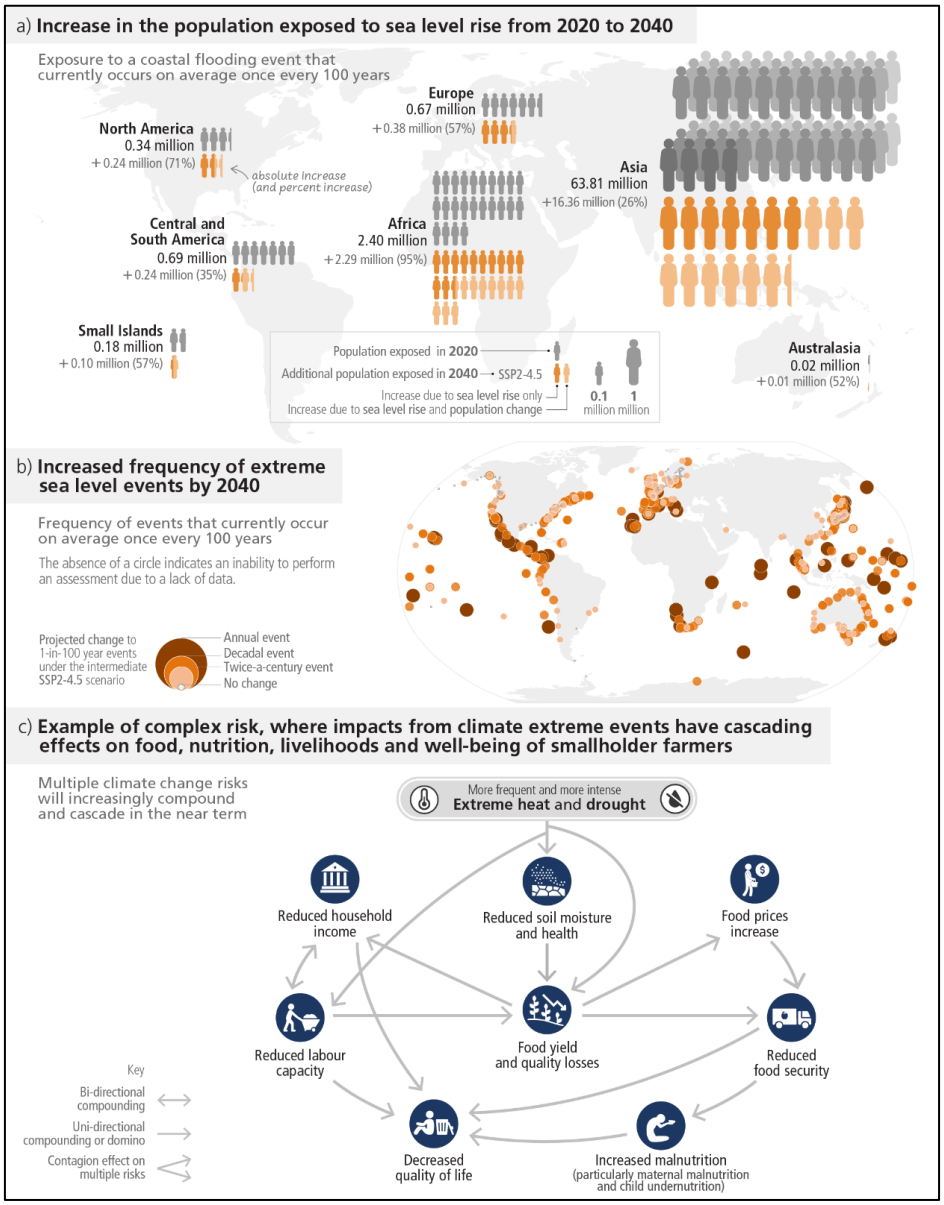
By aligning incentives and support mechanisms, governments can promote sustainable agricultural practices that enhance climate resilience and reduce environmental harm. However, repurposing public support presents significant political and practical challenges, particularly in balancing emission reduction with broader development goals. A strategic approach that combines a detailed analysis of current support systems, transparent stakeholder engagement, and a focus on vulnerable

communities is essential for driving meaningful adaptation. As global pressures on food systems and ecosystems intensify, transforming public policy to prioritize sustainability and resilience will be key to ensuring long-term agricultural viability and environmental stewardship.

5. Enhancing Adaptation: The Need for a New Pan-Political Adaptation Paradigm

The complexity of global environmental challenges stems from our interconnected environmental, socio-political, and economic systems. As highlighted by the OECD, even minor changes can ripple across these systems, causing far-reaching consequences that extend beyond the original event in time, space, and scale (OECD, 2020b). The current shortcomings of environmental policies, which fail to effectively safeguard common resources, underscore the need for a shift in how we approach sustainability. To move beyond this "tragedy of the commons," we must foster a deeper understanding of our interconnectedness and create an awareness that transforms the antagonistic relationship between humans and the environment into one of collaboration and belonging.

Figure 4. Regional risk of facing severe and/or more frequent climate impacts



Source: IPCC AR6 Synthesis Report, 2023

Planetary crises reveal the nonlinear and unpredictable nature of these interconnected systems. Addressing these crises demands a rethinking of traditional policymaking approaches. Innovation, which often occurs at the intersections of different knowledge domains, is crucial for devising new solutions. A systems approach is essential to foster resilience in socioeconomic systems and prepare them for future shocks. This approach recognizes the importance of cross-sectorial collaboration and integrates knowledge from various fields to create policies that address the multifaceted challenges of climate change, biodiversity loss, and economic development (SDSN, 2022).

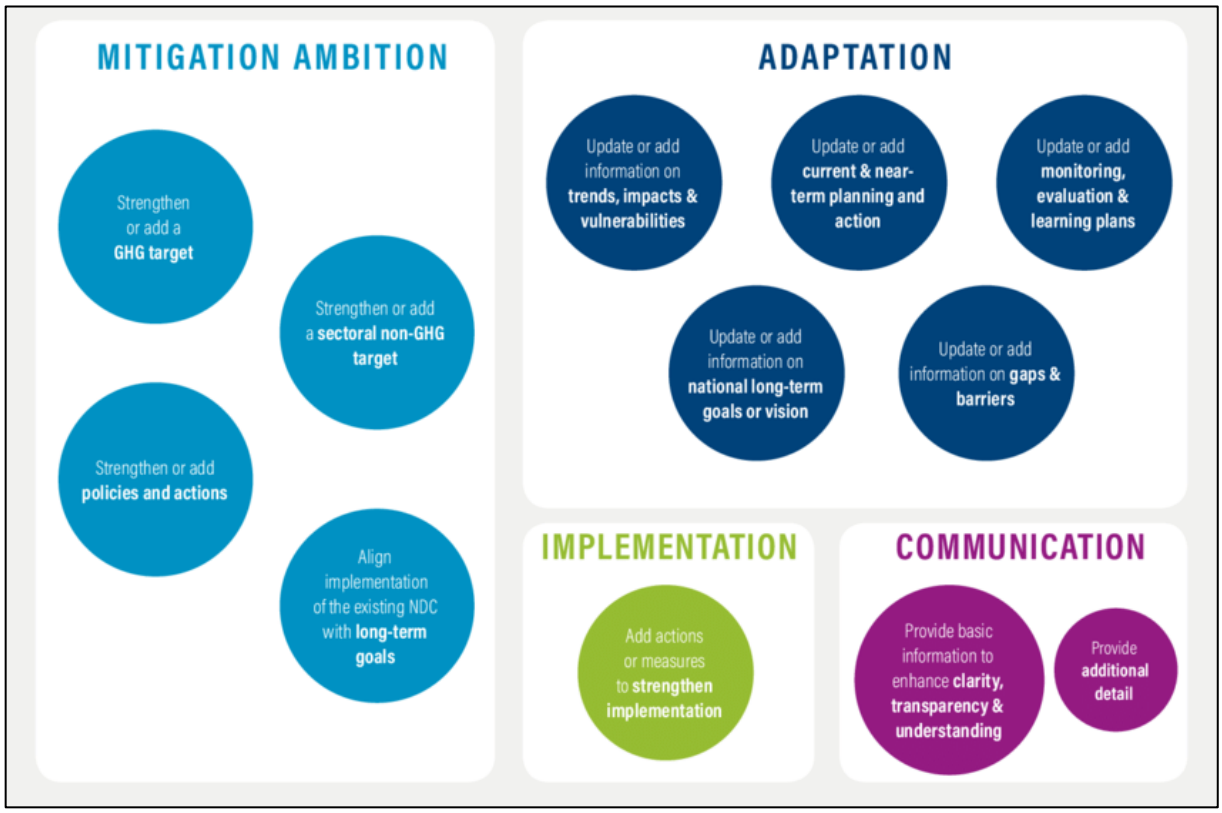
Adaptation efforts to date have been fragmented, sector-specific, and unevenly distributed, particularly among lower-income regions (IPCC, 2023). Deep systemic changes are needed to close these adaptation gaps and meet the complex challenges posed by global climate and development crises. A pan-political adaptation strategy offers a comprehensive framework for addressing these challenges, emphasizing resilience, sustainability, and multilateral cooperation. This strategy should aim to eliminate greenhouse gas emissions, prevent environmental degradation, and stabilize ecosystems, particularly in food and land use.

Institutional reform is critical to advancing such a paradigm shift. Currently, there is a growing disconnect between policymakers and the public, as bureaucratic structures and global markets often fail to reflect local realities. This disconnection, exacerbated by events such as the COVID-19 pandemic and geopolitical tensions, has resulted in high inflation, stagnant economic growth, and energy crises. Moreover, social cohesion has deteriorated, with societies becoming more fragmented along cultural and economic lines (OECD, 2020a). To rebuild trust and strengthen social cohesion—key pillars of a pan-political adaptation strategy—governments must adopt transparent, inclusive, and accountable approaches that genuinely address the concerns of all stakeholders.

However, mere adjustments to existing policies are insufficient. To address global challenges effectively, we need to rethink how we measure and value socioeconomic progress. Policy actions must be integrated, holistic, and supported by institutional reforms that foster inclusivity and collaboration rather than division. For too long, adaptation has focused on damage control and risk-averse policies, such as regulating production activities and designating protected areas. While these measures are important, they are not enough.

The shortcomings of Nationally Determined Contributions (NDCs), a central component of the Paris Agreement, further highlight the need for more coherent and coordinated adaptation strategies. Many NDCs are misaligned with national development plans and lack stakeholder engagement, according to recent findings by SDSN (2022). To drive robust decarbonization and sustainability efforts, global leaders must ensure that climate goals are integrated into legal frameworks and supported by sufficient funding for implementation (Figure 5).

Figure 5. A guide to strengthening national climate plans



Source: Fransen et al. (2019)

A pan-political adaptation strategy must, therefore, promote deliberate, transformative actions aimed at creating a more resilient, sustainable future. This requires fundamental shifts in economic structures, particularly in climate-sensitive sectors like intensive agriculture, carbon-based energy, and unsustainable land use. Protected areas must be expanded, and natural habitats preserved. Ultimately, addressing planetary emergencies requires a holistic vision that acknowledges our interconnectedness with nature and commits to sustainable, inclusive progress.

6. Financing the Scope of Adaptation

The challenge of financing adaptation, especially in the Global South, remains significant. Both the 2023 UNEP *Adaptation Gap Report* and the 2024 UNFCCC *30 Years of Adaptation* report conclude 'that developing countries' adaptation costs and financing needs are significantly higher than previous estimates, with a plausible central range of USD 215 billion to USD 387 billion per year this decade'. The 2024 UNFCCC report concludes that 'the adaptation finance gap – defined as the difference between estimated costs/needs and finance flows – has grown to around USD 194 to USD 366 billion per year, at least 50 percent higher than previous range estimates and suggest that efforts by developed countries would not suffice to close this widening gap but only reduce the gap by between 5 percent and 10 percent' (UNFCCC, 2024, 11).

Many countries in these developing regions lack the financial resources and institutional infrastructure to effectively manage climate emergencies. Key factors such as "financing" and "technology" play crucial roles in adaptation efforts (UNEP, 2022). While international climate funds, like those administered by the World Bank and similar organizations, have made strides in supporting environmental and ecosystem improvements, their focus remains largely on national and supra-national levels (IRFC, 2023). This often leaves local and regional needs underserved. For example, the International Fund for Agricultural Development (IFAD) estimates that only 1,7% of climate funds are directed towards small producers, despite their representing a third of global agricultural production

and being among the most vulnerable to climate impacts (IFAD, 2020).

Local and regional authorities often struggle to access climate-related financing from international development banks and agencies. Expanding the range of financial structures, such as loans, grants, and targeted programs, could make funding more accessible for region-specific projects that directly involve local communities and governments. Tailoring financing to local needs—by balancing top-down funding with bottom-up knowledge and expertise—could enhance the effectiveness of adaptation policies, particularly for vulnerable rural and urban populations.

Another limitation of current climate finance mechanisms is their risk-averse nature. Many climate programs are designed with broad, generic goals due to lengthy negotiation processes and bureaucratic constraints. According to the United Nations, an overwhelming 87% of global public agricultural subsidies contribute negatively to climate, biodiversity, health, and resilience (UNEP, 2021). There is a pressing need to reform climate finance, encouraging the use of more flexible financial instruments that can support innovative and locally impactful projects. This could involve encouraging private sector actors, including farmers, banks, and agribusinesses, to engage in climate-resilient practices.

While climate adaptation is essential, it would be unrealistic to expect countries in the Global South to deprioritize economic growth, especially as many are still in the early stages of development and contribute a fraction of the emissions of industrialized nations. Rather than reshaping entire economies, the focus should be on promoting sustainable forms of growth that are compatible with global climate goals. Many developing countries are already integrated into global value chains and are experiencing rapid technological change, reshaping work and economic structures across these regions (OECD, 2020a).

7. Conclusion: Addressing the Limitations of Adaptation

The failure of current environmental policies to safeguard common resources demonstrates that regulation alone does not guarantee sustainability, even as these resources are rapidly depleted. Moving beyond this "tragedy of the commons" requires us to embrace the interconnectedness between human societies and the environment, fostering a collaborative relationship rather than a destructive one. As history has shown, policymaking cannot shy away from difficult choices. The transition to a green economy will be costly and potentially inflationary, but decisive action is necessary. Drawing a parallel to John F. Kennedy's careful diplomacy during the Cuban Missile Crisis, today’s leaders must avoid complacency in the face of planetary emergencies. Unfortunately, many current policies fall short, with leaders often reluctant to confront powerful business interests, and environmental crises still not recognized as the existential threats they are.

The global environmental emergency demands urgent, strong, and coordinated international action. Delays will only amplify risks and costs, threatening human development, economic stability, and ecosystems. Leaders must have the courage to make tough decisions, acknowledging that meaningful change will require sacrifices, trust, and the redistribution of resources across groups and generations. Economic growth, in its traditional sense, is insufficient if it simultaneously inflicts significant harm on the environment. Therefore, the type of growth pursued must shift toward sustainability, even if this redefines traditional macroeconomic objectives.

To address the current limitations in adaptation, three essential strategies must be pursued:

1. **Increased support for cross-border adaptation projects:** National and international development partners should enhance their support to local and territorial authorities. This includes capacity building, technical assistance for cross-border collaboration, financial and legal arrangements, and the meaningful inclusion of local communities.

2. **Policy integration across levels:** Adaptation considerations must be more effectively integrated into national, regional, and local policies. Harmonizing regional strategies, particularly within planning frameworks, is crucial to addressing both regional and cross-border challenges.

3. **Expanding financing and support options:** A broader range of financing options, such as programs, loans, and grants, should be made available for local and regional adaptation initiatives. These must be supported by active involvement from both government authorities and local communities to ensure sustainable development and local leadership.

These steps are vital to overcoming the barriers to effective adaptation and ensuring a more resilient future for both the environment and the global economy.

References

Agnew, J. The territorial trap: The geographical assumptions of international relations theory. Review of International Political Economy, 1(1), 53–80. http://www.jstor.org/stable/4177090, 1994.

Altieri, M. A. The ecological role of biodiversity in agroecosystems, Agriculture, Ecosystems & Environment, 74(1–3), 19-31, https://doi.org/10.1016/S0167-8809(99)00028-6, 1999.

Andrews, O., Le Quéré, C., Lemke, B. and A., Haines. Implications for workability and survivability in populations exposed to extreme heat under climate change: a modelling study. The Lancet Planetary Health, 2(12), DOI: https://doi.org/10.1016/S2542-5196(18)30240-7, (2018).

Armstrong McKay, D. I. *et al.* Exceeding 1.5°C global warming could trigger multiple climate tipping points. *Science*377, eabn7950.DOI:10.1126/science.abn7950, 2022.

Climate Watch. Explore Long Term Strategies (LTS) https://www.climatewatchdata.org/lts-explore, 2023.

FAO. Food, Agriculture and Cities Challenges of food and nutrition security, agriculture and ecosystem management in an urbanizing world, http://www.fao.org/3/a-au725e.pdf, 2020.

Fransen, T., Sato, I., Levin, K., Waskow, D., Rich, D., Ndoko, S. and J., Teng. Enhancing NDCs: A Guide to Strengthening National Climate Plans. WRI Publications. DOI: 10.46830/wrirpt.19.00021, 2019.

Frischmann, B.M., Marciano, A. and G., Ramello. Retrospectives: Tragedy of the Commons after 50 Years. Journal of Economic Perspectives, 33, 211–228, https://www.jstor.org/stable/26796843, 2019.

Hardin, G. The Tragedy of the Commons. Science 162, pp. 1243–1248, 1968.

Holt Giménez, E and A., Shattuck. Food crises, food regimes and food movements: Rumblings of reform or tides of transformation? Journal of Peasant Studies, 38(1), 109-144, DOI: 10.1080/03066150.2010.538578, 2011.

IAASTD. The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), published under the auspices of the UN and the World Bank, 2009.

IFAD. Examining the Climate Finance Gap for Small-Scale Agriculture, https://www.ifad.org/documents/ 38714170/42157470/climate-finance-gap_smallscale_agr.pdf, 2020.

Ignaciuk, A. and D. Mason-D'Croz. Modelling Adaptation to Climate Change in Agriculture, OECD Food, Agriculture and Fisheries Papers, No. 70, OECD Publishing, Paris. https://doi.org/10.1787/5jxrcljnbxq-en, 2014.

IPBES. Global Assessment Report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany, 2019.

IPCC. AR6 Synthesis Report, https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_LongerReport.pdf, 2023

IPCC. Special Report on the Impacts of Global Warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. https://www.ipcc.ch/sr15/, 2018.

IFRC. Global Plan https://www.ifrc.org/sites/default/files/2022-11/20221124_GlobalPlan_FINAL.pdf, 2023.

Johnson, A. What is Auto-immunity? Seven theses on Derrida and biopolitics, https://www.academia.edu/9036200/What_is_Auto_immunity_Seven_Theses_on_Derrida_and_Bio_politics

Lebreton, L., van der Zwet, J., Damsteeg, JW. et al. River plastic emissions to the world's oceans. Nature Commun, 8, 15611. https://doi.org/10.1038/ncomms15611, 2017.

Leclère, D., Obersteiner, M., Barrett, M. et al. Bending the curve of terrestrial biodiversity needs an integrated strategy. Nature, 585, 551–556. https://doi.org/10.1038/s41586-020-2705-y, 2020.

Lenton, T., Xu, C., Abrams, J., Ghadiali, A., Loriani, S., Sakschewski, B., Zimm, C., Ebi, K., Dunn, R., Svenning, J.-C. and M., Scheffer. Quantifying the human cost of global warming. Nature Sustainability, 6, 1237–1247. https://doi.org/10.1038/s41893-023-01132-6, 2023.

OECD. Agricultural Policy Monitoring and Evaluation 2022: Reforming Agricultural Policies for Climate Change Mitigation, OECD Publishing, Paris. https://doi.org/10.1787/7f4542bf-en, 2022.

OECD. Beyond Growth: Towards a New Economic Approach, New Approaches to Economic Challenges, OECD Publishing, Paris. https://doi.org/10.1787/33a25ba3-en, 2020.

OECD. A systematic resilience approach to dealing with Covid-19 and future shocks, Paris. https://read.oecd-ilibrary.org/view/?ref=131_131917-kpfefrdfnx&title=A-Systemic-Resilience-Approach-to-dealing-with-Covid-19-and-future-shocks, 2020.

OECD. Cities, climate and development, Paris. https://www.oecd.org/swac/topics/climate-change/, 2019.

Olsson, L., H. Barbosa, S. Bhadwal, A. Cowie, K. Delusca, D. Flores-Renteria, K. Hermans, E. Jobbagy, W. Kurz, D. Li, D.J. Sonwa, L. Stringer. Land Degradation. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. https://doi.org/10.1017/9781009157988.006, 2019.

Ostrom, E. Governing the Commons: The Evolution of institutions for collective action. Cambridge: Cambridge University Press, 1990.

Pretty, J., Toulmin, C., & Williams, S. Sustainable intensification in African agriculture. International Journal of Agricultural Sustainability, *9*(1), 5–24. https://doi.org/10.3763/ijas.2010.0583, 2011.

SDSN/FELD. From Global Commitments to National Action: A Closer Look at Nationally Determined Contributions from a Food and Land Perspective, https://files.unsdsn.org/FOLUbrief-2022NDCanalysis-FELD-Nov2022-hires.pdf, 2022.

SDSN/FELD. Shifting Finance Towards Sustainable Land Use: Aligning Public Incentives with the Goals of the Paris Agreement. https://s3.amazonaws.com/feldactiontracker.org/green-finance/Shifting+Finance+Main+Report+Low+Res.pdf, 2021.

Suarez-Gutierrez, L., Muller, W., Li, C. and J., Marotzke. Hotspots of extreme heat under global warming, Climate Dynamics, 55, 429-447, https://doi.org/10.1007/s00382-020-05263-w, 2020.

The Guardian, A biodiversity catastrophe': how the world could look in 2050 – unless we act now, https://www.theguardian.com/environment/2023/nov/29/a-biodiversity-catastrophe-how-the-world-could-look-in-2050-unless-we-act-now-aoe, 2023.

UNEP. Adaptation Gap Report 2023: Underfinanced. Underprepared. Nairobi: UNEP. Available at http://www.unep.org/resources/adaptation-gap-report-2023, 2023.

UNEP. Technology Transfer for Climate Mitigation and Adaptation, Policy Brief. https://unepccc.org/wp-content/uploads/2023/06/tech-transfer-policy-brief-oecd.pdf, 2022.

UNEP, UNDP, FAO. A Multi-Billion-Dollar Opportunity: Repurposing agricultural support to transform food systems. https://openknowledge.fao.org/server/api/core/bitstreams/58af8d5b-eaa8-4620-8b16-3e715f9db7f3/content, 2021.

UNFCCC. 30 Years of Adaptation under the Convention and the Paris Agreement, https://unfccc.int/sites/default/files/resource/AC_2024_30YearsOfAdaptation.pdf, 2024.

Van Houtum, H. and R., Bueno Lacy. The Autoimmunity of the EU's Deadly B/ordering Regime; Overcoming its Paradoxical Paper, Iron and Camp Borders. Geopolitics, 25(3), 706-733. https://doi.org/10.1080/14650045.2020.1728743, (2020).

Wreford, A., Moran, D. and N. Adger. Climate Change and Agriculture: Impacts, Adaptation and Mitigation, OECD Publishing, Paris. https://doi.org/10.1787/9789264086876-en, 2010.