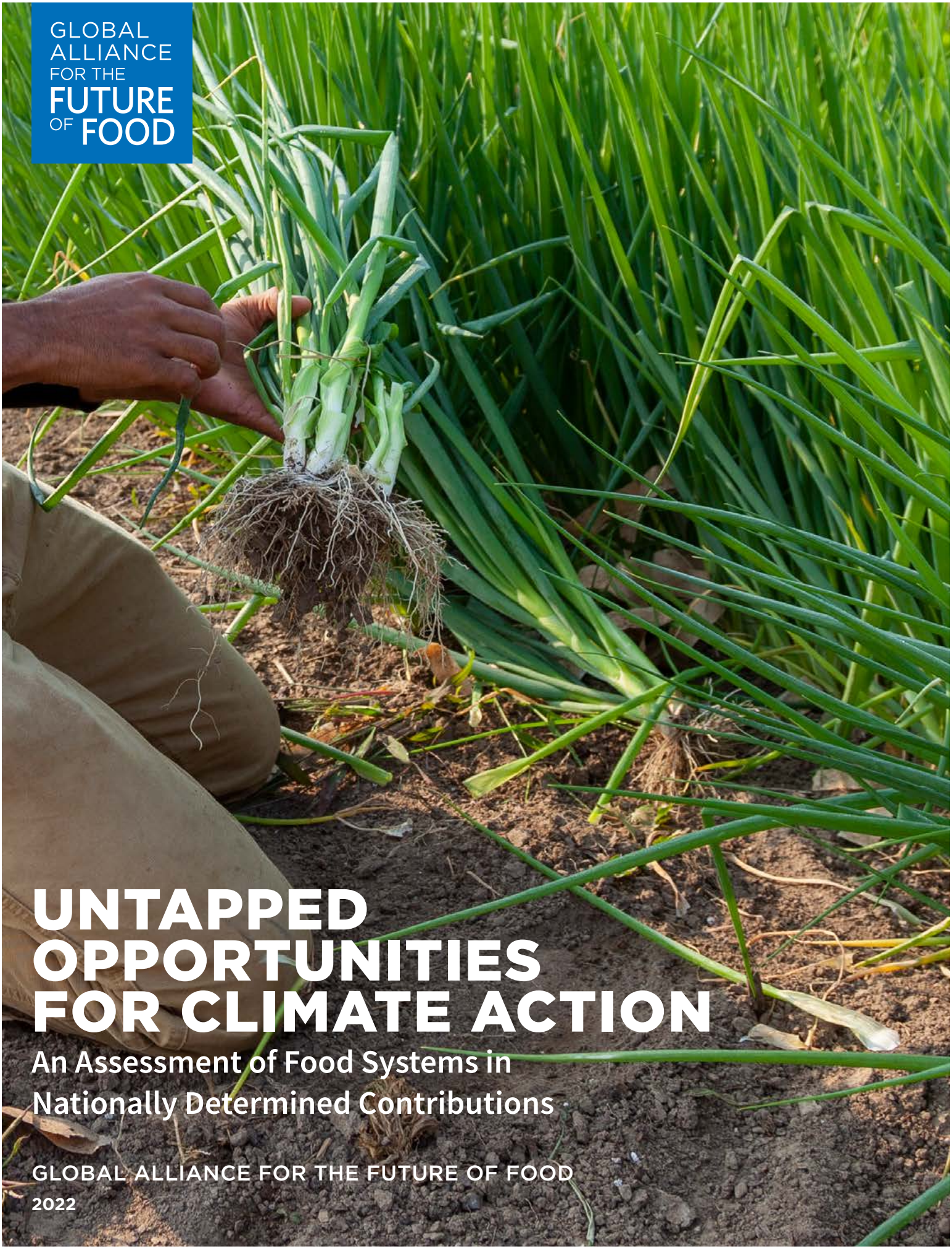
GLOBAL ALLIANCE FOR THE FUTURE OF FOOD



UNTAPPED OPPORTUNITIES FOR CLIMATE ACTION

An Assessment of Food Systems in Nationally Determined Contributions

GLOBAL ALLIANCE FOR THE FUTURE OF FOOD
2022

Suggestion for Referencing: Global Alliance for the Future of Food. *Untapped Opportunities for Climate Action: An Assessment of Food Systems in Nationally Determined Contributions*. n.p.: Global Alliance for the Future of Food, 2022.

Commissioned by the Global Alliance for the Future of Food.

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FOREWORD

2021 issued a clarion call to the world: We fail to transform food systems at our peril. As the Secretary General said in his Statement of Action for the United Nations Food Systems Summit, "Recent reports have found that food systems are contributing up to one-third of greenhouse gas emissions, up to 80% of biodiversity loss, and use up to 70% of freshwater".

However, sustainable food production systems should be recognized as an essential solution to these existing challenges. It is possible to feed a growing global population while protecting our planet." We as a global community are on notice.

The clock is ticking but fortunately there are a multitude of pathways to action ready for the taking.

We know that transforming food systems to respond to the climate emergency will simultaneously improve food security and nutrition, and, when managed well, will reduce pressure on land, sequester carbon, and support biodiversity and conservation. But, to take this beyond words on a page, concerted and interconnected action must be taken: investment and finance flows must stop bankrolling extinction; research priorities must reflect the public good; and farming and production practices grounded in agroecological and regenerative principles must be enabled to flourish.

Here, public policy is a major and significant lever of change.

Nationally Determined Contributions (NDCs) — national climate actions at the heart of the Paris Agreement — are a strategic opportunity for governments to integrate a food systems approach across their policies and programs in the name of climate mitigation. As the designated policy home where Paris signatories present how they're going to reduce their emissions, the NDCs serve a collective way to track global progress on climate goals and signal whether global warming can stay well below the threshold of 1.5°C (2.7°F).

With the 2022 United Nations Climate Change Conference "COP27" set to take place in Egypt this November, followed in quick succession by the first Global Stocktake of the Paris Agreement in 2023, there is an urgent need to realize a food systems approach integrated across the NDCs. This must also be echoed across other national, regional, and local processes and pledges — such as the national food systems pathways to 2030 being developed as a result of the 2021 UN Food Systems Summit process and the commitments on nature, forests, and land-use coming out of COP26 last year. This will not only result in policy and institutional coherence, but it will also catalyze diversified strategies and context-specific solutions at multiple stages, including food production, distribution, consumption, as well as waste.

From our work over the last 10 years we've seen time and again how sustainable food systems have positive multiplier effects, leading to considerable progress across a country's ambitions for food security, prosperous livelihoods, and human, ecological, and animal health and well-being.

> Not only will this mean that climate measures avoid falling into the trap of ineffective "silver bullet" interventions, but also that the strategies designed for the future are truly resilient.

As you'll read in the pages to come, more must be done to enable cross-sector dialogue and systems-thinking, and to install equity and right-based approaches at the heart of planning for the future. The voices, insights, and experiences of diverse stakeholders — such as farmers, fishers, traditional and Indigenous communities, advocates, companies, youth, and women — must be integrated into decision-making in participatory and representative ways. Not only will this mean that climate measures avoid falling into the trap of ineffective "silver bullet" interventions, but also that the strategies designed for the future are truly resilient.

Resilience is one of the seven shared principles that shape, guide, and inform the Global Alliance's work. Resilience speaks to how food must (and can) be produced, processed, and consumed in adequate quality and quantity as part of a stable and renewable system, and not contribute to increasing climate challenges. Resilient food systems open up more climate adaptation and mitigation opportunities, including critical opportunities to nurture resilient human systems and social capital, keeping alive the values, traditions, experience, and expertise needed at this fragile time in our human and planetary evolution.

At the Global Alliance, we share a commitment to bold action and challenging the status quo while identifying positive alternatives. For the last decade, we have worked together and with others to play our role in catalyzing action. With a focus on centering food systems in climate policy, this new analysis and practical toolkit designed for NDC and climate policymakers and advisors is one such contribution.

RUTH RICHARDSON
Executive Director, Global Alliance for the Future of Food

PREFACE

This report is part of a toolkit that highlights some of the many advantages of adequately and comprehensively integrating food systems transformation in Nationally Determined Contributions (NDCs). Food systems not only contribute to and are significantly affected by climate change, but they are also a crucial part of the solutions urgently needed to keep global warming below 1.5°C (2.7°F) by 2050.

The objective of this toolkit is twofold: 1) to assist policymakers and other interested stakeholders in assessing how countries are performing in terms of integrating food systems transformation priorities into countries' NDCs; and 2) to serve as a guide for identifying and reflecting actionable measures and win–win opportunities for more sustainable food systems in future NDC revisions.

More specifically, this report seeks to inform policy development and implementation, advocacy strategies, and key messages of influential state and non-state climate actors by:

- assessing issues, entry points, and opportunities for food systems transformation from a climate perspective;
- developing criteria and an Assessment Framework to evaluate NDCs in view of their efforts to promote food systems transformations; and
- engaging policymakers of the assessed countries to better understand the ambitions, challenges, and needs to make food systems an integral part of climate change policy-making.

The Global Alliance for the Future of Food (GA) commissioned Climate Focus and Solidaridad to develop an Assessment Framework for integrating positive food systems transformation into countries' NDCs. The methodology prepared and implemented is based on the GA's seven interconnected Calls to Action, which highlight critical pathways to food systems transformation, in order to highlight the critical importance and the multiple benefits of including holistic, interconnected food systems policies and programs in national climate plans. Alongside the Seven Calls to Action sit the GA's Seven Guiding Principles — renewability, resilience, equity, diversity, healthfulness, inclusion, and interconnectedness — which are used as a framework for systems thinking. Although growing attention is being given to the connections between climate change and agricultural issues, relatively little focus has been placed on climate change and food systems more broadly.

Designed as a toolkit for policymakers, civil society, and experts working in the food, nature, and climate nexus who wish to evaluate how NDCs fare in relation to a food systems approach, this publication includes the following five resources:

1. **Untapped Opportunities for Climate Action: An Assessment of Food Systems in Nationally Determined Contributions**, which provides an overview of the challenges and opportunities for promoting food systems transformation through NDCs, and includes the main findings stemming from the initial application of the Assessment Framework to the NDCs of 14 selected countries.
2. **A Practical Guide to Assessing Nationally Determined Contributions**, which contains an evaluation matrix and set of criteria to assess the extent to which a food systems approach is taken in developing and implementing NDCs. This guide also describes the process for developing the

Assessment Framework, how it incorporates the GA's Seven Calls to Action and Seven Principles, as well as the rationale for selecting the initial 14 countries for road-testing the Assessment Framework.

3. **Country Assessments**, which present a preliminary and high-level application of the Assessment Framework for each selected country, providing an overview of food systems in the respective country, assessing the extent to which the most recently submitted NDC reflects a food systems approach, and outlining areas for improvement for future NDC cycles.
4. **Case Studies**, which are concrete examples of initiatives that integrate both food systems and climate change and/or directly support food systems transformations. Each of the 14 selected countries has a companion case study.
5. **Technical Data Compilation**, which presents the technical data compiled while filling out the Assessment Framework for each of the 14 selected countries. This document is available upon request at info@futureoffood.org.

KEY MESSAGES

1. Centering food systems transformation within climate change action is critical to cutting emissions and delivering on the target to limit global warming to 1.5°C (2.7°F). The majority of climate change analysis and measures in the 14 Nationally Determined Contributions (NDCs) assessed by the Global Alliance for the Future of Food show that many countries worldwide continue to not realize the full potential of including food systems in their climate strategies and policies.

2. Equitable, inclusive "just transitions" for those working in food systems and who are most vulnerable to climate impacts requires processes and policy platforms built on transparency that enhance the participation of these groups in climate policy-making and implementation. Tackling asymmetries, structural inequities, and knowledge gaps in climate and food governance processes requires all food systems stakeholders to be engaged. Of the NDCs assessed, Colombia had the most democratic and inclusive process for developing their NDCs. Canada, Colombia, the United States, and the United Kingdom refer to capacity-building, skills development, and job creation as an overarching co-benefit of climate action, but these are not overtly linked to food systems.

3. Redirecting public sector finance and fiscal policy away from harmful food and farming practices — such as chemical-intensive agriculture, intensive livestock production, and the production of ultra-processed foods — and toward agroecology and regenerative approaches is an opportunity to support resilient livelihoods, and healthy communities; increase the production of healthy and sustainable food; as well as tackle climate change. When a policy environment incentivizes intensive farming practices, isolated non-governmental efforts to increase the production of healthy and sustainable food will be insufficient to shift the system. Of the NDCs assessed, Germany is the one country that provides a clear commitment to move away from harmful subsidies with plans to promote sustainable production and consumption via greater investment in research, use of pricing instruments to incentivize alternative sources of protein, and actions to increase health and dietary literacy.

4. Locally led, context-specific "nature-positive" solutions such as agroecology and regenerative approaches contribute to greenhouse gas (GHG) emissions mitigation and, when enabled according to a systems approach, give a strong role for local institutions, communities, smallholder farmers, Indigenous Peoples, and women. This ensures the protection and expansion of rights and improves food security and health. Of the NDCs assessed, many agroecological and regenerative agricultural solutions are identified, with Colombia, Senegal, and Kenya putting forward the most ambitious measures.

5. Reforming livestock production with appreciation for contextually dependent factors such as the local ecosystem, livelihoods, and culture is critical given its significant climate and ecological footprint. Of the NDCs assessed, measures to improve the sustainability of livestock production feature in Colombia, France, and Vanuatu. There is an opportunity for livestock production to be included more prominently in forthcoming NDCs, especially by those countries that are major meat producers.

6. Promoting nutritious, whole-food diets underpinned by sustainable, diversified food production adapted to local ecosystems and sociocultural contexts is an essential climate mitigation strategy while delivering multiple health co-benefits. Of the NDCs assessed, only France, Germany, and the United States include demand side measures to promote the consumption of sustainable and healthy foods in their national climate and energy plans. None put forward measures to reduce the consumption of animal protein.

7. Emissions associated with imported food products represent a considerable portion of a country's "attributable" GHG emissions yet are unaccounted for in policy or decision-making. Policy change in relation to "offshoring emissions", tracking externalities, and accounting for the environmental, social, and health impacts of food systems policies and practices requires new mindsets, tools, and methodologies. Of the NDCs assessed, none of the countries fully account for emissions associated with food imports, particularly those related to deforestation and the conversion of ecosystems.

8. Reducing and repurposing food loss and waste are central to mitigating climate change as well as delivering ecological, health, economic, and social co-benefits. Reducing food loss and waste reduces the pressure on arable land for crop production, contributing to food security and cutting GHG emissions. Only one of the NDCs assessed, France, includes comprehensive efforts to address food loss and waste. Actions to reduce emissions from food processing, storage, and transportation were rarely included in other country's NDCs.

9. Climate finance for transforming food systems can be enhanced by government leadership that promotes collaboration across private, philanthropic, and multilateral investments. Making policy implementation costs and impacts fully visible can promote cross-sector action and avoid siloed or single-focused interventions. While some of the assessed NDCs are underpinned by financial mechanisms to support their implementation, few explicitly quantify the costs associated with implementing their measures and achieving their targets.

10. Food systems transformation at local and regional levels is already happening with positive climate, health, and socio-economic impacts, and this work needs to feature more deliberately in respective action plans. Case studies from each of the countries assessed highlight the diverse ways in which local, regional, and national food systems initiatives can contribute to climate action and other co-benefits, such as food security and health, thereby contributing to resilience, food sovereignty, and economic empowerment. They are evidence that transformative action can be taken, it is happening, and it must be accelerated.

EXECUTIVE SUMMARY

A shift to sustainable food systems* can play a crucial role in promoting climate change action while also yielding significant ecological, biodiversity, health, economic, and social and cultural benefits. Global food systems account for 31% of the total anthropogenic greenhouse gas (GHG) emissions,[1] including emissions arising from production, processing, packaging, transport, storage, consumption, and disposal of food. Without adequate interventions, business-as-usual emissions from food systems alone would likely exceed the 1.5°C (2.7°F) emissions budget between 2051 and 2063.[2]

However, modelling shows that well-designed supply-side measures to curb land-use change and the conversion of ecosystems, reduce agricultural emissions, and enhance soil carbon sinks could feasibly mitigate 8.5Gt CO_2eq every year by 2050. In addition, demand-side measures promoting behavioural changes, such as reduced food waste and shifting diets, could mitigate 1.8 Gt CO_2eq every year by 2050.[3] In total, changing the way we produce and consume food could reduce global GHG emissions by *at least* 10.3 Gt a year.[4]

This is a conservative estimate: the upper estimates from other modelling exercises show a greater potential for mitigation from food systems transformation. But even at this level, the impact is significant, equivalent to slightly more than the combined emissions from global transport and residential energy use in 2019.[5] The bottom line is that transformation of the industrialized food systems offers a huge opportunity to keep global warming below the critical threshold of 1.5°C (2.7°F), and it will be impossible to do so without it.

As food systems have profound implications for a country's economic development, food security, and livelihood, as well as for human, ecological, and animal health and well-being, making food systems more sustainable can also lead to considerable progress in these areas. In this context, adopting a food systems approach can assist countries in promoting climate mitigation and enhancing natural ecosystems, while ensuring access to sufficient and nutritious food for a growing population, promoting healthier diets, and increasing community and ecological resilience against external shocks, such as changing weather patterns, more recurrent and extreme climate events, and the ramifications of the COVID-19 pandemic and other potential future pandemics.

A food systems approach takes an integrated perspective, seeking to leverage synergies and reduce trade-offs related to the web of issues, inputs, and processes associated with climate change and food systems. It proposes diversified strategies and context-specific solutions at multiple stages, including food production, distribution, consumption, as well as waste. It also considers the interlinkages between the production of different food products, demand and supply trends, and the various actors involved in each stage of the value chain, such as farmers, fishers, traditional and Indigenous communities, advocates, companies, consumers, and policymakers.

* A food system includes all elements related to the production, processing, distribution, preparation, and consumption of food and their socio-economic and environmental impacts. This includes aspects related to the environment, people, inputs, processes, infrastructures, institutions, and activities. See https://www.climatefocus.com/sites/default/files/200909_WWF_NDC_Food_final_low.pdf.

Untapped Opportunities for Climate Action: An Assessment of Food Systems in Nationally Determined Contributions seeks to support the integration of a food systems approach into Nationally Determined Contributions (NDCs). It does so by developing and applying a dedicated Assessment Framework for Integrating Food Systems in NDCs. The Assessment Framework serves as a policy support tool for national policymakers and policy advocates to enhance subsequent NDCs by helping them to identify opportunities and entry points for food systems in the three key components of NDC cycles: 1) NDC development process, including planning and preparation; 2) NDC content, including targets and measures; and, finally, 3) NDC implementation and monitoring.

The Assessment Framework is designed to enable users — policymakers, civil society organizations, and other experts working in the food–climate nexus and on broader nature/biodiversity priorities — to not only assess how food systems are currently integrated in existing NDCs, but also to identify mitigation opportunities and adaptation needs linked to food systems for future NDC formulations and revisions.

To kick-start this process and illustrate the use of the Assessment Framework, this Overview Report summarizes our findings in applying the Assessment Framework to the NDCs of 14 countries, namely: Bangladesh, Canada, China, Colombia, Egypt, the European Union (with a focus on national climate policies from France, Germany, and Spain), Kenya, Senegal, South Africa, the United Kingdom, the United States, and Vanuatu. These countries have been selected for their mitigation and adaptation potential related to food systems, their capacity needs for increasing food security, as well as their geographical balance and socio-economic representativeness in international climate diplomacy.

So far, the countries assessed have focused their NDCs largely on food production aspects, frequently overlooking other areas and components of food systems. On the positive side, the majority of the assessed NDCs do promote agroecology, regenerative approaches, and nature-positive solutions, with Colombia and Kenya putting forward the most ambitious set of agroecological measures. Actions to protect, conserve, and recover natural ecosystems were also commonly found in NDCs. This involved mostly forest protection, although conservation of coastal ecosystems is mentioned in the NDCs of the United Kingdom, United States, Colombia, China, and Vanuatu.

Conversely, demand-side measures to promote dietary changes and tackle food waste, as well as actions to reduce emissions from food processing, storage, and transportation, were rarely included. Notably, none of the NDCs assessed put forward measures to reduce intake of meat and dairy or to shift diets toward plant-based proteins and from processed to whole foods. Only China includes a target to promote green and low-carbon lifestyles, albeit its NDC does not clarify whether this includes sustainable diets. Moreover, none of these NDCs referred to emissions embodied in imported food products. In addition, the majority of countries assessed neglected other critical demand-side measures such as actions to cut food waste — with notable exceptions being Vanuatu, France, and South Africa — or measures to reduce the impact of food transport.

The majority of NDCs assessed highlighted the importance of food systems' resilience in light of changing climate patterns and more frequent extreme weather events. However, only a few countries have advanced concrete targets, indicators, and measures in their NDCs — or supporting documents — to promote food systems' adaptation, increase self-sufficiency, and build climate-resilient supply chains. Vanuatu's NDC,

for example, sets the goal of enhancing the resilience of subsistence agriculture and ensuring household income and food needs remain adaptive to a changing climate. Indicators such as the involvement of women, participation of small enterprises, use of financial instruments, and infrastructure built to support implementation are used to further articulate the goal.

In terms of planning and elaboration, the majority of the NDCs assessed were spearheaded by the environment ministry and benefited from some level of cross-ministerial coordination and subnational engagement. But while most countries assessed carried out the NDC development process in a rather participatory manner, food systems actors tended to be overlooked in domestic consultation processes. Early engagement with subnational food systems actors has been limited to only a subset — mostly producers — with other relevant actors having little involvement. A notable exception is Colombia, where NDC-related outreach was perceived as particularly democratic and inclusive, involving not only consultations with farmers, food manufacturers, and retailers, but also in-person consultations with local traditional communities, Indigenous Peoples, and gender experts. In Canada, the consultation process was particularly inclusive of Indigenous Peoples: The Canadian government established three senior bilateral tables, each with representation from different Indigenous communities. It also adopted a First Nations Climate Lens to ensure that First Nations perspectives, traditional knowledge, and needs were integrated in the NDC.

There were also significant differences in the extent to which the NDC development processes were deemed to be gender inclusive. For instance, Vanuatu and Canada fared considerably well in this respect, with every proposed measure being preceded by a gender assessment, or even linked to a gender expert. In Kenya, a dedicated gender analysis was undertaken to ensure that gender-responsive actions were identified, planned, budgeted for, and implemented as part of mainstreaming gender into the country's NDC. On the other hand, the United Kingdom has not gone beyond a very general reference to gender equality, and China and the United States failed to consider women as a particular stakeholder group in their NDC. Yet, gender integration is not only a crucial aspect of equitable and participatory food systems, but is also necessary to ensure effective design and implementation of adaptation interventions.

The limited participation of diverse food systems actors in the NDC development process has likely led to a dearth of research, actions, and measures that look at food systems in depth. Taking stock of studies and impact assessments that adopt a food systems perspective can enable policymakers to better understand the drivers of local challenges and ensure that efforts to address these are cross-sectoral, multidisciplinary, and complementary. But for most of the countries assessed, there was little indication that studies addressing food systems in an integrated manner were used to support NDC development and implementation plans. For instance, in the United States, where animal-based foods account for 82% of diet-related GHG emissions,[6] the NDC does not include any actions to make healthy and sustainable food more accessible and affordable. Where the NDCs assessed indicated alignment with existing and forthcoming food systems policies, certain inconsistencies persist. A case in point is the U.K.'s NDC, which makes important references to the National Food Strategy, the U.K.'s Agriculture Act, and the Sustainable Fisheries Policies yet lacks concrete measures that can catalyze a transition to more sustainable and diversified diets in the country. While the mentioning of food-related strategies and policies in the NDC are per se a very positive development, the absence of any specific actions and articulation on the food–climate nexus generates uncertainty over how consistency between these policies will actually be ensured. China's NDC, for instance, commits to comprehensively

reform existing laws and regulations that are incompatible with carbon neutrality but does not provide further details as to how this will be accomplished.

When it came to public spending and domestic finance for NDC implementation, none of the 14 countries sufficiently addressed ineffective, inequitable, and harmful agri-food support. None of the countries assessed included concrete measures to redirect public resources, whether through subsidies or incentives, away from industrial chemical-dependent farming (which often only benefits large farmers) and toward more diverse, regionalized, agroecological, and regenerative approaches that can also support smallholders. Failing to revisit existing budgetary support for carbon-intensive commodities and cheap food can undermine the implementation of food systems targets in the NDC. But some countries are taking promising steps to reform unsustainable public spending. Germany, in particular, has made a clear commitment to move away from harmful subsidies and promote sustainable food consumption via greater investment in research, use of pricing instruments to incentivize alternative sources of protein, and actions to increase health and dietary literacy.

Table 1 (see page 12) provides an overview of the extent and manner in which food systems are considered in the development process, content, and implementation of the NDCs assessed. The table breaks down each of these three NDC elements (process, content, and implementation) into a set of criteria that together reflect the extent to which food systems are integrated in NDCs. The criteria are based on the Assessment Framework, and as such reflect the GA's Seven Calls to Action and Seven Principles. All assessed NDCs are "scored" on each criterion, with dark green indicating that a criterion has fully been met; light green indicating that a criterion has partially been met; light yellow indicating that a criterion has not been met at all; and grey indicating that there was not sufficient information for the criterion to be assessed.

Overall, the differences seen in the level of integration of food-related climate actions into NDCs can be partly attributed to the large diversity in food systems across as well as within countries. It is also a reflection of the degree to which food systems contribute to climate change in the countries assessed, and the vulnerabilities of local food actors to climate change impacts. Our high-level application of the Assessment Framework to the 14 countries reveals that — while no single country fully incorporates a food systems approach into their NDCs, addressing climate and food challenges from production to retail to waste — two countries in particular, Colombia and Kenya, stood out for having more clearly integrated and articulated the different dimensions of food systems in their NDCs. These two countries scored higher across most criteria and NDC components, having been relatively more transparent, participatory, equitable, and holistic in their consideration of food systems.

PRIORITY ACTIONS

As the Assessment Framework is intended to offer forward-looking insights for transformative actions, this report also presents several opportunities for policymakers and other stakeholders to reflect a food systems approach in future NDC revisions. These opportunities, framed as Priority Actions, are based on key findings from the individual Country Assessments and are separated into three categories: NDC preparation, content, and implementation. These Priority Actions can help countries improve food–climate governance aspects,

expand climate actions beyond a narrow focus on agriculture, and better link supply- and demand-side interventions. Tapping into these opportunities can help integrate food systems transformation processes within key national priorities, enabling more comprehensive, ambitious, and equitable climate strategies while at the same time delivering human, ecological, and animal health and increasing climate change resilience.

PRIORITY ACTIONS FOR THE NDC DEVELOPMENT PROCESS

Priority Action 1: Describe the NDC development process in a clear and transparent manner.

Priority Action 2: Engage all relevant food systems' stakeholders in the development of NDCs.

Priority Action 3: Ensure that holistic assessments of national food systems inform the development of NDCs.

Priority Action 4: Further improve cross-sectoral coordination in the development of NDCs.

Priority Action 5: Convene "citizens assemblies" and integrate insights into the development of NDCs.

PRIORITY ACTIONS FOR NDC CONTENT (TARGETS AND MEASURES)

Priority Action 1: Ensure alignment with food systems policies and agri-food support while removing contradictory or overlapping policy interactions.

Priority Action 2: Clearly recognize the various co-benefits of transforming food systems.

Priority Action 3: Account for emissions associated with food imports, including those related to deforestation and the conversion of ecosystems.

Priority Action 4: Include targets and measures to facilitate and accelerate the transition toward healthier and more sustainable diets.

Priority Action 5: Include targets and measures to reduce food loss and waste.

Priority Action 6: Include measures to promote a just transition by creating green food systems jobs and developing green food systems skills.

PRIORITY ACTIONS FOR NDC IMPLEMENTATION

Priority Action 1: Ensure engagement of all key stakeholders and ministries during NDC implementation and monitoring.

Priority Action 2: Address governance challenges to ensure effective implementation and monitoring.

Priority Action 3: Quantify the implementation costs for food systems measures and channel public and private finance accordingly.

TABLE 1

CRITERIA/COUNTRY* **	United Kingdom	Colombia	Bangladesh	United States	Vanuatu	Kenya	France***	Germany***	Spain***	South Africa	China	Canada	Egypt	Senegal
NDC DEVELOPMENT PROCESS														
Coordination mechanism in place	●	●	●	●	●	●	●	●	●	●	◐	◐	◐	●
Cross-ministerial collaboration	◐	●	◐	●	●	○	○	○	●	●	◐	◐	●	●
Consultation with food systems experts and other key stakeholders	◐	●	◐	◐	◐	◐	◐	◐	◐	◐		◐	○	◐
Development of targets based on holistic food systems research		◐	◐	◐	○	◐	○	○	○	○	○	○	○	○
CONTENT OF NDCs														
Headline target – Emissions reduction	68%	51%	6.73–15.12%	50–52%	–	32%	37–42%	55%	23%	Emissions capped to 510 Mt CO2-eq in 2025 and to 420 in 2030	65%	40–45%	–	7–29%
Headline target – Target year	2030	2030	2030	2030	–	2030	2030	2030	2030	2025 and 2030	2030	2030	–	2030
Headline target – Reference year	1990 and 1995	BAU	BAU	2005	–	BAU	2005	1990	1990	BAU	2005	2005	–	BAU
Headline target – Sectoral scope	Economy-wide	Economy-wide	Energy, AFOLU, Waste	Economy-wide	–	Economy-wide	Economy-wide except LULUCF	Economy-wide	Economy-wide	Economy-wide	Economy-wide	Economy-wide	–	Economy-wide
Alignment with existing and forthcoming food system policies	◐	◐	◐		◐	●	◐	◐	◐	◐	◐	◐	◐	◐
Accounting for food systems' emissions		◐	◐	◐	◐		●	●	●	◐	◐	○	○	
Agroecology and regenerative approaches	○	●	◐	●	◐	●	●	●	●	●	◐	●	◐	◐
Conservation and regeneration of valuable ecosystems	◐	●	●	●	◐	●	●	●	●	●	◐	●	◐	●

● Yes ◐ Partially ○ No Insufficient information available

TABLE 1 CONTINUED

Promotion of sustainable fisheries and aquacultures	◐	○	○	○	○	●	○	○	○	◐	○	○	◐	○
Shift to healthy and sustainable diets	◐	○	○	○	○	○	◐	◐	◐	○	◐	○	○	◐
Promotion of climate and food systems resilience	◐	●	◐	◐	●	●	◐	◐	◐	●	◐	○	◐	●
Reduction of food loss and waste	○	○	○	○	◐	○	●	○	●	◐	○	◐	○	◐
Gender responsiveness	◐	●	○	○	●	●	○	○		◐	○	●	○	●
Engagement with farmers, local communities, and Indigenous Peoples	○	●	◐	○	●	○	○			◐	○	◐	◐	◐
Creation of quality food systems jobs	◐	◐	○	◐	◐	○	○	◐	◐			◐	○	◐
Recognition of positive and negative food systems externalities, including economic, social, and health co-benefits	◐	●	○	◐	◐	◐	◐	◐	◐	◐	○	○	○	◐
NDC IMPLEMENTATION PROCESS														
Participatory and collaborative implementation process		●	◐	●	○	●	◐			●	○	●	◐	◐
Participatory and transparent monitoring mechanism informed by food systems research	◐	◐	◐	○	◐	●	○			○		◐	○	◐
Vehicles to direct public and private finance to food systems	◐	●	●	◐	◐	●	◐	◐	◐	◐	◐	●	○	◐

* The above table does not intend to offer a comparison across countries, as each country is unique in its national circumstances and policy environment. As such, the scoring has been based on the specific national context, taking account of barriers and opportunities for transforming respective national food systems.

** The results presented above are derived from the Individual Country Assessments. The scope per assessment has been largely limited to each country's respective NDC.

*** For Germany, France and Spain, our assessment is largely based on these countries' National Energy and Climate Plans — complemented by insights from the EU NDC.

● Yes ◐ Partially ○ No Insufficient information available

INTRODUCTION

The global food system accounts for 31% of all anthropogenic greenhouse gas (GHG) emissions[7] and plays a critical role in climate change mitigation. These emissions arise from land use and storing, transporting, packaging, and processing commodities, as well as retail, food consumption, and food waste. Addressing food systems globally will be essential for meeting either the 1.5˚C or 2˚C (2.7°F or 3.6˚F) target. In fact, even if all non-food GHG emissions were immediately stopped and were net zero from 2020 to 2100, emissions from food systems would still exceed the 1.5˚C (2.7°F) limit between 2051 and 2063.[8] However, modelling shows that well-designed supply-side measures to curb land-use change and the conversion of ecosystems, reduce agricultural emissions, and enhance soil carbon sinks could feasibly mitigate 8.5Gt CO_2eq every year by 2050. In addition, demand-side measures promoting behavioural changes, such as reduced food waste and shifting diets, could mitigate 1.8 Gt CO_2eq every year by 2050.[9] In total, changing the way we produce and consume food could reduce global GHG emissions by *at least* 10.3 Gt a year.[10]

This is a conservative estimate: the upper estimates from other modelling exercises show a greater potential for mitigation from food systems transformation. But even at this level, the impact is significant, equivalent to slightly more than the combined emissions from global transport and residential energy use in 2019.[11] The bottom line is that transformation of the industrialized food systems offers a huge opportunity to keep global warming below the critical threshold of 1.5°C (2.7°C), and it will be impossible to do so without it.

In addition, a shift toward sustainable food systems can yield significant ecological, biodiversity, health, economic, and social benefits. Beyond climate change, the structure and outputs of food systems also have profound implications for countries' economic development, food security, as well as human, ecological, and animal health. Transforming food systems so that they are more sustainable, diversified, resilient, and equitable therefore does not only benefit climate change mitigation, but it also means improved and more balanced food supply, which contributes to both greater food security and better general health and well-being. Transforming food systems may also hold new employment opportunities across the food supply chain, enabling a just transition and helping address equity concerns by enhancing the participation of vulnerable groups in policy-making and implementation. It can also lead to more resilient ecosystems and communities by prioritizing conservation of biodiversity in agriculture and natural ecosystems, promoting local and traditional knowledge, and ensuring greater access to land and productive resources by vulnerable groups.

The food systems approach takes a systemic perspective of the multiple stages of the food supply chain, including food production, distribution, consumption, and waste management. It also seeks to integrate regulatory frameworks that relate to food (for example, trade policies, agricultural subsidies, market structures, research, and education) and take into account the interlinkages in the different points in the food chain between production and consumption, as well as the impacts on the various actors involved.[12] In the context of national climate priorities, adopting a food systems approach can open up new opportunities for climate action, enable the implementation of more ambitious, participatory, and equitable emissions-reduction strategies, and scale up climate-friendly food systems transformation processes already taking place at national, regional, and local levels.

Significant opportunities exist to raise ambition by better integrating food systems into NDCs. Under the Paris Agreement, Nationally Determined Contributions (NDCs) outline countries' mitigation and adaptation needs and ambitions. NDCs are a key political vehicle to express national commitments, actions, and financing needs related to climate mitigation and adaptation. They are formally updated every 5 years, at which time they are expected to reflect more climate-ambitious targets and measures, but countries are requested under the Glasgow Climate Pact, adopted in November 2021, to revisit and strengthen their 2030 targets by the end of 2030. These updates present a valuable opportunity to elevate intentions by better integrating food systems into countries' mitigation and adaptation needs and ambitions. This also means moving beyond solely focusing on food supply in climate policy development to considering mitigation opportunities that go further than food production and address emissions throughout the entire supply chain, including diets and food loss and waste.

Better consideration of opportunities to improve food systems' resilience to climate change is also crucial. By better integrating food systems into NDCs, policymakers can maximize synergies between climate objectives and socio-economic and health priorities as well as address key equity concerns within food systems. In the process, it also helps farmers adapt to changing climatic conditions and prepare for natural disasters. The growing frequency in extreme weather events highlights the importance of building resilience to better cope with natural disasters that can disrupt food supply chains and threaten food security.[13] As emphasized in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (published August 2021), climate change is already driving an increase in climate extremes — such as heatwaves, droughts, and tropical cyclones — in every region in the world, and frequencies are set to increase as the globe warms further.[14]

This Report offers a comparative analysis of the extent to which a food systems approach has been reflected in existing NDCs of 14 selected countries and identifies opportunities for a wider and systemic consideration of food in the development, elaboration, and implementation of future NDCs. We note, however, that at this stage only a high-level assessment of each country's NDC has been performed. For future assessments, a more in-depth application of the Assessment Framework can be conducted, considering not only the NDC but paying further attention to other food-relevant national policies and regulations, such as health and dietary guidelines, food security policies, national adaptation plans, and long-term development strategies. A more in-depth application of the Assessment could also consult with more food systems stakeholders* and experts, through interviews as well as more collaborative setups, such as food and climate workshops or food and climate committees.

* We define food systems stakeholders as all actors from the agri-food sector, government, academia, private sector, NGOs, civil society, and local communities and Indigenous Peoples who are part of or related to the production, processing, distribution, preparation, and consumption of food and their socio-economic and environmental impacts. This also includes experts in the fields of health, nutrition, development and biodiversity.

KEY FINDINGS FROM THE APPLICATION OF THE ASSESSMENT FRAMEWORK

GENERAL FEATURES OF FOOD SYSTEMS IN THE ASSESSED COUNTRIES

Food is a significant component in the economy of each of the countries assessed. Food systems in countries such as Vanuatu and Bangladesh account for a large share of national gross domestic product (GDP), and the majority of 10 million Colombians living in rural areas depend on food production as their primary source of income. While food systems in the United States, United Kingdom, Canada, Germany, France, and Spain still contribute significantly to national employment and economic activity, the contribution to national GDP is relatively small, ranging between 2 and 10%.

All assessed countries face nutritional and health-related challenges linked to food. Across Canada, France, Germany, Spain, the United States, and the United Kingdom, obesity and overweight linked to unhealthy diets affect 25 to 40% of the population. These conditions are strongly linked to an increased risk for such non-communicable diseases as cardiovascular disease or type-2 diabetes. Obesity can also increase the risk of developing serious illness after contracting viruses such as COVID-19. In comparison, Bangladesh, Colombia, China, South Africa, Kenya, and Vanuatu mostly deal with the double burden of malnutrition, with part of the population considered overweight while another significant part, predominantly children, suffers from undernourishment, micronutrient deficiencies, or stunted growth.

Most countries' food systems are vulnerable to stresses and shocks such as natural disasters and the COVID-19 pandemic. Tropical cyclones and tornadoes can disrupt food production, especially in coastal countries such as Bangladesh and Vanuatu, where these natural hazards present significant challenges for food supply. In addition, the COVID-19 pandemic has impacted food production in all countries, some more severe than others. In Bangladesh, for example, the pandemic contributed to disruptions in the transport of foodstuffs and a decrease in the purchasing power of local communities. These ramifications resulted in more food being wasted and farmers' income decreasing while food insecurity increased.

Climate change exacerbates challenges faced by the food systems of most countries — especially food production. Food systems in all assessed countries will be affected by climate change, albeit in different ways and to different degrees. The main concerns for Bangladesh, Colombia, China, Egypt, Kenya, Senegal, South Africa, and Vanuatu relate to prolonged droughts, excessive rainfall, and changing seasonality that will put pressure on food production. Climate change may also result in loss of arable lands and coastal ecosystems — critical aspects for the local provision of foods and foodstuffs. The severity of climate change impacts in these countries is furthermore amplified by limited infrastructural and technological capabilities that are necessary to build resilience, anticipate climate hazards, and manage disasters.[15]

While food systems also contribute significantly to the national GHG emissions of countries such as Bangladesh, Egypt, Senegal, Colombia, and South Africa, it is important to keep in mind that what each of these countries share in annual global GHG emissions is less than 0.3%. The food systems of Colombia, Bangladesh, Vanuatu, and Kenya account for at least 40% of national GHG emissions due to the considerable percentage agriculture contributes to economic activity and related activities, such as deforestation, while Vanuatu contributes less than 0.01% to global GHG emissions.

While food systems in the United States, the United Kingdom, Canada, Germany, Spain, and France assessed contribute relatively less to national GHG emissions, their contribution to global emissions is substantially higher. A key factor here is the relatively high per capita consumption of animal products in these and other high-income countries, which translates into high GHG emissions: while 3.3 kg (7.27 pounds) of meat were consumed per person in Bangladesh in 2017, 98.6 kg (217.4 pounds) were consumed by the average person in the United States in the same year.[16] Furthermore, it is important to note that food consumption and demand in high-income countries drive extraterritorial deforestation and GHG emissions. In the United Kingdom, for example, the overseas carbon footprint for imported commodities such as beef, palm oil, and soy was estimated at 28 million tons of CO_2 equivalent between 2016 and 2018.[17]

Several sociopolitical, economic, and infrastructure challenges hamper the transformation of food systems. An armed conflict has impacted rural development and food production for over 50 years in Colombia, and despite a formal peace agreement being signed in 2016, violence, illegality, and land-grabbing continue to hamper progress. In Bangladesh, Vanuatu, and Kenya, infrastructural inefficiencies in the storage and transport of food threaten rural livelihoods and access to food by marginalized groups. Moreover, limited capacity and budget often hamper implementation.

Opposition by powerful lobby groups and conflicts of interest within government are further obstacles to shift to more sustainable and equitable food systems. These issues reflect the current power asymmetries that severely undermine existing food and climate governance processes, limiting their transparency and efficacy. Existing power dynamics tend to lead to policies and regulatory frameworks that benefit only a few large influential stakeholders, with marginalized communities and those with low power — including women, smallholder farmers, Indigenous Peoples, youth, and poor and marginalized groups — carrying the most unequal burden of the climate crisis and other shocks to food systems, such as the COVID-19 pandemic.[18] Even well-intentioned solutions may have negative effects, such as in the case of Bangladesh, where interviewees indicate that forest mitigation projects can sometimes endanger the livelihoods of smallholder farmers, limiting their access to land and natural resources.[19]

Women, who play an important but largely underappreciated role in food production and in the nutrition of children, also face gender-related challenges. In both Bangladesh and Kenya, for instance, women have unequal access to resources for cultivation as well as markets, even though women have proven to be essential for the provision of key products such as fruits and vegetables in local food supply chains. When it comes to agricultural restoration or development efforts, women are also much less often the recipients of funds and investments, even though they are major innovators in improving cultivation if provided with appropriate resources.

Nonetheless, transforming food systems worldwide presents an opportunity to achieve several benefits related to health, employment, food security, and ecological resilience that go beyond reducing GHG emissions. Not only can the transformation of food systems contribute to climate change mitigation by reducing the GHG footprint of food production, but our assessment also finds that significant co-benefits can be achieved if food systems are transformed. Health is a clear co-benefit: in all assessed countries, a shift to sustainable and healthy diets can reduce the prevalence of obesity and overweight, as well as

address undernourishment and food insecurity. These benefits also imply reduced healthcare expenses and enhanced economic well-being. Beyond nutrition and health, sustainable food systems can contribute to building resilience toward climate change, creating new employment opportunities, addressing equity concerns in current food governance that often undermine basic human rights, supporting rural development and economic prosperity, and, in the case of Colombia, aiding community cohesion and peacebuilding.

INTEGRATION OF A FOOD SYSTEMS APPROACH IN THE ASSESSED NDCS

The countries assessed in this report differ greatly in the manner and extent to which they consider and integrate food systems into their NDCs. The difference in how countries have integrated food systems into their NDCs is undoubtedly a reflection of the great diversity in food systems across the globe, most notably in the degree to which national food systems have historically contributed and continue to contribute to climate change, as well as the vulnerabilities of national food systems to climate change impacts.

The majority of the NDCs assessed were developed under the leadership of the most relevant ministry — typically the one with climate change in its remit — and some benefitted from cross-ministerial coordination. In some of the assessed countries, such as Canada, France, Germany, Kenya, and Spain, there is scope for improving horizontal coordination. Additionally, while the majority of NDC development processes were found to have some degree of public participation, food systems stakeholders and, in particular, marginalized communities were not frequently consulted, leading to knowledge and evidence gaps and compounding structural inequities. Furthermore, the scientific analyses and accounting methodologies that underpin the assessed NDCs often consider only certain food systems elements. None of the assessed NDCs holistically address food systems emissions.

Most of the NDCs assessed demonstrate alignment with existing and forthcoming food systems policies, although some clear inconsistencies persist. Similarly, some of the assessed NDCs identify the co-benefits of their measures — such as the health co-benefits of the U.K.'s dietary commitment — but there is scope to further emphasize the co-benefits of a food systems transition. There is also great diversity in the extent to which NDCs are gender responsive. In Vanuatu, every NDC measure must be preceded by a gender assessment and linked to a gender expert. In Senegal, there is a national strategy for gender equity and equality to ensure gender perspective in all policy-making processes. South Africa's NDC development process included consultations with women and youth, and Canada's NDC has been informed by a "gender-based analysis plus (GBA+)". In contrast, the French, German, and U.S. NDCs do not mention women as an important stakeholder group.

While some NDCs — such as those of the United States, United Kingdom, Canada, and Colombia — emphasize the importance of green jobs, these are not typically linked to the countries' food systems. In turn, agroecology, regenerative approaches, and nature-positive solutions are promoted in the majority of the assessed NDCs, with Colombia, Senegal, and Kenya putting forward the most ambitious set of agroecological measures. Senegal, for example, has set specific and ambitious targets for soil restoration, agroforestry, forest restoration, organic fertilizer application, and other agroecological interventions. Measures to protect, conserve, and recover natural ecosystems were also frequently included in NDCs. This predominantly involved forests, although marine and coastal ecosystems are mentioned in the NDCs of the United Kingdom,

United States, Colombia, and Vanuatu. On the other hand, measures to promote a dietary shift, reduce food loss and waste, and reduce emissions from food processing, storing, and transportation are included far less frequently in NDCs. Notably, none of the NDCs put forward measures to reduce the consumption of animal protein. China's NDC refers to promoting "low-carbon products and lifestyles," but it does not clarify whether it also intends to promote a dietary shift. Moreover, measures to improve the sustainability of livestock production are included in Colombia, France, and Vanuatu's NDCs. Across countries, reducing meat consumption is considered politically sensitive and is therefore avoided during the policy-making process.

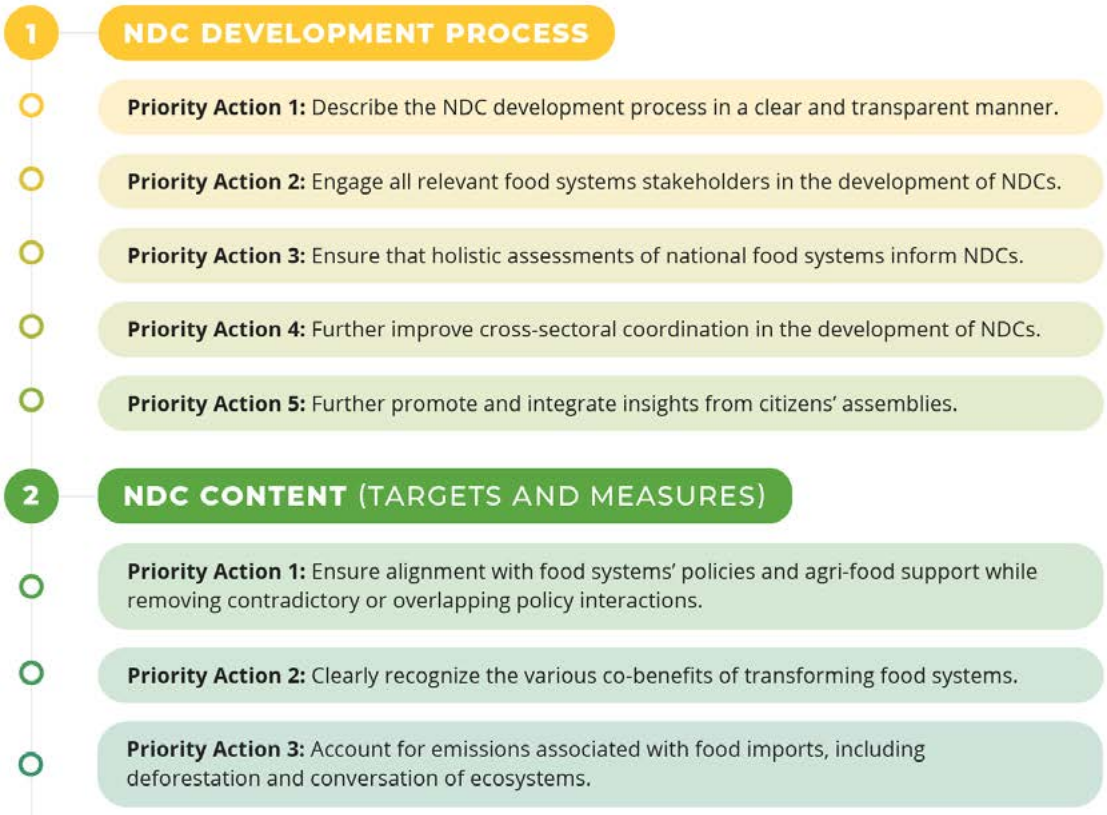
The implementation of many of the assessed NDCs is complicated by governance challenges such as limited transparency and budgets, weak enforcement and monitoring capacities, corruption, and conflicts of interest. In addition, few of the NDC development processes meaningfully engage with ministries, regional governments, and local public officials to implement NDCs, and engagement with non-governmental stakeholders (such as private sector actors, smallholder farmers, women, local communities, Indigenous Peoples, and civil society) is similarly limited. Lastly, while most of the assessed NDCs are underpinned by financial mechanisms to support their implementation, these are only linked explicitly to the implementation of food systems measures in some countries, such as France. The quantification of implementation costs is also often lacking.

OPPORTUNITIES FOR FURTHER INTEGRATING FOOD SYSTEMS IN NDCS

In developing and subsequently applying the Assessment Framework* to the NDCs of selected countries, we have identified various entry points and opportunities for further accelerating food systems transformation. We have synthesized the results and grouped 14 key opportunities in accordance with their direct connection to the following NDC components: 1) NDC planning and construction process; 2) NDC targets and measures; and 3) NDC implementation and monitoring aspects.

The opportunities identified have been formulated as suggested Priority Actions to those involved in the process of preparing and formulating NDCs but may also be of interest to other stakeholders and advocates operating in the food–climate nexus and on broader nature/biodiversity priorities. In framing the suggested Priority Actions, we have also aimed to highlight possibilities for further collaboration and knowledge exchange between countries as well as domestically among different stakeholders and constituencies. These Priority Actions also seek to raise the profile and visibility of more sustainable and integrated food systems, helping catalyze additional finance and scale up food systems transformation processes already taking place at the local level. Figure 1 summarizes the 14 Priority Actions.

FIGURE 1: PRIORITY ACTIONS



* Please see the detailed assessment criteria and how they were developed in "Assessment Framework: Methodology and User Guide."

FIGURE 1: PRIORITY ACTIONS, CONTINUED

PRIORITY ACTIONS FOR NDC DEVELOPMENT PROCESS

Priority Action 1: Describe the NDC development process in a clear and transparent manner.

The overwhelming majority of countries assessed do not provide detailed information about their NDC's development process, making it difficult to assess: 1) the extent to which the process was inclusive and participatory; 2) how stakeholder inputs relevant to food systems were considered; and 3) what research and data were used. Clearly describing the NDC development process is essential for ensuring transparency, equity, and accountability.

Colombia is a notable exception in this regard: its NDC provides detailed information on the development process, including information on actors, processes, and consultation formats. However, all other NDCs assessed provide limited information on the extent to which their development processes were participatory, democratic, and inclusive. For example, the U.S.'s NDC mentions that consultations were conducted and indicates which stakeholder groups were involved but does not provide detail about the consultation format or recruitment strategy. South Africa's NDC mentions that the NDC was presented to stakeholders across business, labour, and civil society (including women and youth constituencies, for their inputs during the NDC development process, but it is unclear if stakeholder inputs relevant to food systems were considered. The U.K.'s NDC highlights that the policies that will be drawn on to achieve the U.K.'s NDC target have undergone consultation but does not detail a consultation process for the actual NDC. Canada extensively described how Indigenous Peoples have been consulted with and how their views are incorporated into the development of the NDC, but much less detail is provided for other consultations or stakeholders.

Providing information about the evaluation, planning, and drafting processes of the NDC should not only strengthen transparency, equity, and accountability but also facilitate review by third parties. More concretely, this information should enable stakeholders to assess the extent to which food systems were considered during the process. This includes specifying:

- who was responsible for coordinating the development of the NDC;
- which other governmental actors supported the development of the NDC and with which responsibilities;
- whether consultations were conducted in an equitable manner, which stakeholders were involved, in which formats (for example, facilitating access by vulnerable groups), and with which result; and
- the extent to which those consultations were considered in shaping the NDC.

The Paris Agreement — and the Katowice Rulebook* — also specify that NDCs should be communicated in a manner that provides the *Information* necessary to facilitate *Clarity, Transparency, and Understanding* (ICTU).[20] While adherence to ICTU guidance is currently optional — albeit strongly encouraged — this will become mandatory when countries review and update their NDCs in 2025. The ICTU guidance recognizes that there is no one-size-fits-all approach but outlines seven information elements that are applicable to all NDCs.[21] Under the planning process, countries should, at a minimum, provide sufficient information to enable readers to understand the planning processes, institutional arrangements, and national context that underpin each NDC.

* The Katowice Rulebook refers to the decisions agreed upon at COP24 in Katowice in 2018. These address the procedures and mechanisms according to which the Paris Agreement will be implemented, ensuring transparency and fairness for all parties.

Priority Action 2: Engage all relevant food systems stakeholders in the development of NDCs.

Few of the assessed NDCs consulted food systems experts. While agricultural stakeholders were consulted for the development of some of the NDCs, experts with a more holistic view on food systems and those with sectoral expertise such as health were rarely involved. The participation of Indigenous Peoples, women, smallholders, fishers, youth, and other poor and marginalized groups was similarly limited. Equitably engaging all food systems stakeholders up front is critical to tackle asymmetries, structural inequities, and knowledge gaps in climate and food governance processes. In particular, meaningful participation of underrepresented groups is key to inclusive governance processes that can secure the recognition of the different practices, perspectives, sources of evidence, and contexts and lead to the creation of more diversified and holistic strategies.

Of the 14 countries assessed, Colombia, South Africa, and Canada had the most inclusive and democratic NDC development process. Colombia's NDC development process consisted of a public consultation, a survey, a communications strategy, dialogues with grassroot communities, and engagement with the private sector. The participatory nature of Colombia's NDC development process is also reflected in the fact that — in addition to the 32 sectoral mitigation targets that have been quantified into Colombia's economy-wide emission-reduction target — the Colombian NDC also contains 89 mitigation measures put forward by departments and cities as well as 24 mitigation measures led by private sector actors, including a food and beverage company and a food retailer. In South Africa, the NDC update involved a process of consultation, awareness-raising, and dialogue to engage stakeholders before the approval of the NDC by the cabinet. The process included stakeholder consultation workshops in each province and with different sectors. In Canada, the consultation process was particularly inclusive with regard to Indigenous Peoples: the Canadian government established three senior bilateral tables, each with representation from First Nations, Inuit, and Métis. A "First Nations Climate Lens" was adopted throughout the NDC development process to include First Nations perspectives, traditional knowledge, and needs with regard to climate change. Moreover, climate plans developed by Indigenous Peoples were annexed to the NDC with an aim to recognize their role as agents of change.

In turn, while the NDC development processes of Bangladesh and Vanuatu were also deemed inclusive, the consultations were selective and only open to specific stakeholders. For instance, in Bangladesh, some interviewed stakeholders were of the opinion that the failure to include farmers in the NDC's development resulted in the non-inclusion of measures for food storage strategies that have a significant potential to reduce food loss.[22]

Notably, none of the countries assessed explicitly included consultations with health and nutrition experts. This is a missed opportunity for ensuring that NDCs maximize health co-benefits. As underscored by the Healthy NDC Scorecard published by the Global Climate and Health Alliance, there is considerable room for climate measures that can promote healthy diets and reduce the vulnerability of people who suffer from noncommunicable diseases, as well as the incidence of vector- and water-borne diseases and respiratory health issues.[23] Of the countries assessed in this report, Colombia and Senegal received the highest health score of 12 out of 15, tying with Laos for second place among the 40 NDCs included in the Healthy NDC Scorecard. In turn, the United Kingdom and Canada scored 7 out of 15, followed by a score of 6 out of 15

for the United States, 5 out of 15 for Kenya, and 1 out of 15 for both the European Union and Bangladesh. Vanuatu, China, Egypt, and South Africa were not assessed in the Healthy NDC Scorecard.*

As NDCs are the most important political vehicle to express national commitments to climate change mitigation, and to some extent adaptation, it is crucial that they reflect the interests and needs of broad segments of the population. This is particularly relevant for food systems measures, which are likely to have co-benefits across different sectors but may also (positively or negatively) impact some groups more than others. Engaging food systems stakeholders early on in the NDC development process — as well as in developing food systems policies that will interact with the NDC — will likely result in more holistic NDCs that reflect local realities, maximize health and socio-economic co-benefits, and minimize trade-offs. Early engagement can serve as a tool to build consensus, ensuring that policies have the necessary buy-in and become actionable, a valuable feat when dealing with contentious issues around food.

It is also important to include targets and measures that have been developed by other public sector institutions, private sector actors, or local communities. The territorial and private sector measures in Columbia's NDC or the Indigenous climate strategies provided in Canada's NDC may offer best practices in this context. This was a missed opportunity in the NDCs of other countries where actors other than the national government are also setting ambitious climate targets. The U.K.'s NDC, for example, does not refer to the ambitious climate target set by the National Health Service to become completely net zero by 2045.

Priority Action 3: Ensure that holistic assessments of national food systems inform NDCs.

The majority of NDCs assessed were underpinned by scientific analyses and accounting methodologies that considered some food systems elements but did not address all components of food systems in an integrated manner. Including holistic assessments of national food systems and accounting for associated emissions in a comprehensive manner can inform the development of ambitious, evidence-based food systems measures, thereby increasing the scale of the GHG emissions reductions that can be achieved through NDCs and extending the scope of impacts beyond climate change.

Generally, the NDCs assessed take account of agriculture and forestry but overlook the adaptation and mitigation potential of food systems as a whole. None of the NDCs assessed put forward an accounting methodology that considers the emissions reductions and removals from food systems in a systematic way. Largely, this is due to the fact that most GHG accounting in NDCs is calculated per sector rather than per system. This contributes to most NDCs neglecting the emissions-reduction potential of food systems measures that do not fit into sectors such as agriculture, transport, or energy. For instance, while NDC targets may include emission reductions through improved waste management, they may not consider

* The Healthy NDC Scorecards will be regularly updated by the Global Climate and Health Alliance as NDCs are revised and submitted. See https://climateandhealthalliance.org/press-releases/healthy-ndcs-scorecard-exposes-health-gaps-in-national-climate-policies-ahead-of-cop26/

emissions-reduction potential from reduced food loss and waste in different stages of food value chains. Similarly, the potential of changing diets is omitted from modelling efforts and accounting methods of most NDCs. In Colombia, for example, food loss and waste were excluded from the modelling scenarios due to a lack of available data. As a result, the Colombian NDC does not put forward any measures to address food loss and waste. The U.S.'s NDC, in turn, accounts for agriculture as a standalone category, while other food-related emissions are only considered implicitly under categories such as transportation emissions and commercial and residential emissions. In many cases, food systems have not been accounted for holistically because the necessary knowledge and data on issues such as food loss and waste and consumption patterns are not available.

Clearly, a more holistic approach is needed for assessing food systems, importantly through transdisciplinary evidence-based research and information-gathering, modelling exercises, and impact assessments, as well as through monitoring, reporting, and verification (MRV) systems that can adequately and systematically monitor emissions reductions and removals from food systems measures. More comprehensive studies are needed to capture and understand all food systems elements — including food production, transportation, distribution, consumption, and disposal — as well as the links among and between food systems elements and food systems actors at local, regional, and national levels. In particular, understanding how local food systems behave is essential for developing measures that are actionable on the ground. In Colombia, for example, a recent study has mapped out the food system profile of the city of Cali, identifying how local issues, economic aspects, and other contextual factors impact the city's food systems. In this context, it is also important to accommodate the influence of trade through food imports and exports. Such a systems-based approach enables researchers and policymakers to identify feedback loops between different food systems elements and actors, which are crucial for identifying the true mitigation and adaptation potential of specific food systems measures, for managing trade-offs, and for maximizing synergies.

In the United Kingdom, interviews indicate that the Climate Change Committee (CCC) — which is tasked with the monitoring of emissions-reduction efforts under the NDC — is seeking to refine the metrics that are used to appraise progress in reducing food systems' emissions.[24] While already quite sophisticated, efforts are now taken to further accommodate the different interrelationships between food systems actors and elements in the CCC's appraisal metrics.

Priority Action 4: Further improve cross-sectoral coordination in the development of NDCs.

The majority of assessed countries had a coordination mechanism in place for the development of their NDCs, typically under the leadership of the ministry with climate change in its remit. While most NDCs were developed with some level of cross-sectoral collaboration, in several instances this lacked meaningful participation of important ministries. Improving cross-sectoral coordination following the principles of inclusive, integrated, multilevel governance processes is therefore crucial for policy coherence across ministries, as well as for building broad support for climate action and realizing the large-scale implementation of NDC measures.

The United States is explicit that its NDC has been developed and will be implemented through a "whole-of-government" approach. Similarly, Spain collaborated across relevant ministries for the development and

implementation of the national energy and climate plan through the establishment of the Inter-Ministerial Commission on Climate Change and Energy Transition. In South Africa, a coordination mechanism led by the Department of Forestry, Fisheries and the Environment was set up to work with different government stakeholders within and across levels of government in updating the NDC. In turn, in Kenya, interviews indicate that there is scope to improve the collaboration between the Ministry of Health and Ministry of Agriculture to promote a shift toward healthier and more sustainable diets.[25] In Germany and France, the Ministries of Agriculture and Food were not extensively consulted during the development of the countries' National Energy and Climate Plans — which reflect the majority of national commitments that contribute to achieving the targets set under the European Union's NDC. Similarly, in Canada, consultation with the Ministry of Agriculture and Agri-Food was limited, reflecting a lack of concrete implementation plans for measures that address agriculture and food production.

For these countries, it is therefore important to improve coordination among ministries. In Kenya — in addition to improving collaboration between the Ministries of Health and Agriculture — this could involve increasing the coordination capacity of the National Climate Change Council, most notably of the Climate Change Units operating at national and county level. In turn, in Canada, Germany, and France, this could take place via the creation of a food and climate taskforce and committees with representatives from all relevant ministries. In Germany, such a taskforce could ensure better collaboration between the Ministry of Environment and the Ministry of Agriculture and Food as a means of establishing synergies without having to compromise party and ministerial interests.

Lessons may also be learned from Colombia's approach to ministerial collaboration, as the NDC update process here was coordinated through the National Climate Change System (SISCLIMA) that involved a leading body (CICC) led by the Ministry of Environment and Sustainable Development, but further included members of other ministries and departments. This process helped institutionalize the NDC revision process across multiple ministries. In addition, it enabled teams from different departments to work together to develop concrete measures and targets. China also provides an example of successful cross-ministerial collaboration in its development of its poverty alleviation office. This office, tasked with alleviating poverty and mainstreaming poverty-alleviation considerations across policies, was composed of different public actors in order to guarantee horizontal collaboration within government.[26] In South Africa, the Presidential Climate Commission, a multistakeholder body established in 2020, advised the country's NDC update. It is comprised of government ministers and part-time commissioners from civil society, the science community, business, and organized labour.

Engagement leading up to and resulting from the 2021 UN Food Systems Summit also presents a valuable opportunity for improving cross-sectoral coordination on food systems challenges, most notably through the appointment of Member State Dialogue Convenors and the organization of Member State Dialogues. These processes are to inform the development of national pathways for sustainable food systems. Of countries assessed for this report, only Canada and France have not submitted national food systems pathways as part of the UNFSS process. In Colombia, interviews indicate that the Dialogues organized under the auspices of the United Nations Food Systems Summit (UNFSS) promoted a holistic food systems perspective in policy-making arenas.[27] In Bangladesh, the Member State Dialogues are similarly expected to improve collaboration between the Ministry of Climate Change on the one hand and the Ministry of Food and Ministry of Agriculture

on the other.[28] Coordination should also be extended beyond the ministerial level to include sub-national and local authorities, as called for through the Glasgow Food and Climate Declaration. The Glasgow Declaration is a pledge by sub-national and local actors to accelerate the development of integrated food policies and calls on national governments to act, including through their NDCs.[29]

Priority Action 5: Further promote and integrate insights from citizens' assemblies.

While not explicitly mentioned in the NDCs, a number of the countries assessed have citizens' assemblies in place to advise on climate change mitigation and adaptation. It is crucial that the recommendations from these citizens' assemblies are given their due process and are awarded the legitimacy that is appropriate in democratic societies. In the context of food systems in particular, assemblies can give voice to citizens who — in their capacities as consumers, food advocates, farmers, fishers, and intermediaries — play a key role in shaping and transforming food systems.

The United Kingdom, for instance, convened a Climate Assembly between January and September 2020, which developed recommendations to strengthen and support the U.K.'s Parliament in its efforts to scrutinize the U.K. government's climate change policies.[30] The U.K.'s NDC, however, does not make any mention of these recommendations. In turn, France held the Citizens Convention for Climate between 2019 and 2020, which was initiated as a response to the Yellow Vest protests and consisted of 150 citizens randomly selected to be representative of the French population.[31] However, it appears that the recommendations from the assembly have been watered down before even making their way into the French National Energy and Climate Plans. While the French Government had initially promised to submit the assembly's "unfiltered" proposals to wider discussion either through a referendum or through Parliament the climate bill that was ultimately passed by Parliament in July 2021 reflected fewer than half of the recommendations put forward by the citizens' assembly.[32] The failure to deliver on the promise of not filtering the assembly's recommendations before they were put to vote further eroded faith in France's climate policies.[33]

The importance of capturing discussions and recommendations from citizens' assemblies cannot, however, be overstated. This is even more so when these recommendations have bearing on food systems, as food can be a contentious personal, social, cultural, and historical issue that affects everyone in society, and government policies must often balance trade-offs and mediate between competing needs. Thus, by organizing climate assemblies, governments empower citizens to go through the mediation process themselves to achieve balanced recommendations that more accurately reflect public opinion. In this sense, the approach followed by Scotland in developing their indicative NDC may offer a best practice: the Scottish Government convened a citizens' assembly on climate change in 2019, which informed and is mentioned explicitly in Scotland's indicative NDC.[34]

PRIORITY ACTIONS FOR CONTENT OF THE NDC

Priority Action 1: Ensure alignment with food systems policies and agri-food support while removing contradictory or overlapping policy interactions.

While most of the assessed NDCs demonstrated some level of alignment with existing and forthcoming food systems policies, several inconsistencies persist. Alignment between climate policies and food-related policies — along with concrete steps to ensure that coherence is achieved and maintained over time — is paramount to ensure the synergetic and ambitious delivery of these policies. Identifying and removing policies that may prevent or hamper progress on building sustainable food systems is also essential.

The U.K.'s NDC, for example, does not put forward concrete measures to deliver its economy-wide target but instead mentions the policies — some of which relate to the country's food system — that will be drawn upon. While this demonstrates some coherence between the NDC target and the food systems policies, the absence of concrete measures and associated monitoring plans could present challenges in ensuring true alignment. Similarly, South Africa's updated NDC is informed by the 2019 Low Emissions Development Strategy and the National Climate Change Response Policy as well as other national policies. These policies and plans acknowledge the role of agriculture in GHG emissions, the effects of climate change on the most vulnerable rural poor, and the challenges of addressing issues related to food security, water, health, and land reform. On the other hand, Canada's NDC does not consider the recently adopted Food Policy for Canada, missing a key opportunity to integrate food systems efforts. In Colombia, interviews highlight that while policy development does aim to pursue alignment through cross-sectoral cooperation, the existence of various subsidies that continue to encourage carbon-intensive food practices hamper the coherent delivery of the NDC.[35]

Policy coherence between climate and food systems plans is crucial for ensuring the synergetic achievement of climate goals, eliminating policy inefficiencies, and reducing implementation costs. Similarly, coherence should also be maintained with other sustainable development instruments, such as the Sustainable Development Goals (SDGs) of the United Nations and the National Pathways being developed as part of the United Nations Food Systems Summit.* It is thus important that the development of NDC targets and measures takes account of existing and forthcoming food systems policies and national commitments that may either contribute to or compete with the implementation of the NDC. This means going beyond simply stating commitments to policy coherence in NDCs or mentioning relevant policies to actually including clear steps and measures through which policy coherence is to be achieved and safeguarded.

One way countries can achieve this consistency is by focusing on revisiting and removing inefficient subsidies that hamper the transition toward more sustainable, healthy, and equitable food systems. For instance, when public support and the policy environment incentivizes land-use-intensive food production and high levels of animal protein consumption, isolated efforts to increase the production of healthy and sustainable food will be insufficient to catalyze a shift toward sustainable food systems. Across the NDCs and national plans evaluated, there is a lack of concrete efforts to redirect public resources away from carbon-intensive farming

* See more under https://summitdialogues.org/overview/member-state-food-systems-summit-dialogues/convenors/.

and toward more diverse and regenerative approaches. Germany is a notable exception in this context and has made an explicit commitment to move away from harmful subsidies and promote sustainable food consumption via, among others, greater investment in research, use of pricing instruments to incentivize alternative sources of protein, and actions to increase health and dietary literacy.

But with the launch of the Policy Action Agenda for Transition to Sustainable Food and Agriculture in Glasgow during COP26, there is now hope that other countries may soon follow in the footsteps of Germany and even go beyond. The Policy Action Agenda sets out pathways and actions that countries can adopt to repurpose public policies and support food and agriculture while improving overall food systems resilience and enabling a just rural transition. So far 16 countries have endorsed the Policy Action Agenda, including the United Kingdom, Spain, and Colombia. Clearly connecting these (planned and adopted) pathways and actions to NDCs has the potential to further catalyze the move toward sustainable food systems.

Priority Action 2: Clearly recognize the various co-benefits of transforming food systems.

While some of the assessed NDCs highlight the benefits of their measures that go beyond climate change mitigation and adaptation, there is much scope to further emphasize the various co-benefits that are associated with a transition to sustainable food systems. The recognition and clear communication of ecological, health, economic, and social co-benefits — such as improved nutrition, food security, job creation, land stewardship and resource access, peace-building, and greater overall ecological integrity — is key to the development of ambitious, evidence-based food systems measures that also benefit from widespread support.

In committing to shift toward healthy diets, for example, the United Kingdom implicitly recognizes the health co-benefits of low-carbon diets. In turn, the U.S.'s NDC emphasizes that the co-benefits of its measures and targets will include job creation, improved public health, and environmental justice — although this is not explicitly linked to food systems measures. However, there is much more room in NDCs to recognize potential co-benefits and include food systems measures and targets that take advantage of these benefits. Similarly, South Africa's NDC recognizes the health risks of climate change, including the increasing burden of disease and other aspects such as infrastructure, health services, availability of medicines and medical supplies, and emergency services. But it fails to consider health benefits of food systems measures such as healthy and sustainable diets for climate change mitigation and adaptation.

Carefully designed food systems mitigation and adaptation measures can contribute to other policy objectives, such as improving public health, reducing healthcare costs, stimulating economic growth, providing green employment, peace-building, conserving biodiversity, supporting cognitive development, promoting food and nutrition security, and increasing resilience to natural, health, and socio-economic shocks. The recognition and clear communication of these co-benefits will likely increase support for food systems measures both within and outside governments. Making these co-benefits clearer in NDCs and stressing linkages to the transition to more sustainable food systems can also improve evidence-based decision-making and enhance predictability for greater private sector investments in sustainable, healthy, resilient, and equitable food systems.

In some countries with minimal GHG emissions, such as Vanuatu and Bangladesh, stakeholders point out that climate change mitigation itself should be seen as a co-benefit, with other policy priorities — achieving food security, building food systems resilience against climate change, and developing rural areas — taking precedence. In Vanuatu, for example, interviews reveal that there are opportunities to build the resilience of fisheries to support adaptation to climate change.[36] Efforts to optimize the use of the country's fisheries — for example, by minimizing waste from fish processing or using this waste to produce new products such as nitrogen fertilizer or fashion accessories from fish skins — could have both adaptation and mitigation benefits if the resource optimization is accompanied by an overall reduction in fishing. In addition, such measures are likely to yield economic co-benefits by creating employment via the repurposing of food loss and increasing production efficiency.

While transitioning toward more sustainable, healthier, and more equitable food systems holds the potential to provide various co-benefits, food systems transformations may also be accompanied by trade-offs — for example, between different policy objectives where increasing resilience requires economic investments (policy trade-offs) as well as where the benefits and costs of food systems transformations are not distributed equally across society (social trade-offs). In this context, it is important to have a holistic understanding of national food systems that enable the identification of potential trade-offs and empower policymakers to address them in an equitable manner. Similarly, care should be taken to ensure that efficiency gains obtained through new practices and technologies do not become the sole focus of food systems and that any increase in production efficiency is duly managed to account for issues such as usage, control, access, scale-appropriateness, and cost.[37]

Priority Action 3: Account for emissions associated with food imports, including those related to deforestation and the conversion of ecosystems.

None of the countries assessed fully account for emissions associated with food imports, particularly those related to deforestation and the conversion of ecosystems. Although the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement apply the "territorial principle" to GHG emissions — that is, only those emissions and removals that take place within national jurisdictions are to be managed and reported internationally by countries — there is scope under NDCs to put forward measures that consider the full extent of the impacts caused by food systems.

Emissions taking place overseas but that are associated with imported goods can represent a considerable portion of the importing country's attributable GHG emissions. For instance, a recent World Wild Fund for Nature (WWF) report on the U.K.'s carbon and nature-related footprint notes that nearly half of the U.K.'s carbon footprint — that is, carbon emissions driven by U.K.-based consumption — comes from overseas.[38] The analysis also highlights that an overseas area equivalent to 88% of the U.K.'s land area was required annually between 2016 to 2018 to meet the country's demand for only seven forest-related commodities: beef, cocoa, palm oil, pulp and paper, rubber, soy, and timber.

This offshoring of emissions is of particular concern when food is imported from deforestation-risk countries, as agriculture and forest commodities such as soy, beef, and palm oil are responsible for large proportions of

tropical deforestation and conversion of ecosystems.[39] Thus, for actions and measures presented in NDCs to truly contribute to more sustainable food systems that have a limited impact on the climate, NDCs should also consider demand-side policies and life-cycle measures that can address deforestation and related emissions associated with food imports.

Adopting such a consumption-based perspective, to complement domestic efforts to reduce emissions within national borders, can more effectively and comprehensively tackle emissions from food systems more broadly. One possible way to achieve this would be for countries to consider in their NDCs concrete actions to incentivize (and mandate) food manufacturers, retailers, and service outlets to address the "Scope 3 emissions"; that is, those emissions falling outside a company's direct control but still linked to their value chains and operations. Incentives and obligations for food companies to report, manage, and mitigate value chain impacts should go beyond climate aspects and also cover interconnected risks such as biodiversity loss, water stress, soil degradation, and antimicrobial resistance in humans stemming from the high use of antibiotics in the meat industry.

Some of the countries assessed have recently made strides to reduce emissions from imported food products. While not reflected in its NDCs, the United Kingdom has introduced the Environment Bill, which, if passed, would make it illegal for firms to use produce from illegally deforested lands. France, in turn, does recognize the importance of addressing imported emissions in its National Energy and Climate Plans but does not link this explicitly to food imports. The French opposition to the Mercosur agreement — which is grounded on arguments that the agreement does not provide sufficient safeguards against environmental degradation and deforestation[40] — may indicate that there is further scope to increase ambition in this regard and include measures to reduce emissions from food imports in future iterations of the French National Energy and Climate Plans. Similar approaches should be followed in other countries, especially those that are dependent on food imports or may become increasingly dependent following more stringent agricultural policies.

In this context, the Glasgow Leaders' Declaration on Forests and Land Use and the Global Methane Pledge announced during COP26 (but outside the official UNFCCC regime) are promising international venues to address embedded deforestation and GHG emissions that come with global food imports. Over 130 countries (so far including 12 of the countries assessed in this study) have signed the Glasgow Leaders' Declaration, pledging to halt and reverse deforestation and land degradation by 2030. While still rather vague on the actual steps and measures to achieve this goal, the Glasgow Leaders' Declaration opens the door for more comprehensive and transformative action, including through the promotion of sustainable international trade and sustainable commodity production and consumption. Similarly, the Global Methane Pledge, which seeks to reduce methane emissions by 30% from 2020 levels by 2030, has been signed by more than 100 countries (including 10 of the countries considered here). Although still largely focused on energy supply chains, agricultural emissions from livestock are also likely to gain prominence in the next few years. For regions like the European Union, where a substantial part of the methane emissions is imported, this is likely to result in additional measures to address emissions originating in other countries.

To reinforce the transformative character and further ensure accountability of the targets and actions promoted by countries under the Glasgow Leaders' Declaration and the Global Methane Pledge, it is crucial

that these signatory countries clearly link those targets and actions to their renewed NDCs to be submitted by the end of 2022.

Priority Action 4: Include targets and measures to facilitate and accelerate the transition toward healthier and more sustainable diets.

Measures to promote dietary transitions are not frequently included in the assessed NDCs, which instead focus largely on food production. This is a missed opportunity, as there is significant scope to reduce GHG emissions through consumption-based measures that aim to facilitate and accelerate dietary changes. It is therefore crucial that NDCs promote nutritious diets that are underpinned by sustainable and diversified food production adapted to local ecosystems and sociocultural contexts as a means to reduce food systems' emissions, with significant potential to deliver additional health benefits. Unhealthy diets that are low in plant-based foods and high in animal protein and ultra-processed foods continue to increase the burden of disease across these countries. For example, in the United States and China, diets dominated by the consumption of low-cost, calorie-dense foods such as soft drinks, snacks, and fried and processed foods and high levels of meat intake are a key factor in increased prevalence of obesity, cardiovascular diseases, and diabetes. This is while in countries with low per capita income significant parts of the population suffer from malnourishment due to low dietary diversity and inadequate protein intake. In Kenya, for example, a large share of the more than 75% of Kenyans living in rural areas suffers from inadequate food intake.

The majority of countries assessed did not include measures to mitigate or adapt to climate change by shifting diets, with the United Kingdom, Germany, and France being notable exceptions for already taking first steps toward facilitating dietary transformations. The U.K.'s NDC includes a commitment to shift toward healthy diets, to be delivered through the National Food Strategy. The Strategy puts forward 14 recommendations, including the introduction of a sugar and salt reformulation tax, mandatory reporting requirements for large food companies, a rural land-use framework, and minimum standards for trade.

Similarly, the German National Energy and Climate Plan includes a commitment to promote sustainable food consumption by expanding the education and guidance that is provided on sustainable, climate-friendly, and healthy nutrition. In turn, while the French National Energy and Climate Plan mentions the intention to influence food demand and consumption through the National Food Nutrition Program, no concrete action points are included to this end.

The limited inclusion of measures that facilitate and accelerate dietary changes likely reflects the challenges associated with shifting diets. In most of the countries assessed, interviews revealed that changing diets is seen as politically sensitive, as citizens do not want government influence over their dietary choices. Similarly, in some countries there may be a lack of knowledge about alternatives for animal protein or other carbon-intensive foods. Furthermore, changing consumption behaviours is a time-consuming process, and in some of the assessed countries there appeared to be a gap between the younger generations (who are generally more open to transition to sustainable and healthy diets) and older generations (who tend to be more

conservative in their food choices). While these challenges are real and material in many countries, they need not be insurmountable. For example, while France and Germany have strong agricultural lobbies associated with the livestock sector, their National Energy and Climate Plans do include the earlier-mentioned measures to promote the consumption of sustainable and healthy foods.

As such, increased attention to diets is welcomed for NDCs currently lacking such measures, but also for countries such as the United Kingdom, Germany, and France, where more ambitious action to transform diets is necessary. Numerous stakeholders interviewed emphasize the potential of public procurement policies — that determine how food is served at the canteens of schools, hospitals, and public buildings — to facilitate a dietary transformation. In the United States, for example, there is significant scope to extend existing federal assistance programs that cover healthy foods to more actively promote plant-based foods. Similarly, in China, where promoting healthy and nutritious diets is a key policy priority, there is opportunity to include concrete policy measures for dietary transformation in subsequent updates of their NDC. In Kenya, where undernutrition and food insecurity continue to be a public health concern, the NDC could put in place stronger measures to promote nutritious, sustainable, and whole-food diets that align with the National School Meals and Nutrition Strategy (2017–2022). It is key, however, that dietary guidance and other policy measures are suited to local needs and respect the cultural heritage of Indigenous Peoples. In Bangladesh, for example, efforts to change diets should focus primarily on increasing food and nutritional security by making healthy and sustainably produced food more accessible. In Canada, acquiring animal protein through hunting and fishing is an essential part of Indigenous Peoples' identities and culture, and may need to be exempted from national efforts to discourage the consumption of meat.

Priority Action 5: Include targets and measures to reduce food loss and waste.

While a few of the NDCs assessed include efforts to address food loss and waste, much scope remains to mitigate and adapt to climate change through such measures. Reducing and repurposing food loss and waste are central to mitigating climate change as well as delivering ecological, health, economic, and social co-benefits by reducing cropland area, contributing to food security, and, overall, cutting GHG emissions. Given growing data availability on food loss and waste, countries are increasingly able to demonstrate the climate mitigation impacts of food loss and waste reduction and the associated co-benefits.

The Vanuatu NDC includes measures to produce biogas and soil enhancer from food waste collected at the municipal and residential levels but does not include measures to systematically reduce food loss and waste. The U.K.'s NDC, in turn, refers to The Resources and Waste Strategy, which includes efforts to cut down food waste. Similarly, the NDC of the European Union highlights that legislation on waste management — which includes food and packaging waste, albeit not explicitly recognized in the E.U.'s NDC — has been strengthened as part of measures to deliver on the NDC. The NDC of South Africa refers to the country's Low Emission Development Strategy, which includes waste as a key sector and sets two targets for food waste reduction. Neither of these NDCs includes concrete and actionable measures to address food loss and waste, however, and the remaining NDCs do not consider food loss and waste at all. In many countries, including Spain, the

lack of knowledge and robust data on food loss and waste presents a significant challenge for considering food loss and waste in mitigation. In both Spain and Colombia, for instance, interviewees reveal that this was a key bottleneck that prevented the development of measures on food loss and waste.[41]

It is therefore important to recognize the mitigation, food security, and economic potential of reducing food loss and waste. In this context, filling existing data gaps in countries where information on food loss and waste is patchy or missing is an important first step that will enable the development of measures that maximize co-benefits and minimize trade-offs. In countries where data is readily available, the co-benefits of reducing food loss and waste are clear. In the United States, for example, investments to reduce food waste by 50% by 2030 are likely to have a 5-to-1 return on investment, in addition to creating 51,000 jobs, reducing GHG emissions, and saving water — and as such should be included in subsequent revisions of the NDC.[42] Bangladesh, in turn, does not include food loss and waste in its NDC and does not have a food waste strategy in place, despite 10 million tons of food being wasted annually. Interviews conducted indicate that stakeholders in Bangladesh recognize measures to improve food storage capacity at the local level as a major issue that can contribute to food security and improved livelihoods — with the co-benefit of significantly reducing GHG emissions.[43, 44]

France's National Climate and Energy Plan may offer helpful best practices for addressing food loss and waste through national climate plans. The Plan includes measures to promote biofuel production from half of the country's food waste resources, as well as mandatory food waste assessments for all food service operators. In addition, the Plan refers to the Roadmap for the Circular Economy, which also seeks to reduce food waste.

Priority Action 6: Include measures to promote a just transition by creating green food systems jobs and developing green food systems skills.

While some of the assessed NDCs include references to capacity-building in the form of education and skills development or mention job creation as an overarching co-benefit, these are rarely linked to food systems. Promoting sustainable livelihoods and creating green food systems jobs is integral to a just transition to healthier and more sustainable food systems that contribute to social and climate justice for all.

The United States and Canada most notably emphasize job creation as a co-benefit or goal of their NDCs, while Colombia's NDC refers to a strategy to promote the "just transition of the workforce toward a resilient and low-carbon economy," to be developed in 2023. Similarly, Spain's national energy and climate plan includes the Just Transition Strategy as a means to support different economic sectors and rural and urban areas in transitioning to a more sustainable economy that generates employment. In South Africa's NDC, an effort to move from a high GHG emissions/low employment energy development pathway to a low emissions/climate-resilient and job-rich pathway is considered central to the measures for sustainable development and climate change mitigation and adaptation. The U.K.'s NDC, in turn, mentions education and skill development as crucial policy areas for their overall approach to climate action. Regrettably, none of these five NDCs link efforts to promote education, skill development, and job creation with efforts to transform food systems.

Vanuatu's NDC and France's National Energy and Climate Plan, on the other hand, include training measures, although these mostly involve farmers and largely exclude other food systems actors.

When the costs and benefits of food systems transformations are not distributed equally across society, transitioning toward more sustainable and healthier food systems will likely involve social trade-offs. It is therefore important to ensure that no one is left behind and that food systems transformations not only maximize co-benefits but are also just and equitable. In this context, the promotion of green food systems jobs is key for raising support and ensuring that no one is left behind in the transformation of food systems. This is particularly important in France, where livestock farmers — who represent a powerful lobby group — fear that mitigation actions will compromise their livelihoods. In Bangladesh, interviewees indicated that climate mitigation projects such as REDD+ programs sometimes endanger the livelihoods of smallholder farmers.[45]

It is crucial that mitigation measures are designed with an eye on minimizing their impacts on livelihoods. Equally importantly, if food systems measures are expected to impact jobs, NDCs should put forward additional measures to create new green jobs and support the workforce in gaining the necessary new skills to facilitate a just transition.

PRIORITY ACTIONS FOR IMPLEMENTATION OF THE NDC

Priority Action 1: Ensure engagement of all key stakeholders and ministries during NDC implementation and monitoring.

Similar to issues seen during NDC preparation, few of the countries assessed engage meaningfully across ministries, regional governments, and local public officials to implement the actions contained in their NDCs. Engagement with non-governmental stakeholders such as private sector actors, smallholder farmers, women, youth, local communities, Indigenous Peoples, and civil society appeared limited during NDC implementation. Meaningful engagement with key food systems stakeholders is central to ensuring participatory, integrated, rights-based governance such that NDC implementation and monitoring are driven not only by evidence but also by sustainability principles and equity considerations.

Often, the responsibility of implementing NDCs lies solely with the national ministries of climate change and related departments. While local stakeholders are often acknowledged in NDCs, meaningful engagement with them is rarely included in implementation and monitoring plans. Thus, the limited involvement of these stakeholders in consultation processes permeates the implementation of measures and targets that may result in the undesirable scenario where certain needs and perspectives are prioritized over others. In turn, in France, lack of participation by ministries in the implementation of the National Energy and Climate Plan may be contributing to the perception by public officials that the plan is merely a suggestion of mitigation scenarios rather than the intended political roadmap.

Multiple approaches can be taken to facilitate widespread engagement in NDC implementation. In Bangladesh, for instance, a recent development has seen the introduction of "climate cells" to each of the country's ministries as technical focal points that identify policies and policy issues that relate to climate change. These have been implemented with the aim of finding synergies between policies, as well as mainstream climate considerations.

Building stakeholders' capacities for participating in NDC implementation can further support engagement with external stakeholders. Crucially, smallholder farmers, women, local communities, and Indigenous Peoples should be empowered to take a leading role in implementing the measures that are likely to impact them most as well as participating actively in the monitoring of this implementation. Although not targeted at the aforementioned groups, France's national energy and climate plan (NECP) includes such an approach for engaging farmers in the implementation of agricultural measures through training that supports them in transitioning to new and more sustainable production systems. Canada's NDC includes conservation programs that call for Indigenous Peoples to take a leading role in implementation. For engagement in monitoring, Vanuatu's MRV tool provides easy access to data platforms where all interested parties can submit information on progress in relation to NDC projects or programs, although opportunities exist to further strengthen the application of Vanuatu's MRV tool to the country's food system. Contributing to the monitoring of NDCs can even be a requirement for all stakeholders involved in climate action, as demonstrated by Kenya, where a law requires all state and non-state actors to annually report on climate-related activities.

Priority Action 2: Address governance challenges to ensure effective implementation and monitoring.

In many of the countries assessed, the implementation of NDCs is complicated by governance challenges such as limited transparency, poor representation, weak enforcement and monitoring capacities, corruption, and conflicts of interest. Transparent, participatory, integrated, and rights-based governance is crucial for effectively mitigating and adapting to climate change as well as for addressing structural inequities in food systems.

In the case of Vanuatu and Bangladesh, for instance, a general lack of institutional capacity hinders implementation of large-scale projects. In addition, governments lack the ability to manage data on progress to support future evaluation and revision of NDCs. Governance challenges can also have implications for particular goals and targets set under NDCs. In France, a strong presence of the livestock lobby in politics prevents any concrete action to reduce GHG emissions from the livestock sector. In the United States, there is significant political resistance against any policy that is seen to restrict food choice, complicating ambitious federal action to address climate change.

Addressing these issues will require broad reforms that go beyond the scope of any single policy. First, it is essential to identify and address governmental challenges that may complicate NDC implementation. This can include setting specific capacity-building targets or actions, especially for food systems measures, as these are often large scale and involve various stakeholders. In turn, in the United States, political resistance has been reduced through the inclusion of climate change actions and measures under bills and policies whose

main focus does not explicitly involve climate change but rather infrastructure or farming, for instance. Strong MRV and monitoring plans can also benefit implementation. Most importantly, perhaps, NDCs should be accompanied by implementation roadmaps with clear roles for relevant stakeholders, robust indicators, and feasible timelines.

In the United Kingdom, the 2008 Climate Change Act provides a broad framework for climate change mitigation and adaptation. Under this act, the Climate Change Committee is tasked with monitoring progress in implementing climate policies and achieving climate goals. As an independent body with a strong legal mandate and widespread public support, the monitoring and advice of the Committee has enabled it to contribute greatly to decarbonizing the U.K.'s energy sector, and it is expected that the Committee's leadership will be increasingly relevant in transforming the U.K.'s food systems in the near future.[46]

Priority Action 3: Quantify the implementation costs for food systems measures and channel public and private finance accordingly.

While some of the assessed NDCs are underpinned by financial mechanisms to support their implementation, few explicitly quantify the costs associated with implementing their measures and achieving their targets. Quantifying the implementation costs for food systems measures can be a stepping stone for directing public finance toward ecologically beneficial forms of farming, healthy food, and resilient livelihoods as well as unlocking private, philanthropic, and multilateral investment opportunities in sustainable food systems.

Kenya has estimated total costs for implementing its mitigation and adaptation actions under the NDC, and established that 87% of the required budget would need to come from external funding. South Africa has quantified the cost of adaptation needs at 16 to 267 billion USD and investment needs for mitigation at 60 to 64 billion USD for the period 2021–2030 under the NDC. Vanuatu has similarly quantified the costs associated with NDC implementation, and Colombia has indicated in its NDC that such a quantification is forthcoming.

When implementation costs are not quantified, finance cannot be allocated in an informed manner, thereby slowing or hampering the implementation of NDCs. Additionally, quantification of costs may help make food systems measures more tangible. As such, quantifying costs — and specifying the methods used for calculation — will likely strengthen the implementation of current and future NDCs.

Such quantification of costs is particularly relevant in countries who seek external funding to implement conditional measures. In these cases, it is important to go further than only quantifying costs and also develop policies and measures that unlock private, philanthropic, and multilateral funding for food systems projects. Without yet having quantified cost, Colombia has identified possible financial vehicles for all of its conditional measures, including donations, concessional and non-concessional loans, capital, and guarantees. Another approach may be to make it possible for private, philanthropic, and multilateral actors to provide funding for national climate action. In this way, donors can provide climate finance while countries still maintain some ownership over decisions around resource allocation.

CONCLUSION

The assessment summary and recommended actions here provide a high-level snapshot of the opportunities based on the NDCs of the 14 countries assessed. These opportunities reflect the differences in how food-related climate actions are integrated into these NDCs and how food systems contribute to climate change in these countries, as well as the risks climate change poses to local food systems and stakeholders.

The Country Assessments not only indicate good starting points for taking a food systems perspective, but they also highlight important gaps and opportunities. The specific opportunities identified in each of the Country Assessments could help countries improve food–climate governance aspects and expand climate actions beyond a focus on agriculture and land-use to include interventions across the food sector while recognizing and strengthening their socio-economic and health benefits. Most assessed countries utilize a consultation process when developing NDCs that can be made more inclusive by taking a rights-based approach and actively involving key food systems stakeholders such as health experts, youth, smallholder farmers, workers, local communities, and Indigenous Peoples. Similarly, good examples of agroecological practices to address unsustainable land-use and food insecurity found in some of the assessed NDCs could be built upon while also adopting measures to address food waste and unsustainable and unhealthy diets.

Opportunities identified in the Country Assessments could help to integrate measures for food systems transformation within key national priorities, enabling more comprehensive, ambitious, and equitable climate strategies while delivering human, ecological, and animal health and well-being and increasing climate change resilience. They could serve as inspiration for enhancing the scope and ambition of the NDCs in the next round of submissions.

For a more specific analysis of the context, key findings, and recommended areas for improvement for each country, we encourage you to read each assessment in detail, which you can find here.

ENDNOTES

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ACKNOWLEDGEMENTS

We are grateful to the numerous individuals and organizations who provided their time and expertise in the planning and development of this work. The Global Alliance's Climate Impact Area Committee must be acknowledged for its leadership and vision. We deeply appreciate their commitment to advancing our understanding of the food–climate nexus. Climate Impact Area members include representatives from the following foundations: 11th Hour Project, Agropolis Fondation, Azim Premji Philanthropic Initiatives, The Christensen Fund, Clarence E. Heller Charitable Foundation, Fondation Daniel et Nina Carasso, David Rockefeller Fund, GRACE Communications Foundation, J.W. McConnell Family Foundation, McKnight Foundation, Oak Foundation, Robert Bosch Stiftung, Tudor Trust, and V. Kann Rasmussen Foundation. This work also benefited from the guidance and inputs of an external Project Advisory Committee (PAC): Ana Maria Loboguerrero, Andrea Carmen, Brent Loken, Bridget Mugambe, Clea Kaske-Kuck, Clementine O'Connor, Fabio Leippert, Helena Wright, Lujain Alqodmani, Malik Dasoo, Marie-Claire Graf, Martina Fleckenstein, Million Belay, Saliem Fakir, and Teresa Anderson.

We are also grateful to all the individuals and organizations who provided their time and insights that made the 14 Country Assessments possible: Alan Dangour, Ana Maria Loboguerro, Andrés Muñoz Rico, Arouna Diédhiou, Augusto Castro-Nunez, Ben Lilliston, Beth Hunter, Brandon Abdinor, Brent Preston, Chen Meian, Chris Stark, Cyrielle Denhartigh, Dana Gunders, Dave Reay, Dorah Wilson, Mohammad Asaduzzaman, Pamela Fergusson, Rod MacRae, Wais Kabir, Dustin Benton, Dylan Anderson-Berens, Emma Sirois, Gisèle Yasmeen, Gloria Elena Erazo Garnica, Gloria Isabel Guzman Casado, Helen Ding, Hu Min, Ibrahima Hathie, Jahangir Masum, Javier Ortiz, Jian YI, John Stoddard, Laura Cramer, Laura Pereira, Lavinia Roveran, Malcolm Dalesa, Mamdou Barry, Margaret Zafiriou, Maria Carrascosa García, Mary Nyasimi, María Navarro González-Valerio, Melle Leestra, Mia MacDonald, Mireia Barba Cuscó,Modi Mwatsama, Nicolas Cock Duque, Ouyang Huiyu, Pablo Montoya, Pauline Scheelbeek, Perihane Allam, M.A. Sattar Mandal, Raymond Auerbach, Ruth Kennedy, Saleemul Huq, Sarah Ouanhnon, Saskia Richartz, Scott Drimie, Sophia Murphy, Stephen Otieno, Susan Alexander, Tanor Meissa Dieng, Tim Benton, Tobias Reichert, Vanessa Sánchez Ortega.

This work was generously funded by the following foundations: David Rockefeller Fund, Crown Family Philanthropies, Foundation Daniel et Nina Carasso, J.W. McConnell Family Foundation, the Oak Foundation, One Earth, and Robert Bosch Stiftung. We extend deep gratitude to the Global Alliance secretariat (Ruth Richardson, Executive Director; Patty Fong, Program Director, Climate and Health & Well-being; Lauren Baker, Senior Director of Programs; Kasia Murphy, Director of Communications; Vivian Maduekeh, Program Coordinator; and Pablo Vidueira, Blue Marble Evaluation Consultant). We extend our thanks to Innovative Green Development Program (IGDP) and Hannah Bestow who supported the translation of these materials into Chinese, French, German, and Spanish.

Lastly, we deeply appreciate the support of the project consultants: Thiago Chagas, Haseeb Bakhtary, Barbara Hermann, Danick Trouwloon, Hilda Galt, Aron Teunissen (Climate Focus); Karin Kleinbooi, Nonsikelelo Nkomo (Solidaridad); and Mark Driscoll (Tasting the Future). This process has been all the stronger due to their help shaping its form and content from beginning to end.

ABOUT THE GLOBAL ALLIANCE FOR THE FUTURE OF FOOD

The Global Alliance for the Future of Food is a strategic alliance of philanthropic foundations working together and with others to transform global food systems now and for future generations. We believe in the urgency of transforming global food systems, and in the power of working together and with others to effect positive change. Food systems reform requires that we craft new and better solutions at all scales through a systems-level approach and deep collaboration among philanthropy, researchers, grassroots movements, the private sector, farmers and food systems workers, Indigenous Peoples, government, and policymakers.

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