A TOOLKIT FOR NATIONAL ACTION ON CLIMATE, BIODIVERSITY, AND WATER IN AGRICULTURE AND FOOD SYSTEMS

Taking stock of good practices, initiatives, and tools for food system transformation through Nationally Determined Contributions, National Adaptation Plans and National Biodiversity Strategies and Action Plans

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1. SUMMARY

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ABOUT THIS TOOLKIT

Overwhelming scientific evidence indicates that nothing other than the widespread transformation of food and agriculture systems is required to achieve the global climate goals set forth in the Paris Agreement as well as the global biodiversity targets of the Kunming-Montreal Global Biodiversity Framework (KMGBF).

In recognition of this, the United Arab Emirates (UAE), which presided over the 28th United Nations Climate Change Conference (COP28), convened a group of organizations to consolidate existing experiences, lessons learned, initiatives, and tools into a single resource to accelerate ambitious climate action in food and agriculture systems for a global audience. The taskforce – which included WWF, Climate Focus, the Global Alliance for the Future of Food, the NDC Partnership, the Food and Agriculture Organization of the United Nations, CGIAR, and Alliance of Biodiversity and CIAT – synthesized existing guidance material and lessons learned on implementation of Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) for food system transformation. The resulting toolkit was published at COP28 to support national policymakers and decisionmakers aiming to accelerate national climate efforts in agriculture and food systems.

Ahead of COP29, this updated toolk aims to reflect additional guidance, tools and case studies for enhancing and implementing NDCs, NAPs, and National Biodiversity Strategies and Action Plans (NBSAPs) serving as a resource for national policymakers and decisionmakers aiming to align and accelerate national efforts on climate and biodiversity action and agriculture and food system transformation by providing:

a) a summary of priority actions based on existing efforts that governments should consider in raising the ambition of their NDCs, NAPs, and NBSAPs through agriculture and food system measures;

b) overviews of good examples of NDCs, NAPs, and NBSAPs in their integration of agriculture and food system measures and of projects and programs in agriculture and food systems that support the implementation of NDCs, NAPs, and NBSAPs; and

c) an overview of existing initiatives, platforms, and tools that can help governments in developing and implementing agriculture and food system policy measures as part of their NDCs, NAPs, and NBSAPs.

By equipping state actors and other key stakeholders with a useful set of knowledge assets, the toolkit specifically aims to support countries to:

- strengthen integration and alignment of national strategies for climate and biodiversity action and food system transformation, including between NDCs, NAPs, NBSAPs, and national food system transformation pathways;
- enhance the integration of food and agriculture system transformation in NDC implementation and revision processes in 2025 and 2030;
- improve the integration of food and agriculture system transformation in NAP formulation and implementation processes, including considerations of NAP progress in 2025; and
- ensure the integration of food and agriculture system transformation in NBSAP revision and implementation processes under the KMGBF.

Given this scope, the toolkit will support implementation of first Global Stocktake outcome under the Paris Agreement, implementation of the Sharm el-Sheikh Joint Work on Implementation of Climate Action on Agriculture and Food Security adopted at COP27 (Decision 3/CP.27) and the Emirates Declaration on Resilient Food Systems, Sustainable Agriculture and Climate Action adopted at COP28 in the UAE. Additionally, the updated toolkit can help countries to progress towards the targets of the KMGBF both globally and at the national level, especially Target 10 on enhancing biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry.

THE NEED AND OPPORTUNITY FOR ACTION

Recent reports by the Intergovernmental Panel on Climate Change (IPCC) as well as the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) continue to reiterate the crucial role that our food systems play in climate change mitigation and adaptation as well as biodiversity conservation and restoration. Food systems account for almost a third of anthropogenic greenhouse gas (GHG) emissions and would cause exceeding the 1.5°C limit between 2051 and 2063 even if all GHG emissions not related to food systems were immediately stopped and were net zero from 2020 to 2100.[1] At the same time, food systems are a main threat to 86% of species at risk of extinction.[2] While stressing the need to shift to sustainable food systems to meet international climate and biodiversity goals and targets set out in the Paris Agreement and the KMGBF, IPCC and IPBES reports highlight the significant ecological, biodiversity, health, economic, social and cultural benefits that this transition offers.

At the national level, opportunities for ambitious climate and biodiversity action in food systems lie in NDCs, NAPs, and NBSAPs.

- NDCs – as the official documents outlining countries' pledged mitigation and adaptation actions – are a key instrument to guide policy development and their on-the-ground implementation. NDCs also support the development of sectoral and cross-cutting policies aligned with climate goals and food systems transformation.

- NAPs are also key when it comes to identifying medium- and long-term adaptation needs and strategies to address them. Established under the Cancun Adaptation Framework (CAF) and re-emphasized in the Paris Agreement, NAPs identify countries' vulnerabilities to climate change risks, and possible solutions, based on the best available science. Outcomes of the NAP process are also used to update and improve the adaptation elements of the NDCs.

- NBSAPs provide national-level strategic direction on the protection and management of biodiversity within a country and are the main tool guiding implementation of the KMGBF at the national level.

A food systems approach to climate and biodiversity action through NDCs, NAPs, and NBSAPs takes a holistic view of how food is produced, processed, distributed, consumed, and disposed of, as well as how these activities interact with other parts of the natural, societal, and economic environments, such as energy, water, waste, and public health systems. Such an approach enables the implementation of more ambitious, participatory, and equitable mitigation and adaptation actions, while also scaling up transformative practices already underway at national, regional, and local levels.

Since the adoption of the Paris Agreement as well as the KMGBF, more and more countries are recognizing food systems transformation as a crucial part of climate and biodiversity action and increasingly consider food in their NDCs, NAPs, and NBSAPs.[3] This is, in part, due to an increasing amount of guidance and support for countries in enhancing their NDC, NAP, and NBSAP ambition and implementation by civil society organizations, the United Nations, international governmental organizations, non-governmental organizations, and research organizations. Yet, many countries continue to face significant challenges in holistically integrating and implementing food system measures as part of these plans. In addition to insufficient climate and biodiversity finance, there is a gap in knowledge of successful food system practices, and mechanisms and tools for countries to use in this journey.

However, the unique potential of agriculture and food systems to tackle the climate and biodiversity crises can only be realized by scaling up investments for required solutions. However, today, only 4.3 percent of global climate finance is committed for food systems.[4]

PRIORITY ACTIONS

Renewed ambition for climate and biodiversity action through food systems transformation must build and capitalize on years of work by governments, civil society, private sector, local communities, and international organizations. Learning from these experiences, new initiatives must enhance, replicate, and scale successful practices that enable a true transformation of food systems at the local, national, and international levels.

In the following, this toolkit calls on policymakers and stakeholders to prioritize six key actions in developing and implementing their NDCs, NAPs, and NBSAPs. These priority actions are based on lessons from years of research, policy support, and implementation of projects and programs for building sustainable and resilient food systems across the world.

IN THE PROCESS OF DEVELOPING AND IMPLEMENTING NDCs, NAPS, AND NBSAPs, POLICYMAKERS SHOULD:

1. **Ensure participatory and integrated approaches to governance at all levels in order to address the structural inequities in food systems.**

   → Build processes and policy platforms on principles of transparency, inclusive participation, and shared power. This will ensure policies are driven not only by evidence, but also ethics and public interest.

   → Ensure inclusion of all marginalized groups including Indigenous peoples, farmers, women, and youth through multistakeholder approaches in policymaking and implementation.

2. **Leverage public and private finance for climate and biodiversity actions in food systems.**

   → Remove subsidies to harmful food and farming practices (such as chemical-intensive and fossil fuel dependent agriculture, intensive livestock production, and monoculture systems), and redirect public and private sector finance toward agroecological approaches to support resilient livelihoods and healthy communities; increase the production of healthy and sustainable food; and tackle climate change.

   → Increase climate and biodiversity finance for food systems transformation by promoting collaboration across private, philanthropic, and multilateral investments.

   → Leverage private finance to scale and fund local and national food and nutrition security, agroecology, and regenerative agricultural projects.

3. **Ensure an equitable, inclusive, and just transition by accounting for the true costs and benefits of food systems for climate and biodiversity action.**

   → Ensure that mitigation and adaptation interventions do not negatively affect those working in food systems and those most vulnerable to climate impacts, which requires policy processes and platforms built on transparency and robust participation of these groups in climate policy making and implementation.

   → Design and implement locally led and context-specific approaches that contribute to climate mitigation and adaptation as well as biodiversity conservation and restoration while providing a substantial role for local institutions, communities, smallholder farmers, Indigenous Peoples, and women. This approach helps to protect and expand these groups' rights while improving food security and health.

   → Integrate the true cost of food into policy and decision making – including environmental and socio-economic costs of food that disproportionate impact marginalized populations – to ensure a just and equitable transformation of food systems.

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IN DECIDING ON THE FOOD SYSTEM MEASURES TO INCLUDE IN NDCS, NAPS AND NBSAPs, POLICYMAKERS SHOULD PRIORITIZE:

4. A shift to nature-positive food production:

- → Encourage a more holistic understanding of agriculture – one that is not only a system for producing healthy food but also for ensuring healthy soil, biodiversity conservation, clean water, sustainable landscape management, and resilient livelihoods for communities.
- → Scale sustainable and agroecological practices that enhance the richness and abundance of biodiversity in land and water and rehabilitate the functions of degraded natural systems to deliver a climate-positive future in which people and nature can thrive.
- → Decouple food production from fossil fuels. Energy intensity in food systems is growing due to increased mechanization, growing use of fossil fuel-based inputs, globalized supply chains, growing demand for meat, dairy and ultra-processed foods, and to some extent, new food trends such as alternative proteins. Ensuring these trends do not lead to additional greenhouse gas emissions is crucial for a meaningful transformation of food systems.
- → Shift to renewable-based cooling (i.e., cold storage), heating (i.e., greenhouses) and drying technologies, and renewable energy for food processing and transport.
- → Systematically evaluate water consumption, allocation, and trade-offs in food systems and align water interventions with other food systems interventions to ensure sufficient water of adequate quality, quantity and stability for a transition to nature-positive food systems.

5. Reduce and repurpose food loss and waste:

- → Reduce and repurpose food loss and waste to mitigate climate change as well as deliver ecological, health, economic, and social co-benefits.
- → Invest in supply chain infrastructure and storage facilities, including new equipment and techniques, to reduce post-harvest food loss.
- → Support short supply chain management (e.g., transport to local markets, urban-rural links, and connections between food producers and consumers).

6. Transition to nutritious and healthy diets:

- → Ensure healthy, sustainable 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.
- → Ensure healthy, sustainable, and just food environments that support plant-rich diets and minimally processed foods.
- → Increase availability, affordability, and access to diverse and nutritious food at local levels, including in public institutions such as schools and hospitals, by adopting sustainable food procurement policies at the national and subnational levels and addressing the true value of food.
- → Introduce regulations to incentivize sustainable dietary choices through lower prices and to disincentivize unhealthy and unsustainable foods through taxation.

GOOD PRACTICE EXAMPLES OF INTEGRATION OF FOOD SYSTEMS IN NATIONAL CLIMATE AND BIODIVERSITY PLANS

Food systems transformation at local and regional levels is already happening with positive climate, biodiversity, health, and socio-economic impacts, and this work needs to feature more deliberately in respective national climate and biodiversity plans. Several countries already stand out as having integrated measures relevant for food systems transformation in their NDCs, NAPs, and NBSAPs.

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Figure 1. Examples of ambitious NDCs, NAPs, and NBSAPs for food systems

GOOD PRACTICE EXAMPLES OF FOOD SYSTEMS PROJECTS AND PROGRAMS FOR CLIMATE MITIGATION AND ADAPTATION, AND BIODIVERSITY

There is an array of programs and projects for climate and biodiversity action through food systems that contribute to the implementation of NDCs, NAPs, and NBSAPs. Together with civil society, private sector actors, governments, and local communities, these projects demonstrate collaborative pathways towards food system transformation for climate and biodiversity goals.

COUNTRY	PROGRAM/PROJECT	▲ Mitigation Focused	■ Adaptation Focused	◯ Biodiversity Focused	Water Focused
Sudan 	**Gums for Adaptation and Mitigation in Sudan (GAMS)** is helping to implement Sudan's NDC by restoring agroforestry systems and advancing climate adaptation at the landscape level. The project focuses on two key components: the restoration of smallholder gum agroforestry systems and improvements in the gum value chain, as well as climate change adaptation through activities such as establishing livestock routes and restoring rangelands. By enhancing gum production quality and quantity, local cooperatives can engage in direct trading agreements, receiving premium prices that incentivize the maintenance of Acacia trees. By preserving Acacias, GAMS contributes to climate adaptation by improving soil quality, ultimately benefiting food crop yields and local economies. Maintaining Acacias also mitigates climate change by sequestering CO_2.	▲	■		
Palestine 	**The Enhancing Adaptation Planning and Adoption of Climate Resilient Agriculture in Palestine** project strengthens inter-institutional coordination for mainstreaming climate smart agriculture into national and local initiatives. The project upgrades the agro-meteorological network, establishes demonstration plots for smallholder farmers to test climate smart agriculture practices, connects small-holder farmers with agro-met weather services and trains them on how to use weather data and forecasts for better crop management. By strengthening climate resilience in the agriculture sector, this project benefits small-scale food producers and the entire food system in Palestine.		■		
Cambodia 	**The Public-Social-Private Partnerships for Ecologically-Sound Agriculture and Resilient Livelihood in Northern Tonle Sap Basin (PEARL)** project in Cambodia enhances the adaptive capacities of farming communities and systems. To achieve this, PEARL develops business plans for climate resilient and inclusive premium value chains for rice, mango, and cashews. In addition, the project provides tailored agro-meteorological advisory services, promotes climate-smart technologies, and facilitates access to finance, ultimately improving the overall climate resilience of Cambodia's food system in alignment with the country's NDC priorities.		■		
Côte d'Ivoire 	**The Development of the Enhancing Sustainable Land Management and Climate-Resilient Agri-food Systems in Côte d'Ivoire** (LARACI) is helping to transition Côte d'Ivoire towards climate-resilient agriculture and income generation for farming communities, improving food security, and protecting vulnerable areas and ecosystems. The project is estimated to benefit approximately 500,000 beneficiaries in the central regions of Nzi, Moronou, Iffou, and Mé – by increasing their health, well-being, and food security. In addition, the project will contribute to reducing emissions from land use.		■		

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COUNTRY	PROGRAM/PROJECT ▲ Mitigation Focused ■ Adaptation Focused ◯ Biodiversity Focused Water Focused
Colombia	**SCALA Colombia** is enhancing the climate change adaptation planning capacities in the agriculture sector in the country through participatory analysis and research by implementing "climate action labs" and "adaptation dialogues". The labs identify adaptation measures for various agricultural value chains and test them in the páramo ecosystem. While dialogues document traditional knowledge for climate adaptation. Additionally, SCALA Colombia encourages private sector involvement in transforming Colombia's food system through climate-adapted agriculture certification guidelines. The program aligns with Colombia's NDC and NAP adaptation priorities, working at the local level and setting the groundwork for larger climate finance interventions to enhance agriculture sector resilience.
Costa Rica	In 2020, **CGIAR through the CCAFS programme and UCI partnered with Costa Rica's Ministry of Environment and Energy** to enhance the country's NDC, through participatory consultations and innovative scenarios analyses. The result is an improved NDC published in December 2020, that emphasizes inclusivity and robust climate strategies, highlighting Costa Rica's commitment to transparent, informed climate action.
Vietnam	The **DeRISK SE Asia** project has introduced Local Technical Agroclimatic Committees (LTAC) in eight provinces in the South of Vietnam to co-develop and disseminate seasonal agroclimatic advisories with local stakeholders, in a participatory way. About 130,000 farmers used the agroclimatic advisories in their planning and decision-making for better risk management, directly contributing to Vietnam's NDC and NAP.
Honduras	Since 2015, the **Alliance of Bioversity and CIAT, as part of CGIAR, has been actively involved in climate change and public policy research in Honduras**, leading to the creation of a diverse set of instruments for crafting and executing NDCs and NAPs.
Peru	In Peru, CGIAR through the Alliance of Bioversity and CIAT has been working to **develop sustainable business models and promote sustainable land use in the cocoa and palm oil value chains, as a pathway to reducing emissions from deforestation and forest degradation**. This included analysing context-specific drivers of deforestation, assessing GHG emissions from the cocoa and palm oil value chains, and developing sustainable business and investment models.

COUNTRY	PROGRAM/PROJECT	▲ Mitigation Focused	■ Adaptation Focused	○ Biodiversity Focused	Water Focused
Uzbekistan 	The **Central Asia Water and Land Nexus** (CAWLN) program strengthens the climate resilience of Uzbekistan's agricultural lands and natural ecosystems through promoting transformational changes in management of water, land, and biodiversity for agriculture. The program follows a collaborative, science-based approach emphasizing gender considerations and cooperation across sectors and borders. The program enables the country to achieve NDC key adaptation goals for climate-resilient agriculture and natural resources management.		■		■
Sri Lanka 	The **Healthy Landscapes Project** focuses on the rehabilitation and sustainable management of Sri Lanka's traditional Tank Cascade System (TCS) for irrigation. The project has restored infrastructure and ecosystems associated with irrigation and trained local users (e.g., farmers; women; youth) in sustainably utilizing the TSC for their livelihoods. The activities have improved the TSC's water capture and storage capacity and strengthened the resilience of local communities to increasing extreme weather events from climate change.		■		
Lao PDR 	The project **Mainstreaming Biodiversity across Agricultural Sectors to implement the Kunming-Montreal Global Biodiversity Framework** supports Lao PDR in translating KMGBF Target 10 on sustainable agriculture into national targets, policies, measures, and practices in the agriculture, aquaculture, fishing, and forestry sectors. The projects fosters policy coherence abd collaboration between biodiversity and agrifood sectors and helps achieve sustainable management of biodiversity in agrifood systems.			○	■
India 	As part of the **Seeds for Needs** program, the Alliance of Bioversity and CIAT have been working with local partners on conserving plant genetic resources through community seed banks. The seed banks provide farmers access to quality seeds for a diverse range of traditional varieties that are better adapted to local agroecological conditions. The activities benefits both biodiversity and people by conserving Indigenous plant genetic diversity and strengthening the resilience of agricultural crop production and livelihoods.		■	○	
Botswana, Mozambique, South Africa, and Zimbabwe 	The project e-flows in the Limpopo Basin in Botswana, Mozambique, South Africa, and Zimbabwe carried out a risk assessment to predict how changes in the river's flow affect the various ecosystem services that people depend on, as well as local biodiversity. The assessment included field surveys and looked at historical data in 27 risk areas to inform a plan to sustainably protect and use the water resources. Implementing e-flows can reduce risks, potentially returning more than 80% of the area to a sustainable state, for example, through better management of groundwater. The project worked with transboundary partners to understand better the needs and challenges of sustainable water management in shared aquifers, for example, the Ramotswa Aquifer, which lies between South Africa and Botswana. Activities included mapping both physical attributes and cultural needs. The project was implemented International Water Management Institute (IWMI) in partnership with Rivers for Life and the University of Mpumalanga in South Africa and supported by USAID with help from national departments responsible for water and sanitation including the Limpopo Watercourse Commission.			○	■

GOOD EXAMPLES OF TOOLS AND RESOURCES FOR ENHANCING AND IMPLEMENTING NDCS, NAPS AND NBSAPS

Enhancing, implementing, and integrating food systems into countries' NDCs, NAPs, and NBSAPs requires sufficient guidance and support for policymakers. Fortunately, there is already a diverse suite of initiatives, tools and resources that offer the support needed to make this transition. This means that policymakers do not need to reinvent the wheel; countries can build upon existing frameworks and knowledge to ramp up climate and biodiversity ambitions, integrate food systems in climate and biodiversity plans, and adequately implement these plans. These efforts vary in scope and focus:

RESOURCE TYPE

- **Partnership or initiative:** An organization or larger initiative whose overall mission is to assist stakeholders in either enhancing, implementing, and/or tracking NDCs, NAPs and NBSAPs. These initiatives may have their own specific tools or reference documents, but they are included in this broader, overarching category given their scope.
- **Guidance or reference:** A stand-alone toolkit or guidance document that policymakers can reference to help increase ambition, accelerate implementation, or monitor the progress of their country's NDC, NAP or NBSAP.
- **Technical tool:** Some resources are technical tools that help countries or sub-national actors, for example, map adaptation or biodiversity or perform preliminary climate risk screenings through advanced climate-related geospatial information and data.

PURPOSE OF RESOURCE FOR NDCs, NAPs AND/OR NBSAPs

- **Enhancing:** These resources help countries ramp up ambition for their NDCs, NAPs, and NBSAPs throughout development and revision processes.
- **Implementing:** Some resources provide support to countries in moving their NDC, NAP and NBSAPs targets from paper to practice. These resources may help build capacity, secure funding, or facilitate technology transfer to make countries' plans a reality – not just a document.
- **Tracking:** Other resources support state and non-state actors in tracking progress on countries' national climate and biodiversity plans.

FOOD SYSTEM SCOPE

- **Food system focused:** A handful of resources, or components of them, are specifically tailored towards the goal of sustainable food systems transformations.
- **Broader sectoral scope:** Many resources were created to support the enhancement, implementation, or tracking of NDCs, NAPs and NBSAPs more broadly, but do not single out food systems as an exclusive area of focus. Some resources, such as UNDP-FAO's SCALA Programme, fall under both categories: much of their work directly focuses on food systems transformation, but also covers other climate and biodiversity measures that fall under land use more broadly.

	RESOURCE TYPE			PURPOSE OF RESOURCE FOR NDCs / NAPs / NBSAPs			FOOD SYSTEM SCOPE	
	Partnership / initiative	Guidance / reference	Technical tool	Enhancing	Implementing	Tracking	Food system focused	Broader sectoral scope
The NDC Partnership	✓			✓	✓	✓		✓
The Marrakesh Partnership for Global Climate Action	✓			✓	✓	✓		✓
UNDP-FAO Programme on Scaling Up Climate Ambition in Land Use and Agriculture (SCALA)	✓			✓	✓	✓	✓	✓
Initiative for Climate Action Transparency by UNOPS	✓			✓	✓			✓
NBSAPs Accelerator Partnership	✓			✓	✓			
The Freshwater Challenge	✓			✓	✓			✓
NDC Assessment Toolkit by Global Alliance for the Future of Food		✓		✓	✓	✓	✓	
WWF, Climate Focus, UNDP Guidance on Enhancing NDCs for Food systems		✓		✓	✓		✓	
Food Forward NDCs		✓		✓	✓		✓	
The NDCs We Want by WWF		✓				✓		✓
Food, Environment, Land and Development (FELD) Action Tracker by FOLU		✓				✓	✓	✓
The NBSAPs We Need		✓		✓		✓		✓
Coping with water scarcity: An action framework for agriculture and food security		✓			✓		✓	
FAO Adaptation, Biodiversity and Carbon Mapping Tool			✓	✓	✓	✓		✓

Figure 2. Overview of a select initiatives and resources for NDC, NAP, and NBSAP enhancement and implementation

	RESOURCE TYPE			PURPOSE OF RESOURCE FOR NDCs / NAPs / NBSAPs			FOOD SYSTEM SCOPE	
	Partnership / initiative	Guidance / reference	Technical tool	Enhancing	Implementing	Tracking	Food system focused	Broader sectoral scope
FAO Nationally Determined Contribution Expert Tool			✓	✓	✓	✓		✓
FAO Climate Risk Toolbox			✓	✓	✓			✓
Global Stocktake Explorer by Climate Policy Radar			✓			✓		✓
FAO NDC Tracking Tool			✓	✓		✓		✓
NBSAP Forum			✓		✓	✓		✓
Global Water Watch			✓		✓	✓		✓
Forest & Landscape Water Ecosystem Services (FL-WES) Tool			✓		✓			✓

Figure 2. Overview of a select initiatives and resources for NDC, NAP, and NBSAP enhancement and implementation

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THE WAY FORWARD

The transformation of the food and agriculture system presents a unique opportunity for tackling the global climate and biodiversity crises while delivering on the 2030 Agenda for Sustainable Development. This toolkit consolidates a range of experiences, knowledge resources, and tools to serve national planners and decision in accelerating national food system transformation and climate and biodiversity action – particularly within NDC, NAP and NBSAP implementation and enhancement. In addition to this toolkit, the following guidance tool provides concrete policy measures, tools, and case studies for integrating food systems measures in NDCs and NBSAPs enhancement and implementation.

FOOD FORWARD NDCS AND NBSAPS

Food Forward NDCs is a guidance tool to support the enhancement and implementation of NDC ambitions for agriculture and food systems transformation. It helps countries to strengthen their NDCs by providing easy and accessible content to identify policy measures and practices and information about their climate change mitigation, adaptation and sustainable development benefits.

It is a simple, interactive, web-based tool that presents users with tangible, evidence-backed policy options and measures, and available literature for transitioning to nature-positive, healthy, and resilient food systems through NDCs. The available policy options can be tailored to a country's specific food systems priorities different intervention areas of the food system, such as food environment, food governance, food production, supply chain, and consumption. In a few clicks, users can access a comprehensive list of implementation measures and other resources like case studies tailored to their preferred policy priorities.

Food Forward NDCs is developed by WWF and Climate Focus through technical collaboration with the Food and Agriculture Organization of the United Nations, the United Nations Environment Programme, NDC Partnership, FAIRR Initiative, CGIAR, Global Alliance for the Future of Food, Biovision Foundation, and the Agroecology Coalition, and with financial support from the German government, specifically Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

In 2025, Food Forward NDCs will be expanded to include guidance for integrating science-based synergistic biodiversity and climate policy measures for agriculture and food systems in NBSAPs to support alignment of NDCs and NBSAPs and delivering multiple climate, biodiversity, and sustainable development outcomes. The guidance on NBSAPs will include concrete policy measures in agriculture and food systems to contribute to each of KMGBF Targets and will provide approaches and tools for target setting and indicator selection for monitoring progress.

2. OVERVIEW OF GOOD PRACTICE EXAMPLES

GOOD PRACTICE EXAMPLES OF INTEGRATION OF FOOD SYSTEMS IN NDCS, NAPS AND NBSAPS

While there is still considerable progress to be made when it comes to integrating food and food systems into NDCs, NAPs, and NBSAPs and their implementation, there are already good examples of how governments are integrating food system measures in their national commitments and plans on climate and biodiversity action. These NDCs, NAPs, and NBSAPs integrate one or several policy measures relevant for food system transformation, including:

- A MULTI-STAKEHOLDER AND INCLUSIVE APPROACH TO DEVELOPING THE NDC, NAP, AND NBSAP
- NATURE-POSITIVE FOOD PRODUCTION ACTIONS FOR CLIMATE CHANGE MITIGATION AND ADAPTATION AND BIODIVERSITY
- POLICY MEASURES TO ADDRESS FOOD LOSS AND WASTE
- POLICY MEASURES TO TRANSITION TO SUSTAINABLE AND HEALTHY DIETS
- EQUITY CONSIDERATIONS IN DESIGN AND IMPLEMENTATION OF FOOD SYSTEM MEASURES

Kenya's NDC

FOOD SYSTEM OVERVIEW

Because of the agriculture sector's significance in Kenya – and the challenges it faces – food systems in Kenya present a key opportunity for transformation for climate action. The agriculture sector accounts for 33% of the country's gross domestic product (GDP), and – combined with Land Use and Land Use Change and Forestry (LULUCF) – accounts for 75% of Kenya's greenhouse gas (GHG) emissions.[5] However, the country's food system is not without its challenges: its characterized by gender disparities and high rates of malnutrition and food insecurity, while experiencing a significant drop in food production in recent years due to climate change.[6] In Kenya, a food systems transformation has the potential to increase employment, improve gender equality, reduce GHG emissions, and lower rates of malnutrition and food insecurity.[7]

NDC DEVELOPMENT

The development of Kenya's Updated NDC included a strong coordination system that built upon existing climate frameworks and pledges while integrating gender considerations into the NDC process. Led by the Ministry of Environment and Forestry and coordinated by the Climate Change Directorate, the NDC development process included a gender analysis that was carried out to ensure that gender-responsive actions were sufficiently integrated and budgeted for within Kenya's NDC. The creation of Kenya's NDC built upon existing frameworks and policies (e.g., the National Adaptation Plan 2015–2030, the Second National Climate Change Action Plan 2018-2022, the Third National Inventory Report, and the Climate Change Act 2016), some of which are relevant to the country's food systems.

FOOD SYSTEM MEASURES

Kenya's NDC includes several important policies and targets related to food systems transformation. These include the transformational agriculture, for crops, livestock, and fisheries, to contribute toward meeting the ambitious climate change adaptation and mitigation targets set by the country. The NDC includes measures to build climate resilience, such as through sustainable land use management, the provision of safety nets, extension services, and access to finance targeted toward marginalized communities. For instance, the NDC describes a measure to develop social safety net structures for women, youth, and other vulnerable groups within the County Climate Change Funds.

NDC IMPLEMENTATION

Kenya makes several significant commitments regarding the implementation of its NDC.[8] The total cost of implementing mitigation and adaptation actions in the updated NDC is estimated at 62 billion USD; Kenya commits to bearing 13% of these costs – a significant increase compared to its first NDC, which was entirely dependent on external support.[9] This shift from its initial NDC indicates a renewed dedication to climate action. Additionally, Kenya is channelling financial support towards rural livelihoods and ecologically beneficial farming, while accelerating the development of a multi-stakeholder monitoring, reporting, and verification (MRV) tool and promoting rights protection in agroecology for marginalized groups. Finally, the NDC includes provisions for technology development and transfer.

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Colombia's NDC

FOOD SYSTEM OVERVIEW

Colombia faces several challenges within – and opportunities to transform – its food systems. In 2018, agriculture accounted for over 6% of Colombia's GDP and employed nearly 16.5% of the country's workforce.[10] Additionally, the agriculture sector was responsible for 19% of Colombia's total exports, including products like coffee, flowers, and plantains.[11] In Colombia, agriculture is mostly performed by smallholder farmers,[12] even though as much as 81% of the land in the country is owned by a small minority.[13] Colombia also faces a complex issue of 'dual' malnutrition, with both food insecurity and obesity prevalent in the country.[14] Considering these complexities, transforming Colombia's food system to ensure food security, healthy diets, environmental sustainability is of the utmost importance.

NDC DEVELOPMENT

The process revising and updating Colombia's NDC involved an extensive process of participatory consultation and dialogue with a range of stakeholder groups, which the country clearly describes in its NDC.[15] The country coordinates its NDC update process using an institutionalized, ministry-led mechanism that enables continuity and regular follow-up on the country's climate plans and targets. The sectoral mitigation potential of Colombia's climate change measures – which includes assessing some food systems elements, like emissions from agricultural production and refrigeration – was calculated using assessment models developed through the Low Emissions Analysis Platform, an integrated, scenario-based modelling tool. Additionally, the development of Colombia's NDC included efforts to capitalize on existing synergies between the climate strategy and other policy development processes. For instance, all measures in the country's NDC are linked to corresponding Sustainable Development Goals to identify the co-benefits that span further than emission reductions on their own.

FOOD SYSTEM MEASURES

The content of Colombia's NDC includes several measures related to food systems.[16] First, Colombia developed an accounting system for GHG emissions reduction and removals, which accounts for emissions from agriculture and land use. Additionally, the country's NDC highlights measures such as agroecology and regenerative approaches to agriculture – specifically those that mitigate emissions from the production of commodities such as cocoa, coffee, and unrefined sugar. Further, given the important role that smallholders play in the country's agricultural sector, Colombia's NDC acknowledges the significance of engaging with smallholders and local communities (though the plan does not include any concrete measures for directly engaging with these groups). While the NDC itself does not include targets nor measures on food waste and loss, in 2019, Colombia introduced an ambitious new law that aims to address both issues,[17] indicating the country's action on food system transformation in pathways outside its NDC.

NDC IMPLEMENTATION

Colombia's NDC considers several elements necessary for implementation and monitoring. The implementation process is described as involving the consolidation of information systems and databases; record-keeping of research, technological development, and innovation needed for implementation; and capacity-building, education, and awareness-raising to facilitate climate action. For instance, Colombia's National Information System of Climate is responsible for the monitoring, reporting, and verification of the country's mitigation measures, plus the monitoring and evaluation of adaptation measures.

France's national climate plans

FOOD SYSTEM OVERVIEW

France's national climate contributions are incorporated within the European Union's NDC. As part of these commitments, France developed an integrated National Energy and Climate Plan (NECP) and a Long-Term Strategy (LTS) – which, in 2020, were both submitted to the European Commission.[18] Additionally, France developed and published an addendum to the European Union NDC, where the country presents emission reduction targets for several of its overseas countries and territories that are not covered by the more broad NDC.[19]

NECP DEVELOPMENT

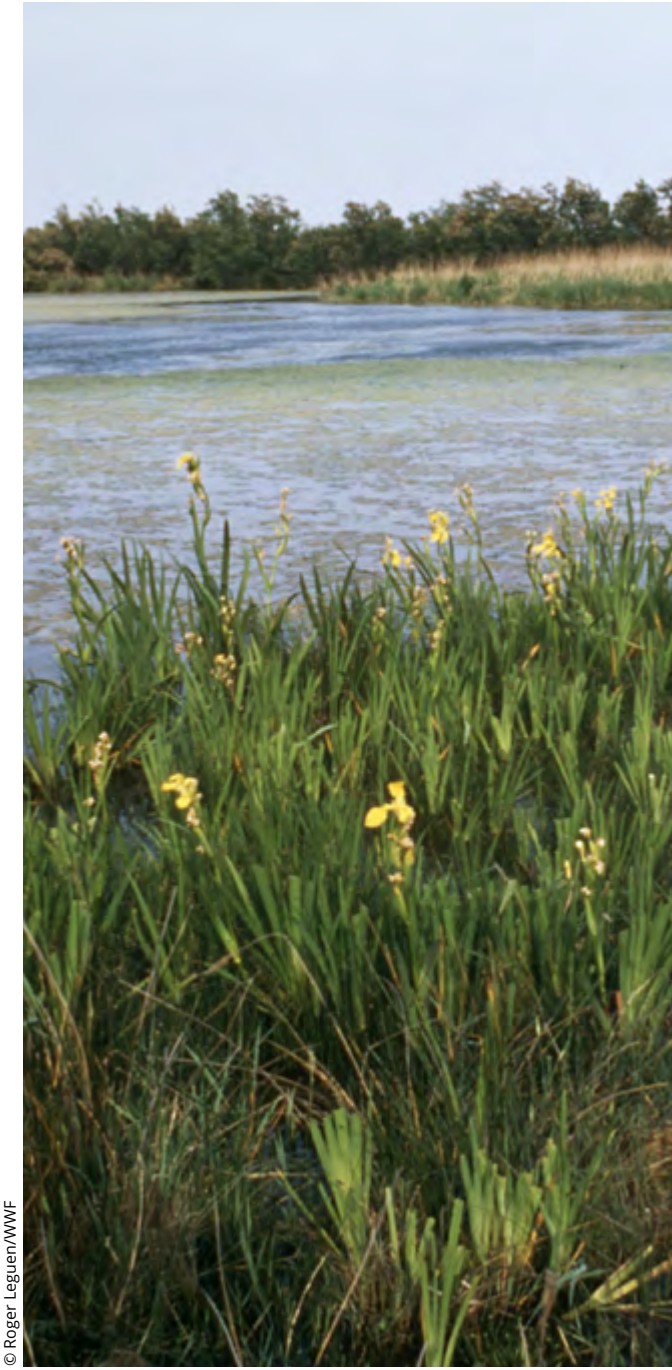
The development process of the NECP was led by the Ministry of Ecological Transition and included participation from diverse stakeholders from within and outside government.[20] The consultation process included multiple platforms for public engagement, including sectoral working groups, workshops, public debates, and online questionnaires. Additionally, the NECP includes an impact analysis that took account of several food system elements, such as improving food production practices, promoting alternative production methods, shifting diets, and promoting bio-based energy.[21]

FOOD SYSTEM MEASURES

France's NECP directly references efforts that work towards a healthy, sustainable, and accessible food system, including a transition toward more sustainable food production facilitated primarily through the Agri-Environmental Plan.[22] Further, France's Biodiversity Plan – which is referred to in the country's NECP – seeks to promote and reinforce plans promoting agroecology and organic farming and includes measures to improve knowledge and management of soil biodiversity for agriculture. Additionally, the NECP addresses critical issues such as food loss and waste reduction, the conversion of food waste into biofuel, and the taxation of refrigerant greenhouse gases. Further, the NECP establishes targets for livestock production to limit emissions while recognizing the need to address imported emissions.[23]

NECP IMPLEMENTATION

Transitioning to a sustainable food system is funded through the government's Major Investment Plan, allocating EUR 5 billion to ecological transformation in agriculture, fisheries, agri-food, and forestry.[24] The NECP includes measures for farmer training under the Teaching to Produce Alternatives Plan, but otherwise does not directly address smallholder farmers, women, or marginalized groups in the food system. It remains unclear whether farmers will be actively engaged in the design and implementation of these training programs. Despite this, various initiatives in France support farmers in enhancing the sustainability of their production.



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Vanuatu's NDC

FOOD SYSTEM OVERVIEW

The food and agriculture sectors are of vital importance to Vanuatu's economy – employing as high as 56% of the country's population in 2017 and accounting for one-fifth of the nation's GDP.[25] Agriculture, livestock – in addition to tourism and offshore financial services – are at the heart of Vanuatu's economy.[26] More than 75% of agricultural production in Vanuatu is for subsistence purposes,[27] and subsistence farming is predominantly focused on root crops such as taro, yam, cassava, and sweet potato.[28] Additionally, about half of the rural households are involved in cattle farming. Fisheries, although relatively small, also have a significant presence throughout Vanuatu, with roughly half of the country's households participating in fishing activities.[29] Crucially, Vanuatu is ranked as the most vulnerable country in the world with regard to natural hazards, which form an ongoing risk for food production and nutritional security.[30]

NDC DEVELOPMENT

Vanuatu's revised NDC development was led by the Department of Climate Change (DoCC) and supported by the United Nations Development Programme's (UNDP) NDC Support Program. It involved multiple rounds of consultations with various stakeholders, including the private sector, NGOs, academia, development partners, and marginalized groups. A gender expert from DoCC was part of the process to ensure gender-responsiveness in the plans and targets.

FOOD SYSTEM MEASURES

Vanuatu's NDC considers food systems largely from an adaptation perspective (with the exception livestock farming measures, which includes a measure to promote regenerative approaches for livestock management).[31] This adaptation focus of food systems derives from the fact that Vanuatu's contribution to global GHG emissions is close to zero. Specifically, the NDC commits to enhancing traditional agricultural practices, focusing on disaster risk reduction and climate change adaptation to ensure that agriculture remains capable of supporting household income and food security by 2030. The NDC includes measures to conserve, protect and sustainably manage mangrove forests and mangrove ecosystems, wetlands, and shoreline trees especially as a measure to enhance resilience to the impacts of climate change.

NDC IMPLEMENTATION

In 2019, an Implementation Roadmap was released to support Vanuatu's initial NDC, with plans for an upcoming update. The NDC also places significant importance on leveraging private and multilateral investments for its successful execution. Furthermore, it incorporates a comprehensive MRV system to track progress across the sectors covered in the country's NDC.[32]

Bangladesh's NDC

FOOD SYSTEM OVERVIEW

Food production is vital to Bangladesh's economy. In the country, agriculture, forestry, and fisheries account for 38% of national employment and 12% of the country's GDP.[33] Around 84% of the rural population in Bangladesh depends either directly or indirectly on agriculture for their livelihoods.[34] The main commodity produced in the country is rice, which alone accounts for nearly half of agricultural employment.[35] Fisheries are also an important source of food in Bangladesh.[36] Additionally, the country faces chronic food insecurity and malnutrition; between 2017 and 2019, severe food insecurity was present within 10% of the country's population.[37]

NDC DEVELOPMENT

Bangladesh's updated NDC was developed by a consortium of national expert including in agriculture and land use commissioned by the Ministry of Environment, Forests, and Climate Change (MoEFCC). Multiple ministries informed the development of concrete targets and measures in the updated NDC. The development process involved a consultation process that included representatives of various governmental bodies, the private sector, and civil society, though participation from local communities, women, farmers, marginalized groups, and Indigenous Peoples was limited or absent.

FOOD SYSTEM MEASURES

Bangladesh's NDC includes multiple measures for agriculture to improve infrastructure and reduce emissions from rice fields, fertilizer use, enteric fermentation, and manure management. It commits to reduce methane emissions from rice cultivation by transitioning to Alternate Wetting and Drying (AWD) irrigation in 20% of all rice cultivation by 2030 to reduce methane. The NDC also includes plans to reduce emissions through changing the variety of rice that they produce for 1.1 million ha of crop lands and improving nitrogen-based fertiliser management in 50,000 ha, unconditionally. If finance contributions are met, the surface area of land for rice crop species diversification and fertiliser management techniques will double, having clear land targets. As part of planned activities, the NDC commits to raise finance for implementing climate-resilient and nature-based agricultural and fisheries initiatives.

NDC IMPLEMENTATION

The country's NDC describes the forthcoming process of developing an MRV system, which includes plans for multiple stakeholders to collect data and progress on the implementation of the NDC under the supervision of the MoEFCC. Additionally, the NDC indicates that MoEFCC is preparing an NDC implementation roadmap and action plan that will suggest governance arrangements for the NDC and NAP implementation framework.

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Liberia's NDC

FOOD SYSTEM OVERVIEW

Agriculture and forestry are the main source of income for over 60% of Liberia's population.[38] In 2021, it made up 31% of Liberia's GDP.[39] It provides income for many households engaging in cassava, rubber, rice, oil palm, cocoa, or sugarcane production. Liberia depends on food imports with more than 80% of its staple food, rice being imported.[40] Fisheries currently represent approximately 10% of Liberia's GDP and employ approximately 3 million people throughout the West African coast.[41]

NDC DEVELOPMENT

The revision and update process of Liberia's NDC was led by the Environmental Protection Agency of Liberia with the support of NDC Partnership through the Climate Action Enhancement Package (CAEP). The process involved a participatory approach and included stakeholders such as line ministries and agencies of government, the private sector, civil society organizations, youth and women groups, and a range of national experts.[42]

FOOD SYSTEM MEASURES

Liberia's NDC outlines a range of measures related to food systems.[43] These measures encompass initiatives such as the introduction of incentives and programs aimed at fostering low-carbon agricultural practices and the adoption of sustainable livestock systems. Additionally, there is a strong focus on creating policy frameworks and incentives to promote low-emission techniques within the production and processing systems of key agricultural and tree crop value chains including conservation agriculture, no/low tillage, agro-silvo-pastoral systems, improved lowland rice cultivation, multi-cropping, organic fertilizers, fertigation, composting, crop rotation, and sustainable agricultural waste management. The NDC also states Liberia aims to implement several measures in the fisheries sector and commits to fully integrate fisheries into climate change adaptation and food security policies at the national level by 2025.

NDC IMPLEMENTATION

Liberia is working on establishing a comprehensive tracking system to diligently monitor the support received for NDC implementation, with a particular focus on exploring international carbon market mechanisms as outlined in Article 6 of the Paris Agreement. Furthermore, Liberia also recognizes the importance of a MRV system for transparency and accountability, with the need for support to strengthen this system. In addition, with support from the NDC Partnership, Liberia is creating a plan for NDC implementation. This plan will set out a timeline and actions for the short and long term. It will cover necessary conditions, policy frameworks, institutions, MRV systems, gender equality, and financial strategies to achieve the NDC's climate goals.

United Arab Emirates' NDC

FOOD SYSTEM OVERVIEW

Food systems occupy a unique role in the United Arab Emirates, in part due to the country's geography and landscape. The United Arab Emirates has limited potential for agricultural development since over 80% of the land is desert.[44] Its environment is characterized by low rainfall, high temperatures, poor soil, and lack of natural waterways, all of which have an impact on the agricultural sector. However, despite the harsh weather conditions and soil and water constraints, in recent decades, the UAE has made efforts to improve its agricultural sector by adopting sustainable and climate smart agriculture methods that focus on the optimal utilization of the cultivated land and the quality of local produce to enhance its competitiveness. The UAE's approach involves using innovative technologies like hydroponics, aquaponics, and organic farming.[45]

NDC DEVELOPMENT

The revision and update process of the UAE's NDC was led by the Ministry of Climate Change and Environment. The process involved engagement with prominent private sector organizations, local NGOs, as well as dedicated representatives of women, youth, and individuals with determination. Furthermore, the government has established the National Dialogue for Climate Ambition (NDCA) as a platform for climate collaboration across various sectors of the economy. The NDCA conducts monthly stakeholder assemblies, bringing together government officials, private sector representatives, and NGOs to discuss sector-specific requirements, priorities, and future strategies for decarbonization.

FOOD SYSTEM MEASURES

The UAE has implemented an all-round approach in its NDC to enhance the sustainability and resilience of its food systems. This includes the adoption of sustainable and controlled-environment agricultural systems, efforts to reduce food waste, and diversification of food imports. The National Food Security Strategy 2051, launched in 2018, focuses on year-round access to safe and sufficient food through sustainable agricultural and consumption practices, promoting productivity, soil and water conservation, food diversification, and food waste reduction.[46] Through public-private partnerships, the UAE has supported vertical farming projects. Furthermore, it has also leveraged government initiatives such as the Ne'ma initiative, a collaboration involving various entities, which aims to reduce food loss and waste by 50% by 2030. The UAE has also launched a nationwide Food Waste Pledge to cut food waste in half by 2030.[47]

NDC IMPLEMENTATION

In implementing its NDC, the UAE includes measures such a comprehensive financial assessment, which has estimated a need for AED 134 billion in investments between 2023 and 2030 to support climate initiatives. The UAE has plans to create investment opportunities within the industrial and building sectors through public-private partnerships (PPPs). The UAE Space Agency is playing a significant role in promoting sustainability by utilizing space data and technology for environmental monitoring and enhancing agricultural productivity. Furthermore, the establishment of the Climate Change Research Network (CCRN) aims to encourage collaboration among scientists and researchers, with a particular focus on climate-related information and adaptation methods. The UAE is developing an MRV-Transparency System to monitor and report on greenhouse gas emissions and air quality pollutants in line with their mitigation targets.

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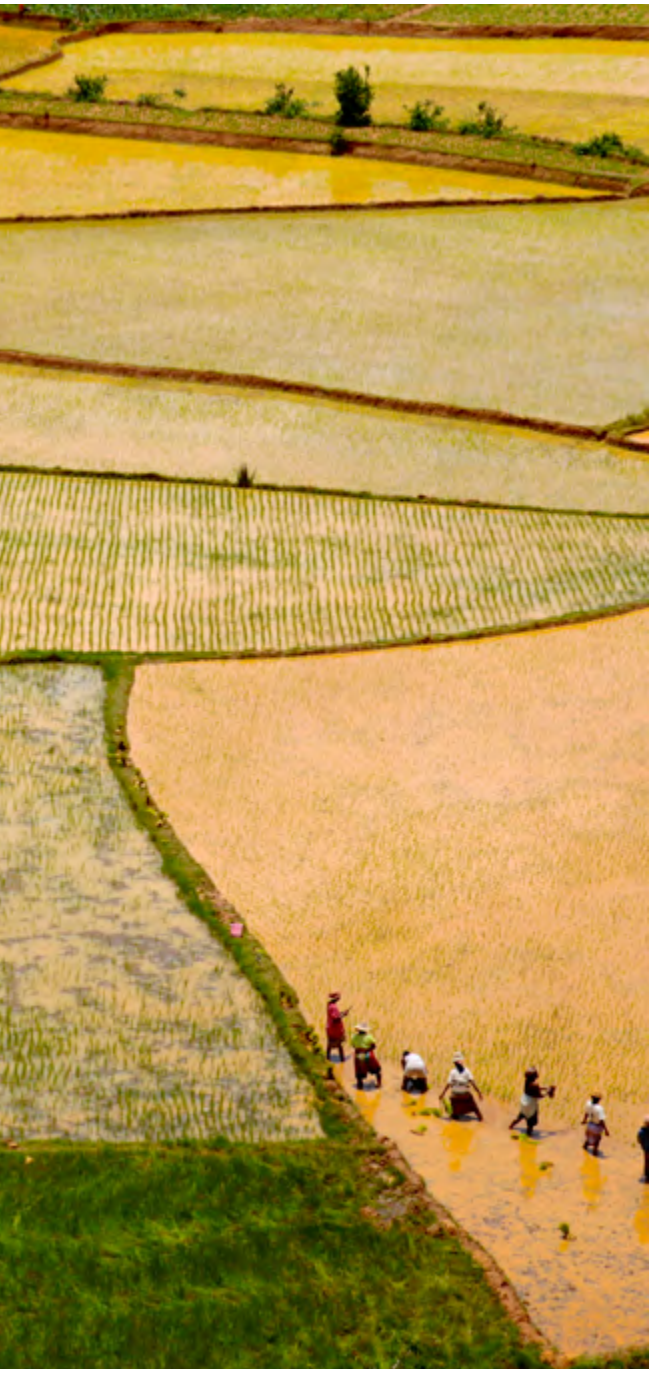

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Madagascar's NAP

FOOD SYSTEM OVERVIEW

Farming, fishing, and forestry are at the core of Madagascar's economy.[48] An estimated four in five people – mostly subsistence farmers – rely on agriculture for their livelihoods.[49] Agriculture accounts for approximately 30% of the country's GDP, generates 40% of national exports,[50] and accounts for 70% of the total employment.[51] Meanwhile, climate change impacts – such as prolonged droughts and heavy rainfalls – contribute to reducing Madagascar's food system capacities and, over the last three years, placing an average of about 1 million people in a state of food insecurity.[52] Additionally, weather events like heavy rains and strong wind have caused extensive damage to rice fields and orchards, which contributes to added pressure on food prices and impacts later harvest seasons.[53]

NAP DEVELOPMENT

The development of Madagascar's National Adaptation Plan (NAP) was taken over by the Ministry of Environment and Sustainable Development (MEDD), through the National Office of Climate Change and Reducing Emissions from Deforestation and Forest Degradation (BN-CCREDD+) with support from German Cooperation (GIZ). The process involves a series of consultations involving multiple stakeholders, including national ministries, civil society, and the private sector.

FOOD SYSTEM MEASURES

In its NAP, Madagascar outlines a strategy aimed at enhancing the resilience and sustainability of its agricultural sector. The plan emphasizes the importance of crop diversification, introducing new species and varieties, and adjusting cropping calendars as needed. Further, it prioritizes strengthening the adaptive capacity of its livestock sector through the promotion of local breeds that are better adapted to challenging climatic conditions and disease resistance across various livestock types, including cattle, pigs, sheep, goats, and poultry. In addition, it states there is a diversity of agroecological practices in place that will be supported and developed more widely: sowing on permanent plant cover, improved rice cultivation, agriculture-livestock integration, among others. Madagascar also states plans to develop and implement training programs for the professionalization of rural youth on agroecology in its NAP. Furthermore, the NAP states that it will promote the creation of occupations that are less dependent on natural resources while also acknowledging gendered implications within food-system livelihoods. Specifically for the agriculture-livestock-fisheries sector, Madagascar states that it supports women in strengthening their capacities and skills – while simultaneously noting and considering the power relations that affect their choices that condition women's lifestyles.

NAP IMPLEMENTATION

Madagascar plans and executes a range of efforts to implement its NAP. These include establishing a liaison mechanism to enhance collaboration among government ministries for consistent information sharing. The government is involving fishermen in community groups and consultation platforms to empower local communities and promote sustainable marine resource management. Additionally, support is being provided to Locally Managed Marine Areas (LMMAs) for the protection of biodiversity and the promotion of sustainable fisheries. Further, Madagascar is developing an MRV system for climate change adaptation interventions. Climate adaptation is being integrated into the National Information and Monitoring and Evaluation System (SNISE) by the Ministry of Economy and Finance (MEF), in collaboration with the MEDD, so that climate change adaptation is considered, monitored, and evaluated in the same way as other development actions in the country. To avoid duplication, a National Evaluation System for Information and Statistics (NESIS) is being established to coordinate with existing sectoral monitoring and evaluation systems while utilizing available data for climate adaptation planning and evaluation.

Cameroon's NAP

FOOD SYSTEM OVERVIEW

Cameroon's economy relies heavily on agriculture, with approximately 70% of its population engaged in this sector.[54] Moreover, agriculture contributes significantly to the country's GDP, accounting for an estimated 80% of the primary sector's contribution.[55] Meanwhile, the food system especially smallholder farmers are increasingly challenged by the uncertainty and variability of weather caused by climate change as crops are predominantly rainfed, yields highly depend on water availability from precipitation and are prone to drought.[56] Women are more severely hit by climate change because they account for 75% of workers in the informal agricultural sector and are primarily responsible for the welfare of their households and food security.[57]

NAP DEVELOPMENT

The development of Cameroon's National Adaptation Plan (NAP) was led by the Ministry of Environment, Protection of Nature, and Sustainable Development, supported by Japan's Cool Earth Partnership Initiative, the United Nations Development Programme's (UNDP), the German Cooperation (GIZ), and the Global Water Partnership-Cameroon.[57] The process involved extensive stakeholder consultations between 2012 and 2015. More than 625 people participated in regional consultations including relevant ministries; universities and research institutes on agroecology; local municipalities; traditional chiefs; development sector; civil society organizations such as associations, unions, or cooperatives; parliamentarians; private sector; and the media. In addition, a multidisciplinary group of experts on the environment, climate change, human sciences, public health, geography, demography, and water resource management contributed to developing the NAP.

FOOD SYSTEM MEASURES

Cameroon's NAP outlines several measures related to food systems. These include initiatives such as promoting irrigation and collaborative water management, particularly in lowlands and watersheds, implementing water conservation techniques to extend agricultural seasons, improving traditional techniques for processing, and storing fish, establishing a national climate alert system for drought and flood management, supporting research on climate-adapted crop varieties and diseases, and developing plans to assist vulnerable groups during disasters. Additionally, there is a focus on strengthening local mechanisms for securing land use and ownership rights for various stakeholder groups, including Indigenous peoples and rural women.

NAP IMPLEMENTATION

In the context of implementing its NAP, Cameroon's plan involves various key measures. These include educating government officials and managers on the impact of climate change on vulnerable groups, increasing awareness and building the resilience of these communities to respond to disasters. The plan also focuses on creating specific support systems for indigenous peoples during disasters, improving the country's ability to anticipate climate-related catastrophes and their implications for internal migration and security. Moreover, it emphasizes strengthening local systems for land use and ownership rights, establishing consultative platforms to advocate for community rights, ensuring secure land access and tenure, and conducting annual monitoring of implementation progress through the Sub-Directorate of Ecological Monitoring and Climate. The assessment of these actions will be made public, with the involvement of the National Observatory on Climate Change (ONACC) once operational.

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Ireland's NBSAP

FOOD SYSTEM OVERVIEW

In 2022, the Irish agri-food sector accounted for almost 7% of the gross national income and exported goods valued at a record EUR 19 billion, accounting for 9% of all exports from Ireland. The sector employs approximately 165,000 people or almost 7% of the total workforce. Agricultural production is focused on grass-based livestock farming, especially for dairy and beef production. The agri-food sector is responsible for approximately 76% of total land in the country. Irish agriculture is dominated by family-owned farms. There are around 135,000 farms with an average sizes of 32.5 hectares and an average income of EUR 46,000 in 2022.[58]

NBSAP DEVELOPMENT

Ireland's NBAP was developed in three stages, each of which targeted a different stakeholder group. During the first stage, representatives from the key government departments and state agencies, biodiversity experts, and the business sector discussed the high-level structure and direction of the NBAP, including the proposed vision, objectives, and outcomes for biodiversity. During the second stage, feedback was sought from stakeholders that are supposed to implement the actions outlined in the NBAP. This included government departments and state bodies, local authorities, and environmental non-governmental organizations and community groups. The third stage consisted of an open public consultation that received more than 300 written responses submitted either online or by post.

FOOD SYSTEM MEASURES

Ireland's 4th National Biodiversity Action Plan (NBAP) contains food-related measures for a majority of targets of the Kunming-Montreal Global Biodiversity Framework (KMGBF). Measures include sustainable soil management, agroecology, integrated and biodiversity-inclusive spatial planning, organic farming, reduced pollution from agricultural inputs, sustainable practices in fishing and aquaculture, reducing food waste, promoting a circular economy, encouraging sustainable consumption choices, introducing sustainability certification schemes, conserving genetic diversity in food production, and improving financial support for biodiversity conservation by family farmers.

NBSAP IMPLEMENTATION

Ireland has established an Infrastructure, Climate and Nature Fund to support NBAP delivery. The European Agricultural Fund for Rural Development is contributing EUR 3.9 billion to the implementation of the Common Agriculture Policy Strategic Plan for 2023-2027 (CAP-SP). Implementation of the CAP-SP involves some environmentally ambitious interventions included in the NBAP. The Department of Agriculture, Food and the Marine is responsible for policies and funding programs in the areas of agriculture, food, fisheries, and forestry.

Related to food system sustainability, Ireland has adopted the Food Vision 2030 which sets out a vision for Ireland to become a world leader in sustainable food systems by 2030. The NBAP does not specify how it relates to the Vision.[59]

Japan's NBSAP

FOOD SYSTEM OVERVIEW

In 2022, agriculture, forestry, and fishing accounted for just 1.02% of the Japanese GDP.[60] The food self-sufficiency ratio on a calorie supply basis is around 38%. Japanese agriculture consists mostly of paddy fields and is characterized by small-scale operations. 98% of agribusiness in Japan is considered family businesses. Farmland accounts for approximately 12% of the national territory.[61] Japan is highly efficient in terms of crop production per hectare but produces high amounts of GHG emissions per hectare (mostly from use of pesticides and chemical fertilizers, rice cultivation, and livestock farming). Chemical inputs tend to be overused.[62]

NBSAP DEVELOPMENT

The NBSAP of Japan 2023-2030 was developed in line with the requirements of the KMGBF. The NBSAP, however, does not specify the process through which it was developed.

FOOD SYSTEM MEASURES

Japan's NBSAP contains several measures relevant to food systems. These measures include implementing nature-positive production practices such as soil conservation, reducing use of chemical and synthetic fertilizers and pesticides on the agricultural lands and and promotes sustainable fishing and aquaculture. The NBSAP also targets reducing food loss and waste through improved processing techniques and food waste recycling for compost, feed, or fuel while promoting local and traditional dietary patterns and use of certification systems to support preferential procurement from producers who are committed to biodiversity conservation.

NBSAP IMPLEMENTATION

Implementation of the NBSAP will follow a science-based, precautionary, and adaptive approach. Biodiversity-related measures will be formulated and implemented based on scientific evidence and local and traditional knowledge. Measures will be added, changed, or discontinued based on newly accumulated scientific evidence and evaluation of monitoring results. NBSAP implementation will also follow a cross-sectoral and cross-generational approach, bringing together the national government, local authorities, agriculture, forestry, and fishery industries, businesses, private organizations, experts, educational and research institutions, and local communities. The NBSAP emphasizes collaboration with local communities to make use traditional knowledge and promote ownership and concrete implementation of biodiversity measures at the local level.

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Kiribati's Updated NDC

FOOD SYSTEM OVERVIEW

Agriculture, forestry, and fishing represent the largest contributor to the Kiribati economy, accounting for more than a quarter of it. More than 75% of all households are engaged in some form of agricultural activity, mostly for their own subsistence.[63] Kiribati's freshwater supply for food systems depends primarily on rainwater collection and groundwater. The freshwater supply is highly dependent on rainfall replenishment and vulnerable to saline contamination.[64]

Impacts of climate change on food production in Kiribati include weather-related stress on water resources as well as salinization of freshwater reserves which, in turn, reduces the quality and availability of water for food production as well as agricultural productivity. Models predict that extreme hydrological events with potential negative impacts for freshwater supply—droughts, storms, heavy rainfall—will intensify in the future.[65]

NDC DEVELOPMENT

Kiribati's Enhanced NDC builds on the Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management 2019-2028 (KJIP) and the NDC Roadmap and Investment Plan. The development of the KJIP and the NDC Roadmap and Investment Plan was overseen by the Kiribati National Expert Group (KNEG). The KNEG is Kiribati's main coordination mechanism for climate change mitigation and adaptation and consists of representatives from the government (MFED, MFAI, MIA), the private sector, civil society, and faith-based organizations. Development of both documents involved engagement with stakeholders such as government ministries, faith-based organizations, local civil society organizations, and development partners. Especially the development of the KJIP included strengthening gender considerations.

FOOD SYSTEM MEASURES

Measures related to food and freshwater in Kiribati's NDC focus on building resilience and adaptive capacity. Key National Adaptation Priorities include increasing water and food security through integrated and sector-specific approaches. In this regard, the country plans to identify and promote salt-, drought-, rain-, and heat stress-resilient crops, fruits, vegetables, and livestock breads. Management of water resources should be community-based. The measures aim to make sure that communities have access to sufficient and adequate freshwater at all time including during extreme weather events such as drought, heavy rain, and storm surges.

NDC IMPLEMENTATION

Implementation of Kiribati's Enhanced NDC will require robust institutional arrangements as well as support in the form of technology transfer, capacity-building, and finance. Implementation also builds on and strengthens existing mechanisms for policy implementation, financing, and monitoring by integrating climate change and disaster risk management considerations into these mechanisms.

The NDC does not specify how much (financial) support is needed for implementing its Key National Adaptation Priorities nor does it mention any specific projects or activities related to freshwater use in food systems that are already under way.

Turkmenistan's Updated NDC

FOOD SYSTEM OVERVIEW

Turkmenistan has the highest air temperatures and the lowest precipitation in Central Asia. Droughts occur frequently and represent a huge challenge, especially since about 80% of the country's territory is occupied by the Karakum Desert.

Agriculture accounts for 11.5% of Turkmenistan's GDP. Due to climate change, the country's agriculture sector may face water scarcity, increased desertification, land degradation, and droughts leading to unsustainable agricultural production and threatening food security. Shortage of freshwater for irrigation will lead to increased degradation, salinization, and erosion of arable lands as well as degradation and reduction of natural pastures negatively affecting productivity and profitability of food production.

NDC DEVELOPMENT

Turkmenistan's NDC was prepared following a multistakeholder approach that included engagement with all parts of society such as key ministries, public and private sector, academic and technical experts, civil society organizations, and representatives of vulnerable groups. The NDC builds primarily on the updated National Strategy of Turkmenistan on Climate Change.

FOOD SYSTEM MEASURES

Agriculture and freshwater use are among the sectors that the NDC identifies as most vulnerable to climate change. Measures to adapt freshwater use to climate change include increasing the efficiency of irrigation systems through modernization and technical re-equipment, improving water resources management through adoption of integrated water resources management, improved regulation of management, protection, and use of water resources, and development of smart information irrigation planning systems. Moreover, collector-drainage water which is recycled in one freshwater reserve is already used to irrigate agriculture. Since water management activities of neighboring countries have a significant impact on the availability of freshwater resources for food systems in Turkmenistan, the regional system of joint water resources management also needs to be improved. Finally, financing of specially protected natural areas should be strengthened to ensure that natural ecosystems can continue to provide essential ecosystem services related to freshwater quality and availability.

NDC IMPLEMENTATION

Turkmenistan sees a huge opportunity in involving the private sector in NDC implementation, especially in the agricultural sector. Companies have already begun implementing water conservation activities and several private environmental firms and non-governmental organizations work on environmental protection issues in the country. Turkmenistan wants to reduce bureaucratic hurdles and offer incentives for private sector engagement in NDC implementation.

Implementation of measures related to freshwater use is already underway. The Global Enviroment Facility (GEF) supports projects to improve the energy efficiency of irrigation systems, reduce water consumption, and improve the reliability of freshwater supply to remote communities in arid regions. UNDP successfully cooperated with the Adaptation Fund to provide assistance to water user associations for improving water infrastructure, introducing drip irrigation systems, and reducing water loss during transportation.

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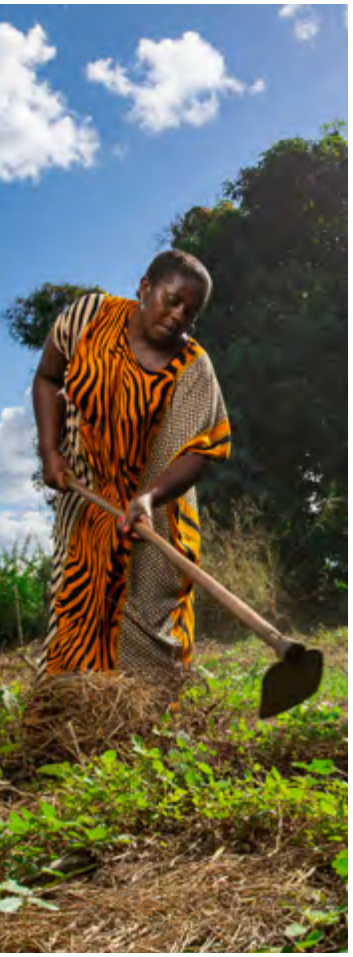
GOOD PRACTICE EXAMPLES OF PROGRAMS, PROJECTS, AND POLICY ACTIONS TO ACHIEVE FOOD SYSTEMS TARGETS OF THE NDCS, NAPS AND NBSAPS

While the responsibility of implementing countries' NDCs, NAPs, and NBSAPs lies with national and subnational governments, civil society and private sector actors play a crucial role in supporting governments to progress towards their NDC, NAP, and NBSAP targets. Below are examples how governments and civil society, donors, research organizations and the private sector implement together projects to achieve national climate and biodiversity commitments through food system transformation.



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Engaging the private sector to benefit agricultural smallholders in Sudan and support climate adaptation and mitigation action

BACKGROUND

Sudan is one of the most vulnerable countries globally to climate change (CC).[66] Rising temperatures, changing precipitation patterns, and more frequent extreme events, such as droughts have been observed and are projected to further increase.[67] In its updated NDC (2021), Sudan re-confirmed agriculture to be one of its four priority sectors for climate change adaptation. Sudan describes the 'reduction in ecosystem integrity, decline in crop and gum yields, and impacts on livestock production' as the climate change impacts that are of highest concern. Sudan also prioritizes mitigation efforts in the land use sectors, promoting 'the restoration and sustainable management of 1.7 million hectares of degraded forest reserve and Gum Arabic belt'.[68]

ACTIVITIES

Designed by FAO and Sudan, the GCF project 'Gums for Adaptation and Mitigation in Sudan (GAMS): Enhancing adaptive capacity of local communities and restoring carbon sink potential of the Gum Arabic belt' is under implementation since 2021. GAMS' entry point for enhancing the adaptive capacity of local communities to climate change is gum arabic (gum). Functioning as emulsifier, gum is produced through harvesting Acacia trees and is a valuable commodity for international trade. Given the limited capacity of local smallholder farmers to organize in cooperatives, their position in the value chain is often marginal. Thus, it is often more profitable to cut trees for other purposes instead of maintaining them for gum production. GAMS strengthens cooperatives and develops their capacities to produce higher quality and quantity of gum. By improving their capacities to harvest, store, and process gum, the cooperatives can enter into direct agreements with gum exporting companies, which purchase quality gum above local market prices. Receiving a premium price allows smallholders to reinvest in their business and provides a financial incentive to preserve Acacias. Restoring and preserving Acacias carries important climate change adaptation and mitigation benefits. The trees sequester CO_2, are adapted to climate change and provide key ecosystem services, including improved water retention capacity and nitrogen content in soils. These services stabilize food crop yields, even in the face of climate change. The project also increases the resilience of livestock and dependent communities by restoring pasture lands, livestock routes, and infrastructure, such as watering points.[69]

IMPACT

By improving the position of smallholder farmers in the gum value chain, providing financial incentives to maintain Acacias, stabilizing food crop yields, livestock production and income opportunities, GAMS increases the climate change resilience of the local ecosystem, economy, and food system, which are key adaptation priorities in Sudan's NDC. Simultaneously, by restoring 276.000 ha of agroforestry systems and pasture lands, the project reduces 9,2 million tCO_2e and thereby contributes to Sudan's NDC total 2030 GHG reduction target of 27,1 million tCO_2e.

Using data and research to inform climate change resilient food systems in Palestine

BACKGROUND

In Palestine, maximum and minimum temperatures have risen since the 1950s and are projected to further increase. Observations on rainfall indicate a reduction in annual precipitation, coupled with changing precipitation patterns. As 97% of field crops are rainfed, climate change impacts on food production and rural livelihoods are increasingly severe.[70] In its 2016 NAP and 2021 NDC, Palestine recognizes its agriculture sector as highly vulnerable to CC. To improve its climate change adaptation planning across sectors, Palestine's NAP specifies the need for improved national weather and climate observation and modelling capacities. In addition, Palestine underlines climate-smart agriculture (CSA) as key adaptation option in its NAP and NDC, with the latter promoting the conversion of 50% of Palestinian farms to climate smart agriculture by 2040.[71]

ACTIVITIES

Under implementation since 2022, the GCF NAP Readiness project 'Enhancing Adaptation Planning and Adoption of Climate Resilient Agriculture in Palestine'[72] was co-designed by FAO and Palestine to enhance national adaptation planning. The project strengthens the inter-institutional coordination required for mainstreaming climate smart agriculture into national and local initiatives. Additional core activities include the technical upgrade and expansion of the agro-meteorological network. Weather data collection is improved and its automatic dispersion to all stakeholders introduced. Furthermore, the project sets-up demonstration plots where climate smart agriculture practices, such as improved soil management, are being tested by farmers, for adoption on their own land. The farmers are also being trained to use the newly available weather data to inform the timing of sowing, watering, and harvesting of crops. Based on the data and results made available through the upgraded agro-meteorological network and demonstration plots, public-private sector engagement is facilitated to discuss and evaluate climate change risks and opportunities for food production, as per Palestine's agro-ecological zones.[73]

IMPACT

This project is geared towards enhancing Palestine's national adaptation planning capacities in the context of climate-smart agricultural production, which is in direct support of its NAP and NDC. With its implementation, the climate change resilience of Palestine's agriculture sector, smallholder food producers, and – by extension – the entire food system is being enhanced. The upgrade and expansion of the meteorological network benefits all sectors, making this project a key driver of strengthened climate change adaptation across Palestine.

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Partnering for ecologically-sound agriculture and resilient livelihoods in Cambodia

BACKGROUND

Cambodia is exposed and highly vulnerable to the impacts of climate change. The country's agriculture sector is particularly at risk from impacts associated with increasing average temperatures, changes in the duration of the dry season, and the increasing frequency and intensity of extreme events such as droughts. To increase the resilience of its agriculture sector and dependent livelihoods, Cambodia's NDC priority actions include a range of measures such as the scaling-up of climate-smart farming systems and improving the accessibility of agrometeorological services. Cambodia's NDC also highlights the importance of enhancing gender responsiveness.[74]

ACTIVITIES

Designed by FAO and Cambodia and approved in 2023, the GCF project 'Public-Social-Private Partnerships for Ecologically-Sound Agriculture and Resilient Livelihood in Northern Tonle Sap Basin (PEARL)', is designed to support implementation of Cambodia's NDC adaptation priorities in the agriculture sector. The project equips farmers and other stakeholders with access to tailored and crop-specific agro-meteorological advisory services delivered through strengthened inter-institutional coordination and capacity. Through systematic agricultural extension services, the project provides guidance on how to better use these advisories and related measures to anticipate and address risks to agricultural operations from climate variability and change. PEARL also works through certification programs for key crops such as rice, mango, and cashews to provide a basis for value chain development and the building of adaptive capacity: beneficiary groups can develop business plans for climate change resilient, inclusive and gender-responsive premium value chains and highlight core investment needs, including technologies to support the adoption of climate-resilient agriculture. These technologies could include solar water pumps, drip irrigation systems, and machinery and equipment for food processing and storage, to avoid post-harvest losses. The access to climate resilient technologies is facilitated through the Farmer-led Agricultural Resilience Mechanism (FARM). Eligible agricultural stakeholders can use the FARM for implementing their crop- and climate-specific business plans. The FARM ensures that business plans: 1) are based on a thorough climate change risk screening; 2) support the acquisition of climate-smart agricultural technologies; 3) train beneficiary groups in setting-up trust fund accounts to support further community driven investment; and 4) establish linkages with complementary agricultural financial institutions.[I]

IMPACT

PEARL implements adaptation actions as detailed in Cambodia's NDC. By improving the position of farmers along the food value chain, while promoting agro-ecological practices, enhancing accessibility to agro-met data and information, and improving the financial capacities of agricultural stakeholders, the project contributes to enhancing the climate change resilience of the entire food system in Cambodia.

I https://www.greenclimate.fund/sites/default/files/document/fp199-fao-cambodia_0.pdf

Development of the Enhancing Sustainable Land Management and Climate-Resilient Agri-food Systems in Côte d'Ivoire

BACKGROUND

Côte d'Ivoire's Revised NDC prioritizes the agricultural sector with several planned mitigation and adaptation measures. These include the enhancement of environmental and climate information system and access; the implementation of climate risk management systems; and the promotion of sustainable soil management techniques. Further, the country's NDC defines measures to build rural farm communities' capacity for climate resilience targeting young and women and promote and support climate resilient technologies for agriculture, livestock, and fisheries.

ACTIVITIES

The CGIAR, Alliance for Biodiversity, and CIAT project – 'Development of the Enhancing Sustainable Land Management and Climate- Resilient Agri-food Systems in Côte d'Ivoire (LARACI)' – is implemented alongside the GGGI, the country's Ministry of Environment & Sustainable Development, and the Ministry of Agriculture. The project has been under implementation since 2022 (and running until 2024). The goal of the program is to initiate a paradigm shift towards climate-resilient agriculture and income generation for farming communities for improved food and nutrition security, while protecting and strengthening targeted vulnerable agro-ecological areas and ecosystem services in Côte d'Ivoire. The project will provide information and services, strengthen institutions and regulatory systems, and unlock access to finance towards adoption of climate smart agriculture technologies. Additionally, it will focus on specific adaptation measures for rice, cassava, and yam crops.

IMPACT

The project expects to reduce the vulnerability and increase the resilience of approximately 500,000 beneficiaries in the central regions of Nzi, Moronou, Iffou, and Mé. This represents 58.75% of the total population in these areas. These direct beneficiaries are expected to benefit from improved climate resilience, health and well-being, and food and water security. Additionally, the project will contribute to climate change mitigation. This includes reducing emissions from land use, deforestation, forest degradation, and sustainable forest management, as well as the conservation and enhancement of forest carbon stocks.

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Engaging local communities for climate-resilient agriculture value chains in Colombia

BACKGROUND

Colombia has traditionally experienced high levels of inter-annual variability. However, climate change has been observed and is projected to further intensify extreme events associated with the La Niña and El Niño phenomena, such as droughts and floods.[75] Average temperatures in Colombia have risen by 1°C over the last twenty years while rainfall patterns have become increasingly erratic.[76] Agriculture is identified as one of the most exposed and vulnerable sectors to climate change in Colombia's 2016 NAP[77] and 2020 NDC[78]. The NDC details the need to develop adaptation interventions that inter alia support (i) enhanced climate change adaptation capacities in key agriculture value chains and (ii) the operationalization of national climate change frameworks such as the Integrated Climate Change Management Plan for the agriculture sector (the 'PIGCCS'), which was adopted in 2021.

ACTIVITIES

The FAO-UNDP Global Programme 'Scaling up Climate Ambition on Land Use and Agriculture through NDCs and NAPs (SCALA)' was launched in Colombia in 2021 (see Part 1 on the global SCALA Programme). To enhance the climate change adaptation planning capacities in the agriculture sector, SCALA Colombia conducts participatory analysis of the impacts of climate change and supports community-led planning to identify adaptation measures for rice, corn, beef, dairy, sugarcane, and cacao value chains. The identified measures are implemented in the páramo, an alpine tundra ecosystem in the Andes, in close collaboration with rural food producers. Lessons are collected on stabilizing food yields while preserving the natural resource base for scaling up in other areas. SCALA Colombia also makes use of participatory research to document and systematize traditional knowledge of Indigenous Peoples and other groups for climate change adaptation in agriculture, while also strengthening community adaptation processes. The programme also strengthens the connection between local communities and national planning; for example, by organizing agro-climatic roundtables where stakeholders discuss how to operationalize the agriculture sector PIGCCS. To incentivize private sector participation in the transformation of Colombia's food system as per the country's NDC and NAP adaptation priorities, the programme designs guidelines for the certification of climate-adapted agriculture for rural microentrepreneurs and food producers.

IMPACT

SCALA Colombia addresses key agriculture priority needs identified in Colombia's NDC and NAP through its targeted activities designed to strengthen capacities at the local level and operationalize the Climate Change Management Plan for agriculture. The programme collaborates closely with local communities and the private sector and provides the baseline for large-scale and targeted climate finance interventions designed to further enhance climate change resilience in Colombia's agriculture sector and food system.

Strengthening National Climate Ambitions through participatory scenarios in Costa Rica

BACKGROUND

Following the Paris Agreement, Costa Rica undertook several initiatives aimed at formulating and reinforcing its NDC, focusing notably on conducting a national diagnosis and engaging stakeholders. However, as of 2020, the clear and measurable delineation of NDC objectives, integrating stakeholder perspectives, had not been achieved. Additionally, there was a lack of clarity regarding the most suitable methodologies to tackle this challenge across various sectors, including agriculture.

ACTIVITIES

Over five years, the CGIAR Research Program on Agriculture and Food Security (CCAFS) and the University of International Cooperation (UCI) partnered with Costa Rica's Ministry of Environment and Energy (MINAE) to advance the country's ambitious climate objectives. As part of these efforts, CGIAR and partners supported the country with enhancing their NDC[79]. Using CCAFS's innovative scenarios methodology, MINAE established ambitious climate targets through extensive participatory consultations involving diverse stakeholders from the public, private sector, civil society, NGOs, and academia (including 55% women and 26% under 30). This pioneering scenario methodology saw the participants generating future scenarios considering uncertainties that might affect Costa Rica's climate goals. These scenarios were used to scrutinize the country's proposed climate measures and recommendations were made to strengthen these measures, considering potential challenges and opportunities in different future contexts. UCI also trained 25 experts from prominent climate change organizations, empowering them to facilitate similar workshops.

IMPACT

The final NDC document was published on December 28, 2020, referencing the employed future scenarios methodology. The scenario-guided consultation process empowered Costa Rica to proactively shape its climate agenda through robust, inclusive, and forward-thinking approaches.[80] Not only did it result in a tangible final document, but it also provided Costa Rica with the means to make informed and strategic climate decisions, supporting its path toward a more sustainable and resilient future amidst climate change. The transparency of the materials and methodology employed showcases Costa Rica's commitment to public engagement and effective climate action. All workshop recordings and materials used throughout the process are now accessible on the MINAE website, making available the knowledge and methodology used for future needs. UCI's trainings have also enabled MINAE to conduct periodic sessions, foresee future scenarios, and adapt its climate strategies, a crucial contribution to their National Ambition Cycle.

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Local Technical Agroclimatic Committees enhance resilience of farmers in Vietnam

BACKGROUND

Climate change is threatening Vietnam's agricultural production with significant implications for its food security and export value. Agroclimatic information and advisory is critical to inform planning and decision making by smallholder farmers who are still dominating agricultural production. Through "Local Technical Agroclimatic Committees", seasonal and short-agroclimatic bulletins were disseminated using multiple media to over 130,000 farmers (520,000 beneficiaries) in 351 communities in Vietnam's Mekong Delta and South-Central Coast to adapt to climate change and improve resilience, directly contributing to Vietnam's NDC and NAP.

ACTIVITIES

Since 2020, the Alliance of Bioversity International and CIAT has been working with Vietnam's Department of Crop Production (DCP) to improve climate risks management among smallholder farmers, introducing Local Technical Agroclimatic Committees (LTAC) approach, as part of the DeRISK SE Asia project. This new methodology helps to develop and disseminate seasonal agroclimatic advisories, in a participatory way. The LTAC approach entails an extensive dialogue process, involving experts, local authorities, technicians, representatives from the public and private sectors, and farmers; it is aimed at understanding the climate forecast in a province and generate context-specific recommendations to reduce risks associated with climate variability. They provide farmers with information about the expected weather conditions, such as rainfall, temperature, humidity and related risks.

This process results in seasonal, monthly and 10-day provincial and district level local agroclimatic bulletins distributed to end-users or farmers, which contains tailored seasonal climate and short-term weather forecasts, potential impacts on crops, as well as recommendations for agricultural production planning and decision-making. The advisories are generated with support of Crop Decision Trees that provide specific information on crop stages, agricultural practices, climate risk and response strategies under different climate scenarios. Farmers can access agroclimatic advisories via multiple communication channels, including messaging apps, farmer-to-farmer sharing, loudspeakers, printed posters among others.

IMPACT

Supported by Germany, the project reached 130,000 farmers by the end of 2022 and the number keeps growing, as the approach is being expanded to additional provinces through the new CGIAR initiative 'Asian Mega Deltas'. In fact, following the successful implementation and positive feedback from the provinces, Vietnam's Ministry of Agriculture and Rural Development (MARD) has decided to extend the reach of the initiative to all 13 provinces in the Mekong River Delta, making the dissemination of the bulletins an integral part of the Vietnamese government's national climate change adaptation strategy.

Farmers have used the agroclimatic advisories for seed varieties selection, land preparation, planting methods, water management, pest control, and harvesting dates identification based on predicted climate and weather forecast. Evidence shows that agroclimatic advisory services are a cost-effective way to improve agricultural productivity and resilience to climate change. Improved access and enhanced understanding of seasonal forecasts and agroclimatic advisories has helped farmers better plan and manage their farms and make informed decisions about their crops. It has also helped to reduce the use of pesticides and cope with climate risks related with excessive rainfall, flooding, drought, among others.

Supporting the development and implementation of the 2015-2025 National Strategy for Climate Change Adaptation in Honduras' Agri-Food Sector

BACKGROUND

From the formulation of the first version of the NDC of Honduras, the agricultural sector has been a priority for the government of this country, and the final update of the NDC has ratified this position. Therefore, the development and implementation of adaptation and mitigation plans and strategies for the agricultural sector based on scientific evidence have been increasingly important.

ACTIVITIES

Since 2015, the Alliance of Bioversity and CIAT, as part of CGIAR, has been actively involved in climate change and public policy research in Honduras, providing information, methodologies and tools such as developing vulnerability and climate risk analyses and scenarios for the agri-food sector, to craft, strengthen and execute the country's NDC and NAPs, as well as for shaping local and sector-specific policies contributing to these plans. This included organizing consultations to establish adaptation plans and defining the necessary steps, facilitating workshops with relevant stakeholders to align with and establish goals for the NDCs, and collaborating with policymakers to integrate research findings into policy development, strengthening the National Meteorological Service capacities and enhance the risk management system. This includes the formulation and assessment of proactive measures and collaborative agroclimatic services.

IMPACT

The Alliances' support to Honduras resulted in the formulation of Honduras's Climate Change Policy for the coffee sector[81], the Climate Resilience Plan for the national bean chain[82], and the development of several municipal adaptation plans, such as those for San Juan in Intibucá[83] and Marcala[84] in La Paz. Currently, efforts are dedicated to crafting the National Climate Services Framework Plan and establishing the Monitoring, Reporting, and Verification (MRV) system for the Agriculture, Forestry, and Other Land Use (AFOLU) sector. Alongside implementing partners, over 40,000 families are benefiting from essential information on climate forecasts for making informed decisions. Additionally, hundreds of families have successfully implemented prioritised adaptation practices through participatory community processes.

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Business model to address drivers of deforestation in Peru

BACKGROUND

Peru's NDC, mitigation goal is 40% against the BAU scenario in 2030 and the absolute target number in terms of the amount of CO_2 is 179 $MtCO_2e$ by 2030.[85] The agriculture sector is critical to Peru's NDCs achievement. The Government of Peru aims to establish public/private coalitions to facilitate the adoption of sustainable practices in selected production systems (cocoa, coffee, biofuels and other palm oil products, agroindustry, and cattle ranching), to increase productivity in already deforested land and to achieve deforestation-free agricultural production.

ACTIVITIES

CGIAR – through the Alliance of Bioversity and CIAT – has been working to develop sustainable business models and promote sustainable land use in the cocoa and palm oil value chains, as a pathway to reducing emissions from deforestation and forest degradation. This included analysing context-specific drivers of deforestation and assessing GHG emissions from the cocoa and palm oil value chains, which contributed to implementing the country's NDC.

The project also worked with cocoa and palm oil smallholder farmers, living in the Peruvian Amazon and their associations, to improve productivity while reducing GHG emissions from land use systems, based on a deforestation-free vision jointly agreed among all key value chain actors. This included increasing their capacity in land management practices and co-designing and implementing sustainable and inclusive business models. In addition, to improve and secure the financial sustainability of small businesses, the project has developed sustainable investment models that have been presented to impact investors and social lenders.

IMPACT

During its four years of implementation, the project has assessed, prioritised and re-shaped cocoa and palm oil value chains – together with local actors and governments – to achieve competitiveness and low carbon and zero deforestation goals. By enhancing capacities and designing business models with a zero-deforestation vision (e.g., cocoa cooperative Curimana and palm oil company Olamsa), the project has contributed to sustainable land use and biodiversity conservation in the Peruvian Amazon, helping to create shared economic, environmental and social value in target agricultural value chains. The project has also enhanced the mitigation capacity of national stakeholders through two regional zero-deforestation and low GHG emissions strategies for the cocoa and for the palm oil sectors.

Strengthening integrated water and land management for climate resilient agroecosystems in Uzbekistan

BACKGROUND

Uzbekistan, a landlocked country in Central Asia, is home to ecologically important river and wetland systems, extensive grasslands, semi-deserts, and high mountain ranges which support some of the most unique species and habitats on earth. These ecosystems also provide essential services to people, including water, food and livelihoods, and are critical for achieving the Sustainable Development Goals (SDGs). However, Uzbekistan's natural environments are increasingly threatened by drivers of ecosystem degradation and loss, including natural resource competition, unsustainable economic development and demographic pressure. Climate change and increased water scarcity projected in the near future have prompted Uzbekistan to prioritize climate adaptation measures in its NDC, including integrated water resources management, land restoration, and biodiversity conservation to safeguard and build the resilience of the country's natural environment and agroecosystems.

ACTIVITIES

Implemented by FAO, the GEF-funded Central Asia Water and Land Nexus (CAWLN) program is designed to improve the health of agricultural land and watersheds, reduce deforestation, and promote rural development. Through collaborative, science-based approaches, CAWLN is building the resilience of natural and agricultural landscapes at both the national and regional level through transformational changes in the management of water and land use resources and biodiversity for agriculture.

The program is structured around five key activities. First, it strengthens transboundary and cross-sectoral cooperation within the Amu Darya and Syr Darya river basins, facilitating a harmonized approach to integrated watershed management. Second, it enhances governance frameworks and mechanisms and improves stakeholder capacities to apply gender-responsive and integrated land-water-biodiversity management practices aligned with national commitments. Third, the program enhances decision-making tools and capacities, including satellite imagery use for Monitoring and Decision Support Systems, to support planning related to water, land, agriculture, and ecosystem management. Fourth, it promotes gender-responsive sustainable land management practices in sustainable agriculture and ecosystem restoration, by integrating multi-stakeholder mechanisms and incentives to achieve Land Degradation Neutrality. Finally, the program focuses on restoring key aquatic and terrestrial habitats, protecting native biodiversity, and improving livelihoods of rural communities through enhanced ecosystem service benefits.

IMPACT

The CAWLN program is designed to promote transformational changes through integrated land-water-biodiversity management for the resilience of Uzbekistan's natural landscapes and agroecosystems. By building governance frameworks, enhancing decision-making processes, addressing gender inequalities and social norms, and enhancing cross-sectoral cooperation, the programme will enable Uzbekistan to deliver on key adaptation goals for climate resilient agriculture and natural resource management stated in its NDC, including the restoration of degraded ecosystems and biodiversity and improved rural livelihoods.

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Restoring irrigation systems for enhanced climate resilience, food and nutrition security, and rural livelihoods in Sri Lanka

BACKGROUND

Sri Lanka's Tank Cascade System (TCS) is an ancient irrigation system, unique to the country's dry zone. An ecosystem in itself, the TCS consists of an intricate network of small to very large 'tanks' positioned along a gradient and connected through a series of canals. Within the system, paddy fields and dense forests coexist. The system's vital role in food and nutrition security, rural livelihoods and local culture led to its designation as a Globally Important Agricultural Heritage System in 2017.[86] Despite the TCS's significance, the system has been deteriorating, and its sustainability is threatened by widespread tank neglect, rapid land use changes, and biodiversity loss, the impacts of which are exacerbated by the effects of climate change.[87] Further, since 2019 Sri Lanka's multiple crises—the political, economic and fuel crises, as well as the COVID-19 pandemic and rising cost of food—have pushed many households in the cascade landscape into food insecurity.[88] To advance adaptation and resilience in the agriculture and water sectors, Sri Lanka's NDC commits to restoring small tank cascades and individual tanks through 2030.

ACTIVITIES

The project "Healthy Landscapes: Managing Agricultural Landscapes in Socio-ecologically Sensitive Areas to Promote Food Security, Well-being and Ecosystem Health" (short name: Healthy Landscapes Project) focuses on the rehabilitation and sustainable management of the TCS. Aligning with national priorities for climate resilience in the agriculture and water sectors outlined in Sri Lanka's NDC and in partnership with local governments and communities, the project has restored five water tanks and 500 hectares of forests and micro-land uses.[89, 90] At the same time, 300 farmers were trained in sustainable land management (SLM) practices such as the preparation of soil bunds, use of drip irrigation, and application of organic fertilizer (e.g., manure and compost). The project also partnered with two local women's farming organizations to strengthen the livelihoods of 120 women farmers by supporting them with maize cultivation, ensuring they benefit from the growing demand for this crop. Finally, by organizing a workshop on smart agriculture for participants from both academia—including students, lecturers, and researchers—and government, the project highlighted emerging opportunities for local youth, encouraging them to stay in the cascade landscape, as opposed to moving to urban areas to pursue better livelihoods.

IMPACT

The Healthy Landscape Project's restoration efforts improved the TCS's ability to capture and store rainwater, enhancing local communities' resilience to increasing rainfall variability and extreme weather events, including floods and droughts, in the dry zone. In fact, well water levels were maintained in surrounding villages during the prolonged drought of 2023-2024.[91] Farmers trained in SLM practices applied their knowledge across 1,000 hectares of agricultural land minimizing soil erosion and water loss in their fields while improving soil fertility and helping to sustain crop productivity even under changing climate conditions. Additionally, SLM guidelines and policy recommendations for cascade landscape management developed under the project will be incorporated into national policy during the upcoming review, with 150 policymakers and implementers already sensitized on how to put these guidelines into practice. Finally, by cultivating 120 acres of maize, the 120 women farmers supported by the project collectively earned 25 million LKR (USD 82,000). This success clearly demonstrates the powerful impact of addressing gender disparities in access to and control over resources (such as land, water, and high-quality seeds), as well as skills training—disparities observed both in the cascade landscape and at the national level.[92] Overall, the project contributed to safeguarding the TSC to benefit both current and future generations of cascade landscape communities.[93]

Mainstreaming biodiversity across agricultural and forestry sectors in Lao PDR

BACKGROUND

Lao PDR's natural landscape dominates 80% of its area, 236,800 km², with mountainous regions and rich fauna and flora, comprising 166 species of reptiles and amphibians, 700 birds, 90 bats and over 247 mammals, and approximately 500 species of indigenous fish.[94] However, unsustainable agricultural practices, land use change, forest fires, and illegal wildlife trade are driving biodiversity loss and undermining the resilience of these key ecosystems, which is even further compounded by climate change.[95] To address those threats, Lao PDR has committed to translating the Kunming-Montreal Global Biodiversity Framework[96] targets into national policies and strategies with a vision of assuring a thriving biodiversity for years to come. Through the support of FAO,[97] Lao PDR's Ministry of Agriculture and Forestry has developed a roadmap for mainstreaming biodiversity across agricultural and forestry sectors for 2024-2030. The roadmap is a call to action for all stakeholders to integrate the sustainable use and conservation of biodiversity in those sectors as a catalyst for sustainable development. It further aims to address gaps between existing policies and commitments on biodiversity, climate change, and land restoration. It was formulated through multi-stakeholder consultation processes to ensure alignment of the environment and agriculture sectors on the vision of mainstreaming biodiversity. The roadmap serves as a foundation for future policy direction and projects on the ground.

ACTIVITIES

The project "Mainstreaming Biodiversity across Agricultural Sectors to implement the Kunming-Montreal Global Biodiversity Framework (KMGBF)"[98] supports Lao PDR to implement its roadmap for mainstreaming biodiversity across agriculture and forestry sectors. Specifically, the project is contributing to the translation of the KMGBF Target 10 on sustainable agriculture (crop and livestock production), aquaculture, fisheries, and forestry into national targets, policies, measures, and practices aimed at ensuring sustainable management of biodiversity in those sectors. At the policy level, the project is supporting the revision of the country's NBSAP to ensure its alignment with KMGBF Targets relevant to the agriculture and forestry sectors. In addition, the project will promote the integration of NBSAP Targets into sectoral strategies and action plans to ensure a common vision for the sustainable management of biodiversity. At the field level, multi-stakeholder approaches are being used to identify biodiversity-friendly practices for sustainable agriculture, aquaculture, fisheries, and forestry in response to the challenges and threats to biodiversity that are traditionally posed by agriculture, as well as leveraging opportunities for enhancing the livelihoods of smallholder farmers.

IMPACT

The project is anticipated to foster cross-sectoral collaboration and policy coherence in the effort to align the nationally-defined NBSAP targets set with other national and sectoral commitments, including the 2021 NDCs under the Paris Agreement and land restoration commitments communicated under other multilateral environmental agreements. As a result of strengthened cross-sectoral collaboration and policy coherence across multiple institutions and policy agendas, the project will enable Lao PDR to address the climate change-biodiversity-nutrition nexus, resulting in greater resilience of smallholders to droughts, floods and soil erosion, and ultimately contributing to the achievement of the country's biodiversity and climate goals for agrifood systems.

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Conserving genetic diversity through community seed banks in India

BACKGROUND

India is one of 12 global mega gene centers, rich in agrobiodiversity, adapted to local environmental conditions. Yet, the country's agricultural sector is facing severe challenges due to climate change, with April 2022 being the hottest recorded month in over a century.[99] Irregular rainfall and drought are leading to declining farm yields, particularly affecting the country's monsoon-dependent agricultural system. Conserving plant genetic resources (PGR) and promoting the use of local genetic diversity, especially climate-resilient crops, can help to sustain productivity in the face of climate change. However, many traditional landraces and crop varieties are either lost or underutilized.

ACTIVITIES

The Alliance of Bioversity International and CIAT have been working with local partners on PGR conservation, focusing on developing and institutionalizing community seed banks.[100] These banks help to conserve valuable traditional varieties and offer farmers better access to quality seeds, especially given that most small and marginal farmers in India currently rely on low-quality seeds from local markets. These efforts are part of the Seeds for Needs Programme, which works to improve farmers' access to a diverse range of crop varieties that are better suited to local agro-ecological conditions. The programme involves a broad range of stakeholders, including national government departments, state universities, civil society organizations, the private sector, and farming communities. Together, they work to mainstream traditional varieties and landraces, focusing on participatory crop improvement strategies. Farmers are directly engaged in knowledge-sharing practices that empower them to preserve and use these varieties.

IMPACT

The establishment of community seed banks in India has had a transformative impact on agricultural resilience and farmer livelihoods. The seed banks have expanded genetic diversity and improved plant sustainability, with over 200 varieties of climate-resilient crops collected and conserved. They have significantly enhanced smallholder farmers' access to high-quality seeds, including for staple crops like rice and wheat, which are crucial for food security in India. Data shows that over 60% of the participating farmers have reported increased yields and better crop performance due to access to improved seed varieties. Moreover, the seed banks have become integral players in the seed market, allowing local and farm-saved varieties to be commercialized. This has created opportunities for farmers to gain monetary benefits from the conservation and sale of unique local varieties. Therefore, community seeds banks not only contribute to the conservation and management of plant genetic resources but also provide farmers with income-generation opportunities, promoting sustainable agricultural practices in the face of climate change.

E-flows in the Limpopo Basin in Botswana, Mozambique, South Africa, and Zimbabwe

BACKGROUND

The Limpopo River basin in southern Africa is shared by Botswana, Mozambique, South Africa, and Zimbabwe. It is the driest it has been for 35 years with groundwater supplies held in porous rock under the ground aquifers which are at risk of running low, especially at times of drought. Water resources provided by the Limpopo Basin are socially, economically, and ecologically valuable, supporting communities that are highly vulnerable to the effects of climate change. In 2016, reduced rainfall led to the Limpopo Province in South Africa being declared a disaster area with widespread crop failure and economic hardship. Excessive upstream use primarily for irrigation is a threat to the goods and services provided by the biodiversity and ecosystems of the rivers in the basin are affected.

The e-flows (environmental flows) project aimed to enhance biodiversity and ecosystem services of the river basin and support the livelihoods of rural communities that depend on it for their water security, for example, for irrigation of their crops. E-flows are the river flows needed to support vegetation, fish, and macroinvertebrates like snails, worms, and crayfish in both the river and its margins, which in turn provide ecosystem services, like nutrient recycling.

ACTIVITIES

Implemented by International Water Management Institute (IWMI) in partnership with Rivers for Life and the University of Mpumalanga in South Africa and supported by USAID with help from national departments responsible for water and sanitation including the Limpopo Watercourse Commission, the project carried out a risk assessment to predict how changes in the river's flow affect the various ecosystem services that people depend on, as well as local biodiversity. The assessment included field surveys and looked at historical data in 27 risk areas to inform a plan to sustainably protect and use the water resources. The project worked with transboundary partners to understand better the needs and challenges of sustainable water management in shared aquifers, for example, the Ramotswa Aquifer, which lies between South Africa and Botswana. To support agricultural water management, the researchers adapted a set of tools that local farmers could use to optimize their groundwater use for irrigation.

IMPACT

Implementing e-flows through, for example better management of groundwater, can reduce risks, potentially returning more than 80% of the area to a sustainable state. Under this project, farmers were able to save up to 40% of water, 30% of energy (for pumping groundwater), and 80% of fertilizers on their crops using soil moisture probes and nutrient measurements. Farmers also enhanced crop production creating savings and additional incomes for the farmers.

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3. EXISTING INITIATIVES AND TOOLS

Several initiatives led by non-governmental organizations, multilateral institutions, and the United Nations are dedicated to implementing and enhancing NDCs, NAPs and NBSAPs on a global scale. These initiatives play a pivotal role in advancing climate and biodiversity action and sustainability efforts in food systems.

GLOBAL INITIATIVES ON ENHANCING NDCs, NAPs and NBSAPs FOR FOOD SYSTEMS TRANSFORMATION	
▲ PLATFORMS / INITIATIVES ■ GUIDANCE MATERIAL ● TECHNICAL TOOL	
▲ The NDC Partnership	**The NDC Partnership** brings together 133 countries, developed and developing, and 99 institutional members to create and deliver on ambitious NDCs that help achieve the Paris Agreement and the Sustainable Development Goals (SDGs). Governments identify their NDC implementation priorities and the type of support that is needed to translate them into actionable policies and programs. Based on these requests, the membership offers a tailored package of expertise, technical assistance, and funding.
▲ The Marrakesh Partnership for Global Climate Action	**The Marrakech Partnership for Global Climate Action** provides a roadmap to help Parties to the Paris Agreement identify actions needed by 2021, 2025, 2030 and 2040 as steps to achieve the agreement's 2050 targets. The partnership hosts 'living' guidance documents, to be updated periodically with the latest information, strengthens collaboration between national governments, monitors progress, and aligns Party and non-Party stakeholders towards science-based climate goals.
▲ UNDP-FAO Global SCALA Global Programme	**The UNDP-FAO 'Scaling up Climate Ambition on Land Use and Agriculture through NDCs and NAPs' (SCALA) Global Programme** supports countries to move from planning to implementation of climate action in land use and agriculture. SCALA is structured around three components designed to address barriers that countries face for climate action: i) strengthening the evidence base for transformative action, ii) enhancing governance, integration and monitoring of agriculture and land-use priorities and iii) promoting investment and private sector engagement in climate action.
▲ Initiative for Climate Action Transparency (ICAT)	A collaborative effort whose trust fund is managed by the United Nations Office for Project Services (UNOPS), **ICAT** provides countries with tailored support and practical tools and methodologies to build the robust transparency frameworks needed for effective climate action in sync with national development priorities.
▲ NBSAPs Accelerator Partnership	The NBSAPs Accelerator Partnership is a country-led initiative providing support for the development and implementation of ambitious NBSAPs.
▲ The Freshwater Challenge	The Freshwater Challenge is a country-led initiative for the conservation and restoration of freshwater ecosystems by 2030.
■ NDC Assessment Toolkit	**The NDC Assessment Toolkit** provides a suite of resources – published by the Global Alliance for the Future of Food – designed to assist countries in adopting a food systems approach to address climate change through their NDCs.
■ Enhancing NDCS For Food Systems: Recommendations for Decision-Makers	United Nations Environment Programme (UNEP), WWF, EAT, and Climate Focus published recommendations for enhancing NDCs in the food sector, along with. The **guidance** outlines the potential of the food system to contribute to climate change mitigation and adaptation (with a focus on mitigation) and provides specific policy recommendations and measures that can be incorporated into NDCs.
■ The NDCs We Want	**The NDCs We Want** is a checklist and tracking database by WWF designed to promote progress, highlight best practices, pinpoint challenges, and address shortcomings within the NDC process. The project's ultimate objective is to elevate the ambition level of NDCs on a global scale.
■ Food, Environment, Land and Development (FELD) Action Tracker	The Food, FELD Action Tracker is a strategic initiative under the Food and Land Use (FOLU) Coalition, led by the UN Sustainable Solutions Network (SDSN). The Action Tracker is complementing other initiatives by the Coalition, dedicated to providing practical support to countries' transformation of food and land use systems.

GLOBAL INITIATIVES ON ENHANCING NDCs, NAPs and NBSAPs FOR FOOD SYSTEMS TRANSFORMATION	
▲ PLATFORMS / INITIATIVES ■ GUIDANCE MATERIAL ● TECHNICAL TOOL	
■ Food Forward NDCs	The NDC **Guidance Tool for Food Systems (short Food Forward NDCs) was developed by WWF, Climate Focus and partners** for policymakers and practitioners, which supports the implementation of measures that enable systemic shifts in food systems to meet NDC targets.
■ The NBSAPs We Need	The **NBSAPs We Need** is a comprehensive checklist for updating NBSAPs. Based on the checklist, the NBSAPs Tracker assesses the quality of countries' NBSAPs and promotes further improvement and accountability.
■ Coping with water scarcity: An action framework for agriculture and food security	The report **Coping with water scarcity: An action framework for agriculture and food security** provides a conceptual framework to address food security under conditions of water scarcity in agriculture.
● Adaptation, Biodiversity and Carbon Mapping Tool (ABC-Map)	ABC-Map is an open access tool that was developed by FAO and IFAD in 2023. It provides users with a preliminary climate change risk screening, relevant biodiversity indicators, and the carbon reduction potential of a project, plan or policy targeting the agriculture, forestry and land-use sector (AFOLU).
● NDC Tracking Tool	Operational since 2022, FAO's **NDC Tracking Tool** is openly available and allows users to collect information required to track progress made in implementing a country's NDC.
● Global Stocktake Explorer	The Global Stocktake Explorer is a database by the Climate Policy Radar, which originated from a decade of research at the London School of Economics and Political Science. This AI-powered tool is designed to search through thousands of climate interventions, laws, policies, and litigation cases worldwide, aiming to identify gaps and best practices.
● Climate Risk Toolbox	Developed by FAO, the CRTB is an open-access tool, which allows users to perform preliminary climate risk screenings through advanced climate-related geospatial information and data.
● Nationally Determined Contribution Expert Tool (NEXT)	NEXT is an open access, new generation GHG accounting tool for estimating the GHG emission reduction potential of mitigation actions in the agriculture, forestry, and land-use (AFOLU) sector, developed by FAO.
● NBSAP Forum	The **NBSAP Forum** is a web portal that provides countries with the necessary information and an online community of practice to develop and implement effective NBSAPs and prepare national reports under the UNCBD.
● Global Water Watch	Global Water Watch is an open access data platform that provides decisionmakers with near-real-time information on water resources globally. Use cases include drought monitoring, transboundary water management, and river basin and reservoir planning.
● Forest & Landscape Water Ecosystem Services (FL-WES) Tool	The Forest & Landscape Water Ecosystem Services (FL-WES) Tool provides decision support for the monitoring of forest-water interactions. For instance, the tool guides users to the best methodologies to collect baseline information in order to understand forest-water interactions, and supports stakeholders who want to incorporate an appropriate framework for the forest-water nexus into their policies and management practices.

PLATFORMS AND INITIATIVES

THE NDC PARTNERSHIP

The NDC Partnership brings together 133 countries, developed and developing, and 99 institutional members to create and deliver on ambitious NDCs that help achieve the Paris Agreement and the Sustainable Development Goals (SDGs). Governments identify their NDC implementation priorities and the type of support that is needed to translate them into actionable policies and programs. Based on these requests, the membership offers a tailored package of expertise, technical assistance, and funding. This collaborative response provides developing countries with efficient access to a wide range of resources to adapt to and mitigate climate change and foster more equitable and sustainable development. The NDC Partnership is built on the premise of collective action: by acting together, we achieve more. In 2022 at COP27, the NDC Partnership launched its Global Call for NDCs 3.0 & LT-LEDS. Building on lessons from support provided in 2020/201 through the Climate Action Enhancement Package (CAEP), the Global Call supports developing member countries in two key, interconnected fronts: preparing, updating and refining Long-term Low Emissions Development Strategies (LT-LEDS) and enhancing the quality and increasing the ambition of their Nationally Determined Contributions (NDCs). The aim is to advance LT-LEDS and NDCs, while fostering alignment between the two instruments and developing capacities for their sustained implementation. In 2024, the NDC Partnership and UNFCCC released the NDC 3.0 Navigator, an interactive tool to further support countries to enhance ambition and accelerate implementation in the 2025 round of NDC submissions.

Additionally, the Partnership hosts several interactive tools on its Knowledge Portal, which help users learn about good practices on climate action (Good Practices Database), navigate existing climate guidance and tools (Climate Toolbox), browse through climate finance opportunities (Climate Funds Explorer and Climate Finance Bulletin), and search for examples of what countries have committed to in their NDCs (NDC Content Explorer). These tools can be searched broadly, or with a sector-specific lens, including tools and information specific to the agriculture and FOLU sector.

THE MARRAKESH PARTNERSHIP FOR GLOBAL CLIMATE ACTION

Launched in November 2016 at COP 22, The Marrakech Partnership for Global Climate Action aims to strengthen collaboration between governments, cities, regions, businesses, and investors and other key stakeholders in the climate action space to lower emissions and increase resilience against climate impacts, supporting the implementation of the Paris Agreement.

Under the Marrakesh Partnership, the Climate Action Pathways outline the longer-term vision for a 1.5-degree climate-resilient world and aim to provide a roadmap to help Parties and non-Party stakeholders to identify actions needed by 2021, 2025, 2030 and 2040 as steps to get to the 2050 vision. As such, they are intended as living documents, to be updated periodically with the latest information and lessons learned as the state of climate action evolves. Land use, Ocean and costal zones and Water are key thematic areas of the pathways. The Land Use pathway for example calls to "increase the role of forest landscape restoration as a nature-based solution in NDCs, showing increased ambition by 2025 and provides insights on actions that different stakeholders can put into place to achieve this.

The Marrakech Partnership is currently focused on climate actions between now and the end of 2025 (Improved Marrakech Partnership) to support the success and overachievement of Nationally Determined Contributions and National Adaptation Plans. There are several objectives for 2021-2025:

- Mobilizing and aligning non-Party stakeholders (NPS) towards credible, transparent, science-based goals that maximize ambition. Race to Zero and Race to Resilience will be continued and strengthened to promote convergence and mobilize NPS.
- Help NPS drive sector transformation with actionable milestones, fostering collaborative efforts across sectors and value-chains. The Climate Action Pathways and 2030 Breakthroughs will continue to be used as core tools for this purpose.
- Strengthening collaboration between national governments and NPS by identifying opportunities where climate action from NPS encourages and/or helps to create the conditions for national governments to enhance ambition and accelerate implementation.
- Expand global engagement with a focus on developing country stakeholders, encouraging action, highlighting opportunities, and tailoring solutions to their context.
- Monitoring NPS progress transparently to build confidence and shared understanding using tools like the Global Climate Action Portal (GCAP) and the Yearbook of Global Climate Action.
- Develop a unified narrative for the pivotal decade of climate action to inspire further efforts.

UNDP-FAO GLOBAL PROGRAMME SCALING UP CLIMATE AMBITION ON LAND USE AND AGRICULTURE THROUGH NDCS AND NAPS (SCALA)

The 'Scaling up Climate Ambition on Land Use and Agriculture through NDCs and NAPs' (SCALA) programme supports countries to move from planning to implementation of climate action in land use and agriculture. Using countries' Nationally Determined Contributions (NDCs) and/or National Adaptation Plans (NAPs) as entry points, SCALA identifies pathways for implementing climate adaptation and mitigation actions with the potential to trigger transformative systems change. It emphasises private sector engagement and gender-responsive and inclusive approaches.

This global programme is structured around three components designed to address barriers to implementation of climate action: i) strengthening the evidence base for transformative action, ii) enhancing governance, integration and monitoring of agriculture and land-use priorities and iii) promoting investment and private sector engagement in climate action. The twelve partner countries, each implementing a context-specific work plan, are: Argentina, Cambodia, Colombia, Costa Rica, Cote d'Ivoire, Egypt, Ethiopia, Uganda, Senegal, Mongolia, Nepal, and Thailand. Additional countries are supported through the SCALA Private Sector Engagement Facility. An example for country-level activities under the SCALA Programme is provided in Part 3, in form of the SCALA Colombia case study.

In addition to supporting countries to develop the capacity to own and lead the process to meet targets set out in their climate commitments under the Paris Agreement, SCALA is active at the global level. The programme disseminates knowledge materials on transformative and systems-level change, convenes learning events among peers, showcases country lessons at international events and co-creates interventions to scale up climate finance. Funded through the International Climate Initiative (IKI) of the German Government, SCALA builds on lessons learned from the Integrating Agriculture in National Adaptation Plans (NAP-Ag) Programme, where FAO and UNDP played a catalytic role in the paradigm shift for NAPs, establishing partnerships between sectors for adaptation planning and budgeting within governments from 2015-2020.

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INITIATIVE FOR CLIMATE ACTION TRANSPARENCY (ICAT) BY UNOPS

The Initiative for Climate Action Transparency (ICAT) provides countries with tailored support and practical tools and methodologies to build the robust transparency frameworks needed for effective climate action in sync with national development priorities.

Founded in 2015, ICAT is a collaborative effort whose trust fund is managed by the United Nations Office for Project Services (UNOPS). Its mission is to help build the capacity of developing countries to measure the impacts of their climate actions while fostering greater transparency, effectiveness, trust and ambition in climate policies worldwide. To do this, ICAT works under four main workstreams:

1) Providing direct country support, by delivering hands-on support tailored to a country's needs and national priorities.

2) Establishing and running regional Climate Action Transparency Hubs, which build capacity at scale for climate action transparency.

3) Providing an ICAT Toolbox, which offers a range of open-source tools and methodologies that help countries advance their transparency efforts

4) Facilitating knowledge sharing through a variety of knowledge exchange activities and resources

While ICAT's work is not specific to any sector or arena, ICAT's Knowledge Hub can be filtered by topic, including agriculture, forestry, and other land use (AFOLU) or agriculture alone.

For example, to help policymakers assess the impacts of policies on greenhouse gas emissions, ICAT and the Greenhouse Gas Management Institute (GHGMI) have launched Agriculture Methodology: Assessing the Greenhouse Gas Impacts of Agriculture Policies. The guide is relevant to all countries and regions, and applicable to agricultural policies – whether planned, adopted or implemented – at the national, subnational or municipal level.

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NBSAPS ACCELERATOR PARTNERSHIP

The NBSAPs Accelerator Partnership is a country-led global initiative to support the development and implementation of ambitious NBSAPs and collectively achieve the goals and targets of the GBF and, ultimately, the global vision of living in harmony with nature by 2050. Under the leadership of the governments of Colombia and Germany, the NBSAP Accelerator Partnership brings together countries with a whole-of-government and a whole-of-society approach to strengthen global, regional, and national ambition on biodiversity action.

As a dedicated platform for NBSAPs enhancement and implementation, NBSAPs Accelerator Partnership is in a unique position to coordinate and collaborate with the NDC Partnership on identifying areas for synergies between NDC and NBSAP and helping governments to maximize those synergies in the update and implementation of their climate and biodiversity strategies.

THE FRESHWATER CHALLENGE

The Freshwater Challenge is a country-led initiative that aims to conserve the intact freshwater ecosystems and bring 300,000 kilometers of rivers and 350 million hectares of wetlands under restoration by 2030. The Challenge aims to enhance synergies across climate and biodiversity targets at the national and global levels by:

1) Ensuring that restoration and conservation of freshwater ecosystems is integrated and properly addressed in the relevant global, regional, and national processes to tackle the climate and nature crisis and achieve sustainable development.

2) Quantifying existing global ambitions and account for the contributions of the different stakeholders to restore and conserve freshwater ecosystems by supporting countries to define quantitative, geographically specific, and coherent targets across sectors and connecting targeted interventions from non-state actors with national plans and strategies.

3) Accelerating implementation of freshwater commitments by increasing the overall investment into restoration and conservation of freshwater ecosystems, mobilizing resources through existing funds and initiatives, and leveraging investments.

GUIDANCE MATERIAL

NDC ASSESSMENT TOOLKIT

In 2022, the Global Alliance for the Future of Food published Untapped Opportunities: Assessment Food Systems in Nationally Determined Contributions, a suite of resources designed to assist countries in adopting a food systems approach to address climate change through their NDCs. The suite of materials offers to policy makers, climate advisors, and other food systems stakeholders:

- A summary report – Untapped Opportunities for Climate Action: An Assessment of Food Systems in Nationally Determined Contributions – aimed to inform policy development and implementation, advocacy strategies, and key messages of influential state and non-state climate actors and highlights the many opportunities for governments to use food systems transformation to drive significant greenhouse gas emissions reductions, as well as other health, environmental, and social benefits.

- Guidance and related Assessment Framework – A Practical Guide to Assessing Food Systems in Nationally Determined Contributions – designed to enable policymakers, organizations, and other interested stakeholders to take a comprehensive food systems approach to the development and implementation of future NDCs or national climate policies, including a bespoke Assessment Framework that is based on the Global Alliance's Seven Principles and Seven Calls to Action for Food Systems Transformation.

- 14 individual country assessments – available here – each of which provides an overview of food systems in the respective country and outlines areas of improvement and opportunity.

- A summary of country assessments and lessons learned – Confronting the Climate Crisis with Food Systems Transformation: Stories of Action from 14 countries – that presents clear and compelling evidence for how food systems can contribute creative solutions to climate change.

In particular, the Assessment Framework can be used to assess the extent to which a food systems perspective is adopted in developing and implementing NDCs. It is designed as a living document to be continuously refined to reflect the most recent research on food systems thinking, as well as the technical input from a wide range of food systems actors.

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ENHANCING NDCS FOR FOOD SYSTEMS: RECOMMENDATIONS FOR DECISION-MAKERS

In 2020, United Nations Environment Programme (UNEP), WWF, EAT, and Climate Focus published recommendations for enhancing NDCs in the food sector, along with. The guidance – Enhancing NDCS For Food Systems: Recommendations for Decision-Makers – outlines the potential of the food system to contribute to climate change mitigation and adaptation (with a focus on mitigation) and provides specific policy recommendations and measures that can be incorporated into NDCs to address various aspects of the food system's impact on climate change. The guidance and recommendations provided in this paper are meant to serve as a starting point for discussions, future development and to provide a clear way towards measurable, actionable outcomes within NDCs.

The United Nations Development Programme (UNDP) has also published an array of NDC guidance documents that cover overarching enhancement and implementation, as well as multiple pieces of sector-specific guidance. Their sector-specific guidance often highlights opportunities for NDC enhancements (including for sectors like agriculture, forest and land-use, transport, and the power sector).

WWF "NDCS WE WANT"

The "NDCs We Want" is a checklist and tracking database by WWF designed to promote progress, highlight best practices, pinpoint challenges, and address shortcomings within the NDC process. The project's ultimate objective is to elevate the ambition level of NDCs on a global scale.

As countries submit their updated NDCs, WWF assesses them using the checklist and shares the outcomes of this analysis. Their website serves as an evolving resource, regularly updated as the assessment process advances. Evaluated countries are marked on the map and added to the list of assessed NDCs, which helps ensure transparency and accountability in climate action.

WWF also provides a resources section that overviews a suite of WWF authored and co-authored guidance documents on NDC enhancement and implementation, plus a list of external guidance, analyses, and overviews for the NDC process.

This tool has the potential to drive enhancements in the integration of food systems within countries' commitments by systematically identifying gaps and shortcomings in countries' NDCs related to food systems and offering guidance and support on how to effectively integrate and strengthen these components.

FELD ACTION TRACKER

The Food, Environment, Land and Development (FELD) Action Tracker is a strategic initiative under the Food and Land Use (FOLU) Coalition, led by the UN Sustainable Solutions Network (SDSN). The Action Tracker is complementing other initiatives by the Coalition, dedicated to providing practical support to countries' transformation of food and land use systems: It does so by systematically analysing national policies; by tracking the resulting implementation and other related actions; by identifying good practices to be shared on a dedicated platform; and by assessing specific impact and overall progress against national and global strategies and targets under the Paris Climate Agreement and the SDGs.

FELD and its methodologies are designed to support countries and their partners in devising, implementing and improving effective and ambitious policies for transforming their food and land-use systems and practices. The Action Tracker focuses on collecting and analysing relevant policies (including strategies, frameworks and other government plans of action) across a growing number of countries as a basis for the direct engagement with those on the policy frontlines:

- To support policy design and formulation for effective implementation
- To catalyse cross-country learning of available policy responses, interventions and tools
- To build a global platform of practical, action-oriented policy resources for all countries and partners to draw from and contribute to.

The tracker collaborates with a range of partners and organisations, and draws from an ever-growing number of related initiatives dedicated to support countries in taking ambitious action to address climate change and strengthen sustainable development by tracking and reviewing national policies and other actions, by synthesising across existing initiatives, platforms and efforts, and by assessing the extent to which current actions advance national and internationally agreed targets, including the Sustainable Development Goals and objectives under the Paris Agreement.

NDC GUIDANCE TOOL FOR FOOD SYSTEMS

WWF in partnership with Climate Focus, supported by GIZ, FAO, UNEP, CGIAR, NDC Partnership, the Global Alliance for the Future of Food, Biovision, FAIRR Initiative, and other organizations has developed a NDCs guidance tool for food systems (short Food Forward NDCs) for policymakers and practitioners, to support the implementation of policies, governance, and on-the-ground measures that enable systemic shifts in food systems to meet NDC targets to help fill the gap in tangible, actionable guidance and to support stakeholders in taking a holistic view of climate-food policy implementation.

Food Forward NDCs is an interactive web-based tool that allows policy makers and practitioners to identify and choose targeted guidance on 30+ policy options, measures and actions in five food system intervention areas. The tool aims to illustrate strategies to achieve climate and biodiversity outcomes alongside broader development goals for policy makers and practitioners involved in NDC development and implementation at various levels.

THE NBSAPS WE NEED

WWF developed a comprehensive checklist of criteria for the NBSAPs We Need to support countries when revising their NBSAPs. The checklist contains 19 criteria in five areas (Ambition; Whole of Government & Society Approach; Means of Implementation; Human Rights-Based Approach; Tracking Progress & Accelerating Action) for revising and updating NBSAPs.

The checklist also forms the basis for WWF's NBSAP Tracker which critically reviews countries' submissions under the UNCBD. The Tracker systematically analyzes if NBSAPs are ambitious, actionable, aligned with the Global Biodiversity Framework, and delivered on time. Assessments of NBSAPs are fair, impartial, and evidence-based and follow a methodology designed with guidance from FELD/NATURE ACTION TRACKER, based at the Sustainable Development Solutions Network and the OECD. The assessments provide insights into the effectiveness of NBSAPs. WWF is collaborating with partners to hold countries accountable and drive further improvement.

COPING WITH WATER SCARCITY: AN ACTION FRAMEWORK FOR AGRICULTURE AND FOOD SECURITY

The report Coping with water scarcity: An action framework for agriculture and food security aims to provide a conceptual framework to address food security under conditions of water scarcity in agriculture. The report was developed by FAO in consultation with experts and covers:

- Key definitions related to water scarcity;
- Conceptualization of water scarcity in ways that are meaningful for policy development and decision-making;
- Quantification of water scarcity;
- Policy and technical response options available to ensure food security in conditions of water scarcity;
- Criteria and principles that should be used to establish priorities for action in response to water scarcity in agriculture and ensure effective and efficient water scarcity coping strategies.

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TECHNICAL TOOLS FOR POLICY AND PROJECT DEVELOPMENT, IMPLEMENTATION, AND TRACKING

NDC TRACKING TOOL

Operational since 2022, FAO's NDC Tracking Tool is openly available and allows users to collect information required to track progress made in implementing a country's NDC. The Tool allows users to assess progress on NDC implementation by (i) comparing planned versus implemented mitigation and adaptation actions, and (ii) estimating the GHG reduction achieved from the implementation of mitigation actions compared against the sectoral and/or national baseline and NDC target scenario. The Tools' structure corresponds to the requirements of the Modalities, Procedures and Guidelines of the Paris Agreement's Enhanced Transparency Framework and, therefore, supports countries to collect the necessary information needed for the submission of Biennial Transparency Reports (BTR). It is designed to support government staff and other experts involved in the preparation, implementation, enhancing, and reporting of a country's NDC. The tool covers all NDC relevant mitigation sectors. For adaptation, planned and implemented policies as well as measures can be tracked for a total of 13 sectors, including agriculture. As the Tool is designed to track the implementation of a country's NDC, its results provide the user with insights into implementation achievements, shortcomings and potential areas for further enhancing an NDC.

ADAPTATION, BIODIVERSITY AND CARBON MAPPING TOOL (ABC-MAP)

ABC-Map is an open access tool that was developed by FAO and IFAD in 2023. It provides users with a preliminary climate change risk screening, relevant biodiversity indicators, and the carbon reduction potential of a project, plan or policy targeting the agriculture, forestry and land-use sector (AFOLU). More specifically, this Google Earth Engine-based satellite imagery app is designed to support policy makers, technicians, and project designers to understand the trade-offs, synergies and impacts of climate change mitigation, adaptation, and land restoration efforts of a project, plan or policy, such as a NAP or NDC. The tool does not require detailed information from the user, only the geographical location, and a preliminary description of activities. As such, it is an important resource for NDC and NAP practitioners involved in the low carbon and climate-resilient development of the AFOLU sector. The tool was developed with the kind support from the Agence Française de Développement and the German Federal Ministry of Food and Agriculture.

GLOBAL STOCKTAKE EXPLORE

The Global Stocktake Explorer is a database by the Climate Policy Radar, which originated from a decade of research at the London School of Economics and Political Science. This AI-powered tool is designed to search through thousands of climate interventions, laws, policies, and litigation cases worldwide, aiming to identify gaps and best practices.

Users can search for any phrase or term within global or regional legislation, policies, litigation, or the UNFCCC documents. For instance, a user can search for instances of "food systems" mentioned in global or regional legislation, policies, UNFCCC, or in litigation. The data can be sorted by relevance, date, or title. The entire database is open-source and can be downloaded in whole or in part. This tool can help countries in strengthening the food systems component of their NDCs and NAPs by providing access to relevant information, ensuring a more in-depth analysis of the global landscape of commitments. It offers a systematic approach to pinpointing gaps and deficiencies within their strategies, making the task of strengthening their commitments more effective.

CLIMATE RISK TOOLBOX (CRTB)

Developed by FAO in 2022, the Climate Risk Toolbox (CRTB) is an open-access tool, which allows users to perform preliminary climate risk screenings through advanced climate-related geospatial information and data. Based on the IPCC AR6 conceptualization of risk, the tool visualizes climate risk hotspots by identifying hazard probability, exposure and vulnerability of agricultural systems and communities in any area worldwide. The tool is designed to support policy makers, project designers and technicians to conduct preliminary climate change risk screenings of agricultural investment projects, plans, and policies, such as NAPs and NDCs. During this preliminary climate risk screening process, recommendations are provided by the CRTB to inform next steps for mainstreaming climate change resilience building measures within agricultural projects, plans and policies. As such, it is a key resource for NDC practitioners involved in climate change adaptation planning. In-depth and context-specific climate risk assessments can be done by applying the FAO's Climate and Agriculture Risk Visualization and Assessment (CAVA) tool.

NATIONALLY DETERMINED CONTRIBUTION EXPERT TOOL (NEXT)

Developed by FAO in 2022, NEXT is an open access, new generation GHG accounting tool for estimating the GHG emission reduction potential of mitigation actions in the agriculture, forestry, and land-use (AFOLU) sector. The tool measures annual changes in carbon stocks per unit of land (in hectares), as well as CH4 and N_2O emissions, expressed in tCO_2-e/year. NEXT can be applied "ex-ante" (i.e., in the mitigation action planning stage) to estimate the mitigation potential of a planned project, policy or action, as well as estimate the relative contribution of multiple mitigation actions in the NDC to achieving the NDC GHG target. NEXT can also be applied "ex-post" (i.e., after implementation) to iteratively track mitigation progress of an ongoing project, policy or action. The tool is designed to support policy makers, project designers and technicians to evaluate the climate change mitigation impact of AFOLU-elements in projects and policies, including NDCs and LTSs. As such, it is a key resource for NDC practitioners involved in mitigation planning, reporting and enhancement processes in the AFOLU sector. NEXT was developed with the kind support from the Agence Française de Développement and the German Federal Ministry of Food and Agriculture.

NBSAP FORUM

The NBSAP Forum is a web portal hosted by the Secretariat of the UN Convention on Biological Diversity (CBD), UNDP, and UNEP. The web portal supports countries in implementing the CBD and its strategic plans, including global biodiversity targets by helping countries to find the information they need to develop and implement effective NBSAPs and prepare national reports. The web portal includes a free, web-based e-learning platform, an online forum to connect practitioners and technical experts on issues related to alignment and implementation of NBSAPs in support of the KMGBF, and a technical help desk in multiple languages.

GLOBAL WATER WATCH

Global Water Watch is a data platform with free, globally accessible near-real-time information on water. The tool provides information on thousands of global reservoirs and major river systems, helping decision-makers respond to extreme weather events and manage growing risks of climate change.

The platform uses modern AI and EO algorithms to map dams, produce high-resolution spatio-temporal information on the amount of water stored in reservoirs as well as water level and flow information in major river systems in near-real-time.

The tool improves drought awareness by allowing users to assess the current state of drought and surface water resources on a global scale. Users can also utilize the tool for transboundary water management to assess water resources in internationally shared river basins, track trends, and detect deviations. The tool can also be used in river basin and reservoir planning to analyze stocks and balances, plan for growing seasons, and manage abstraction permits with global data that complements local data on water use and demands.

FOREST & LANDSCAPE WATER ECOSYSTEM SERVICES (FL-WES) TOOL

Forest-water-climate interactions are particularly important for food and water security. Because of the role of forests in the water cycle, forests provide numerous benefits for climate change mitigation and adaptation while supporting agrifood systems, including through climate, surface water and rain regulation services. To ensure the forest-water nexus is monitored and considered in policy and management decisions, the FAO's Forest and Water Programme developed the Forest & Landscape Water Ecosystem Services (FL-WES) Tool.

The tool provides decision support for the monitoring of forest-water interactions based on different contexts and situations. Based on the current conditions of the interest area and the available knowledge and resources, the tool will guide users to the best methodologies to collect baseline information in order to understand forest-water interactions. If baseline information already exists, the user will be guided to build on what is already in place to better measure these indicators and take into account a wider range of issues that will be key for future management plans. The interactive tool is integrated with other state of the art data systems and provides guidance on current, trustworthy and widely used methodologies. As such, the FL-WES tool provides an innovative approach to forest-water monitoring that may be applied at different management scales and in any area of the world.

The target audience includes national and sub-national forestry, water and environmental agencies globally, as well as natural resources managers, who are interested in incorporating an appropriate framework for the forest-water nexus into their policies and management practices.

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ENDNOTES

1 Clark, M. A., Domingo, N. G., Colgan, K., Thakrar, S. K., Tilman, D., Lynch, J., ... & Hill, J. D. (2020). Global food system emissions could preclude achieving the 1.5 and 2 C climate change targets. Science, 370(6517), 705-708.

2 WWF. (2024). 2024 Living Planet Report. https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/5gc2qerb1v_2024_living_planet_report_a_system_in_peril.pdf.

3 WWF (2022). Unlocking and Scaling Climate Solutions in Food Systems: An Assessment of Nationally Determined Contributions. WWF.

4 CPI (2023). Landscape of Climate Finance for Agrifood Systems. Climate Policy Initiative

5 S. Nosratabadi, et al., "Social Capital Contributions to Food Security: A Comprehensive Literature Review," Foods 9(11). Retrieved from: https://doi.org /10.3390/foods9111650.

6 F. Rampa and K. Dekeyser, "AgrInvest-Food Systems Project," (2020).; FAO, IFAD, UNICEF, WFP, and WHO, "The State of Food Security and Nutrition in the World 2020: Transforming Food Systems for Affordable Healthy Diets" (2020). Retrieved from: https://doi.org/10.4060/ca9692en.

7 lobal 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.

8 Kenya's Updated NDCs, "Submission of Kenya's Intended Nationally Determined Contributions" (No. 2; NDC, p. 20), Ministry of Environment and Forestry (2020); 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.

9 Kenya's Updated NDCs, "Submission of Kenya's Intended Nationally Determined Contributions" (No. 2; NDC, p. 20), Ministry of Environment and Forestry (2020).

10 Organization for Economic Co-operation and Development, "9. Colombia" in "Agricultural Policy Monitoring and Evaluation 2020" (2020). Retrieved from: https://www.oecd-ilibrary.org/sites/46b251d4-en/index.html?itemId=/content/component/46b251d4-en.

11 Food and Land Use Coalition, "Colombia: Food and Land Use" (2020). Retrieved from: https://www.foodandlandusecoalition.org /wp-content/uploads/2019/10/Colombia-Food_and_Land_Use.pdf.

12 DANE, "Tercer Censo nacional Agropecuario. Tomo 2. Resultados. Departamento Administrativo Nacional de Estadística, Bogotá" (2016). Retrieved from: https://www.dane.gov.co/files/images/foros/foro-de-entrega-de-resultados-y-cierre-3-censo-nacional-agropecuario/CNATomo2- Resultados.pdf.

13 DANE ,"Censo Nacional Agopecuario: 2014" (2014). Retrieved from: https://www.dane.gov.co/files/images/foros/foro-de-entrega-de-resultadosy- cierre-3-censo-nacional-agropecuario/CNATomo2-Resultados.pdf.

14 Food and Land Use Coalition, "Colombia: Food and Land Use" (2019). Retrieved from: https://www.foodandlandusecoalition.org/wp-content/uploads/2019/10/Colombia-Food_and_Land_Use.pdf; Organization for Economic Co-operation and Development, "Health at a Glance: Latin America and the Caribbean 2020" (2020). Retrieved from: https://www.oecd-ilibrary.org /sites/13e271bc-en/index.html?itemId=/content/component/13e271bc-en; 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.

15 Gobierno de Colombia. (2020, December). "Actualización de la Contribución Determinada a Nivel Nacional de Colombia (NDC)." Retrieved from: https://unfccc.int/sites/default/files/NDC/2022-06/NDC%20actualizada%20de%20Colombia.pdf

16 Gobierno de Colombia. (2020, December). "Actualización de la Contribución Determinada a Nivel Nacional de Colombia (NDC)." Retrieved from: https://unfccc.int/sites/default/files/NDC/2022-06/NDC%20actualizada%20de%20Colombia.pdf; 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.

17 E. M. Broad Lieb, et al., "Colombia Legal Guide – Food Donation Law and Policy" (2021). Retrieved from: https://www.foodbanking.org/wpcontent/ uploads/2021/01/Colombia-Legal-Guide.pdf.

18 Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, Official Journal of the European Union L328 (2018). Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999&from=EN.

19 Ministère de la Transition Écologique et Solidaire Soumission de la France ; Objet : mise à jour de la contribution déterminée au niveau national de la France (2021). Retrieved from: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/France%20First/FR%20CDN%20addendum%20r%C3%A9vis%C3%A9%20-%202021.pdf.

20 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.

21 European Commission, "National Energy and Climate Plans (NECPs)" (n.d.). Retrieved from: https://ec.europa.eu/energy/topics/energy-strategy/ national-energy-climate-plans_en.

22 Ministère de l'Agriculture et de l'Alimentation, "Le projet agro-écologique en 12 clés" (2016). Retrieved from: https://agriculture.gouv.fr/le-projet- agro-ecologique-en-12-cles.

23 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.

24 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.

25 Future Directions International, "Food and Water Security in Vanuatu" (2019). Retrieved from: https://www.futuredirections.org.au/wp-content/ uploads/2019/11/Food-and-Water-Security-in-Vanuatu.pdf.

26 Republic of Vanuatu, "Intended Nationally Determined Contribution" (2015). Retrieved from: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Vanuatu%20First/VANUATU%20%20INDC%20UNFCCC%20Submission.pdf.

27 Future Directions International, "Food and Water Security in Vanuatu" (2019). Retrieved from: https://www.futuredirections.org.au/wp-content/ uploads/2019/11/Food-and-Water-Security-in-Vanuatu.pdf.

28 Vanuatu Ministry of Climate Change, "Third National Contribution to the UNFCCC" (2020). Retrieved from: https://unfccc.int/sites/default/files/ resource/Vanuatu%20Third%20National%20Communication%20Report.pdf.

29 United Nations Development Programme, "Circular Economy Opportunities in Vanuatu: A Concise Metabolic Approach to Defining a Resource-Efficient and Low-Carbon Future," UNDP, New York (2021). Retrieved from: https://www.ndcs.undp.org/content/ndc-support-programme/en/home/ impact-and-learning /librar y/vanuatu-circular-economy-opportunities.html.

30 Future Directions International, "Food and Water Security in Vanuatu" (2019). Retrieved from: https://www.futuredirections.org.au/wp-content/uploads/2019/11/Food-and-Water-Security-in-Vanuatu.pdf.

31 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.

32 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.

33 World Bank, "Agriculture, Forestry, and Fishing Value Added (% of GDP): Bangladesh" (n.d.). Retrieved from: https://data.worldbank.org/country/ bangladesh.

34 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.

35 Bangladesh Rice Knowledge Bank, "Rice in Bangladesh" (n.d.). Retrieved from: http://www.knowledgebank-brri.org/riceinban.php.

36 Bangladesh Bureau of Statistics, "45 Years Agriculture Statistics of Major Crops" (2018). Retrieved from: http://bbs.portal.gov.bd/sites/default/ files/files/bbs.portal.gov.bd/page/16d38ef2_2163_4252_a28b_e65f60dab8a9/45%20years%20Major%20Crops.pdf.

37 FAOSTAT, "Bangladesh" (n.d.). Retrieved from: http://www.fao.org/faostat/en/#country/16.

38 International Trade Administration. (n.d.). Liberia – Agricultural Sectors. *International Trade Administration*. Retrieved November 11, 2023, from https://www.trade.gov/country-commercial-guides/liberia-agricultural-sectors.

39 International Trade Administration. (n.d.).

40 International Trade Administration. (n.d.).

41 World Bank. (2019). Liberia Sustainable Management of Fisheries. Retrieved from https://documents1.worldbank.org/curated/en/483401576480235332/pdf/Concept-Project-Information-Document-PID-Liberia-Sustainable-Management-of-Fisheries-P172012.pdf.

42 Republic of Liberia (2021). Liberia's Revised Nationally Determined Contribution (NDC). Accessible at: https://disasterlaw.ifrc.org/sites/default/files/media/disaster_law/2022-05/Liberia's%20Revised%20Nationally%20Determined%20Contribution%20%28NDC%29.pdf

43 Liberia's Revised Nationally Determined Contribution (NDC). | FAOLEX. (n.d.). Retrieved November 11, 2023, from https://www.fao.org/faolex/results/details/fr/c/LEX-FAOC206208/.

44 AQUASTAT – FAO's Global Information System on Water and Agriculture. (2008). Country Profile – United Arab Emirates. Retrieved November 11, 2023, from https://www.fao.org/aquastat/en/countries-and-basins/country-profiles/country/ARE.

45 Agriculture Development & Health | Knowledge | UAE Ministry of Climate Change and Environment. (n.d.). Retrieved November 21, 2023, from https://www.moccae.gov.ae/en/knowledge-and-statistics/agricultural-development.aspx.

46 The United Arab Emirates Government. (n.d.). National Food Security Strategy 2051. The United Arab Emerates Government. Retrieved from https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/environment-and-energy/national-food-security-strategy-2051.

47 UAE's Food Waste Pledge and Winnow Tackle Food Waste. (2020, February 6). Food Tank. Retrieved November 21, 2023, from https://foodtank.com/news/2020/02/uaes-food-waste-pledge-and-winnow-tackle-us4-billion-problem/.

48 Aguilera, C. (n.d.). Recommendation on the draft Council decision on the conclusion of the Sustainable Fisheries Partnership Agreement between the European Union and the Republic of Madagascar and the Implementing Protocol thereto (2023-2027) | A9-0299/2023 | European Parliament. Retrieved November 11, 2023, from https://www.europarl.europa.eu/doceo/document/A-9-2023-0299_EN.html.

49 Madagascar: $227 million to Increase Productivity and Strengthen the Resilience of Rural Livelihoods [Text/HTML]. (n.d.). World Bank. Retrieved November 11, 2023, from https://www.worldbank.org/en/news/press-release/2023/04/07/madagascar-afe-227-million-to-increase-productivity-and-strengthen-the-resilience-of-rural-livelihoods.

50 International Fund for Agricultural Development (IFAD). (n.d.). Madagascar. *International Fund for Agricultural Development (IFAD)*. Retrieved November 21, 2023, from https://www.ifad.org/en/web/operations/w/country/madagascar.

51 Madagascar: $227 million to Increase Productivity and Strengthen the Resilience of Rural Livelihoods. (n.d.).

52 Fayad, D. (2023). Food Insecurity and Climate Shocks in Madagascar: Republic of Madagascar. *Selected Issues Papers, 2023(037)*. Retrieved November 21, 2023, from https://www.elibrary.imf.org/view/journals/018/2023/037/article-A001-en.xml.

53 Fayad, D. (2023).

54 WWF. (n.d.). WWF Cameroon strategic vision on food and agriculture. Retrieved November 11, 2023, from https://cameroon.panda.org/our_work/food_and_agriculture/.

55 WWF. (n.d.).

56 German Federal Ministry for Economic Cooperation and Development (BMZ), Tomalka, J., Lange, S., Gleixner, S., & Gornott, C. (n.d.). *Climate Risk Profile: Cameroon*. Retrieved from https://www.pik-potsdam.de/en/institute/departments/climate-resilience/projects/project-pages/agrica/giz_climate-risk-profile_cameroon_en_final_2022_21_07.

57 World Bank. (n.d.). Towards a People-Centered Green and Resilient Cameroon. *World Bank*. Retrieved November 21, 2023, from https://www.worldbank.org/en/news/feature/2022/11/04/towards-a-people-centered-green-and-resilient-cameroon.

58 Department of Agriculture, Food and the Marine. (2023). *Annual Review and Outlook for Agriculture, Food and the Marine 2023*. Retrieved from https://www.gov.ie/pdf/?file=https://assets.gov.ie/277211/017e5734-74a3-478e-af25-0adb19ee7ffd.pdf; Government of Ireland. (2022). *Food Vision 2030. A World Leader in Sustainable Food Systems*. Retrieved from https://www.gov.ie/pdf/?file=https://assets.gov.ie/179717/910771f6-05ed-43f1-b8ce-52ef7c602710.pdf.

59 Government of Ireland. (2022).

60 World Bank Group. (2024). Agriculture, forestry, and fishing, value added (% of GDP). Retrieved November 6, 2024, from https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?most_recent_year_desc=false&view=chart.

61 Fuhrmann-Aoyagi, M. B., Miura, K., & Watanabe, K. (2024). Sustainability in Japan's Agriculture: An Analysis of Current Approaches. *Sustainability*, 16(2), 596.

62 Fuhrmann-Aoyagi, M. B. et al. (2024).

63 Kiribati National Statistics Office. (2022). *Kiribati Agriculture and Fisheries Report*. Retrieved November 6, 2024, from https://nso.gov.ki/census/kiribati-agriculture-and-fisheries-report-based-on-2020-census/.

64 McSweeney, C. F., Jones, R. G., Lee, R. W., & Rowell, D. P. (2015). Selecting CMIP5 GCMs for downscaling over multiple regions. *Climate Dynamics*, 44(11), 3237–3260.

65 McSweeney, C. F. et al. (2015).

66 University of Notre Dame. (n.d.). Rankings: Notre Dame Global Adaptation Initiative. *Notre Dame Global Adaptation Initiative*. Retrieved November 21, 2023, from https://gain.nd.edu/our-work/country-index/rankings/.

67 World Bank. (n.d.-a). Climate Change Knowledge Portal: Climate Projections: CMIP5 Data. Retrieved November 21, 2023, from https://climateknowledgeportal.worldbank.org/.

68 Republic of Sudan, The Higher Council for the Environment and Natural Resources. (2021). Republic of the Sudan: First Nationally Determined Contribution under the Paris Agreement. Retrieved from https://unfccc.int/sites/default/files/NDC/2022-10/Sudan%20Updated%20First%20NDC-12102021.pdf.

69 Green Climate Fund. (2020). Gums for Adaptation and Mitigation in Sudan (GAMS): Enhancing adaptive capacity of local communities and restoring carbon sink potential of the Gum Arabic belt, expanding Africa's Great Green Wall.

70 Tippmann, R., & Baroni, L. (2017). *The Economics of Climate Change in Palestine*. Retrieved from https://www.climamed.eu/wp-content/uploads/files/The-Economics-of-Climate-Change-in-Palestine.pdf.

71 State of Palestine. (2021). The State of Palestine's First Nationally Determined Contributions (NDCs) 'Updated Submission'. Retrieved from https://unfccc.int/sites/default/files/NDC/2022-06/Updated%20NDC_%20State%20of%20Palestine_2021_FINAL.pdf.

72 State of Palestine & FAO. (2022). Enhancing Adaptation Planning and Adoption of Climate Resilient Agriculture in Palestine. Readiness Proposal. Retrieved from https://www.greenclimate.fund/sites/default/files/document/palestine-fao-nap-pse-rs-004.pdf.

73 State of Palestine & FAO. (2022).

74 Kingdom of Cambodia. (2020). Cambodia's Updated Nationally Determined Contribution. Retrieved from https://unfccc.int/sites/default/files/NDC/2022-06/20201231_NDC_Update_Cambodia.pdf.

75 World Bank. (n.d.-b). Climate Change Knowledge Portal: Colombia. Retrieved November 21, 2023, from https://climateknowledgeportal.worldbank.org/country/colombia.

76 World Bank. (n.d.-b).

77 República de Colombia. (n.d.). Plan nacional de adaptación al cambio climático. Retrieved from https://www4.unfccc.int/sites/NAPC/Documents/Parties/Colombia%20NAP%20Spanish.pdf.

78 República de Colombia. (2020). Actualización de la Contribución Determinada a Nivel Nacional de Colombia (NDC). Retrieved from https://unfccc.int/sites/default/files/NDC/2022-06/NDC%20actualizada%20de%20Colombia.pdf.

79 Veeger, M., Vervoort, J., Martinez, D., León, F. de, & Paniagua, F. (2015). Shifting the paradigm: Narratives of the future guide the development of Costa Rica's INDC. Retrieved from https://cgspace.cgiar.org/bitstream/handle/10568/69238/PB%20Scenarios%20INDC%20Costa%20Rica.pdf?sequence=1&isAllowed=y.

80 Inter-American Institute for Cooperation on Agriculture. (2021). Costa Rica increases climate ambition by collectively imagining futures. Blog del IICA. Retrieved November 21, 2023, from https://blog.iica.int/en/blog/costa-rica-increases-climate-ambition-collectively-imagining-futures.

81 CONCAFE y Oficina Presidencial de Cambio Climático. (2021). Política de Cambio Climático del Subsector Cadé de Honduras. Retrieved from https://issuu.com/hondurastock/docs/politica_ccsch_versionissuu.

82 Obando, D.; Duron, M.; Uclés, M.; Del Cid, J.; Martínez, O.; Villagran, E.; Lara, N.; Aguilar, V. (2021) Plan de resiliencia climática de la cadena nacional de frijol, Honduras. Cali (Colombia): Alliance of Bioversity International and CIAT. 33 p.

83 Duron, M.; Ferrera, R.; Obando, D.; Uclés, M. (2021) Plan municipal de adaptación al cambio climático de San Juan Intibucá – Honduras 2021-2026. 29 p.

84 Martínez, O.; Fiallos, D.; Obando, D.; Uclés, M. (2021) Plan municipal de adaptación al cambio climático del municipio Marcala, La Paz – Honduras 2021-2026. 32 p.

85 Gobierno de Perú. (2022). CONTRIBUCIONES DETERMINADAS A NIVEL NACIONAL DEL PERÚ. Retrieved from https://unfccc.int/documents/499569.

86 FAO. (2024). The Cascaded Tank-Village System in the Dry Zone of Sri Lanka, Sri Lanka. *GIAHS*. Retrieved November 6, 2024, from https://www.fao.org/giahs/giahsaroundtheworld/sri-lanka-cascaded-tank-village-system/en.

87 Ratnayake, S. S., Khan, A., Reid, M., Dharmasena, P. B., Hunter, D., Kumar, L., et al. (2022). Land Use-Based Participatory Assessment of Ecosystem Services for Ecological Restoration in Village Tank Cascade Systems of Sri Lanka. *Sustainability*, 14(16), 10180.

88 The World Bank. (2022). *Sri Lanka Development Update. Protecting the Poor and Vulnerable in a Time of Crisis*. Retrieved from https://documents1.worldbank.org/curated/en/099052823154036369/pdf/P179559078517c0bd0bcc20748bed66c540.pdf.

89 Ministry of Environment, Sri Lanka. (2021). Updated Nationally Determined Contribution. Retrieved from https://unfccc.int/sites/default/files/NDC/2022-06/Amendmend%20to%20the%20Updated%20Nationally%20Determined%20Contributions%20of%20Sri%20Lanka.pdf.

90 Ministry of Environment, Sri Lanka. (2016). National Adaptation Plan for Climate Change Impacts in Sri Lanka, 2016-2025. Retrieved from https://www4.unfccc.int/sites/NAPC/Documents%20NAP/National%20Reports/National%20Adaptation%20Plan%20of%20Sri%20Lanka.pdf.

91 Alliance Bioversity & CIAR & CGIAR. (n.d.). Tank Cascade System (TCS): A Nature-based Solution for Achieving Climate Resilience in Sri Lanka's Dry Zone. Retrieved from https://cgspace.cgiar.org/server/api/core/bitstreams/6d6d9005-c3e2-4db5-b229-24db22075061/content.

92 FAO. (2018). *Country Gender Assessment of Agriculture and the Rural Sector in Sri Lanka*.

93 Mendonce, S., Borelli, T., Hunter, D., Silva, A., Bandara, T., & Ratnayake, S. S. (2022). Healthy landscapes: Managing agricultural landscapes in socio-ecologically sensitive areas to promote food security, well-being and ecosystem health. Retrieved November 6, 2024, from https://hdl.handle.net/10568/127661.

94 CBD Secretariat. (n.d.). Lao People's Democratic Republic – Country Profile. Retrieved November 6, 2024, from https://www.cbd.int/countries/profile?country=la.

95 Lao PDR National Biodiversity Strategy and Action Plan 2016-2025

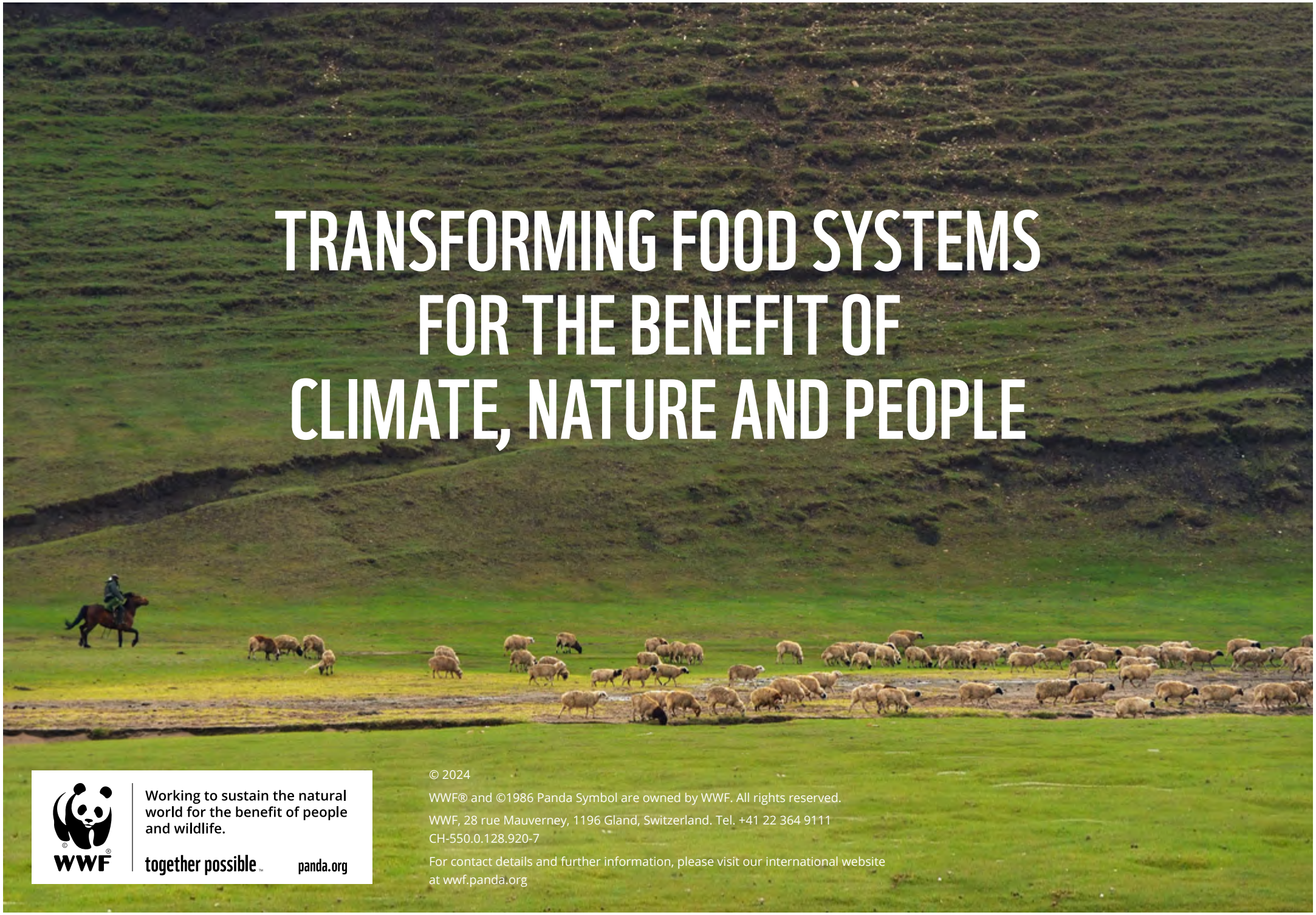
96 https://www.cbd.int/gbf

97 FMM/GLO/165/MUL, https://www.fao.org/flexible-multipartner-mechanism/projects/project-detail/en/c/1629226/

98 FVC/GLO/193/MUL

99 Debnath, R., Bardhan, R., & Bell, M. L. (2023). Lethal heatwaves are challenging India's sustainable development. *PLOS Climate*, 2(4), e0000156.

100 Cabildo, C. T., & Panghulan, J. J. (2023, November 14). Community seed banks empower farmers. *Alliance Bioversity International – CIAT*. Retrieved November 6, 2024, from https://alliancebioversityciat.org/stories/community-seed-banks-empower-farmers-address-climate-risk-india.



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