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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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Rome, 24–28 March 2025

FAO'S WORK ON CLIMATE CHANGE

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I. INTRODUCTION

1. The Commission, at its Nineteenth Session, stressed the importance of continuing to increase capacity-building and training programmes on climate change adaptation and mitigation, in collaboration with existing intergovernmental and international bodies, with regard to all GRFA and within the broad framework of relevant global policies and strategies, including the *FAO Strategy on Climate Change 2022–2031*.[1]

2. The present document provides a breakdown of FAO's work.

II. FAO'S ACTIVITIES ON CLIMATE CHANGE

3. Climate change is one of the most pressing challenges facing our world today. The impacts of climate change are widespread, affecting ecosystems, biodiversity, and human communities. Rising sea levels, more frequent and severe weather events, and disruptions to food and water supplies are just a few of the consequences. FAO has consistently aimed to enhance its support to Members in their efforts with respect to climate change adaptation and mitigation, working towards climate-resilient and low-emission agrifood systems while striving to achieve the Sustainable Development Goals, in particular eradicating hunger and malnutrition. Climate action at global, regional, national and local levels across agrifood systems is fundamental to their transformation in a coherent manner according to, and dependent on, national contexts and capacities.

4. The *FAO Strategy on Climate Change 2022–2031* and its Action Plan[2] take a comprehensive approach, considering various sectors such as crops and livestock production, forestry, fisheries and aquaculture, along with related value chains, livelihoods, biodiversity, water and ecosystems. The Strategy echoes the recognition of the Paris Agreement of the fundamental priority of safeguarding food security and ending hunger and presents the role of agrifood systems as part of the solution to climate change and seeks complementarities with the missions of other organizations and related agreements. Furthermore, it assists countries in aligning their agrifood systems with their national climate commitments and policies, including Nationally Determined Contributions (NDCs), National Biodiversity Strategies and Action Plans (NBSAPs) and Land Degradation Neutrality (LDN) targets.

5. The Action Plan's core purpose is to implement the vision set out in the Strategy being: "agrifood systems[3] are sustainable, inclusive, resilient and adaptive to climate change and its impacts and contribute to low-emission economies while providing sufficient, safe and nutritious foods for healthy diets, as well as other agricultural[4] products and services, for present and future generations, leaving no one behind". It further seeks to orient how FAO enhances support to its Members and to enhance FAO's own operational modalities, in particular in terms of capacity development, resource mobilization, partnerships and communications, to deliver climate action under the three pillars of the Strategy in an efficient and coherent manner.

6. Climate change is further embedded in FAO's Strategic Framework 2022-31[5] and its Medium Term Plan (Reviewed) 2022-25 and Programme of Work and Budget 2024-25.[6]

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[1] FAO. 2022. *FAO Strategy on Climate Change 2022–2031*. Rome. https://openknowledge.fao.org/handle/20.500.14283/cc2274en

[2] FAO. 2023. *FAO Action Plan 2022–2025 for the implementation of the FAO Strategy on Climate Change*. Rome. https://doi.org/10.4060/cc7014en

[3] The agrifood system covers the journey of food from farm to table – including when it is grown, fished, harvested, processed, packaged, transported, distributed, traded, bought, prepared, eaten and disposed of. It also encompasses nonfood products that also constitute livelihoods and all of the people as well as the activities, investments and choices that play a part in getting us these food and agricultural products. In the FAO Constitution, the term "agriculture" and its derivatives include fisheries, marine products, forestry and primary forestry products.

[4] For FAO, agriculture covers crop–based farming systems and livestock systems, including rangelands and pasturelands, forestry, fisheries and aquaculture.

[5] C 2021/7.

[6] C 2023/3.

7. FAO is supporting countries to both mitigate and adapt to the effects of climate change through a wide range of research-based and practical programmes and projects,[7] as an integral part of the 2030 Agenda and the SDGs. Under the Paris Agreement, countries are expected to reduce emissions and meet national climate targets. In addition, the Climate change knowledge hub[8] is continuously updated with new information, which includes a learning corner that provides up-to-date webinars and e-learning courses.

8. At the United Nations Climate Change Conference (COP29), FAO highlighted the vital role of agriculture and food systems in combating climate change. The conference also emphasized biodiversity, linking genetic resources to sustainable agrifood systems. Discussions included strategies to combat deforestation and restore ecosystems, integrating biodiversity conservation with climate and food planning. FAO's Baku Harmoniya Climate Initiative aims to promote sustainable agriculture that protects biodiversity while ensuring food security and livelihoods.

9. Furthermore, at the at the United Nations Biodiversity Conference (COP16), discussions linked climate change and biodiversity under the Kunming-Montreal Global Biodiversity Framework (KM GBF). Key discussions focused on integrating biodiversity into climate action plans and adopting measures to mitigate ecosystem degradation from climate-related pressures.

Capacity development

10. FAO has produced various guidelines and tools that aim to support countries in their national adaptation of international climate change and biodiversity obligations, covering both climate change adaptation and mitigation. Annex I presents a list of documents developed by the FAO since the last Commission's session.[9]

Projects

11. FAO's project portfolio on climate change has continuously expanded through both the Green Climate Fund (GCF) and the Global Environment Facility (GEF). The project portfolio for FAO's GCF includes USD 1.2 billion, 20 FAO-led projects valued at USD 1 billion million and 94 readiness projects valued at USD 70.5 million.[10]

12. FAO's global GEF portfolio currently exceeds USD 1 billion, assisting more than 120 countries in projects that respond to local priorities, deliver global environmental benefits, and advance the SDGs. GEF has 62 active projects in 50 countries addressing both climate change and biodiversity, totalling USD 458 million in GEF financing.

Programmes and Initiatives

Scaling up Climate Ambition on Land Use and Agriculture through NDCs and National Adaptation Plans

13. The Scaling up Climate Ambition on Land Use and Agriculture through nationally determined contributions and National Adaptation Plans (SCALA) programme[11] supports countries to enhance climate action in land use and agriculture, together with partners. SCALA supports 12 countries[12] to

[7] https://www.fao.org/climate-change/programmes-and-projects/en/; https://www.fao.org/gef/en
[8] https://www.fao.org/climate-change/knowledge-hub/en
[9] For further information consult: CGRFA-19/23/3/Inf.1.
[10] https://openknowledge.fao.org/handle/20.500.14283/cc6929en; https://www.fao.org/gcf/en
[11] https://www.fao.org/in-action/scala/en
[12] The 12 core SCALA countries are: Argentina (https://www.fao.org/in-action/scala/countries/argentina/en), Cambodia (https://www.fao.org/in-action/scala/countries/cambodia/en), Colombia (https://www.fao.org/in-action/scala/countries/colombia/en), Costa Rica (https://www.fao.org/in-action/scala/countries/costa-rica/en), Cote d'Ivoire (https://www.fao.org/in-action/scala/countries/cote-d'ivoire/en), Egypt (https://www.fao.org/in-action/scala/countries/egypt/en), Ethiopia (https://www.fao.org/in-action/scala/countries/ethiopia/en), Mongolia (https://www.fao.org/in-action/scala/countries/mongolia/en), Nepal (https://www.fao.org/in-

translate their NDC and National Adaptation Plans (NAPs) into actionable and transformative climate solutions in land use and agriculture with multistakeholder engagement.

14. Furthermore, through the SCALA programme, FAO identifies pathways for implementing climate actions with the potential to trigger transformative systems change, emphasizing private sector engagement and gender-responsive and inclusive approaches that benefit natural resource-dependent communities in situations of vulnerability. Examples of SCALA impact include: designing a monitoring and evaluation system in Egypt to track progress on adaptation as part of the country's NAP; strengthening monitoring, reporting and verification systems in Côte d'Ivoire and Ethiopia to track emissions from agrifood systems as part of the Enhanced Transparency Framework; bolstering agricultural value chains through system level assessments in Mongolia and Uganda informing the 2025 NDC update; enhancing the skills of men and women livestock producers in Costa Rica to achieve certification for their sustainable practices; leveraging and scaling up climate-resilient indigenous and traditional knowledge and practices in Colombia, particularly among women, youth and other marginalized groups; and increasing the agrifood dimension of the new climate action priority plan in Cambodia.

15. SCALA has also enhanced and developed critical tools to spur agrifood transformation within and beyond target countries, such as the Technical guidance for the Nationally Determined Contribution Expert Tool and the Climate Action Review tool for transitioning from planning to implementation in the agriculture and land-use sectors.

16. FAO and the United Nations Development Programme (UNDP) are co-leading this 20 million euro programme (2021–2025) with funding from the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) through the International Climate Initiative (IKI).

Food and Agriculture for Sustainable Transformation (FAST) Partnership

17. The Food and Agriculture for Sustainable Transformation (FAST) Partnership[13] is a multi-stakeholder partnership that aims to catalyze and accelerate the transformation of agriculture and food systems by 2030 for people, climate, and nature. The partnership was developed to implement activities and achieve the objectives of the FAST Initiative,[14] which was launched by the COP27 Presidency in 2022 in Sharm el-Sheikh, Egypt. Its goals are to improve the quantity and quality of climate finance contributions towards the transformation of agriculture and food systems, to support adaptation efforts, and to maintain a 1.5-degree pathway while ensuring food and economic security.

Baku Harmoniya Climate Initiative for Farmers

18. Baku Harmoniya Climate Initiative for Farmers aims to serve as a coordinator to improve coherence in the field, bringing together existing initiatives, coalitions and networks to share experiences, identify synergies and gaps. It is an aggregator bringing together initiatives, coalitions and networks to share experiences, identify synergies and gaps, facilitate finance, and foster collaboration on agriculture, including by empowering communities and women in rural areas. It will look for opportunities to realize diverse co-benefits from climate actions in agriculture and food systems. These include increasing farmers' resilience and reducing the risk of loss and damage, reducing greenhouse gas (GHG) emissions and increasing GHG sinks when possible, reducing food losses and waste, conserving biodiversity and soil health and applying innovative approaches while considering national circumstances and knowledge.

Tools Programmes and Initiatives

action/scala/countries/nepal/en), Senegal (https://www.fao.org/in-action/scala/countries/senegal/en), Thailand (https://www.fao.org/in-action/scala/countries/thailand/en) and Uganda (https://www.fao.org/in-action/scala/countries/uganda/en).

[13] https://www.fao.org/climate-change/action-areas/access-to-climate-finance/fast/en

[14] https://www.fao.org/3/cc2186en/cc2186en.pdf

19. FAO has developed a wide range of tools and services aimed at enhancing countries' technical capacities. For example, FAO supports developing countries in their National Adaptation Plans by assisting in better access to and interpretation and use of climate risk information.[15] FAO also plays a central role in supporting climate action in agrifood systems (crops, livestock, forestry, fisheries and aquaculture and related value chains, livelihoods, ecosystems and biodiversity) and guiding governments on enhancing the agrifood dimension of NDCs.[16] Annex II presents a list of FAO tools.

[15] FAO. 2024. *How FAO supports developing countries in their National Adaptation Plans*. Rome. https://doi.org/10.4060/cd0892en

[16] FAO. 2024. *How FAO supports developing countries on their Nationally Determined Contributions*. Rome. https://openknowledge.fao.org/handle/20.500.14283/cd2389en

ANNEX I

RECENT DOCUMENTS DEVELOPED BY FAO ON CLIMATE CHANGE

Title	**Description**
Crumpler, K., Wybieralska, A., Roffredi, L., Tanganelli, E., Angioni, C., Prosperi, P., Umulisa, V., Dahlet, G., Nelson, S., Rai, N., Schiettecatte, L.S., Salvatore, M., Wolf, J. & Bernoux, M. 2024. *Agrifood systems in nationally determined contributions: Global analysis – Key findings*. Rome, FAO. https://doi.org/10.4060/cd3210en	This publication provides an overview of the major climate-related risks and greenhouse hotspots in agrifood systems and synthesizes in seven key findings the main climate change adaptation and mitigation strategies being set forth in nationally determined contributions (NDCs) to address them. It also takes stock of the underpinning governance, knowledge and capacity and finance needs articulated to enable climate action in agrifood systems. Lastly, ahead of the global call for third-round NDCs expected to be submitted by all countries in 2025, these key findings serve to inform enhanced ambition, action and support of the mitigation, adaptation and climate finance ambition gaps in agrifood systems.
FAO. 2024. *Pathways to forest data transparency: Best practices from national forest monitoring to support climate action*. Rome. https://doi.org/10.4060/cd3208en	Pathways to forest data transparency: Best practices from national forest monitoring to support climate action provides essential insights for enhancing transparency in forest data. Featuring successful examples from Africa, Asia-Pacific, and Latin America and the Caribbean, this publication empowers countries to develop robust national forest monitoring systems that drive climate reporting and inform effective policy.With adaptable case studies, this guide showcases innovative approaches demonstrating how NFMSs can be tailored to diverse needs while aligning with global standards. This resource equips policymakers, researchers, and forest managers with actionable strategies to enhance NFMSs, support sustainable development, and promote effective climate solutions.
FAO. 2024. *Biodiversity and agrifood systems in nationally determined contributions* - NDC thematic policy analysis. Rome. https://doi.org/10.4060/cd2827en	As countries develop and revise their nationally determined contributions (NDCs), there is growing recognition of the need to integrate biodiversity considerations into them – particularly in the context of agrifood systems – in order to ensure that climate actions also contribute to, or at least do not undermine, the sustainable use and conservation of biodiversity, and the ecosystem services it provides.This brief draws on the findings of an analysis of the treatment of agrifood systems in NDCs to identify opportunities to leverage actions under NDCs to achieve co-benefits for climate, biodiversity and food security, and avoid maladaptation.

FAO & UNFCCC. 2024. *Climate technologies for agrifood systems transformation – Placing food security, climate change and poverty reduction at the forefront.* Rome. https://doi.org/10.4060/cd2877en	The report highlights the needs for robust technology assessments to underpin climate technology identification for agrifood systems transformation that addresses all stages of agrifood value chains. This needs to be supported by capacity-building programmes, targeted financing and fed into the ongoing climate policy process. The capacity-building strategy and efforts are to be tied to the technology assessments, and identify suitable and correct skill sets, especially for smallholders and vulnerable segments of the population.
FAO. 2024. *FAO contribution to the Intergovernmental Panel on Climate Change, Advancing scientific development to strengthen climate change policies.* Rome. https://openknowledge.fao.org/handle/20.500.14283/cd3153en	This FAO Contribution to the Intergovernmental Panel on Climate Change (IPCC) factsheet highlights FAO's role in advancing scientific knowledge that informs IPCC reports on climate change, agriculture, and food security. By providing essential data, expert insights, and tools—such as updated climate zone maps, soil classification systems, and the IPCC Add-on Tool—FAO supports countries in tracking greenhouse gas emissions and meeting climate commitments. These contributions strengthen global climate policies and promote sustainable food systems.
FAO. 2024. *Greenhouse gas emissions from agrifood systems – Global, regional and country trends, 2000–2022*. FAOSTAT Analytical Brief Series, No. 94. Rome. https://openknowledge.fao.org/handle/20.500.14283/cd3167en	Agrifood systems account for about one-third of total anthropogenic greenhouse gas emissions. They are generated within the farm gate, from crop and livestock production activities; by land-use change, caused by deforestation, biomass fires and peatland degradation processes often linked to land clearance for agriculture; and in pre- and post-production processes, comprising the supply chain including food manufacturing, retail, household consumption and food disposal. According to the latest data, global agrifood systems emissions reached 16.2 billion tonnes of carbon dioxide equivalent (Gt CO2eq) in 2022, virtually unchanged from 2021, and representing an increase of 10 percent since 2000.
Dooley, K., Duchelle, A.E., Fernandez-Ugalde, J.C., Wertz-Kanounnikoff, S., Boulay, A., Libert-Amico, A., Branthomme, A., Fortuna, S., Pekkarinen, A. 2024. *Bridging nature and climate through protection of primary forests with high ecological integrity - FAO technical brief*. Rome, FAO. https://doi.org/10.4060/cd1733en	Primary forests, which comprise less than one-third of the world's remaining forests (around 1.11 billion ha), are where the majority of the world's terrestrial biodiversity is found. They also comprise the largest proportion of terrestrial carbon stocks with the total ecosystem carbon stored in primary tropical forests calculated at 141-159 Gt C. Furthermore, the world's tropical primary forests are the customary homelands of Indigenous Peoples who continue to play a critical role in their protection and conservation management. Yet primary forests continue to be degraded and lost at a rate of almost six million hectares per year. This briefing focuses on the important role of primary forests in meeting climate and biodiversity goals. It also explains science-based principles relevant to policy pathways for protecting, restoring, and sustainably managing these forests.

Ma, X., Bahri, T., Meybeck, A., Bernoux, M. & Kaugure, L. 2024. *Navigating the waters of the United Nations Framework Convention on Climate Change – A guide for the aquatic food sector.* FAO Fisheries and Aquaculture Technical Paper, No. 718. Rome, FAO. https://doi.org/10.4060/cd1401en	Amid growing awareness of climate risks and solutions in the aquatic food sector, this guide aims to equip stakeholders from the sector — including government officials, fisheries and aquaculture managers, private sector actors, fishers, fish farmers, and researchers — with a comprehensive understanding of the United Nations Framework Convention on Climate Change (UNFCCC) architecture. This understanding will enable them to navigate and leverage the UNFCCC processes effectively, ensuring equitable engagement with climate policymaking. Moreover, this guide identifies a menu of practical entry points under the UNFCCC for the aquatic food sector, providing relevant stakeholders with a useful toolkit and potential channels to advocate for their interests, integrate sector-specific needs, and contribute robust adaptation and mitigation solutions. The guide also emphasizes the importance of strategic resource allocation across a wide range of entry points, to accommodate the varied and evolving priorities of different countries and stakeholder groups. Ultimately, this guide aims to ensure a level playing ground for the aquatic food sector in climate fora, enhancing its capacity to contribute to sustainable and resilient agri-food systems worldwide.
Azzurro, E., Bahri, T., Valbo-Jørgensen, J., Ma, X., Strafella, P. & Vasconcellos, M., eds. 2024. *Fisheries responses to invasive species in a changing climate – Lessons learned from case studies*. FAO Fisheries Technical Paper, No. 704. Rome, FAO. https://doi.org/10.4060/cd1400en	The increasing pressure of a globalized economy and the effects of a changing climate are making biological invasions a frequent feature of marine and freshwater environments. Global fisheries and aquaculture need to adjust to these changes, with the dual aim of reducing the negative ecological consequences caused by these species and making the most of the opportunities they may offer. Capitalizing on a spectrum of management actions from case studies, a global survey and a literature review, this report presents nine measures – grouped as environmental, social or socioeconomic strategies – and explores their potential, main challenges, and enabling factors. These measures, discussed by a group of international experts, may be used as practical resources to aid in the evaluation and identification of appropriate fisheries management responses to aquatic invasive species in the context of climate change. While this report does not attempt to comprehensively address all the complexities of its fast-evolving subject, it provides a starting point for adaptation strategies, recognizing the diverse legal, cultural and socioeconomic conditions of different fisheries, and offering valuable insights to help policymakers, fisheries managers and practitioners deal with aquatic invasions.
Stanford Center for Ocean Solutions, WorldFish, the Food and Agriculture Organization of the United Nations, Beijer Institute of Ecological Economics, CARE, and Environmental Defense Fund. 2024. *Integrating blue foods into national*	These guidelines are designed for audiences working on Nationally Determined Contributions (NDCs) and other climate strategies. They offer diverse entry points for employing blue foods in climate solutions and are intended to be a starting point for setting targets and developing policies related to blue foods in climate action, offering a framework rather than an exhaustive

climate strategies: Enhancing nationally determined contributions and strengthening climate action. Stanford Center for Ocean Solutions. https://openknowledge.fao.org/handle/20.500.14283/cd2482en	list of actions. Policymakers can adapt these policy options to NDCs as well as consider their relevance in other areas of climate planning, including water and waste management, energy, nutrition, and economic development. The policy options outlined in these guidelines are organized into five intervention areas. In addition, we offer four enabling measures that can strengthen the implementation and monitoring of aquatic food climate solutions.
FAO. 2024. COFI/2024/INF/17. *Blue Transformation actions on climate resilient aquatic food systems – supporting the FAO strategy on climate change.* https://openknowledge.fao.org/handle/20.500.14283/np428en	This document outlines climate actions that are currently ongoing across the FAO Fisheries and Aquaculture Division and in decentralized offices in response to the COFI35 request regarding "the development of a set of FAO actions focused on climate resilient fisheries and aquaculture", and in the context of the Blue Transformation roadmap. It also provides potential climate actions that could be undertaken in the future, subject to the availability of financial resources, as well as buy-in and commitment from Members and partners.
Norambuena Cleveland, R., Soto, D., Núñez Montaner, L. y Aguilar-Manjarrez, J. 2024. *Evaluación del estado de avance de políticas y planes de adaptación al cambio climático en la acuicultura en América Latina y el Caribe*. FAO Circular de Pesca y Acuicultura, n.º 1270. Santiago, FAO. https://doi.org/10.4060/cc9985es	This document is published in response to the recommendations of the reports of regular meetings of the Commission on Small-Scale, Artisanal Fisheries and Aquaculture for Latin America and the Caribbean to address the impacts of climate change on aquaculture in the region. First, the scenario of aquaculture in the face of climate change and climate variability is described. The methodological approach used to carry out the assessment is detailed below, and finally the main threats associated with climate change and their impacts by type and culture system, the management instruments for adaptation to climate change in aquaculture, and case studies from six countries that, together, accounted for 93% of aquaculture production in Latin America and the Caribbean in 2021. Next, recommendations are proposed for decision-makers for the promotion of policies and plans for adaptation to climate change.
Burgos, S., Wolf, J., Kaugure, L., Bernoux, M., Drieux, E., Vasileiou, I. and Stapleton, J. 2024. *Advancing climate action on agriculture and food security – Progress on agriculture-related climate change negotiations and the Sharm el-Sheikh Joint Work (SJWA) from COP27 onwards, Technical note*. Rome, FAO. https://doi.org/10.4060/cd2084en	Climate Change (UNFCCC), Parties adopted Decision 3/CP.27 establishing the Sharm el-Sheikh Joint Work on the Implementation of Climate Action on Agriculture and Food Security (SJWA). The new Joint Work builds on the outcomes and recommendations of the Koronivia Joint Work on Agriculture (KJWA) process, representing a critical step towards its implementation, that of previous activities addressing issues related to agriculture under the UNFCCC, as well as future topics, recognising that solutions are context-specific and take into account national circumstances.The purpose of this technical note is to provide an update on the UNFCCC negotiations on agriculture and food security since the adoption of the SJWA at COP27 in 2022. The note outlines the various agreed elements of the SJWA, the submission of views by Parties and observers to the UNFCCC in 2023, and the key elements of the new SJWA road map agreed at SB60 in 2024. It also provides an initial mapping of the implementation of the Koronivia outcomes, as well as decisions and initiatives related to

	agrifood systems at recent COPs. The note also presents the main results of support before COP28 in December 2023 and to the Sixtieth meeting of the UNFCCC's Subsidiary Bodies (SB60) in June 2024, and provides key recommendations on the way forward for the successful implementation of the SJWA road map and targets in the run-up to COP31.
FAO. 2024. *How FAO supports developing countries on their nationally determined contributions*. Rome. https://openknowledge.fao.org/handle/20.500.14283/cd2389en	This policy brief explains what nationally determined contributions (NDCs) are and why they are important for agriculture; details FAO's support to countries on NDCs; outlines five interrelated workstreams where this support is targeted (adaptation and resilience, mitigation, just transition, transparency, and finance); provides a list of FAO tools under each workstream area; and, finally, presents four country case studies illustrating FAO's NDC support.
FAO. 2024. *How FAO supports developing countries in their National Adaptation Plans*. Rome. https://doi.org/10.4060/cd0892en	National Adaptation Plans (NAPs) serve as vital policy instruments for guiding countries' efforts to reduce vulnerability and build adaptive capacity and resilience to climate change impacts. The Food and Agriculture Organization of the United Nations (FAO) plays a central role in supporting adaptation efforts and advancing NAPs globally. Through technical support, institutional support, improving access to finance, and the provision of knowledge products and tools, FAO supports developing countries in the formulation and implementation of NAPs that increase resilience in agrifood systems across FAO mandate areas (agriculture, forestry and fisheries).
Pingault, N., Licona Manzur, C., Meybeck, A., Gitz, V., Baral, H., Bernoux, M., Crumpler, K., Duchelle, A.E., Drieux E. &Thomas, R.P. 2024. *Land use and the Sharm el-Sheikh joint work on implementation of climate action on agriculture andfood security*. Environment and Natural Resources Management Working Paper, No. 99. Rome, FAO and CIFOR. https://doi.org/10.4060/cd0981en	Land use and land-use change (including related policies) interact with climate and climate change (including related policies) in multiple ways. Land-use sectors are among the most affected by climate change. They are also a significant source of greenhouse gas (GHG) emissions. According to the Intergovernmental Panel on Climate Change, agriculture, forestry and other land use are the second source of GHG emissions after fossil fuel use and account globally for about 23 percent of total net anthropogenic GHG emissions. However, the land use sectors are not only part of the problem, but also part of the solution. They are key to adaptation. The global potential of land-based mitigation options is evaluated at about 30 percent of the global mitigation effort required in 2050 to meet the 1.5 °C target of the Paris Agreement. This publication, resulting from a collaboration between FAO and the Center for International Forestry Research, lead centre of the CGIAR research programme on Forests, Trees and Agroforestry, aims to recall those complex interactions and to explore the opportunities to enhance the role of land use under the United Nations Framework Convention on Climate Change to advance climate change mitigation and adaptation.

FAO. 2024. *The unjust climate – Measuring the impacts of climate change on the rural poor, women and youth: Summary*. Rome. https://doi.org/10.4060/cc9638en	Measuring the impacts of climate change on the rural poor, women and youths report assembles an impressive set of data from 24 low- and middle-income countries in five world regions to measure the effects of climate change on rural women, youths and people living in poverty. It analyses socioeconomic data collected from 109 341 rural households (representing over 950 million rural people) in these 24 countries. These data are combined in both space and time with 70 years of georeferenced data on daily precipitation and temperatures. The data enable us to disentangle how different types of climate stressors affect people's on-farm, off-farm and total incomes, labour allocations and adaptive actions, depending on their wealth, gender and age characteristics. The brief summarizes the key messages and findings.
Szaboova, L. 2023. *Climate change, migration and rural adaptation in the Near East and North Africa region.* Rome, FAO. https://doi.org/10.4060/cc3801en	This report reviews evidence on the climate–livelihoods–migration nexus in the NENA region, identifies knowledge gaps and makes suggestions for future policy and programming to leverage the potential of migration for climate change adaptation
Galbiati, G.M., Yoshida, M., Benni, N. & Bernoux, M. 2023. *Climate-related development finance to agrifood systems – Global and regional trends between 2000 and 2021*. Rome, FAO. https://doi.org/10.4060/cc9010en	This publication addresses the persistent knowledge gap related to climate finance to agrifood systems, providing data and information to support countries making informed decisions towards agrifood systems transformation. The analysis brings to light the evolution of climate finance in agrifood systems over the past two decades, showcasing unique sectorial analysis of climate finance allocations for adaptation and mitigation, delving into the diversity of actors involved, from bilateral and multilateral agencies to the private sector, highlighting the critical need for partnerships that transcend boundaries.
Angioni, C., Haensel, M. & Wolf, J. 2023. *Catalysing climate solutions: an introduction to FAO's work on climate change adaptation in agrifood systems*. Rome, FAO. https://doi.org/10.4060/cc9070en	Recognizing the important role adaptation plays for agrifood systems, and its prominence in the Paris Agreement, the paper presents and reflects on FAO's repertoire of different adaptation actions and solutions. Complementing the conclusion of the Global Stocktake at COP28, it comprehensively summarizes FAO's efforts to boost progress in global adaptation actions. The paper (a) emphasizes the importance of bringing agrifood systems into the global adaptation agenda and policy landscape; (b) creates a cross-sectoral portfolio of FAO adaptation solutions covering multiple scales and approaches; (c) gives an insight into FAO's work with partners and Members and presents relevant networks and collaborations. Laying out FAO's guiding principles according to the FAO Strategy on Climate Change 2022–2031, it underscores FAO's efforts for transformative action in agrifood systems and demonstrates FAO's people-centered approach to climate change adaptation.
FAO. 2023. *Pathways towards lower emissions – A global assessment of the greenhouse gas emissions and mitigation*	This FAO report presents a comprehensive global assessment of greenhouse gas emissions from livestock systems, utilizing FAO's Global Livestock Environmental Assessment Model

options from livestock agrifood systems. Rome. https://doi.org/10.4060/cc9029en	(GLEAM) based on the most recent available data. GLEAM also considers indirect emissions from upstream activities, such as feed and other inputs, and part of the downstream processes including post-farm transport, processing and packaging of raw products. Drawing from an extensive literature review, this publication illustrates pathways towards lower emissions through a set of interventions on both the supply and the demand sides of animal production.
FAO. 2023. *Loss and damage and agrifood systems – Addressing gaps and challenges*. Rome. https://doi.org/10.4060/cc8810en	The purpose of this report is to stimulate discussions on the central role of agrifood systems in the loss and damage debate and identify the gaps in data, knowledge and finance that need to be addressed. The report provides an overview of the loss and damage concept, the status of analytical methodologies and tools, a summary of the reporting on loss and damage in nationally determined contributions (NDCs), an outline of the policy needs and some preliminary analysis of the financing needs. Overall, support to countries needs to be targeted and strengthened so that loss and damage in agrifood systems can be dealt with as early as possible. This support needs to ensure that no one is left behind while striving for better production, better nutrition, a better environment and a better life.
FAO. 2023. *Agrifood solutions to climate change – FAO's work on the climate crisis*. Rome. https://doi.org/10.4060/cc8055en	Amid a worsening climate crisis and slow progress in cutting greenhouse gases, sustainable agrifood systems practices can help countries and communities to adapt, build resilience and mitigate emissions, ensuring food security and nutrition for a growing global population. FAO is working with countries and partners from government to community level to simultaneously address the challenges of food security, climate change and biodiversity loss.But none of this will ultimately succeed unless the world commits to a significant increase in the quality and quantity of climate finance.
Libert-Amico, A., Duchelle, A.E., Cobb, A., Peccoud, V. & Djoudi, H. 2022. *Forest-based adaptation: transformational adaptation through forests and trees.* Rome, FAO. https://doi.org/10.4060/cc2886en	Forest-based adaptation is an ensemble of climate actions that employ forests and trees in support of climate change adaptation and resilience, including sustainable forest management, forest conservation and restoration, reforestation and afforestation. Forest-based adaptation can help address the gaps between current adaptation actions and the adaptation needed for reducing climate-related risks and impacts, while contributing to most of the Sustainable Development Goals and promoting strong synergies with mitigation. This FAO technical paper unpacks the concept of forest-based adaptation and describes policy spheres that could bolster the role of forests and trees in providing adaptation and resilience benefits. It introduces a set of ten principles for using forests and trees to promote transformational adaptation, which were developed with leading experts from the Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF) and other partners. It describes

	the policy implications of each principle and draws on examples from diverse forest ecosystems and management practices to illustrate their application in practice.
FAO. 2023. *Tracking progress on food and agriculture-related SDG indicators 2023*. Rome. https://doi.org/10.4060/cc7088en	At the mid-point of the Agenda 2030 for Sustainable Development, there is an urgent need to understand where the world stands in eliminating hunger and food insecurity, as well as in ensuring sustainable agriculture. The new report of the Food and Agriculture Organization of the United Nations (FAO), titled Tracking progress on food and agriculture-related SDG indicators, offers analysis and trends on indicators across eight Sustainable Development Goals (SDGs) – in particular, SDGs 1, 2, 5, 6, 10, 12, 14 and 15 – highlighting areas of progress and areas where further effort is needed. Available in digital format, this year's edition also discusses selected indicators for which FAO is a contributing agency and/or that have key implications for food and agriculture. These additional indicators provide valuable information on agricultural losses resulting from disasters, the distribution of land tenure rights, the prevalence of stunting and malnutrition, the impact of international trade policies and regulations on agricultural trade, especially in developing and least developed countries, and the proportion of land degradation.This edition also includes, for the first time, an overall statistical progress assessment for SDG 2 that synthesizes information across all indicators aimed at achieving Zero Hunger, including those for which FAO is not the custodian agency.
Distefano, E., Rai, N. and Wolf, J. 2023. *Using metrics to assess progress towards the Paris Agreement's Global Goal on Adaptation – Transparency in adaptation in the agriculture sectors*. Rome, FAO. https://doi.org/10.4060/cc2038en	This publication serves as a guide for countries in exploring how reporting for the Sustainable Development Goals (SDG) indicators under FAO custodianship serves the scope of compiling information for the biennial transparency reports (BRT) under the Enhanced Transparency Framework (ETF). The paper intends to demonstrate the potential integration of adaptation reporting with SDG and Sendai Framework for Disaster Risk Reduction (SFDRR) global measurable targets and corresponding indicators to advance towards a common understanding of how to track adaptation while informing progress towards the Global Goal on Adaptation (GGA). It is aimed primarily at technical authorities and experts working on monitoring and evaluation (M&E) of adaptation in the agriculture sectors and compiling information to report on adaptation at national and international levels. Secondly, it is aimed at policy- and decision-makers that can use M&E evidence to inform adaptation planning, both in the agriculture sectors specifically and as part of broader national adaptation planning, implementation, and budgeting processes.
FAO. 2023. *A snapshot of the status and way forward for transforming agrifood systems in the Pacific – Identifying*	Snapshot of the status and way forward for transforming agrifood systems in the Pacific – Identifying entry points and analysing trade-offs for policymakers," describes the impact of climate change on the agrifood systems of Pacific Island countries. The changing temperature,

entry points and analysing trade-offs for policymakers. Apia. https://doi.org/10.4060/cc4940en	precipitation, and sea level patterns have a significant impact on food production and trade, leading to food insecurity, malnutrition, and non-communicable diseases, particularly in vulnerable groups like women and youth. The report provides an overview of entry points for sustainable food system transformation, such as traditional Pacific farming practices, crop diversification, agroforestry, and community-managed marine protection zones. The report also emphasizes the need for socioeconomic, health, and environmental impact assessments to manage these trade-offs and to understand the potential revenue generation from taxes on unhealthy commodities, which could be used to subsidize local food production and transport.
Özkan, Ş., Teillard, F., Lindsay, B., Montgomery, H., Rota, A., Gerber P., Dhingra M. and Mottet, A. 2022. *The role of animal health in national climate commitments*. Rome, FAO. https://doi.org/10.4060/cc0431en	This brief has been produced by the Food and Agriculture Organization (FAO) of the United Nations, in collaboration with the Global Dairy Platform (GDP) and the Global Research Alliance on Agricultural Greenhouse Gases (GRA) and with the financial support of the New Zealand Government. The FAO was approached by GDP and GRA to develop guidance following previous research on dairy cattle in order to support policy makers and livestock sector actors in implementing a process that captures the co-benefits of cattle health initiatives in their climate commitments. It provides examples in specific countries in collaboration with the World Bank and the International Fund for Agricultural Development (IFAD). This brief provides methodological guidance on the quantification of animal health interventions and their impact on greenhouse gas (GHG) emissions, on the basis that they deliver multiple benefits to individual farmers and society which could outweigh the costs of the intervention, particularly when considering reduced GHG emissions.
Garrett, L., Lévite, H., Besacier, C., Alekseeva, N. and Duchelle, M. 2022. *The key role of forest and landscape restoration in climate action.* Rome, FAO. https://doi.org/10.4060/cc2510en	Forest and land degradation affects almost 2 billion hectares (ha) of land and threatens the livelihoods, well-being, food, water and energy security of nearly 3.2 billion people. Forest and landscape restoration (FLR) is a relatively recent response to address these impacts and aims to recover the ecological functionality and enhance human well-being in deforested and degraded landscapes. Forest and landscape restoration practices have also proven to have significant benefits for addressing the impacts of climate change. These include carbon sequestration and reduction of greenhouse gas (GHG) emissions, improving the resilience of landscapes and reducing disaster risks. Forest and landscape restoration is therefore one of the key solutions of the agriculture, forestry and other land-use (AFOLU) sector considered in the United Nations Framework Convention on Climate Change (UNFCCC), confirmed in the Glasgow's Declaration on Forest and Land during the twenty-sixth UNFCCC Conference of the Parties (COP26). This publication highlights the links between FLR and climate change mitigation and adaptation issues, and considers further opportunities to enable greater integration between the two agendas. Many large restoration initiatives have been launched in

	the last decade. More projects are under preparation through the United Nations Decade on Ecosystem Restoration, including many projects of the Food and Agriculture Organization of the United Nations (FAO). These projects, often funded under the Global Environment Facility (GEF) and other climate funds are emphasized in the report to illustrate the numerous climate benefits of FLR. As a relatively cost-effective approach to supporting carbon sequestration, conservation and sustainable forest use, FLR is playing an active role in enabling climate mitigation. Should the Bonn Challenge reach its goal to restore 350 million ha, it could sequester up to 1.7 gigatonnes of carbon dioxide (Gt CO2) per year. Reduction of GHG emissions is also crucial, and the FLR approach provides a strong basis to reduce emissions from deforestation and forest degradation, especially through Reducing Emissions from Deforestation and Forest Degradation (REDD+) activities. It can also support sustainable bioenergy, in particular the wood energy sector, a large contributor of GHGs. Forest and landscape restoration is also key for supporting the conservation of existing forests and landscapes to protect and enhance carbon already stored in ecosystems, such as those in peatlands. This publication describes the different tools that have been developed by FAO to better measure the quantities of carbon stored and other climate benefits achieved through FLR projects.
FAO. 2022. *Strengthening gender-responsive climate policies and actions in the livestock sector*. Rome. https://doi.org/10.4060/cc2998en	About 600 million of the world's poorest households keep livestock as an essential source of income and food production to manage risk, store wealth and build up assets. However, women face several constraints to ownership and decision-making power in the sector. Scaling up culturally acceptable and locally available solutions requires government intervention through intentional policies that can empower women. Further, more funds should be allocated to replicate successful gender-responsive and transformative projects and identify entry points to mainstream gender considerations into livestock policies. This brief showcases promising research and innovation, particularly from countries engaged through the Food and Agriculture Organization of the United Nations (FAO) Flexible Multi-Partner Mechanism (FMM) 149 project. India and Botswana are highlighted as examples to inform policymakers and guide gender-responsive, climate-smart investments and policies in countries' livestock sectors
FAO. 2022. *Strengthening gender-responsive climate policies and actions in aquaculture and fisheries – From research to policies*. Rome. https://doi.org/10.4060/cc2699en	Women perform essential work throughout aquaculture and fisheries, yet their contributions are often overlooked and unrecognized in national statistics, policies, and development interventions. Women remain underrepresented in or excluded from formal governance processes and have limited say in decision-making. This brief showcases promising research and innovation, particularly from countries engaged through the Food and Agriculture

	Organization of the United Nations (FAO) Flexible Multi-Partner Mechanism (FMM) 149 project. Uganda, Belize and Samoa are highlighted as examples to inform policymakers, guide gender-responsive investments, policies, and strategies in countries' work in response to climate change.
FAO. 2022. *Strengthening gender-responsive climate policies and actions in climate-smart agriculture*. Rome. https://doi.org/10.4060/cc2957en	Championing women as critical agents of change within their communities and in policy and decision-making processes at national and international levels is a fundamental step towards ensuring gender equality and climate-related issues are adequately addressed in agricultural policies and dialogue and considered by international climate finance mechanisms, government ministries and research institutions. Gender-responsive climate-smart agriculture refers to approaches that consider women's and men's specific priorities and their different access to resources, services, education and information to build climate resilience, through a focus on equality and agency. This brief showcases promising research and innovation, particularly from countries engaged through the Food and Agriculture Organization of the United Nations (FAO) Flexible Multi-Partner Mechanism (FMM) 149 project. Senegal, Uganda and Belize are highlighted as examples to inform policymakers, guide gender-responsive investments, policies, and strategies in countries' work in response to climate change.
FAO. 2022. *Strengthening gender-responsive climate policies and actions in agrifood value chains.* Rome. https://doi.org/10.4060/cc2959en	Climate change can increase gender inequalities: while men can diversify into other commodities or migrate to other regions in search of economic opportunities in response to climate impacts, women often have more limited options, and therefore less resilience, due to their domestic responsibilities and poor access to resources and services. Failure to recognize the multiple roles performed by women along the agrifood value chain, and to address their specific needs and priorities often reduces their economic and social opportunities. This brief showcases promising research and innovation, particularly from countries engaged through the Food and Agriculture Organization of the United Nations (FAO) Flexible Multi-Partner Mechanism (FMM) 149 project. Senegal, Samoa and Zambia are highlighted as examples to inform policymakers, guide gender-responsive investments, policies, and strategies in countries' work in response to climate change.

ANNEX II

FAO TOOLS ON CLIMATE CHANGE

Tool	**Description**
Earth Map: https://earthmap.org/	A point-and-click cloud-based platform powered by Google Earth Engine and other free data sources. Earth Map enables any user to visualize, analyze, and monitor changes on Earth's surface, performing multi-temporal and multi-parametric land monitoring, climate assessments and other geospatial and Earth Observation-based analyses.
Adaptation, Biodiversity, and Carbon (ABC) Mapping Tool: https://abc-map.fao.org/	A geospatial app that holistically assesses the environmental impact of policies, plans and investments in the agriculture, forestry, and other land-use sectors through Google Earth-based satellite imagery.
Climate and Agriculture Risk Visualization and Assessment (CAVA): https://fao-cava.predictia.es/	Climate and Agriculture Risk Visualization and Assessment (CAVA) is an approach to climate information with a focus on agriculture. Its goal is to provide long-term, climate services by democratising access and simplifying the use of past and future climate and impact data.
Climate Action Review (CAR) Tool: https://openknowledge.fao.org/handle/20.500.14283/cd0260en	Supports national adaptation planners through a practical, step-by-step process to identify actionable entry points for transformative adaptation in the agriculture and land-use sectors through multi-stakeholder engagement.
Climate Risk Toolbox (CRTB): https://data.apps.fao.org/crtb/	Supports the design of climate-resilient agricultural investment projects and plans, by allowing users to conduct climate risk screenings through advanced climate-related geospatial information and data.
Technical guidance for the Nationally Determined Contribution Expert Tool (NEXT): https://doi.org/10.4060/cc0568en	The Nationally Determined Contribution Expert Tool (NEXT) is a greenhouse gas accounting tool developed by the Food and Agriculture Organization of the United Nations (FAO) to support annual environmental impact assessment for the Agriculture, Forestry and Other Land Use sector (AFOLU).

Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists (SHARP+): https://doi.org/10.4060/cb7399en	Assesses climate resilience among small farming households to pinpoint areas needing intervention, shape project activities, and monitor and evaluate the adaptive capacity and resilience of communities.
The Modelling System for Agricultural Impacts of Climate Change (MOSAICC): https://openknowledge.fao.org/handle/20.500.14283/cb4295en	MOSAICC is an innovative tool to carry climate change out climate change impact assessment studies at the national level.
Greenhouse Gas Data Management (GHG-DM) tool: https://www.fao.org/fileadmin/user_upload/climate_change/etf/docs/GHG_DataManagementTool.zip	This excel-based package helps GHG inventory compilers manage the information related to the activity data and parameters in the agriculture, forestry and other land use (AFOLU); energy; industrial processes and product use (IPPU); and waste sectors.
Adaptation Toolbox for Fisheries and Aquaculture: https://openknowledge.fao.org/handle/20.500.14283/i9705en	A portfolio of climate adaptation tools and methods to strengthen adaptation in the sector.
LEAP Global database of GHG emissions related to feed crops: http://www.fao.org/partnerships/leap/database/ghg-crops/en/	The GHG database on feed-crops is a global database of emissions, emission intensities and life cycle inventory for 5 main crops: maize, wheat, barley, soybean and cassava.