منظمة الأغذية والزراعة للأمم المتحدة | 联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Продовольственная и сельскохозяйственная организация Объединенных Наций | Organización de las Naciones Unidas para la Alimentación y la Agricultura

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Submission by the Food and Agriculture Organization of the United Nations (FAO)
To the United Nations Framework Convention on Climate Change (UNFCCC)
In relation to the First Global Stocktake

In response to the call for submission by the Chairs of the Subsidiary Bodies under the UNFCCC, FAO is pleased to share its contribution to the first Global Stocktake (GST) that will contribute to the Information Collection and Preparation Phase pursuant to decision 19/CMA.1, paragraphs 19, 36 and 37.

FAO's vision is a climate resilient world, free from hunger and malnutrition, that conserves biodiversity and protects the environment. Therefore FAO's Strategic Framework 2022-31 and work is dedicated to better environment that will contribute to better production, better nutrition and better life, as well as the shared goals and cooperation towards the 2030 Agenda for Sustainable Development, the Paris Agreement and the Rio Declaration on Environment and Development.

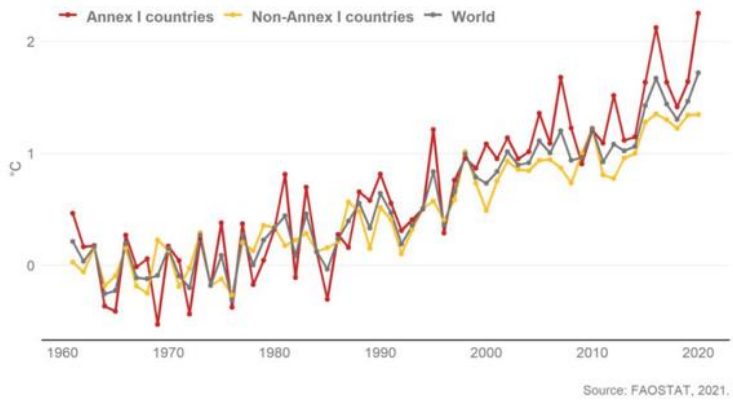
Due to the specific mandate of FAO this submission presents Organization's work assessing progress made in thematic areas of mitigation, adaptation, finance flows and means of implementation, social and economic consequences and impacts of response measures, loss and damage and other crosscutting themes within land use and agricultural sectors. The submission is organized following these thematic areas and responding to the relevant guiding questions provided by the Chairs of the Subsidiary Bodies of the UNFCCC.

Mitigation

1. What is the collective progress made towards achieving the long-term temperature goal in Article 2.1(a) of the Paris Agreement, in the light of equity and the best available science?

According to FAOSTAT Temperature Change domain[1], in 2020, statistics showed significant warming trends worldwide. In 2020, global mean annual temperature change over land was the highest in the instrumental record, 1.71 °C above the 1951–1980 climate normal (Figure 1). The global mean annual temperature change, averaged over the past decade (2011–2020) was 1.31 °C and well above earlier periods. It was 1.01 °C in the previous decade (2001–2010) and 0.58 °C in the decade before (1991–2000). Furthermore, in all regions, decadal–average mean annual temperature change was larger in the last decade (2011–2020) compared to the previous one (2001–2010). The largest increase was recorded in Europe (2.0 °C vs. 1.3 °C) and the smallest in Asia (1.2 °C vs. 1.0 °C). In the last decade, all regions had decadal mean annual temperature change greater than or equal to 1.0 °C (FAO, 2021a). Thus, global mean annual temperatures are increasing in all regions, as confirmed by the Intergovernmental Panel on Climate Change (IPCC, 2021) and estimating that the chances of crossing the global warming level of 1.5 °C in the

Figure 1. *Mean annual temperature anomalies over land for World.*



[1] The FAOSTAT Temperature Change domain disseminates statistics of land surface air temperature change by country, with annual updates. The current dissemination covers the period 1961–2020. https://www.fao.org/food-agriculture-statistics/data-release/data-release-detail/en/c/1396579/

next decades, unless immediate, rapid and large scale-reductions in greenhouse gas emissions, limiting warming to close to 1.5 ^{o}C or even 2 ^{o}C will be beyond reach.

Almost half of the solutions to stay within agreed temperature goals under the Paris Agreement come from food and agriculture. These solutions involve action on forests and other ecosystems, soils, water, livestock, oceans and food systems – as well as on food environments and consumers. Nature-based solutions are key. They help mitigation, adaptation and resilience, conserve and restore ecosystems, and ensure nature contributes to resilient livelihoods, green job generation and rural poverty reduction. For example:

- Reducing deforestation and restoring degraded forests and landscapes are cost-effective rapid ways to cut emissions by over 5 GtCO2eq/yr – about ten percent of total 2018 emissions, while boosting biodiversity and healthy ecosystems. In this regard FAO and UNEP is implementing Decade on Ecosystem Restoration, regional and sub-regional initiatives under Forest and Landscape Restoration Mechanism in Latin America, Africa, Asia and Pacific, as well as Great Green Wall initiative in Africa. They all contribute to the achievement of the Bonn Challenge, which aims to restore 350 million ha by 2030.
- If managed sustainably, emissions from livestock production, in particular, methane, can be cut by 30 percent. FAO works with other development partners on accounting of greenhouse gas (GHG) emissions associated with livestock production, mapping the climate smart livestock activities, and evaluation of their environmental impacts using the FAO tool titled Global Livestock Environmental Assessment Model. To achieve this, FAO supported the development and harmonization of the methods and metrics to quantify GHG emissions in the livestock sector through a multi-stakeholder Partnership of Livestock Environmental Assessment and Performance (LEAP), collaborated with the Climate and Clean Air Coalition (CCAC) to reduce methane emissions from the livestock sector, while enhancing food security and livelihoods in 19 countries.
- Restoring agricultural land and degraded soils can remove up to 51 GtCO2eq from the atmosphere in total and raise food production by 17.6 megatons per year. Since 1950's, FAO has been committed to provide technical assistance to countries in various soil applications. The Organization assists countries to implement Sustainable Soil Management (SSM) and improve soil governance to guarantee healthy and productive soils, and support the provision of essential ecosystem services towards food security and improved nutrition, climate change adaptation and mitigation, and sustainable development.
- As agriculture accounts for 70 percent of freshwater withdrawals, actions to produce more with less water will go a long way towards adapting to climate change. FAO supports countries in sustainable water management, including coping with water scarcity in agriculture, drought risk management, irrigation management, water productivity and others

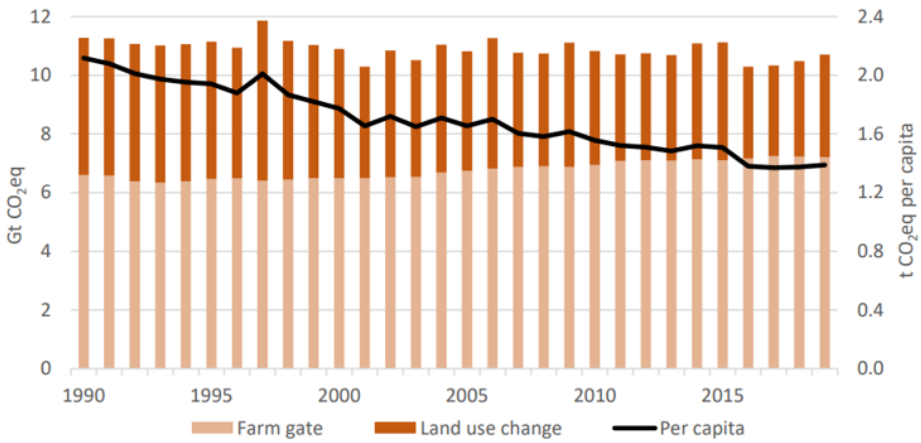
In addition, FAO's Green Cities Initiative focuses on improving the urban environment, strengthening urban-rural linkages and the resilience of urban systems, services and populations to external climate related shocks in at least 100 cities around the world in the next by2023, looking to have 1000 cities join by 2030. The initiative is ensuring access to a healthy environment and healthy diets from sustainable agri-food systems, increasing availability of green spaces through urban and peri-urban forestry, it will also contribute to climate change mitigation and adaptation and sustainable resource management.

2. *What is the collective progress made towards achieving the long-term mitigation goal in Article 4.1 of the Paris Agreement, in the light of equity and the best available science?*

Agriculture is a significant contributor to climate change, in addition to being one of the economic sectors most at risk from it. Greenhouse gas (GHG) emissions due to agriculture are generated both within the farm gate by crop and livestock production activities, and through land use change processes at the conversion boundary between natural ecosystems and agricultural land. Together they contribute about 20 percent of total emissions from all human activities (IPCC, 2019; Tubiello *et al.*, 2021).

In 2019, total emissions from agriculture, i.e. generated within the farm gate and at the farm boundary with natural ecosystems, were 10.7 billion tonnes of carbon dioxide equivalent (Gt CO2eq). These emissions remained fairly constant over the 1990–2019 period, with no statistically significant trend (Figure 2).

Figure 2. *Global absolute and per capita emissions from agriculture, detailing farm-gate and land use change components, 1990–2019.*

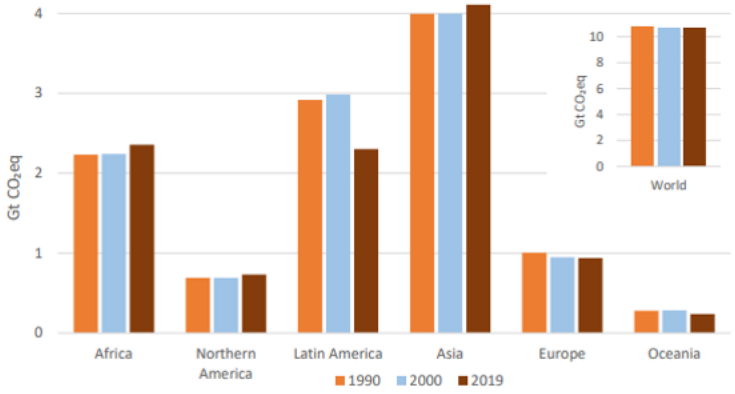


Source: FAOSTAT, 2021.

Emissions generated within the farm gate and those associated to land use change were nonetheless characterized by opposite trends, which tended to cancel each other out. Specifically, the former increased by about 10 percent over the period 1990–2019, from 6.6 to 7.2 Gt CO2eq, while the latter decreased by 25 percent, from 4.7 to 3.5 Gt CO2eq. Of the emissions components, such as methane (CH4), nitrous oxide (N2O), nitrogen-related emissions from synthetic fertilizers and crop residues showed the largest growth since 1990 (+44 and +42 percent respectively), reflecting growth in crop production over the same period. At the same time, emissions from deforestation saw significant decline (-31 percent), in connection with more stringent regulation. In terms of land use change, emissions from fires in organic soils increased strongly (+31 percent), reflecting the ongoing conversion of these natural ecosystems to agriculture, especially in South-eastern Asia (FAO, 2020b). Results also indicate that removals of CO2 by forests, i.e. their sink strength in partially counterbalancing emissions, decreased significantly in the past 30 years, by 24 percent, and about 2.9 Gt CO2eq in 2019, albeit forests remain an overall carbon sink today.

Whereas total emissions from agriculture remained virtually unchanged over the last 30 years, they decreased on a per capita basis, by nearly 35 percent, from 2.1 to 1.4 t CO2eq per capita, as a result of improvements in the efficiency of agricultural production processes and of reductions in land conversions, especially deforestation (Figure 2).

Figure 3. *Trends in regional emissions from agriculture (1990, 2000, 2019).*



Source: FAOSTAT, 2021.

Regional emissions in 2019 were the largest in Asia on an absolute basis (4 billion tonnes), and in Oceania and Latin America on a per capita basis (4–6 tonnes/cap). The largest increase since 1990 was in Africa (30 percent), while the largest decrease was in Latin America (20 percent). Brazil, Indonesia and China represented more than 50 percent of global emissions from agriculture. Emissions from deforestation and from peat fires dominated the national emissions from agriculture in Brazil and Indonesia, respectively, whereas farm-gate emissions were the larger contributor in China (Figure 3).

When linking this with risks and vulnerabilities, smallholder farmers, who are highly dependent on natural resources and agriculture, are considered to be disproportionately vulnerable to the impacts of climate change. Moreover, more vulnerable groups such as, women and girls, indigenous communities, minorities and people with special needs are exposed to climate risks even more, due to existing social and economic inequalities, limited access to resources and decision-making capacities. Africa has been identified as a particularly exposed region, because of the combined effect of frequent climate change-related weather events and of the importance of agriculture in the economy. At the same time they lack appropriate technological and economic resources, knowledge, as well as socio-economic support to tackle such challenges. Often they are neither able to invest in technology and apply practices that are less GHG intensive, nor in a position to adapt to impacts of climate change. Thus their

opportunities to adapt to the impacts of climate change, reduce GHG emissions while increasing productivity, incomes and well-being are limited.

Additional information is available in FAO' Food and Agriculture Statistics and FAOSTAT Analytical Briefs:

- FAO, 2021. *Food and Agriculture Statistics*. Available at: https://www.fao.org/food-agriculture-statistics/data-release/data-release-detail/en/c/1413420/

3. *What are the projected global GHG emissions and what actions are Parties undertaking to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty (Article 4.1 Paris Agreement, Decision 19/CMA.1, paragraph 36(b))?*

In response to the Paris Agreement's call for greater ambition, new or updated nationally determined contributions (NDC) show a steady improvement in both the coverage and quality of mitigation and adaptation in the agricultural, forestry and fisheries sectors ("agricultural sectors" for short) and tend to be aligned with longer-term low-emissions and climate-resilient goals and pathways. New/updated NDCs reflect more attributes of adequate and effective planning and implementation than previous NDC submissions, including participatory stakeholder engagement, cross-sectoral coordination mechanisms, alignment with National Adaptation Plans (NAP) and Sustainable Development Goals (SDG) and elements of enhanced transparency. Out of all new/updated NDCs 95percent include adaptation in the agricultural sectors compared to previous NDCs (92 percent), 95 percent also include mitigation in the agriculture and/or Land Use, Land Use Change and Forestry (LULUCF) sectors compared to previous NDCs (82 percent), 70 percent include disaster risk reduction (DRR) and management compared to previous NDCs (59 percent), 38 percent reference women and/or other marginalized groups in the agricultural sectors–compared to previous NDCs (9 Percent) (Crumpler *et al*., 2021).

First, reducing emissions from deforestation is believed to be the land-based measure with the largest mitigation potential over the next decade, with an estimated mitigation potential of 1.6 – 5.6 $GtCO_2eq$/year (Roe *et al.*, 2019). National forest monitoring has seen great progress over the past 15 years (Neeff & Piazza, 2019), often driven by countries' aspiration to participate in REDD+ (Sandker *et al*., 2021). As many as 56 countries have submitted a REDD+ forest reference emission level to assess emission reductions from deforestation (UNFCCC, 2022). Assessments of deforestation mitigation (potential) strongly depends on how the benchmark is set, and in specific what reference period is used to compare reductions against; comparing annual emissions in forest reference emission levels valid for the period 2015-2020 from REDD+ reporting by 49 countries with FAOSTAT (FAO, 2020a) estimated emissions from net forest conversion for the 5 years preceding 2015-2020 results in a 1 $GtCO_2eq$/year difference (3.7 versus 2.7 $GtCO_2eq$/year respectively) (FAO, 2022). This is therefore an important aspect to consider in assessing the progress made from LULUCF towards achieving the long-term mitigation goal in Article 4.1 of the Paris Agreement.

Second, limiting emissions from livestock-related activities by: (i) improving livestock management and particularly the way livestock is fed, in order to cut enteric fermentation; (ii) improving management of animal dejection; and (iii) reducing livestock production and adopting less resource-intensive and healthier diets with less meat and meat products (FAO, 2020b).

Third, reducing GHG emissions from the AFOLU sectors lies in improving the management of areas already under intensive land use, such as croplands. In crop production, preserving carbon in the soil is possible with Conservation Agriculture with (no-till, mulching/cover/ crops, crop rotation) works as both mitigation and an adaptation measure because retaining soil moisture at low potentials reduces crops' vulnerability to dry spells.

Adaptation

4. *What is the collective progress made towards achieving Article 2.1(b) of the Paris Agreement, in the light of equity and the best available science?*
5. *What is the overall progress in achieving the global goal on adaptation, in the context of climate impacts, risks and vulnerabilities (Article 7.14 (d) Paris Agreement)?*
6. *What actions have been taken to increase the ability to adapt to the adverse impacts of climate change and foster the climate resilience of people, livelihoods, and ecosystem? To what extent have national adaptation plans and related efforts contributed to these actions (Decision 19/CMA.1, paragraph 36(c))?*

7. *What adaptation efforts have developing countries undertaken to address their adaptation needs (Article 7.14 (a) Paris Agreement, Decision 11/CMA.1, paragraph 9)?*
8. *How adequate and effective are current adaptation efforts and support provided for adaptation (Article 7.14 (c) Paris Agreement)?*

FAO recognizes that in order to contribute to the Global Stocktake and assess collective progress on adaptation, the approach to monitoring and evaluation (M&E) of adaptation efforts would need to shift from assessing progress in terms of outputs and lower level outcomes to a deeper substantive analysis of the impact on adaptive capacity, resilience and vulnerability reduction. There are increasing national efforts as countries are designing their national M&E systems, and international organizations are supporting the strengthening of statistical systems for tracking policy outcomes and decision making on adaptation, guiding on the use of adaptation metrics to assess and report on national adaptation goals and targets set under the Paris Agreement. While, countries play a key role in monitoring and assessing the achievements of their national adaptation goals, and communicate this information through their NDCs, National Adaptation Plans (NAPs), adaptation communications (AC) and Biennial transparency reports (BTR); the Global Stocktake offers a compelling opportunity to build on the country level strengths, and reinforce the use of high quality data to provide valuable information on the global progress towards the global goal on adaptation.

One of the ways to get access to the information on progress on adaptation is to review the portfolio of the Financial Mechanism of the UNFCCC, including the Global Environment Facility (GEF) and the Green Climate Fund (GCF), which are consistently contributing to a wealth of data, through their reporting requirements for setting of program objectives, definition of baselines, selection of relevant results indicators, and guidance to tracking the adequacy and effectiveness of adaptation efforts. FAO with a GEF portfolio of USD 1.3 billion (280 projects) covering the climate change mitigation and adaptation, along with the other GEF focal areas, has strong potential to tap into existing detailed information on countries' achievements and contribution to the Global Goal on Adaptation. More specifically, in the context of the GEF-managed climate change adaption trust funds -the Least Developed Countries Fund and the Special Climate Change Fund- FAO assists countries in reporting on the results of these climate change adaptation investments through established results frameworks and respective indicators, including: (i) number of direct beneficiaries; (ii) area of land managed for climate resilience (ha); (iii) total number of policies, plans, and frameworks that will mainstream climate resilience; and (iv) number of people trained or with awareness raised.

FAO's experience in supporting the process of formulation and implementation of the NAPs has demonstrated that ongoing progress made towards adaptation is often impacted by existing national climate change strategies, policies and plans that often become the mandate for the NAP process. Existing development frameworks helped identify priorities including areas for investment within the agriculture, forestry and fisheries sectors. FAO supported a number of countries working on NAP in agriculture. Among those countries that have officially launched the NAP process, the integration of adaptation into national, subnational and local development plans have commenced and in different stages of advancement (21 countries supported by FAO). Key enabling activities for initiating the NAP formulation entailed the establishment or enhancement of institutional arrangements for the process (21 countries), identification and engagement of multiple stakeholders including indigenous peoples, women, youth, private sector, and others (21 countries), stocktake of activities through synthesis of available adaptation information, identification of existing capacities, policies, strategies and plans, (21 countries), explore complementarities in the activities and support related to formulating their NAPs and updating their NDCs (19 countries). In addition countries have been engaged in developing a strategy for mobilizing the private sector in relation to climate change adaptation (11 countries), and identifying measures to strengthen gender responsiveness in the NAP formulation and implementation (21 countries).

Countries have conducted analyses of past and current climate change scenarios, downscaling of climate scenarios to local level (7 countries), completed a comprehensive climate vulnerability assessment for different sectors (7 countries), conducted a needs assessment for improved climate information services (4 countries). In terms of actions that have been taken to increase the ability to adapt to the adverse impacts of climate change and foster the climate resilience of people, livelihoods, and ecosystem, and the extent to which have NAPs and related efforts contributed to these actions, it is worth noticing that several countries have engaged in the assessment of ongoing and past adaptation activities to identify gaps and opportunities for scaling them up (17 countries), identification of opportunities and needs for 'climate proofing' key investments (8 countries), appraisal, prioritization and ranking of adaptation options (20 countries), for instance through cost-benefit analysis (CBA) or multi-criteria assessments and the capacity building in applying different adaptation technologies and practices. Furthermore, countries have

increasingly recognized the importance of mapping of the technical, institutional and financial needs and gaps, in order to expedite access to finance (8 countries), and the management of coherence between adaptation and relevant frameworks including SDGs, the Sendai Framework and others (9 countries). In addition, the NAPs and related efforts for reporting, monitoring and review are critical to improve appreciation of country progress in achieving the Global Goal on Adaptation. This is the case for the development of national M&E systems to support adaptation reporting (12 countries), the design of tracking and budget coding for monitoring public expenditure on adaptation (9 countries), as well as starting communicating progress on NAP (19 countries).

Finally, FAO confirms its commitment to contribute to the global discussion on metrics and approaches to review and aggregate progress towards the Global Goal on Adaptation, as well as provide country guidance for reporting on adaptation in the agricultural and land use sectors under the Modalities, Procedures and Guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement, contained in decision 18/CMA.1 and its annex. In line with this commitment, FAO is drawing on its multidisciplinary knowledge and experience to propose coherent indicator framework that can be used to effectively monitor progress towards the targets that countries have set in their NDCs and NAPs.

Recognizing that countries are already monitoring and reporting on their progress on adaptation, vulnerability and resilience under the Paris Agreement as well as the Sendai Framework for Disaster Risk Reduction (SFDRR), and the overarching 2030 Agenda, but are facing key hurdles in the harmonization of methods and indicators, FAO is preparing a paper on: "Transparency in Agriculture: Essential metrics to assess progress towards the global goal on adaptation". The main scope is to discuss and reflect on the potential alignment of the reporting systems of different international agenda and the streamlining of national efforts to comply with existing mechanisms and reporting requirements. Specifically, the paper will provide an insight of how the data collected for the SDG and SFDRR indicators under FAO custodianship can inform the compilation of information for agriculture and land use sectors and inform the BTR-adaptation. This approach is also supported under the Koronivia Joint Work on Agriculture (KJWA) topic "2(b) on methods and approaches for assessing adaptation, adaptation co-benefits and resilience". Under topic b, one of the six key priorities of the Koronivia process, countries stressed the necessity for a coherent framework of methods and indicators to track adaptation.

Additional information is available in the publications listed below:

- FAO. 2017. Addressing Agriculture, Forestry and Fisheries in National Adaptation Plans. Rome. Available at: https://www.fao.org/3/i6714e/i6714e.pdf
- FAO. 2021. Final evaluation of the project "Integrating Agriculture into National Adaptation Plans (NAP-Ag)". Project Evaluation Series, 06/2021. Rome. Available at: https://www.fao.org/documents/card/en/c/CB5225EN
- Chiriacò, M.V., Perugini, L. Bellotta, M., Bernoux, M. & Kaugure, L. 2019. Koronivia Joint Work on Agriculture: analysis of submissions on topics 2(b) and 2(c). Environment and Natural Resources Management Working Paper no. 79. Rome. Available at: https://www.fao.org/documents/card/en/c/ca7026en/
- Drieux, E., Van Uffelen, A., Bottigliero, F., Kaugure, L. & Bernoux, M. 2021. *Understanding the future of Koronivia Joint Work on Agriculture. Boosting Koronivia*. Rome, FAO. Available at https://www.fao.org/3/cb6810en/cb6810en.pdf.

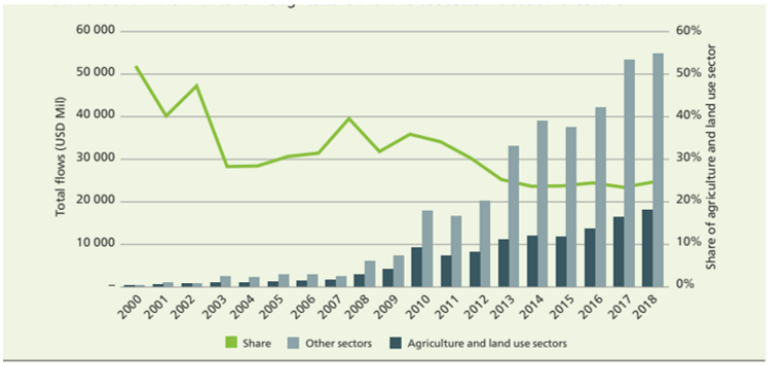
Finance flows and means of implementation

9. What is the state of current global climate finance flow and the overall progress made towards making the financial flows consistent with the pathways towards low GHG emissions and climate-resilient development, in the light of equity and the best available science (Article 2.1(c) Paris Agreement)?

Climate finance is a fundamental element of the global development agenda and has been accelerating in recent years. There is a steady and substantial increment of climate flows to all sectors, passing from USD 50 million in 2000 to USD 73 billion in 2018. The total amount of climate finance contributions in the period 2000-2018 reached USD 466 billion, half of which was provided between 2015-2018.

Yet between 2000 and 2018 the share of global climate finance in the agriculture and land-use sector has decreased, passing from an average of 45 percent of the total flows at the beginning of the millennium, to 24 percent in 2013 where it has since stayed. The total sum of contributions to the agriculture and land-use sector between 2000 and 2018 amounted to USD 122 billion, representing 26 percent of the global climate finance flows to all sectors (Figure 4) (Buto *et al*., 2021).

Figure 4. *Allocations of climate finance to agriculture and land use sectors versus other sectors*



Source: OECD DAC Climate-related Development Finance database; compiled and calculated by FAO.

Considering that land use can contribute significantly to mitigation of climate change, including through the promotion of sustainable management of forests and oceans and other terrestrial, coastal, and marine ecosystems and that the sector must take measures to facilitate adequate adaptation to climate change, which is particularly important for ensuring that food security is not threatened, there is a need to increase the proportion for allocated for the agriculture and land-use sectors in the financial flows to limit the climate change.

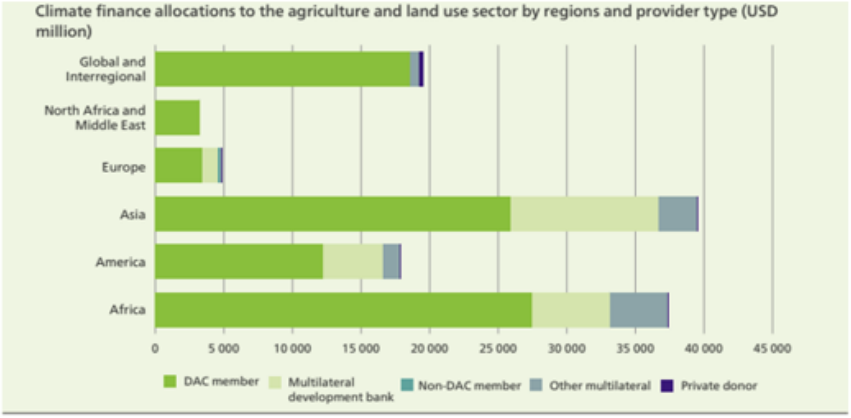
Additional information is available in the following publication:

- Buto, O., Galbiati, G.M., Alekseeva, N. & Bernoux, M. 2021. *Climate finance in the agriculture and land use sector between 2000 and 2019 – Special update.* Rome, FAO. Available at: https://www.fao.org/3/cb8040en/cb8040en.pdf.

11. What are the barriers and challenges, including finance, technology development and transfer and capacity-building gaps, faced by developing countries?

The main challenges for financial flows is limited variety of financing sources. The main sources of climate finance flows at the global level came from the bilateral resource partners represented by OECD Development Assistance Committee members, and the multilateral development banks, which represented more than 90 percent of total contributions both for the agriculture and land use sector and at the global level (Figure 5). Investment from the private organizations remain marginal (Buto *et al*., 2021).

Figure 5. *Climate Finance allocations to the agriculture and land use sectors by regions and by provider type (USD million).*



Source: OECD DAC Climate-related Development Finance database; compiled and calculated by FAO.

Agriculture and land-use sector stakeholders need to address the dynamic and accelerate the global climate finance landscape and transition to more diverse access to types and sources of flows. To enable such transitions, the agriculture sector stakeholders should have strategies outlining the main actors, mechanisms and architecture of climate finance in a comprehensive and holistic manner.

In relation to barriers and challenges on technology development and transfer and capacity-building gaps, there are still:

- Limited knowledge and capacity to plan for adaptation and determine the appropriate level of actions;
- Government budgets are insufficient to address rising climate impacts;
- Poor capacity of developing countries in accessing climate finance and implementing climate change mitigation and adaptation measures;
- The need of improving major donors' understanding of the challenges faced by developing countries; and
- Little financial flows reaching communities at local level. It is estimated by IFAD that only 1.7 percent of climate finance goes to small-scale farmers in developing countries despite their disproportionate vulnerability to the

impacts of climate change. Limited experience and knowledge among fishers, fish farmers and governments of climate smart adaptation actions in fisheries and aquaculture.

12. What is the collective progress made towards achieving the long-term vision on the importance of fully realizing technology development and transfer in order to improve resilience to climate change and to reduce greenhouse gas emissions referred in Article 10.1 of the Paris Agreement? What is the state of cooperative action on technology development and transfer?

FAO recognizes the importance of achieving lasting long-term progress in advancing technology development and transfer, in particular in agriculture, realizing that the ultimate objective for climate change adaptation and mitigation in agriculture is producing more food more efficiently under changing cultivation conditions, while simultaneously achieving net reductions in GHG emissions from food production and marketing. The tremendous rate at which climate is changing necessitates a swift and radical shift in coping strategies relying on the use of technology in agriculture, especially in developing countries. It is important to note that technology can be an enabler but could also lead to a technological divide impacting smallholder farmers, who due to the high initial investment costs and need for training and education, may not have access to the benefits.

According to the FAO's Strategic Framework for 2022-2031, FAO will apply in all programmatic interventions four cross-cutting/cross-sectional "accelerators", such as: technology, innovation, data and complements (governance, human capital, and institutions). It is critical that these accelerators are inclusive and gender-sensitive, are used to spur development and minimize trade-offs among the SDGs and development priorities. At FAO "scaling up technology and innovation" are viewed as priorities contributing to increase in food security, protection of biodiversity, restoration of ecosystems and tackling climate change.

New and emerging technologies are already changing the food and agriculture sector, and most governments or agri-food systems actors have harnessed their potential but the barriers for broader technology diffusion and uptake remain. The major barriers experienced by providers of technological solutions are: difficulty in demonstrating value, limited access to investment, an 'unsympathetic' regulatory landscape and difficulty in reaching customers. Technology users identify lack of awareness, high capital costs, long return on investment, lack of verified impact and regulatory restrictions are issues impeding quick technology uptake. FAO is directing its efforts to help farmers take full advantage of new technologies such as digital agriculture, biotechnologies, precision agriculture, innovation in agroecology, 5G, and Artificial Intelligence to increase food production whilst respecting the environment. FAO has implemented a number of initiatives contributing to the progress in agricultural technology development and innovation for combating climate change. Here are a few examples:

- FAO's Hand-in-Hand Initiative and its Geospatial Data Platform uses big data and information to accelerate agricultural transformation and sustainable rural development, especially for the poorest countries.
- Together with Google, we launched Earth Map, which gives access to global agricultural, environmental and climate information for decision-making.
- FAO's Climate Change Knowledge Hub provides information and data on climate change in the agriculture and land use sectors from over 50 organizations with links to learning materials, reports, guidelines, policy briefs, tools and more.
- Other FAO's initiatives which have innovation at their heart include the Green Cities Initiative and the 1000 Digital Villages Initiative, COVID-19 Response and Recovery Programme, as well as the International Platform for Digital Food and Agriculture - an inclusive, multi-stakeholder forum to identify how the world's food and agricultural sectors can harness digital tools such as e-commerce, blockchain and Artificial Intelligence for improved pest control and crop production, and early warning of food security threats.

13. What progress been made on enhancing the capacity of developing country Parties to implement the Paris Agreement (Article 11.3 Paris Agreement)?

Knowledge management in disaster, climate, crisis and conflict risk management good practices. The Knowledge Platform on Resilience (KORE) developed a framework to facilitate systematic knowledge and learning processes aiming to identify and capture effective and impactful interventions and approaches contributing to strengthening the resilience of vulnerable people, livelihoods and ecosystems in the face of shocks and stresses, including climate change and climate-related risks. KORE's work is driven by knowledge gaps, needs and opportunities, and its range of products are designed to inform future investments for more strategic, quality and coherent policy and programming work in food crises contexts. The platform specifically facilitates processes of:

- **Generating *evidence-based knowledge*** to illustrate the disaster, climate risks and crisis effects as well as the opportunities and impacts brought about from a range of interventions and practices implemented by FAO and partners.
- **Facilitating *the organization of consultative/learning events and webinars*** with key external partners to deepen and enrich collective knowledge on resilience and climate resilience in agriculture and food systems.
- **Developing capacities *by raising awareness and training*** on a range of functions (technical, M&E, etc.) on the unique role of Knowledge Management and Learning to support resilience programming and contribute to tackle this climate and other protracted crises.

Sustainable livestock management[2]

FAO offers a variety of capacity building support options that contribute to implementation of the goals of the Paris Agreement. One area that is presented here relates to policy measures in livestock sector, whereby FAO supports member countries to conduct comprehensive policy analysis to support climate actions in the livestock sector, including technical assistance to the World Bank, in order to mainstream the Climate Smart Livestock principles in investment projects that enhance the contribution to increase in productivity, mitigation and adaptation. This initiative also ensures that mitigation co-benefits are tracked in a better way and can be reflected at the national level as the UNFCCC commitments. FAO supported countries to raise the ambitions of their climate actions in the livestock sector through capacity development to improve GHG emissions inventories based on the Tier 2 methodology, institutional arrangements, MRV and policy analysis.

Joint analysis of food insecurity and malnutrition, with conflicts and climate change, weather extreme events among the main driver of hunger, and financial flows. FAO is hosting and supporting the Global Network Against Food Crisis, which is an alliance of humanitarian and development actors united by the commitment to tackle the root causes of food crises and promote sustainable solutions through shared analysis and knowledge, strengthened coordination in evidence-based responses and collective efforts across the Humanitarian, Development and Peace (HDP) nexus. It produces its Global Report on Food Crisis (GRFC). The annual GRFC provides a consensus-based overview of the world's food crises (FSIN and Global Network Against Food Crises, 2021). The 2021 edition reported the growing severity and magnitude of these crises with at least 155 million acutely food-insecure people in need of urgent assistance in 55 countries/territories in 2020. This figure represented the highest number in the GRFC's five-year existence, reflecting the compounding impacts of persistent conflict/insecurity, and economic shocks, including those associated with the COVID-19 pandemic, climate change and weather extremes.

Analysing financing flows to address food crises caused by the impacts of climate change among other impacts. It provides decision makers with an analysis of financing flows on food sectors – food security, agriculture and nutrition – in countries with food-crisis situations identified in the GRFC. Its main objectives are to: (i) understand how the international community and national governments are addressing food crises; and (ii) provide evidence-based indications of financial allocations (GNAFC, 2021).

Guiding questions related to efforts referred to in decision 19/CMA.1, paragraph 6 (b), 1 that:

Address the social and economic consequences and impacts of response measures

14. Pursuant to Article 4.15, 4.7 of the Paris Agreement and Decision 19/CMA.1 paragraph 6(b)(i), what is the collective progress of efforts made that address the social and economic consequences and impacts of response measures, including relevant support systems while implementing mitigation policies and actions towards the achievement of the Paris Agreement goals?

Investing in carbon neural and sustainable agrifood systems

There is a wide range of estimated costs and societal benefits for engaging food and land use systems in the fight against climate change. Yet the vast majority suggest very high returns for society. The total economic mitigation potential of crop and livestock activities, including soil carbon sequestration and better grazing land management, is estimated at 3 – 7 percent of total anthropogenic emissions by 2030 – based on the 2020 data (Santos *et al.*, 2021). The potential economic value of mitigating these emissions can conservatively amount to USD 60 billion to

[2] For other FAO initiatives that are enhancing capacity of developing country Parties to implement the Paris agreement, please see examples under questions 14 and 18.

USD 360 billion, according to assumed shadow price and offsetting costs, using USD 50–100 per tonne of CO2eq as social cost of carbon (World Bank, 2017) and USD 10 per tonne of CO2eq as offsetting costs. More broadly, reducing emissions, halting and restoring biodiversity loss, improving health and nutrition, and achieving inclusive growth can produce an annual societal return of USD 5.7 trillion by 2030 (FOLU, 2019). Furthermore, the evidence shows that the volume of investments reportedly focused on environmental and social outcomes or sustainability reached USD 30 trillion in 2018. This constitutes 25 percent of assets professionally managed globally, representing a three-fold increase since 2012 (GSI-Alliance, 2018).

Social and economic benefits of investing in disaster risk reduction

Disaster risk reduction good practices that work at farm-level and which, with small investments, can have a significant positive impact on the resilience of their livelihoods. Investing in practices and technologies intended to reduce disaster risks at the farm level provides farmers with economic and social benefits that are significantly higher than the benefits they gained from previously used practices. For example, on average, disaster risk reduction practices and technologies generates benefits 2.2 times higher than practices previously used by farmers under hazard conditions. The average observed benefit–cost ratio is 3.7 in hazard cases – under non-hazard conditions this rose to 4.5. Benefits included both increases in agricultural production as well as avoided hazard-associated loss and damage (FAO, 2019a).

Anticipatory actions

FAO has implemented 37 anticipatory action projects in 24 high risk countries since 2016, the majority of which anticipated shocks on food security ahead of hydro-meteorological hazards caused by climate change. Some examples and an analysis of their impacts include:

- In Bangladesh, the distribution of sealable storage drums and animal feed ahead of the peak of major floods in 2020 contributed to reduce animal mortality and flood damages to stored crop seeds (FAO, 2021b);
- In Southern Madagascar, the distribution of vegetable seeds, water pumps and micro-irrigation kits ahead of the 2017/18 drought played a key role in ensuring access of vulnerable households to an acceptable and more diversified diet (FAO, 2019b);
- In Kenya, livestock protection interventions ahead of the 2016/17 drought helped increase milk production and sustain children's nutrition (FAO, 2018a);
- Other examples include investment in desert locust surveillance and control in Greater Horn of Africa and Yemen (FAO, 2021c), effective use of early warning information for livestock in Mongolia (FAO 2018b), providing farmers and herders with wheat crop protection packages, cash for work for rehabilitating in Afghanistan (FAO, 2021d), implementing anticipatory actions to mitigate the combined impact of drought in the department of La Guajira, Colombia, and the migration crisis on livelihoods and food security of migrants, returnees and host communities in Venezuela (FAO, 2019c), and analysing sex-segregated focus group discussions and providing equal access to early warning systems in the Philippines that led to an increase in women's contribution to household decision-making and income (FAO, 2020c).

Climate change adaptation

Climate change adaptation projects for fisheries and aquaculture implemented in developing countries with the support of FAO have led to synergistic benefits in social and economic development (see further information above under questions 4-8). Some examples include:

- In Chile, the FAO project significantly contributed to improving the adaptive capacity to climate change of the local fisheries and aquaculture sector in all four pilot coves. The high quality in-person participatory capacity-building sessions, raising awareness about topics such as productive diversification, adaptation to climate change, aquaculture and tourism, helped establish more resilient fishing and aquaculture systems, affecting women and young people in particular (FAO, 2021e).
- In Kenya, FAO supported rehabilitation of over-exploited mangrove forests in coastal areas through partnerships with local communities. In total over 268,000 mangrove seedlings were planted, and new mangrove nurseries were established to support wild fisheries restoration. The local communities diversified income through aquaculture of seaweed, crab, milkfish, and shrimp.
- In South Africa, FAO supported the acquirement of skills, knowledge and empowerment of coastal communities, in particular women, to be able to start and improve their own individual or group sustainable supplementary or alternative income. This is particularly critical in the face of declining reliability of income and benefits from fishing as a result of climate change.

- FAO identified a replicable approach to account for local specific needs of smallholder farmers, consisting of targeting agronomic solutions in response to the climate and socio-economic, and institutional challenges assessed, and to linking sustainably produced crops to markets. Implementing this approach in Zambia showed a yield increment between 46 percent to 123 percent. In Sri Lanka, it reduced the quantity of fertilizer used by 27 percent and the total irrigation requirements by 20 percent, so that 15 percent more land could be irrigated in the dry season thanks to the water saved in the rainy season.

Avert, minimize and address loss and damage associated with the adverse effects of climate change:

15. Pursuant to Article 8 of the Paris Agreement and Decision 19/CMA.1 paragraph 6(b)(ii), what is the collective progress of efforts made to enhance understanding, action and support towards averting, minimizing and addressing loss and damage associated with the adverse effects of climate change, in the light of equity and the best available science?

The FAO's **Methodology for Damage and Loss Assessment in Agriculture**[3] supports countries to generate precise and holistic data for the agricultural sector and can be used for national Disaster Risk Reduction/Management, resilience and to help monitor the achievement of global targets (Conforti *et al*., 2020). In addition, FAO has been supporting countries to enhance data availability on disaster impacts in crop and livestock production and for the first time ever introducing the systematic monitoring of disaster impacts in forestry, fisheries and aquaculture subsectors.

Furthermore, three major reports on loss and damage provide insights of climate impacts on agriculture and food security:

- **The Impact of Disaster and Crises on Agriculture and Food Security** (FAO, 2021f) provides a powerful case for investing in disaster risk reduction and resilience – especially data gathering and analysis for evidence-informed action – to ensure agriculture's crucial role in building inclusive and resilient food systems. It presents the most recent trends in agricultural production loss attributed to disasters across all agricultural sectors, covers new ground by translating agricultural production losses into nutritional terms, provides some initial analysis of COVID-19 impacts on food production, and explores technological innovations that are changing the way we study and respond to natural hazards.
- **The Impact of Disasters on Agriculture and Food Security 2017** (FAO, 2018c). This report provides the latest data on the impact of disasters and crises on agriculture sectors, combined with sound analysis of remaining gaps and challenges. Its attention is not limited to natural disasters alone, but includes the first-ever analysis of the effect on agriculture of conflict and food chain crises. The 2017 report also considers how the entire sector is impacted: not only crops and livestock, but also forestry, fisheries and aquaculture.
- **The Impact of Disaster on Agriculture and Food Security 2015** (FAO, 2015).This study assesses the impact of medium to large scale natural hazards and disasters on the agriculture sector and subsectors in developing countries between 2003 and 2013, focusing on direct physical damage and indirect economic losses. The findings of the study are expected to support national and international efforts to reduce damage and losses caused by disasters and strengthen the resilience of the agriculture sector, in line with resilience targets set under the Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals, and the Paris Agreement.

[3] Developed in close collaboration with UN Office for Disaster Risk Reduction and used for reporting in the the Sendai Framework Monitor for Indicator C2.

Cross-cutting

16. To achieve the purpose and long-term goals of the Paris Agreement (mitigation, adaptation, and finance flows and means of implementation, as well as loss and damage, response measures), in the light of equity and the best available science, taking into account the contextual matters in the preambular paragraphs of the Paris Agreement:

a. What are the good practices, barriers and challenges for enhanced action?

Good practices:[4]

- **Climate change, biodiversity and nutrition nexus**. Humankind is facing a perfect storm of climate change, biodiversity loss and multiple forms of malnutrition coexisting in the same country, community, household and even individual. Turning it around, requires to adopt an agrifood-systems perspective – from the ecosystems supporting food production to the actual production, processing, distribution, preparation and consumption of food. Doing so, can help to identify key policies and actions needed to address the challenges of climate change, biodiversity loss and nutrition and clarify their health, environment, social equity and economic impacts. FAO has identified entry points and recommendations for concrete actions by key stakeholders – governments, academia, civil society, private sector, and development partners –to build resilient, inclusive, and sustainable agrifood systems (FAO, 2021g).
- **Access to innovation and technology**. Innovation in agriculture cuts across all dimensions of the production cycle and along the entire value chain - from crop, forestry, fishery or livestock production to the management of inputs to market access. FAO assists member countries in unlocking the potential of innovation to drive socio-economic growth, ensure food and nutrition security, alleviate poverty and improve resilience to climate change, thereby helping to achieve the Sustainable Development Goals. For example, FAO's Hand-in-Hand Initiative and its Geospatial platform is an evidence-based, country-led and country-owned initiative to accelerate the Sustainable Development Goals using the most sophisticated tools available, including advanced geo-spatial modeling and analytics to identify the biggest opportunities to raise the incomes and reduce the inequities and vulnerabilities of rural populations, who constitute the vast majority of the world's poor. Other examples include digital tool for climate change adaptation and risk reduction which analyses in near-real time climate and weather data at farm level and translates them in useful information and recommended actions for farmers, tools for participatory assessment of land degradation assessments and sustainable land management in grasslands and pastoral areas (Perez Rocha, 2020), and Rift Valley Fever Early Warning Decision Support Tool (RVF DST) helps farmers to predict areas at risk of climate-sensitive diseases in animals in order to enhance risk mitigation and anticipatory actions (FAO, 2021h).
- **Climate sensitive investments**. Agricultural investments that are climate-sensitive are key to ensure that the world's growing population has sustainable access to safe, affordable and nutritious food while also reducing agriculture's emissions and making it more productive and resilient. FAO has compiled practical reference material on integrating climate risk considerations at all stages of the investment project cycle, from design to implementation, monitoring and evaluation. The materials showcases a wealth of FAO developed tools, tested approaches and selected experiences that will help investment practitioners design and implement more and better climate sensitive investments in agriculture (FAO, 2021i).
- FAO has compiled a set of good practices for **climate-adaptive fisheries management** that have proven their effectiveness and can be adapted to different contexts, based on case studies from Myanmar, the Northeast Atlantic, South Africa, Uruguay, south-eastern Australia, Belize, the Western and Central Pacific Ocean, the Philippines, the Mediterranean, Canada (east and west coasts) and Peru (Bahri, 2021). Furthermore, the FAO Fisheries and Aquaculture Adaptation Toolbox compiles the various current and recommended adaptation options in the fisheries and aquaculture sector.

Barriers and challenges:[5]

- **Indigenous Peoples** still are facing violation of their rights, in particular their territorial rights experienced along forced displacement, land grabbing, or illegal extractive industries. Deforestation, urban migration, conservation-schemes add to the violations of their rights, in particular Free Prior and Informed Consent (FPIC) and self-determined development, leading to an erosion of their food systems, and ultimately, increased GHG

[4] See also examples provided under questions 13 and 18.

[5] See also examples provided under Sections on Mitigation (questions 1-3), Adaptation (questions 4-8) and question 11.

emissions. Despite the increased recognition of the relevance of Indigenous Peoples' traditional knowledge in the climate crisis and biodiversity conservation debates (IPBES, 2019), the traditional knowledge of Indigenous Peoples is still too often excluded from the scientific debate on climate change, biodiversity conservation and food systems (The Global-Hub on Indigenous Peoples' Food Systems, 2021) despite the valuable inputs it can provide. The exclusion of traditional knowledge in scientific and policy debates represents not only a threat to Indigenous Peoples willing to preserve their traditional lifestyles, but also a missed opportunity for the rest of world to learn from them.

- So far there has been little integration of climate change into **fisheries and aquaculture** related laws, regulations and policies. Some efforts have been made to address climate change impacts but in a fragmented manner; the responses need to be more formalized and institutionalized.
- While the overall finance for addressing climate change impacts has been increasing in the last two decades, the proportion of **climate finance in agriculture and land use sectors** have been decreasing (see question 11). Furthermore, there is limited variety of financing sources, current adaptation finance flows are well below estimated needs (UNEP, 2021), and climate finance often does not reach the communities that are most affected by climate change impacts (for example Indigenous Peoples have only been receiving less than 1 percent of the available climate funding so far). Agriculture and land-use sector stakeholders need to address the dynamic and accelerate the global climate finance landscape and transition to more diverse access to types and sources of flows. To enable such transitions, the agriculture sector stakeholders should have strategies outlining the main actors, mechanisms and architecture of climate finance in a comprehensive and holistic manner.

b. What is needed to make finance flows consistent with a pathway towards low GHG emissions and climate-resilient development?

Direct support for decarbonization efforts in agrifood systems.

Agriculture and food systems increasingly have been targeted for reducing the GHG emissions. Nevertheless, complex issues on how to achieve carbon neutrality remain. Furthermore, definition of carbon neutrality is controversial. There is limited reliable and up-to-date inventory data on food production processes for accurate carbon footprint assessments and while farm-level innovations and methodologies hold promise, they are far from perfect. Innovative institutional approaches and deployment of digital technologies are required to cut transaction costs particularly as many agrifood systems rely on fragmented supply chains including large numbers of smallholder farms. In addition, governance challenges remain in verifying the effectiveness and reliability of the different stages of a carbon neutrality path. The lack of a clear governance framework with companies often employing internal approaches to reduce emissions without independent oversight hinders more decisive action on the part of agrifood businesses, and also fails investors and consumers. Importantly, the costs of becoming carbon-neutral can be significantly higher for smaller companies and offsetting costs – at current prices – can be much lower than reduction costs across emissions-intensive sectors. While the prospect for carbon-neutral agrifood systems seems distant today, there is a need to push this agenda forward because of the critical links between agriculture and climate change. The private sector can genuinely embrace shared values to reduce costs, mitigate risks, protect brand value, ensure long-term supply chain viability, and gain competitive advantages (Santos *et al*., 2021). There is a need for a direct support for decarbonisation in agrifood systems:

- Support through public interventions and engagement of International Financial Institutions is often required to subsidize measurement, reporting and verification (MRV) efforts for small scale actors, when carbon related externalities are not correctly priced. Clear pathways should be developed to allow companies to inclusively compete in the space for carbon neutrality.
- Direct support through concessional financing, subsidies, and other forms (such as green public procurement instruments) can all help companies' decarbonization and MRV efforts on a wider scale. Companies need to systematically support agrifood actors in their wider supply chains to qualify for carbon marketplaces and payment for ecosystem service schemes to ensure they are compensated for sustainably applying agricultural regenerative practices.
- Direct support also applies to the development of green financial products and financing options for agrifood systems players who adequately carry out carbon reductions. The promotion and implementation of de-risking solutions especially tailored to reducing transaction costs and risks associated with promoting sound governance mechanisms for low-carbon pathways are important.

- Finally, decarbonization will also require maintaining and protecting carbon sinks. Halting deforestation and leveraging the role of farmers as suppliers of environmental services are vital to address climate change (Santos *et al*., 2021).

c. What are the needs of developing countries related to the ambitious implementation of the Paris Agreement?

FAO has analysed the common challenges and needs that many developing countries have already experineced and may experience in future in implementing their NDCs and the global targets of the Paris Agreement (Crumpler *et al*., 2021) and identified five interrelated areas of intervention:

- **Capacity building for the Enhanced Transparency Framework (ETF)**, which requires countries to provide national inventory reports of their GHG emissions and information on the progress made in implementing their NDCs. These reporting measures are important, as they will show whether countries are actually meeting their commitments. Done correctly, these measures can build confidence among governments, investors and other stakeholders, and spur a scaling up of global climate actions.
- **Coherent policy frameworks** for climate action in the agriculture sectors. In many countries, the proposed NDC targets exceed what can be achieved through existing policy frameworks. Government ministries will have to undertake new policy initiatives and measures to reach their mitigation and adaptation targets and support is needed on integrating climate considerations into policies, strategies, programmes and projects in a way that is coherent with national priorities and the actions of other ministries.
- **Research analysis and tools**. Because of constraints related to resources and capacities, research and analysis on climate vulnerabilities and adaptive capacities has often been limited to specific sectors or regions. Given that the world's most impoverished people earn their living from agricultural work, the widespread knowledge gaps in this area for all the agriculture sectors are particularly problematic.
- **Capacity development for implementation** and action in the agriculture sectors. A lack of capacity can prevent many developing countries from scaling up climate action in the agriculture sectors. Some stakeholders may have the technical capacities and expertise to support sustainable and climate-smart agriculture development, but lack the functional capacities to put this expertise into practice.
- Mobilizing **investment for the development of the agriculture sectors**. Current flows of public international climate finance do not coincide with the priorities developing countries have specified in their NDCs. Developing countries give adaptation the highest priority, but existing flows of climate finance overwhelmingly favour mitigation. Furthermore, the agriculture sectors continue to receive only a modest share of international climate finance, which has proportionally decreased in past two decades. Financing flows need to reflect the importance that developing countries assign to adaptation and agriculture.

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17. What is needed to enhance national level action and support, as well as to enhance international cooperation for climate action, including in the short term?

One of the ways for enhanced national action and support is promotion of preventative multi-sectoral approach, which leads to coordination and collaboration among various stakeholder groups (e.g., government, civil society, and private sector) and sectors (e.g., disaster management, health, environment, and economy) to jointly achieve a policy outcome guided by the climate science. By engaging multiple sectors, policymakers can leverage knowledge, expertise, outreach, and resources, benefiting from their combined and varied strengths as they work toward the shared goal of building climate resilience and combating adverse impacts of climate change based on the projected climate scenarios. Below are the examples of coordination action supported by FAO.

Anticipatory action mainstreamed into disaster risk management and climate adaptation policies. National level action can be enhanced by bridging the work of humanitarian and development actors. For example, humanitarian anticipatory action can contribute to achieve the objectives set under the Paris Agreement, such as those related to enhancing early warning system capacity and reaching "the last mile" as well as those focussing on protecting the most vulnerable from shocks. Yet more needs to be done to effectively integrate an anticipatory action approach into disaster management systems and climate action. This requires political will and coherent thematic and financial programming beyond humanitarian, DRR and climate adaptation silos - recognizing that they have complementary and mutually reinforcing roles in protecting the most vulnerable from increasingly severe and compounding shocks.

- An encouraging example is the ASEAN Agreement of Disaster Risk Management and Emergency Response (AADMER) Work Programme 2021-2025, signed by the 10 ASEAN Member States and clearly integrating

anticipatory action as a priority. Its implementation will help to ensure an anticipatory approach is embedded in national and local policies and processes and thus further support effective disaster risk management in the region.

- Another example is the 2021-2025 Strategy for Food Crises Prevention and Management approved by the Government of Niger: anticipation is part of the overall objective, and it represents one of the main pillars of this important national strategy.

Global multi-stakeholder platform to facilitate collaboration on reaching carbon neutrality along international agrifood supply chains. FAO is establishing a platform that will coordinate efforts to create synergy and maximize efficiency of private sector initiatives, and contributing to better governance of GHG quantification, reduction and offsetting processes. In particular, the platform would help companies, producer organizations and business associations to measure, reduce and offset GHG emissions. In addition, FAO is supporting efforts to measure and reduce GHG emissions by the banana sector through the development of an online tool and capacity development activities. The activities have benefited four key banana-exporting countries and will be expanded to reach a total of ten major exporting countries. They will also be broadened to include other fruit export industries. FAO is also exploring the potential of block chain technology to track along supply chains and promote bananas produced using low-carbon technology.

In addition, efforts should be made in aligning reporting processes for countries under UNFCCC and other conventions to explore synergies and avoid duplicated efforts, improve efficiency and transparency of the negotiations process under the UNFCCC, and strengthening inter-institutional collaboration covering different sectors and promoting cross-sectoral planning, decision-making, and implementation at national level.

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18. What is the collective progress made by non-Party stakeholders, including indigenous peoples and local communities, to achieve the purpose and long-term goals of the Paris Agreement, and what are the impacts, good practices, potential opportunities, barriers and challenges (Decision 19/CMA.1, paras 36(g) and 37(i))

The mobilization and engagement of a diversity of actors is important for achieving meaningful progress under the Paris Agreement. However, one of the main challenges for the multi-stakeholder enhanced climate action is the lack of **shared narrative** on climate adaptation and resilience actions across and within sectors and among public, private and community actors. This is leading to inaction and fragmentation instead of scale and impacts. An additional constraint is the separation or silos between mitigation, adaptation and finance actions, instead of addressing these altogether as essential and mutually supportive actions, especially for people and countries most vulnerable and at risk from climate change. Therefore, interventions should always combine these three elements on reducing GHG emissions, reducing and managing multiple climate risks and support scalability and replication elsewhere in view of the urgency of the unfolding climate emergency. Below are the examples of the initiatives and events recently supported by the FAO with the view to contributing to encouraging coordinated multi-actor approach to climate action. Some of these initiatives could be replicated and scaled up as good practices encouraging partnership building and coordination.

The **UNFCCC Marrakesh Partnership on Global Climate Action (MPGCA)** and its Climate Action Pathway is one of the tools that offers more coherent narratives and actions on climate change across and within sectors in order to achieve 1.5° C resilient world in 2050. FAO supports the guidance given in the pathway documents. For example, Climate Action Pathway on Land Use is defining a narrative and actions on protection, restoration, production and post-production, covering the full lifecycle of land use and their production systems. Similarly, Climate Action Pathway on Resilience offers narrative for multi-stakeholders where disaster risk reduction and management (including emergency preparedness and response) and climate change adaptation approaches are combined around climate risk management to develop a suite of actions to address climate risks and impacts across and within systems and related sectors. Equally, Climate Action Pathway on Oceans and Coastal Zones brings together "Oceans Community" consisting of academia, NGOs, private sector and intergovernmental organizations and contributes to the global climate dialogue, showcases action on the ground, and ensures aquatic food systems are addressed within the UNFCCC.

The United Nations Food Systems Summit (UNFSS) convened in 2021 led to the creation of a series of multi-stakeholder initiatives to follow up on the commitments of the Agenda 2030 through national pathways for the transformation of agrifood systems. FAO participated actively in the Resilience action area, including in the sharing of the Climate Resilient Food Systems (CRFS) Alliance. This CRFS Alliance provides a platform for achieving climate resilient food systems by synergizing efforts across the different actors who are part of the alliance. The mission of

the alliance is to join forces to accelerate action towards climate resilient, sustainable, equitable and inclusive food systems in a coherent manner, focusing on the most vulnerable countries and regions, in particular arid and semi-arid lands (ASALs), Small Island Developing States (SIDS), land-locked developing countries (LLDCs) and least developed countries (LDCs).

Furthermore, global challenges, such as climate change, but also biodiversity conservation or hunger reduction would not be tackled without including Indigenous Peoples in the debate. Indigenous Peoples are key allies of the Sustainable Development Goals. More inter-culturally in recognizing traditional knowledge as valid source of evidence in policy-making, as well as full inclusions de Indigenous Peoples in policy discussion are critical. A coalition on Indigenous Peoples' food systems supported by Mexico, Finland, Norway, New-Zealand, Dominican Republic, Canada and Spain was launched at the Summit. The coalition aims to promote "respecting, recognizing, protecting and strengthening Indigenous Peoples' food systems" across the world. While Indigenous Peoples represent 6.2 percent of the world population, they inhabit around 25 percent of the world land (Garnett *et al.*, 2018), and they preserve 80 percent of the remaining terrestrial biodiversity on the planet (Sobrevilla, 2008). In addition, an estimated 36 percent of the world's remaining intact forests are on Indigenous Peoples' lands (Fa *et al.*, 2020), therefore preserving Indigenous Peoples' knowledge and practices on food systems in critical in tackling climate change.

The **Global-Hub on Indigenous Peoples' Food Systems.** The Global-Hub is a knowledge platform that brings together indigenous and non-indigenous experts, scientists and researchers to establish a knowledge dialogue that is gathering evidence-based contributions on Indigenous Peoples' food systems. The Global-Hub informs policy discussions and research agendas on food security, biodiversity and climate change at local, national and regional levels ensuring that indigenous peoples' knowledge and rights are at the center and that their food systems are valued and protected. By working horizontally and vertically in knowledge sharing, the Global-Hub supports the well-being of indigenous peoples and the preservation of their ancestral territorial management practices and food systems that have fed indigenous peoples for centuries while preserving 80 percent of the remaining biodiversity in the planet (FAO *et all*. 2021). The Global-Hub provides technical contributions to the Coalition on Indigenous Peoples' food systems resulting from the UN Food Systems Summit, but also the High-Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS), the UN Decade of Ecosystems Restoration, the UN Decade of Indigenous Languages, the UN Decade on Action on Nutrition, the UN decade on Family Farming, the UNFCCC, and other relevant policy processes.

The **Biocentric Restoration Initiative** responds to the need for new models of conservation, restoration and sustainable food systems that can strengthen global efforts to conserve biodiversity, address food security and reduce carbon emissions. It relies on the traditional knowledge and ancestral territorial management practices of indigenous peoples that have proven to preserve biodiversity and sustainably preserve forests across the world. FAO works with indigenous organizations to develop Indigenous Peoples' biocentric restoration plans and implement them in Ecuador, India, Peru and Thailand, blending their ancestral practices with new methods and technologies that can ensure the long-term preservation of the ecosystems in the territories they inhabit. In addition, in Peru, 12 radio micro-programs were developed in coordination with the Peruvian Confederation of Amazonian Nationalities (CONAP). The programs included information and interviews about traditional practices and ancestral knowledge of forest governance, food systems and climate change adaptation. They were translated into Awajun language and disseminated through 5 local radio stations in Atalaya and Satipo, as well as through FAO's Soundclound, FAO Peru's Twitter. Indigenous Peoples participated in the elaboration of communicational content for radio and social media in the context of the World Food Day.

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