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CLIMATE CHANGE AND ITS IMPACT ON THE WORK AND ACTIVITIES OF FAO

Executive Summary

The FAO Strategy on Climate Change (FAO SCC) was endorsed at the 156th Council in April 2017, following a yearlong consultation process including with relevant Governing Bodies. FAO is committed to further accelerating the delivery of the Strategy on Climate Change, especially in the context of the biennial theme for 2018–2019 “Climate change and its impact on the work and activities of FAO”, the Paris Agreement and the 2030 Agenda for Sustainable Development.

This document presents an overview of the impacts of climate change on agriculture and food systems together with an update on how FAO is implementing the three Outcomes of its Strategy on Climate Change.

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I. The impacts of climate change on agriculture and food systems

1. Crops, livestock and natural resources are vulnerable to the impacts of climate change. Ensuring the sustainability of agricultural production and food systems is fundamental to delivering on multiple objectives including national and global climate goals, the 2030 Agenda for Sustainable Development, the FAO Strategy on Climate Change as well as the Sendai Framework for Disaster Risk Reduction.

Crops, livestock and natural resources under a changing climate

2. Climate change is affecting agricultural production and food systems through gradual shifts, such as elevated temperatures and atmospheric carbon dioxide concentrations, incursion of coastal waters and increased salinity, through increasing frequency and intensity of extreme weather events as well as through changes in the intensity, frequency and patterns of precipitation.

3. Crop production is highly sensitive to climate and climate change is affecting yields, quality and the diversity of many crop species in different regions. Livestock productivity is adversely affected by climate change through impacts on animal biodiversity, health and reproduction. Climate change also affects the composition, availability, quality and yields of forage and feed crops.

4. Moreover, climate change is altering the distribution, transmission, frequency and severity of pests and diseases of crops and animals. Some of the most dramatic effects of climate change on animal pests and diseases are likely to be seen among arthropods, such as mosquitoes, midges, ticks, fleas and sandflies, which are important vectors of livestock and human diseases. With changes in temperatures and humidity levels, the populations of these pests may expand their geographic range, and expose animals and humans to diseases to which they have no natural immunity. Climate change will also affect crop pests and diseases through changes in survival rates, higher developmental and reproductive rates and modified migration patterns, leading to increased pest and disease pressure on crops.

5. Damage to and depletion of natural resources due to climate change undermines the ecosystem services on which agricultural production depends. Soil is a key resource in natural production environments for crops and fodder, and is at risk from erosion due to predicted increases in drought and flooding. Similarly, many regions are likely to face changes in water availability that will impact agricultural production.

The impacts of climate change on food safety

6. Climate change affects food production systems and supply chains, with several direct and indirect implications for food safety. It may lead to changes in the pattern and prevalence of food safety hazards resulting in the need for increased vigilance to enable effective adaptation of food safety controls at appropriate stages of the food chain. Periods of drought, higher temperatures and humidity increase the risk of fungal growth and contamination of key food commodities, as seen in the case of cereal mycotoxins. Exposure to these toxic fungal metabolites through consumption of contaminated foods remains a major concern to public health globally, which is being further exacerbated by climate change.

7. Furthermore, the changes in patterns of plant and animal diseases could lead to the over- or misuse of agricultural chemicals, that might result in unsafe levels of pesticide and veterinary drug residues in food.

8. Food safety risks may also arise through changes in the availability of water resources due to climate change. Issues related to water scarcity and consequential negative impacts on water quality could impact food safety, for example through the transmission of microbiological and chemical

contaminants from irrigation and food production as well as through food processing, handling and preparation.

II. How to transition towards a climate-resilient and sustainable agriculture

A. Promoting sector-based solutions to upscale climate change adaptation and mitigation action

Crops

9. Climate resilient and sustainable crop production needs to be promoted through context-specific and culturally appropriate approaches, practices, technologies and innovations responding to the direct and indirect impacts of climate change on crops and crop production.

10. The identification, development and promotion of crop species and varieties that are resilient and adapted to a range of changing conditions and emerging needs, will be important to ensure the sustainability of agricultural production systems as well as food and nutrition security. The genetic diversity represented by the predominant staple crops is limited. Therefore, there is a critical need to harness the genetic variability and biodiversity available and to promote the conservation of plant genetic resources for food and agriculture, including crop wild relatives and traditional crop varieties. In this respect, neglected or underutilized species (NUS) (please see COAG/2018/INF7) provide a considerable source of genetic diversity that could be well adapted to adverse, marginal and changing environments.

11. Increasing the genetic pool will allow for the development of varieties that may be more resistant to abiotic and biotic stresses and facilitate the long-term adaptation of agricultural systems. One promising approach includes farmer participatory plant breeding in which farmers and plant breeders collaborate in crop varietal development. Plant breeding, adapted pest management practices as well as timely monitoring and forecasting of environmental conditions are of paramount importance in preventing crop losses due to pests and diseases. Initiatives to promote and take advantage of greater genetic and crop diversity will have to be combined with effective seed delivery systems and extension services.

12. Adoption of varieties and practices by farmers will require support through extension services, demonstration plots and information of performance in as many agro-ecological regions as possible along with market acceptance of new or different products. This will enable farmers to use quality seeds and planting materials of well-adapted crop varieties in a timely manner.

Livestock

13. Livestock systems are an important livelihoods asset, which provide food and income and also serve as an essential safety net during times of crisis. At the same time, these systems have relatively large greenhouse gas (GHG) emissions, caused by feed production, enteric fermentation, animal waste and land-use change. There are win-win solutions that exist in livestock production, which can boost food security, increase economic opportunities for livestock keepers and reduce the impacts of climate change. Action in this sector will require harnessing animal biodiversity as well as additional finance and investment to facilitate the transition to climate smart approaches.

14. There is considerable scope for reducing emissions from livestock production. Policies supporting changes in management practices will be important in building resilience and improving carbon and nitrogen management in livestock systems while contributing to food security through higher food output.

15. Emissions and emission intensities can be reduced by improving productivity through better feed, genetics, health and animal husbandry. Improved pasture management offers an important

opportunity to sequester atmospheric CO₂ as soil carbon in sustainable and integrated systems that include livestock. Such measures also enhance land and animal productivity, in addition to improved biodiversity and water retention. Better integration of livestock into the circular bio-economy as well as a focus on reduced losses and waste along the value chain, also has the potential to decrease emissions. Feeding animals by-products that humans cannot eat, recycling and recovering nutrients and energy from animal waste reduces GHG emission leakages from food systems.

Natural resources

16. Natural resources are the basis for climate resilient and sustainable agricultural production while agricultural practices directly affect those natural resources, ecosystems and landscapes. As such, sustainable agriculture and food systems are possible only through an approach that takes into account the conservation and efficient use of natural resources that support increased resilience to climate change.

17. For instance, to prevent soil erosion, farmers need to be encouraged to permanently cover soil with plants, ideally using food crops and species or those that contribute to improved soil fertility. In the face of water scarcity, crop production technologies, including raised beds, mulches, grafting and drip irrigation should be promoted. Protected cultivation systems offer vast potential to conserve water, nutrients and to control pests and diseases, and are suited to both rural and peri-urban areas.

18. FAO provides solutions to support its Member Nations in tackling soil erosion and water scarcity, including through the Global Soil Partnership and Global Water Scarcity Initiative. The solutions must be complemented by actions targeting the sustainable use of natural resources within the entire food system.

B. Promoting transformative and integrated approaches to achieve sustainable agriculture

19. There is an urgent need to promote transformative change in how food is grown, produced, processed, transported, distributed and consumed. As such, adopting an integrated food systems perspective for climate change adaptation and mitigation will be critical to providing food security for all, especially for the most vulnerable groups including women, youth, indigenous people and other communities living in fragile environments.

III. Implementing the FAO Climate Change Strategy

20. The FAO Strategy on Climate Change provides the framework for FAO action to achieve three mutually reinforcing outcomes. Outcome 1 focuses on enhancing the capacities of Member Nations while Outcome 2 pursues the integration of food security and nutrition and the agricultural sectors in the international agenda on climate change. The achievement of Outcomes 1 and 2 is underpinned by Outcome 3, which aims to strengthen coordination and delivery of FAO work on climate change.

Outcome 1: Enhanced capacities of Member Nations on climate change through FAO leadership as a provider of technical knowledge and expertise

Increasing knowledge and technical support to countries on climate-smart agriculture approaches

21. FAO is promoting Climate Smart agriculture (CSA) which is a farmer-focused approach that can facilitate a transition to agriculture and food systems, which are more productive, sustainable, resilient and climate-friendly. It aims to tackle three main objectives: sustainably increasing agricultural productivity and incomes; adapting and building resilience to climate change; and reducing and/or removing GHG emissions, where possible. The second edition of the CSA Sourcebook was released at COP23 in November 2017 and additional learning materials are being

developed to facilitate countries' use and application of the tools and resources it provides. FAO is currently working with the African Development Bank (AfDB) to build the capacity of its staff for mainstreaming CSA into the AfDB's portfolio. Furthermore, FAO has delivered training on CSA to several African countries to help them achieve their NDC ambitions. FAO has also promoted CSA through the Talanoa Dialogue organized during the Subsidiary Bodies (SB) meetings in Bonn. Finally, FAO, as a member of the Global Alliance for Climate Smart Agriculture, has used different fora to share CSA experiences.

Supporting countries to implement their NDCs and NAPs

22. Nationally Determined Contributions (NDCs) define countries' commitments on adaptation and mitigation actions in response to climate change. Actions in the food and agricultural sectors feature prominently in the NDCs and particularly those of developing countries. Yet, when it comes to the implementation of these commitments, in many countries, the agriculture authorities are not well integrated into climate change governance processes. Many poor and vulnerable countries face a limited ability to adapt to climate change, making these countries even more vulnerable to climate change. FAO is working to support agriculture authorities to remedy this situation, including through the enhancement of institutional coordination with other relevant sectors, including environment, energy, trade, transport, industry.

23. FAO aims to support over 40 countries in the biennium 2018-19 to implement and further refine the agricultural sector components of their NDCs. Following the publication of FAO's first detailed regional analysis of NDCs for Eastern Africa in 2017, FAO will carry out additional regional analyses on the NDCs. FAO is developing a platform to support NDC implementation and facilitate knowledge and information sharing among relevant stakeholders. FAO continues to facilitate the Thematic Working Group on Agriculture, Food Security and Land Use under the umbrella of the NDC Partnership, which was launched in 2017 and currently has a membership of around 20 actively participating countries. The Working Group supports the agricultural authorities in implementing the NDC commitments in the agricultural sectors by collecting and disseminating best practices, success stories and lessons learned through a peer-to-peer learning approach. As part of this work FAO is also contributing to the overall NDC Partnership in-country engagement, assisting countries in planning NDC implementation and in monitoring progress.

24. FAO is currently supporting 11 countries in Africa, Asia and Latin America through the joint UNDP-FAO *Integrating Agriculture in National Adaptation Plans* (NAP-Ag) programme to identify and integrate climate change adaptation measures into relevant national planning and budgeting processes. This integration will help enhance institutional capacities and processes for operationalization of climate response strategies in the agricultural sectors as well as the facilitation of stronger partnerships between Ministries of agriculture, environment, planning and finance, and other national partners. The programme contributes to NAP formulations and the achievement of targets laid out in partner countries' Nationally Determined Contributions (NDC) and the Sustainable Development Goals (SDG). FAO aims to continue and scale up its support in 2018-19 also in the context of the dedicated GCF readiness window.

Supporting countries to integrate food security, agricultural sectors and climate change in their national policies

25. FAO has been providing guidance to countries on integrating climate considerations into policies, strategies, programmes and projects in a way that it is coherent with national priorities and the actions of other Ministries. This includes a) formulating and implementing NDCs, in a way that representatives from all relevant sectors are involved in the planning process and to bridge agriculture and environmental planning processes; and b) providing capacity development and technical support to countries on how to develop and implement National Adaptation Plans (NAPs), Nationally Appropriate Mitigation Actions (NAMAs), through NAP-Ag and MICCA programmes and on implementing the Sendai Framework for Disaster Risk Reduction in the agriculture sector.

Facilitating country access to climate finance

26. FAO is supporting countries to scale up climate investment in the agricultural sectors by assisting them to access resources from the Green Climate Fund (GCF) and the Global Environment Facility (GEF), as well as from other sources including European Commission, multilateral development banks and bilateral partners. On the period from 2007 to 2017, the total value of climate finance in FAO's GEF portfolio amounts for USD 424 million from which 33 projects (21 percent of the portfolio value) are focused on climate change adaptation with USD 157 million in funding. USD 267 million address climate change mitigation as part of multi-focal area projects, while 1 percent of the project portfolio focuses exclusively on climate change mitigation. FAO is supporting countries in all regions to develop and deliver technically sound projects that contribute to achieving the type of transformational change sought by the GCF. Finally, FAO is supporting countries as a 'delivery partner' under the GCF Readiness Programme.

Outcome 2: Improved integration of food security and nutrition, agriculture, forestry and fisheries considerations within the international agenda on climate change through reinforced FAO engagement

Ensuring the perspectives of food security and agricultural systems are prioritized in international fora

27. FAO has been actively engaged in the international climate change agenda under the UNFCCC supporting countries both within and outside the negotiations. This ongoing activity is helping to ensure that food and agricultural systems are well featured as global priority within the international climate agenda. FAO follows several negotiation work streams and supports countries within and outside formal sessions on issues related to agricultural sectors. These include mitigation, adaptation, REDD+, capacity building, finance, gender. FAO has been actively involved in this area, and is expected to continue to play a key role at COP24 given the relevance of the Koronivia Joint Work on Agriculture (KJWA) and the Polish Presidency priorities which include forests, soils and transition to green economy. FAO is collaborating with both governments and non-state actors including through the Marrakech Partnership for Global Climate Action, the NDC-Partnership, the Paris Committee on Capacity Building and the Intergovernmental Panel on Climate Change.

Contributing to the Koronivia joint work on agriculture

28. The adoption of the Koronivia Joint Work on Agriculture decision at COP23 marked a milestone for the recognition of the importance of the agricultural sectors in climate action. Prior to the UNFCCC session held in Bonn, Germany in May 2018, FAO hosted a Koronivia Dialogue on 8-9 March for the agriculture negotiators, which helped them prepare for the formal negotiations. Following a request by countries, FAO is analyzing the submissions made by various stakeholders on the KJWA and will present the results at COP24 to help support the implementation of the KJWA. In collaboration with the Rome-Based Agencies (i.e. IFAD and WFP) FAO organized two events on KJWA and climate finance, during the UNFCCC May session in Bonn. Both events attracted over 130 people including negotiators, UN Agencies and youth representatives, and helped advance discussion on the content of the KJWA.

29. FAO submitted its [views](#) on the six following elements of the KJWA explaining how it would contribute to implementing them through its expertise and unique strength:

- a) Modalities for implementation of the outcomes of the five in-session workshops on issues related to agriculture and other future topics that may arise from this work;
- b) Methods and approaches for assessing adaptation, adaptation co-benefits and resilience;

- c) Improved soil carbon, soil health and soil fertility under grassland and cropland as well as integrated systems, including water management;
- d) Improved nutrient use and manure management towards sustainable and resilient agricultural systems;
- e) Improved livestock management systems;
- f) Socioeconomic and food security dimensions of climate change in the agricultural sector.

Promoting greater awareness of the food and agricultural sectors in international climate financing

30. FAO is actively engaging with relevant funding bodies to underscore the importance of the agricultural sectors in ensuring sustainable development and the implementation of the Paris Agreement.

31. Resource mobilization for climate and environment finance activities is being increased in 2018–19 through greater strategic engagement with the Global Environment Facility (GEF), the Green Climate Fund (GCF) as well as with other multilateral and bilateral resource partners. The partnership between FAO and GEF will continue growing as GEF-7 is rolled out, enhanced by the integration of the FAO's GEF unit into the Climate and Environment Division (CBC). GEF-7 programming aims at supporting transformation of key systems and maximizing impacts. FAO is collaborating closely with the GCF Secretariat and other stakeholders in order to provide technical input and raise awareness and understanding on the importance of the food and agricultural sectors in international climate finance decisions. In addition, FAO is preparing an initiative to support up to ten Direct Access Entities (DAE) to develop high-quality GCF projects in the agricultural sectors to be launched in 2018.

32. The private sector presents an important source of climate finance. FAO is taking on a more proactive role in collaborating and guiding private flows of capital into climate related agricultural investments.

Outcome 3: Strengthened coordination and delivery of FAO work on Climate Change.

33. Climate Change is reflected in the five FAO Strategic Programmes, which guides the work of FAO units. The importance of climate change was reinforced by the endorsement by the FAO Council of the 2018-19 biennial Theme *Climate Change and its impacts on the work and activities of FAO*.

34. FAO continues to facilitate its peer-to-peer exchange of knowledge and expertise under the Technical Network on Climate Change (TNCC) through regular e-updates, biweekly Climate Change Study Circle Sessions, webinars on international developments, opportunity for peer review and emerging topics of importance and annual face-to-face meetings with FAO's key regional climate change focal points. The TNCC is also used to consult and peer-review documents and knowledge products on climate change within FAO. It ensures effective dissemination and exchange of experience in addressing climate change in agriculture across FAO. The TNCC is linked to other technical networks such as the Water, Land and Tenure networks to enhance knowledge sharing and integration across thematic area.

35. FAO has been strengthening its internal coordination to best support countries in their climate negotiations under the UNFCCC. This also includes coordination of FAO's engagement in activities and initiatives under the Marrakech Partnership on Global Climate Action, including the Global Framework on Water Scarcity in Agriculture in a Changing Climate (WASAG). In addition, through a partnership with Google, FAO is leading on the development of Collect Earth, a digital tool that enables data collection through Google Earth, allowing countries to assess land use, deforestation and the quantification of environmental impacts.

36. Enhanced collaboration with the Rome-based Agencies (RBAs) and the Committee on World Food Security (CFS) is facilitated through joint activities on climate change, including the informal RBA working group on climate change as well as cooperation on the preparation and participation in relevant international meetings and fora. FAO, WFP and IFAD jointly applied for the organization of a side event at the 45th CFS session on strengthening the link between climate change and food security.

The way forward

37. FAO will continue to implement its Action Plan to deliver the three Outcomes of the FAO Strategy on Climate Change. This includes continued efforts to strengthen FAO internal coordination, and to seek opportunities to enhance capacities of its Member. Some of these would be achieved through FAO's ongoing initiatives, and through its engagement in international fora such as COP24 of the UNFCCC in December, the UN Secretary General 2019 Climate Summit, and the 2019 High-level Political Forum on Sustainable Development.