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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Item 3 of the Provisional Agenda

Nineteenth Regular Session

Rome, 17–21 July 2023

CLIMATE CHANGE AND GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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Documents can be consulted at www.fao.org

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I. INTRODUCTION

1. The Commission, at its Eighteenth Regular Session, noted the potential genetic resources for food and agriculture (GRFA) offer for climate change adaptation and mitigation, including the improvement of related pests and diseases resistance, and stressed the need for their conservation and sustainable use to fully explore and exploit this potential. It requested FAO to fully consider GRFA in its work on climate change.¹
2. The Commission requested FAO to review and revise, as appropriate, the draft questions on climate change and GRFA,² as presented to the Commission at its Eighteenth Regular Session, with a view to shortening, simplifying and testing them, and streamlining the reporting process, for consideration by the intergovernmental technical working groups (Working Groups). The questions, as revised by the Working Groups, should also be reflected in future reporting formats through which countries report on the implementation of Global Plans of Action.³
3. Furthermore, the Commission also requested the Working Groups to review and revise, as appropriate, the *Voluntary Guidelines to Support the Integration of Genetic Diversity into National Climate Change Adaptation Planning*,⁴ (Voluntary Guidelines) taking into account the need to address the vulnerabilities of GRFA to climate change, in line with relevant international agreements, for consideration by the Commission at its next session.⁵
4. The present document proposes activities that the Commission may wish to consider as part of its work on climate change. It summarizes developments in and FAO actions on climate change and provides a revised version of the draft questionnaire. It outlines potential changes to the Voluntary Guidelines and proposes a process for their revision, taking into consideration the guidance received from the Working Groups. More detailed information on FAO's work on climate change is provided in the document *FAO's work on climate change*.⁶

II. BACKGROUND

5. Food security and climate change are among the greatest challenges the world faces. Climate change, along with other drivers, is already undermining the recent progress made in the fight against hunger and malnutrition. FAO estimates that in 2021 between 702 and 828 million people faced hunger worldwide.⁷ Extreme weather events are increasing in intensity – 52 percent of countries were exposed to three or four types of climate extremes (heat spell, drought, flood or storm) in 2015–2020, compared with 11 percent in 2000–2004.⁸ Climate variability and the increasing intensity and frequency of climate extremes as part of climate change pose multiple challenges: these affect all dimensions of food security and add pressure on already fragile agrifood systems.
6. The need to maintain food production in the face of climate change is a fundamental objective of the United Nations Framework Convention on Climate Change (UNFCCC).⁹ The 2015 Paris Agreement additionally recognizes “the fundamental priority of safeguarding food security and ending

¹ CGRFA-18/21/Report, paragraph 16.

² CGRFA-18/21/3, *Appendix II*.

³ CGRFA-18/21/Report, paragraph 19, see <https://www.fao.org/cgrfa/policies/global-instruments/gpa/en/>

⁴ FAO. 2015. *Voluntary Guidelines to Support the Integration of Genetic Diversity into National Climate Change Adaptation Planning*. Rome. <https://www.fao.org/3/a-i4940e.pdf>

⁵ CGRFA-18/21/Report, paragraph 20.

⁶ CGRFA/WG-PGR-11/23/5/Inf.1.

⁷ FAO, IFAD, UNICEF, WFP & WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. Rome, FAO. <https://doi.org/10.4060/cc0639en>

⁸ FAO, IFAD, UNICEF, WFP & WHO. 2021. *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome, FAO. <http://www.fao.org/3/cb4474en/cb4474en.pdf>

⁹ UNFCCC, Article. 2.

hunger, and the particular vulnerabilities of food production systems to the adverse effects of climate change”.¹⁰

7. Climate change is having significant impacts on agrifood systems.¹¹ In the face of increasing extreme weather events around the globe, including high precipitation, heatwaves and droughts, the Intergovernmental Panel on Climate Change (IPCC) warns of unequivocal, unprecedented, irreversible trends that increasingly put the planet and humanity in peril.¹² Globally, 10 percent of the currently suitable area for major crops and livestock is projected to be climatically unsuitable by mid-century and 31–34 percent by the end of the century.¹³ Agrifood systems, therefore, need to adapt and be made resilient to the climate changes that are already unavoidable. Modifications at global, regional, national and local levels, including for crops, livestock, forests, fisheries, aquaculture and related value chains, and associated biodiversity, are fundamental components of climate action because agrifood systems are heavily affected by climate change and, at the same time, contribute to global greenhouse gas (GHG) emissions.¹⁴

8. Impacts of the climate crisis, ranging from heatwaves and heavy precipitation to droughts and tropical cyclones, are projected to intensify.¹⁵ This requires urgent resilience building, including through preparatory actions, adaptation and mitigation in agrifood systems. Unless there are immediate and deep emission reductions across all sectors, limiting global warming to 1.5 °C will be beyond reach.¹⁶ This is further highlighted in the IPCC 2022 report on *Climate Change 2022: Mitigation of Climate Change*.¹⁷ The 2022 report on *The State of Food Security and Nutrition in the World* noted that, while small-scale producers bear the devastating consequences of changing climate, degraded soils, food insecurity and irregular migration, only about 1.7 percent of the money so far invested globally in climate finance is reaching small-scale producers, and it is mostly going to mitigation objectives compared to adaptation.¹⁸

9. GRFA are the basis for sustainable agriculture and food security. However, the impact of climate change on GRFA is still not receiving the attention it deserves notwithstanding its global scale and significance for enhancing climate action including adaptation and resilience. A better understanding of genetic resources, their role in agriculture and food production, and their sustainable

¹⁰ https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf

¹¹ The “agrifood system” covers the journey of food (for example, cereals, vegetables, fish, fruits and livestock) from farm to table – including when it is grown, harvested, processed, packaged, transported, distributed, traded, bought, prepared, eaten and disposed of. It also encompasses non-food products such as forestry, animal rearing, use of feedstock, biomass to produce biofuels and fibres. It constitutes all of the activities, investments and choices made, and it impacts on the livelihoods of all the people that play a part in getting us these agri-food products. (C 2021/28, <https://www.fao.org/3/nf649en/nf649en.pdf>).

¹² IPCC. 2021. *Climate Change 2021: The Physical Science Basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

¹³ IPCC 2022. *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK and New York, USA, Cambridge University Press. 3056 pp. doi:10.1017/9781009325844.

https://report.ipcc.ch/ar6/wg2/IPCC_AR6_WGII_FullReport.pdf

¹⁴ IPCC. 2020. *Climate Change Land: an IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, Greenhouse Gas Fluxes in Terrestrial Ecosystems*, https://www.ipcc.ch/site/assets/uploads/sites/4/2020/06/IPCCJ7230-Land_SM5_200226.pdf

¹⁵ IPCC. 2021. *Climate Change 2021: The Physical Science Basis*. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

¹⁶ IPCC. 2022. *IPCC Press Release (2022/15/PR): The evidence is clear: the time for action is now. We can halve emissions by 2030*. <https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-pressrelease/>

¹⁷ IPCC. 2022. *Climate Change 2022: Mitigation of Climate Change*. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK, and New York, USA, Cambridge University Press. doi: 10.1017/9781009157926.025. <https://www.ipcc.ch/report/ar6/wg3/>; IPCC. 2023 AR6 Synthesis Report. <https://www.ipcc.ch/report/sixth-assessment-report-cycle/> and <https://www.ipcc.ch/report/ar6/syr/resources/spm-headline-statements/>

¹⁸ FAO, IFAD, UNICEF, WFP & WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. Rome, FAO. <https://doi.org/10.4060/cc0639en>

management, is a prerequisite for developing solid climate change adaptation and mitigation strategies. Genetic resources diversity plays a key role in carbon sequestration and climate change mitigation in aquatic ecosystems, natural and planted forests, annual and perennial crops and grasslands, and soils. The diversity of GRFA, which provides a vast reservoir of options for adapting agricultural production to the impacts of climate change, thus needs to be conserved and used for the well-being of present and future generations. Many GRFA are conserved in genebanks (*ex situ*) while others need to be conserved in agricultural production systems or in natural or semi-natural habitats (on farm and *in situ*). However, a combined approach involving complementary *in situ* and *ex situ* conservation measures is recommended. Access to genetic resources with relevant traits for climate change adaptation and mitigation is crucial as many individual countries rely, for a significant part, on genetic resources originating from other countries.

10. Adaptation and mitigation should not be considered alternative or conflicting approaches. Rather, they both represent complementary aspects of a comprehensive strategy to tackle all the impacts of climate change. While mitigation operates on a longer time scale (up to 70 years) and requires a worldwide coordinated approach to reduce gradually and eventually curb GHG emissions at planetary level, adaptation acts also on shorter time horizons and mainly at local level (from national downwards) and can be modulated according to the different local situations (i.e. local impacts, vulnerabilities and resilience capacities). Moreover, agrifood systems offer considerable opportunities for synergies between adaptation and mitigation measures. Lack or inappropriateness of mitigation measures can increase the need for and therefore the costs of adaptation measures.

11. Climate change is an overarching challenge that is directly related to FAO's global goals and programme priorities under the four betters (better production, better nutrition, a better environment, and a better life, leaving no one behind). FAO supports countries in transforming their agrifood systems to achieve the Sustainable Development Goals, including eradication of hunger and loss of genetic diversity. The *FAO Strategy on Climate Change 2022–2031*¹⁹ places agrifood systems from production to consumption at the centre to deliver impactful innovative solutions for adaptation and mitigation. Adaptation to and mitigation of climate change in the agricultural sectors require bold actions within the next decade. Climate change adaptation and mitigation policies and programmes should clearly reflect the need to conserve and sustainably use genetic resources to achieve sustainable development.

12. Climate change has been part of the Commission's work plan since 2013. Since then, the Commission has worked to showcase the impacts climate change is having on GRFA, increase the attention it deserves and enhance climate action towards the conservation, characterization and sustainable use of GRFA. However, evidence of climate change adaptation and mitigation at the genetic resources rather than species level has been difficult to collect and compile.

III. FAO ACTIVITIES ON CLIMATE CHANGE

13. The Commission, at its Eighteenth Regular Session, requested FAO to increase capacity-building and training programmes on climate change adaptation and mitigation in collaboration with existing intergovernmental and international bodies.²⁰ It further stressed the importance of sufficient funding and capacity to support relevant research and development in the fields of GRFA and biodiversity for food and agriculture (BFA), especially in developing countries.²¹ The document *FAO's work on climate change*²² provides more information on FAO's work and shows that many projects address certain aspects of GRFA, and much guidance is already available on climate change for both adaptation and mitigation. However, there is an urgent need to mainstream sustainable use and conservation of BFA and GRFA across climate change adaptation and mitigation programmes, projects and policies and into national climate change adaptation and mitigation planning.

¹⁹ FAO. 2022. *FAO Strategy on Climate Change 2022–2031*. Rome. <https://www.fao.org/3/cc2274en/cc2274en.pdf>

²⁰ CGRFA-18/21/Report, paragraph 21.

²¹ CGRFA-18/21/Report, paragraph 16.

²² CGRFA/WG-PGR-12/23/5/Inf.1.

IV. REVIEW AND REVISION OF THE DRAFT QUESTIONNAIRE

14. The Working Groups recommended that the Commission request FAO to further shorten and simplify the questionnaire with a view to avoid duplication of other reporting processes. They recommended that the questions, when circulated to National Focal Points, target the different sectors of GRFA.²³ They further recommended that once circulated and responses received, the Secretariat prepare a summary, with a view to establishing a baseline of national responses of all sectors.²⁴

15. The Working Group on Aquatic Genetic Resources for Food and Agriculture noted that Members may submit comments on the draft questionnaire by 1 May 2023.²⁵ No comments were received.

16. No consensus was reached during the Working Group discussions on whether the questionnaire should address the mitigation of climate change and the nationally determined contributions (NDC) of countries and it was recommended that the Commission consider this at its forthcoming session.²⁶

17. Taking these inputs into account, the Secretariat proposes to divide the questionnaire into two separate questionnaires targeted at different National Focal Points/National Coordinators. The draft questionnaires are given in *Appendixes I and II*. *Appendix II* also includes two questions that the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture agreed should be transferred from the *Draft country report questionnaire supporting the preparation of the Third Report on The State of The World's Animal Genetic Resources for Food and Agriculture*²⁷ to the draft questionnaire on climate change.²⁸

V. REVISION OF THE VOLUNTARY GUIDELINES TO SUPPORT THE INTEGRATION OF GENETIC DIVERSITY INTO NATIONAL CLIMATE CHANGE ADAPTATION PLANNING

18. The Voluntary Guidelines, developed under the aegis of the Commission and approved by the FAO Conference in 2015,²⁹ currently aim to:

- i. promote the use of GRFA in climate change adaptation and support their integration into national climate change adaptation planning;
- ii. support genetic resources experts and those involved in climate change adaptation to identify and address the challenges and opportunities of GRFA in adaptation; and
- iii. promote the involvement of genetic resources stakeholders in the national climate change adaptation planning process.

19. Thus, the Voluntary Guidelines very much focus on adaptation. Climate change is an ongoing and accelerating process and GRFA will have to be conserved and continuously mobilized to meet new challenges as conditions change over the coming decades. Since the approval of the Voluntary Guidelines, important developments have occurred, including the adoption of the Koronivia Joint Work on Agriculture in 2017,³⁰ and of the new FAO Strategy on Climate Change 2022–2031,³¹ adopted by the 170th Session of the Council,³² which both emphasize the role of the agriculture

²³ CGRFA/WG-FGR-7/23/Report, paragraph 17.

²⁴ CGRFA/WG-AnGR-12/23/Report, paragraph 31; CGRFA/WG-AqGR-4/23/Report, paragraph 27; CGRFA/WG-FGR-7/23/Report, paragraph 18; CGRFA/WG-PGR-11/23/Report, paragraph 28.

²⁵ CGRFA/WG-AqGR-4/23/Report, paragraph 27.

²⁶ CGRFA/WG-AqGR-4/23/Report, paragraph 27; CGRFA/WG-FGR-7/23/Report, paragraph 18.

²⁷ CGRFA-19/23/10.3/Inf.1.

²⁸ CGRFA-19/23/10.1, paragraph 22.

²⁹ C 2015/REP, paragraph 52(b).

³⁰ COP decision 4/CP.23; Drieux, E., St-Louis, M., Schlickerrieder, J. & Bernoux, M. 2019. *State of the Koronivia Joint Work on Agriculture - Boosting Koronivia*. Rome, FAO.

<https://www.fao.org/3/ca6910en/CA6910EN.pdf>

³¹ FAO. 2022. *FAO Strategy on Climate Change 2022–2031*. Rome.

<https://www.fao.org/3/cc2274en/cc2274en.pdf>

³² CL 170/REP.

sectors in both climate change adaptation and mitigation. The Commission's recent global assessment reports on aquatic GRFA,³³ and on BFA,³⁴ both make reference to climate change adaptation and mitigation, as do the resulting policy responses – the *Framework for Action on Biodiversity for Food and Agriculture*³⁵ and the *Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture*.³⁶

20. The study *The role of genetic resources for food and agriculture in adaptation to and mitigation of climate change*,³⁷ published in 2022 following a request by the Commission,³⁸ concludes that the contributions of the characterization, conservation, breeding and sustainable use of GRFA to climate change adaptation and mitigation should continue to be strengthened in all sectors, as the potential to use GRFA in climate change adaptation and mitigation remains largely untapped. It further shows that little information on the impact of climate change on GRFA, their related vulnerability and knowledge of adaptation and mitigation at the genetic level, is available for the sectors. Furthermore, the study identifies differences between the knowledge on adaptation and mitigation across the different sectors. It is apparent that many sectors focus more on adaptation, such as the animal and plant sector, whereas others also focus on mitigation, such as the forest sector.

21. The study highlights that there are still a number of knowledge gaps related to the use of GRFA in climate change adaptation and mitigation. It is evident that there is a need for awareness raising and capacity development for both producers and policymakers.

22. Given the similarities and differences across the different sectors of GRFA, a broad approach might be needed to reap climate change solutions, including supporting developing country growth priorities with a sustainability lens, enabling cutting-edge technology to address climate issues, and promoting collaboration and sharing of knowledge and good practices. The revision of the Voluntary Guidelines, which currently focus on the genetic resources dimension of adaptation, could further broaden their scope to take into account both adaptation and mitigation in a balanced way. This could include, in particular, a revision of *Chapter 4: Elements and Steps*.

23. Furthermore, an update of the Annexes to the Voluntary Guidelines could reflect the revisions to *Chapter 4* and the recently adopted *Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture*³⁹ and the *Framework for Action on Biodiversity for Food and Agriculture*.⁴⁰

24. With regards to the process, and as recommended by the Working Groups,⁴¹ a global multi-stakeholder workshop should be convened to exchange information and experiences, in particular on breeding programmes directed towards adaptation traits, share views and priorities, and to provide an

³³ FAO. 2019. *The State of the World's Aquatic Genetic Resources for Food and Agriculture*. FAO Commission on Genetic Resources for Food and Agriculture assessments. Rome.

<https://www.fao.org/3/CA5256EN/CA5256EN.pdf>

³⁴ FAO. 2019. *The State of the World's Biodiversity for Food and Agriculture*, J. Bélanger & D. Pilling, eds. FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome. 572 pp.

<http://www.fao.org/3/CA3129EN/CA3129EN.pdf>

³⁵ FAO. 2022. *Framework for Action on Biodiversity for Food and Agriculture*. FAO Commission on Genetic Resources for Food and Agriculture. Rome. <https://doi.org/10.4060/cb8338en>

³⁶ FAO. 2022. *Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture*. FAO Commission on Genetic Resources for Food and Agriculture. Rome. <https://doi.org/10.4060/cb9905en>

³⁷ FAO. 2022. *The role of genetic resources for food and agriculture in adaptation to and mitigation of climate change*. FAO Commission on Genetic Resources for Food and Agriculture. Rome.

<https://doi.org/10.4060/cb9570en>

³⁸ CGRFA-18/21/Report, paragraph 17.

³⁹ FAO. 2022. *Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture*. Commission on Genetic Resources for Food and Agriculture. Rome.

<https://doi.org/10.4060/cb9905en>

⁴⁰ FAO. 2022. *Framework for Action on Biodiversity for Food and Agriculture*. FAO Commission on Genetic Resources for Food and Agriculture. Rome. <https://doi.org/10.4060/cb8338en>

⁴¹ CGRFA/WG-AnGR-12/23/Report, paragraph 32; CGRFA/WG-AqGR-4/23/Report, paragraph 28; CGRFA/WG-FGR-7/23/Report, paragraph 19; CGRFA/WG-PGR-11/23/Report, paragraph 29.

opportunity for an initial discussion of possible changes to the Voluntary Guidelines. The workshop could also provide a forum for stakeholders, in particular farmers and Indigenous Peoples and local communities, to exchange information and experiences and share views and priorities. The Voluntary Guidelines, as revised in the light of the outcomes of the workshop and taking into account the responses received to the questionnaire, could be considered in regional consultations and, subsequently by the Working Groups and the Commission at their next sessions.

VI. GUIDANCE SOUGHT

25. The Commission may wish to review the draft questionnaire, as contained in *Appendixes I and II*, also taking into consideration the outcomes from the Working Groups.

26. The Commission may wish to request the Secretariat to:

- (i) circulate the finalized questionnaires for completion by all National Focal Points/National Coordinators, by 1 September 2023,⁴² with a view to establishing a baseline of national responses of all sectors;
- (ii) prepare a summary of responses to the questionnaire for consideration by the Working Groups and the Commission at their next sessions;
- (iii) convene a global multi-stakeholder workshop on climate change and GRFA to exchange information and experiences, in particular on breeding programmes directed towards adaptation traits, share views and priorities, and discuss possible changes to the *Voluntary Guidelines to Support the Integration of Genetic Diversity into National Climate Change Adaptation Planning*;
- (iv) revise the Voluntary Guidelines in light of the outcome of the workshop and taking into account the responses received to the questionnaire, for consideration in regional consultations and subsequently by the Working Groups and the Commission at their next sessions; and
- (v) continue to increase capacity-building and training programmes on climate change adaptation and mitigation in collaboration with existing intergovernmental and international bodies.

27. The Commission may wish to invite Members to make use of the FAO tools and guidance on climate change adaptation and mitigation when developing or updating their National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs).

⁴² CGRFA/WG-AnGR-12/23/Report, paragraph 31.

APPENDIX I

**FOR COMMISSION NATIONAL FOCAL POINTS:
DRAFT QUESTIONNAIRE ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE
AND CLIMATE CHANGE**

Climate change poses new challenges to the management of the world's genetic resources for food and agriculture (GRFA), but it also underlines their importance. The study *The role of genetic resources for food and agriculture in climate change adaptation and mitigation*⁴³ noted that the specifics of climate change adaptation and mitigation differ by sector.

The present questionnaire, directed at national governments represented by their National Focal Points to the Commission on Genetic Resources for Food and Agriculture, aims to gather information at country level on activities related to the impacts of climate change on GRFA and to the role of GRFA in climate change adaptation and mitigation.

The information required may have to be gathered through consultations with relevant national stakeholders.

Country:	
Prepared by (name, agency/institution, function):	
Date:	

Climatic impacts on GRFA

Q1: Has your country, in the last five years, undertaken a climate risk and vulnerability assessment of GRFA, taking into account the concerns of different genetic resource sectors and socio-economic implications? If yes, please indicate who took the action – government, research, non-governmental organization/civil society organization (NGO/CSO).

	Yes	If yes, please provide further information and the reference to the report(s)	No
GRFA in general			
Animal genetic resources for food and agriculture			
Aquatic genetic resources for food and agriculture			
Forest genetic resources			
Micro-organism and invertebrate genetic resources for food and agriculture			
Plant genetic resources for food and agriculture			
Other (please provide details)			

⁴³ FAO. 2022. *The role of genetic resources for food and agriculture in adaptation to and mitigation of climate change*. FAO Commission on Genetic Resources for Food and Agriculture. Rome.
<https://doi.org/10.4060/cb9570en>

Integration of GRFA into the climate change planning processes

Q2: Does your country have a National Adaptation Plan (NAP) or a comparable document?

If your country has a NAP or comparable document, please provide the title of the document and a link

Does it include GRFA sustainable use and conservation for one or more sectors?

- Yes
If yes, please indicate the sectors as applicable
- No

Q3: Has your country developed a specific adaptation plan for GRFA for one or more sectors, included in wider sectoral or cross-sectoral adaptation plans?

- Yes
If yes, please specify the sectoral or cross-sectoral plan
- No

Q4: Does your country include GRFA sustainable use and conservation for one or more sectors in its Nationally Determined Contributions (NDC) or a comparable document?

- Yes, in the adaptation component
If yes, please specify sectors as applicable
- Yes, in the mitigation component
If yes, please specify sectors as applicable
- No

Q5: In national planning related to the contributions of GRFA to climate change action, or in the preparation of policies or national plans on this subject, have the following been taken into account? Please provide additional information where requested.

	Adaptation		Mitigation	
	Yes	No	Yes	No
The existing global plans of action for animal, aquatic, forest and plant genetic resources and the Framework for Action on Biodiversity for Food and Agriculture (add new global plans of action when adopted) (please specify)				
The significance of an integrated approach across the different sectors of GRFA				
Other relevant instruments (please specify)				
The different institutions involved in the characterization, conservation and use of GRFA (please specify the sector)				
The collaborative arrangements developed to prepare country reports for <i>The State of the World</i> reports on plant, animal, forest and aquatic genetic resources (please specify the sector)				
The various institutional arrangements that link GRFA sectors to national agricultural, environmental, health and planning entities or agencies (please specify)				

Q6: Which areas of GRFA management are highlighted as important for adaptation to and mitigation of climate change in your country's NAP, NDC and/or other climate-related national plans/strategies?

	GRFA Sector	Adaptation: yes/no	Adaptation: if yes, please specify	Mitigation: yes/no	Mitigation: if yes, please specify
Characterization					
Sustainable use and selection					
Conservation					
Access and benefit-sharing					

Q7: Has your country identified, and included in an official national policy document, possible synergies, conflicts or trade-offs between national adaptation/mitigation policies/plans for one or more sectors of GRFA and other aspects of national adaptation/mitigation planning?

	No	Yes.	If yes, indicate the document (link, reference)	If yes, specify the policies/plans	If yes, what are the synergies, conflicts or trade-offs in question?
GRFA in general					
Please specify GRFA sectors as applicable					

Q8: Has your country prepared policy-relevant materials intended to increase policymakers' awareness of the value of GRFA?

- Yes
If yes, please provide further information
- No

Implementation of climate change policies, programmes and projects

Q9: Has your country established the institutional arrangements, for example a country-level coordination mechanism, needed to strengthen the role of GRFA in national climate change adaptation and mitigation planning?

	Adaptation: yes/no	Adaptation: if yes, please specify	Mitigation: yes/no	Mitigation: if yes, please specify
Institutional arrangements for GRFA in general				
Institutional arrangements for the following components of GRFA as part of institutional arrangements set out in wider strategies/plans for the respective sector:				
Animal genetic resources for food and agriculture (as part of a livestock or agriculture sector plan, or similar)				
Aquatic genetic resources for food and agriculture (as part of an aquaculture or fisheries plan, or similar)				

Forest genetic resources (as part of a forestry or agroforestry plan, or similar)				
Micro-organism and invertebrate genetic resources for food and agriculture (as part of a wider plan addressing micro-organisms and invertebrates in the food and agriculture sector)				
Plant genetic resources for food and agriculture (as part of an agriculture, crop production or horticulture plan, or similar)				
Several sectors of GRFA (as part of an integrated plan covering several agriculture sectors)				
Several sectors of GRFA (as part of a land-use or rural development plan, or similar)				

APPENDIX II

**FOR SECTORAL NATIONAL FOCAL POINTS/NATIONAL COORDINATORS:
DRAFT QUESTIONNAIRE ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE
AND CLIMATE CHANGE**

Climate change poses new challenges to the management of the world's genetic resources for food and agriculture (GRFA), but it also underlines their importance. The study *The role of genetic resources for food and agriculture in climate change adaptation and mitigation*⁴⁴ noted that the specifics of climate change adaptation and mitigation differ by sector.

The present questionnaire, directed at the animal, aquatic, forest and plant sectors of countries, represented by their sectoral National Focal Points/National coordinators to the Commission on Genetic Resources for Food and Agriculture, aims to gather information at a sectoral level on activities related to the role of GRFA in climate change action.

The information required may have to be gathered through consultations with relevant sectoral national stakeholders.

Country:	
Prepared by (name, agency/institution, function):	
Sector	<p>Please indicate one of the following options:</p> <ul style="list-style-type: none"> • Animal genetic resources for food and agriculture • Aquatic genetic resources for food and agriculture • Forest genetic resources • Micro-organism and invertebrate genetic resources for food and agriculture • Plant genetic resources for food and agriculture • Biodiversity for food and agriculture/ Associated biodiversity/wild foods
Date:	

Climatic impacts on GRFA

Q3: Has your country, in the last five years, conducted a stock taking/inventory of the current state of conservation and use of [sector] GRFA, and did this include an analysis of the strengths, weaknesses, opportunities and threats (SWOT) in the context of climate change adaptation and mitigation, taking account of national development goals in relevant areas? Please indicate who took the action – government, research, non-governmental organization (NGO)/civil society organization (CSO) – and when?

- Yes, stocktaking and SWOT
- Yes, stocktaking only
- If yes, who and when? Please provide further information

⁴⁴ FAO. 2022. *The role of genetic resources for food and agriculture in adaptation to and mitigation of climate change*. FAO Commission on Genetic Resources for Food and Agriculture. Rome.
<https://doi.org/10.4060/cb9570en>

- No, but a stocktaking is planned
- No

Integration of GRFA into the climate change planning processes

Q2: Which of the following [sector] GRFA-related areas has your country considered in its sectoral or cross-sectoral NAP, NDC and/or other climate-related national plans/strategies?

- Improving *in situ* and *ex situ* conservation of GRFA
- Improving characterization and evaluation of GRFA, including of conserved materials
- Improving methods for identifying and making available appropriate local GRFA for particular circumstances
- Introducing new species, populations, varieties and breeds likely to be better adapted to changed/changing conditions
- Strengthening production systems' adaptability and resilience through diversification
- Improving the quality of supporting and regulating ecosystem services such as pollination, pests and diseases regulation and water-quality regulation
- Developing improved methods of breeding better adapted plant, animal, tree and fish varieties, breeds and populations
- Developing ways of capacity building, extension and information dissemination
- Increasing awareness of the value of GRFA
- Other: please specify

Implementation of climate change policies, programmes and projects

Q3: Has your country implemented the following types of projects related to [sector] GRFA and climate change adaptation and mitigation? Please include all projects, including those undertaken by the private sector or NGOs with a brief explanation or link.

	Yes/No	Please provide details
Capacity-development programmes for GRFA and climate change stakeholders		
Public-awareness campaigns		
Targeted selection and breeding		
Community-based testing programmes for new materials		
Research activities		
Conservation of GRFA		
Other		
No projects have been implemented		

Q4: Has your country/stakeholders in your country addressed the following [sector] GRFA management areas in the context of climate change adaptation and mitigation, including NAP and NDC implementation?

	Adaptation: yes/no	Adaptation: if yes, please specify	Mitigation: yes/no	Mitigation: if yes, please specify
Characterization				
Sustainable use and selection				
Conservation				
Access and benefit-sharing				

Q5: Has your country identified gaps and weaknesses in its institutional or technical capacity to undertake the various actions associated with the conservation and sustainable use of [sector] GRFA in the context of climate change adaptation and mitigation? If yes, which gaps and weaknesses were identified?

- Institutional gaps: yes/no
If yes, please specify and provide details of gaps
- Technical gaps: yes/no
If yes, please specify and provide details of gaps

Impact of implementation on GRFA, adaptation and mitigation

Q6: Has your country assessed the impact of management practices on the conservation and sustainable use of [sector] GRFA and on the ecosystem services they deliver, and identified and validated those practices that are found to be most conducive to climate change adaptation and mitigation?

- Yes, comprehensive for the whole sector
- Yes, for certain management practices in certain circumstances
If yes, specify practices that are conducive
- No

Q7: Has your country undertaken monitoring and impact assessment of the implementation of policies, projects or programmes mentioned in the questions above?

- Yes
If yes, please describe how the impact of the policies, projects or programmes was monitored and the results
- No

Additional sectoral questions specifically for Animal Genetic Resources for Food and Agriculture

Q8: Please indicate the extent to which climatic changes have affected or are predicted to affect animal genetic resources and their management in your country and describe these effects.

Element impacted by climate change	Impact of climate change on animal genetic resources over last ten years (none, low, medium, high)	Future impact of climate change on animal genetic resources and their management (predicted for the next ten years) (none, low, medium, high)	Describe the effects of climate change on animal genetic resources and their management (text)
Productivity of animals			
Reproduction			
Health and survival of animals			
Costs of animal production			
Cessation of animal production activity			
Shift in species and/or breeds raised			

Q9: Please indicate the extent to which breeding programmes in your country integrate in their breeding objectives aspects related to adaptation and resilience in the face of climate change and its effects (none, low, medium, high)⁴⁵

Species	Integration of breeding objectives related to adaptation and resilience	Describe briefly the traits and underlying data available (text)
Cattle (specialized dairy)		
Cattle (specialized beef)		
Cattle (multipurpose)		
Sheep		
Goats		
Pigs		
Chickens		
Managed bees		
[species]		

⁴⁵ Aspects related to adaptation and resilience in the face of climate change may correspond for instance to the inclusion of traits such as: heat tolerance; tolerance resistance or resilience to specific diseases or parasites, or selection for specific phenotypes.