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COUNCIL

Hundred and Sixty-eighth Session

29 November-3 December 2021

Report of the 18th Regular Session of the Commission on Genetic Resources for Food and Agriculture (CGRFA) (27 September-1 October 2021)

Executive Summary

The FAO Conference, at its 42nd Session, “mandated the Council, at its 168th Session, to consider for endorsement the Report of the 18th Regular Session of the Commission on Genetic Resources for Food and Agriculture.”¹ The Commission held its 18th Regular Session from 27 September to 1 October 2021 virtually; its report is contained in this document.

The Commission reviewed at this session the implementation of its global plans of action on animal, forest and plant genetic resources for food and agriculture and the status of preparation of new global assessment reports on plant and forest genetic resources. It also considered various cross-sectoral matters. It approved a draft Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture in response to *The State of the World's Aquatic Genetic Resources for Food and Agriculture* (2019) and endorsed a draft resolution on the conservation and sustainable use of biodiversity for food and agriculture and the Post-2020 Global Biodiversity Framework, for adoption by the Council (*Appendices D & F*). The Commission also endorsed, in response to the report on *The State of the World's Biodiversity for Food and Agriculture* (2019), a Framework for Action on Biodiversity for Food and Agriculture.

Suggested action by the Council

The Council is invited to

- a) adopt the Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture,
- b) adopt the resolution on *The conservation and sustainable use of biodiversity for food and agriculture and the post-2020 global Biodiversity framework*; and
- c) endorse the Report of the 18th Regular Session of the Commission on Genetic Resources for Food and Agriculture, including *the Framework for Action on Biodiversity for Food and Agriculture*.

¹ C 2021/REP, para. 45(b)

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**Food and Agriculture
Organization of the
United Nations**

COMMISSION ON
GENETIC RESOURCES
FOR FOOD AND
AGRICULTURE

CGRFA-18/21/Report

Eighteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture

27 September – 1 October 2021

**REPORT OF THE COMMISSION ON GENETIC RESOURCES
FOR FOOD AND AGRICULTURE**

**Eighteenth Regular Session
27 September – 1 October 2021**

The documents of the Eighteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture are to be found on the Internet at:

<http://www.fao.org/cgrfa/meetings/detail/en/c/1414719/>

They may also be obtained from:

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I. OPENING OF THE SESSION

1. The Eighteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture (Commission) was held from 27 September to 1 October 2021. The list of delegates and observers is available on the Commission's website.²
2. The meeting was convened virtually, on an exceptional basis, in light of the global COVID-19 pandemic and the associated public-health concerns and constraints, following consultations by the Commission's Bureau on the arrangements for virtual meetings. Prior to the beginning of its deliberations, the Commission endorsed these arrangements.
3. The Commission confirmed that the virtual meeting constituted a formal regular session of the Commission and agreed to apply its normal rules and practices to the conduct of the meeting and to suspend any rules that may be incompatible with the virtual mode used for the purposes of the meeting. The Commission also agreed to the application of any special procedures or amended working modalities as may be required for the efficient conduct of the meeting.
4. In accordance with its Rules of Procedure, the Commission had elected its Chair, Vice-Chairs and *Rapporteur* for the Eighteenth Regular Session at its Seventeenth Regular Session in 2019. The Chair of the Eighteenth Regular Session was Mr François Pythoud (Switzerland). Ms Renata Negrelly Nogueira (Brazil), Mr Benoît Girard (Canada), Mr William Wigmore (Cook Islands), Mr Thanawat Tiensin (Thailand), Mr John Mulumba (Uganda) and Mr Maeen Ali Ahmed Al-Jarmouzi (Yemen) were elected Vice-Chairs. Mr Tiensin was elected *Rapporteur*.
5. Mr François Pythoud opened the session and welcomed delegates and observers.
6. Mr QU Dongyu, Director-General of FAO, opened the session and welcomed delegates and observers. He qualified biodiversity as “essential” for food security and food diversity, considering that it represents the variety of life in each ecosystem. He noted that the session coincided with important developments at FAO and in other international fora related to biodiversity, including the *FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors* and its *2021-23 Action Plan*, adopted by the Council in 2021. He highlighted that, in July 2021, FAO, in collaboration with the Secretariat of the Convention on Biological Diversity (CBD), held a Global Dialogue on the role of food and agriculture in the post-2020 global biodiversity framework, including a high-level segment that helped to raise awareness of the international policy processes on biodiversity, in particular with regard to the post-2020 global biodiversity framework. He stressed the importance of the agri-food sector positioning itself in these discussions as a key player in the management of biodiversity and as its custodian. He added that the agri-food sector also played a role as a buffer in the restoration of ecosystems. Mr QU noted that the Commission would consider at this session a policy response to the report on *The State of the World's Biodiversity for Food and Agriculture*, which would provide a key input for the post-2020 global biodiversity framework. He concluded by stressing the need to work together through scientific and holistic approaches to build a world with better production, better nutrition, a better environment and a better life for all, leaving no one behind.
7. Ms Elizabeth Maruma Mrema, Executive Secretary of the CBD, welcomed delegates and observers. She noted that the work of the Commission on issues that range from aquatic resources, forests, plant and animal genetic resources to biotechnologies, access and benefit-sharing (ABS) and “digital sequence information” (DSI) holds an important key that can unlock many transformations across the agricultural sectors and can ensure the successful adoption and implementation of the post-2020 global biodiversity framework. She highlighted that the policy response to the report on *The State of the World's Biodiversity for Food and Agriculture* would be a major contribution to the engagement of the agricultural sectors in the implementation of the new framework on the ground. She further noted that the CBD is fully committed to advancing the uptake of a biodiversity-inclusive One Health transition, which is expected to be adopted at the 15th meeting of the Conference of the Parties to the CBD. She concluded by stressing the need to work together towards the achievement of a vision of living in harmony with nature that also supports health and well-being.

² <http://www.fao.org/cgrfa/meetings/detail/en/c/1414719/>

8. Mr Kent Nnadozie, Secretary of the International Treaty on Plant Genetic Resources for Food and Agriculture (Treaty), highlighted the importance of the continued collaboration between the Commission and the Treaty Secretariats on both technical and policy matters. He reiterated that the work of the Governing Body of the Treaty refers to – or is supported by – products, decisions and instruments developed by, or under the auspices of, the Commission. He noted that the discussions on the development of a policy response to *The State of the World's Biodiversity for Food and Agriculture* and *The State of the World's Aquatic Genetic Resources for Food and Agriculture* were of high interest to the Treaty and that their outcomes would be brought to the attention of the Governing Body. He stressed the strong potential for the Commission and the Treaty to deploy their comparative advantages to ensure that plant agrobiodiversity maintains a high level of relevance in the post-2020 global biodiversity framework.

9. Ms Irene Hoffmann, Secretary of the Commission, welcomed delegates and observers. She noted that operating in a virtual mode had enabled the Commission to increase its outreach globally, with a high number of intersessional meetings and consultations having taken place in addition to the usual meetings of the intergovernmental technical working groups (Working Groups). She emphasized the importance of reaching an agreement at this session on new policy frameworks for both biodiversity for food and agriculture (BFA) and aquatic genetic resources, noting that these frameworks could greatly contribute to the implementation of the post-2020 global biodiversity framework as well as to the achievement of the Sustainable Development Goals (SDGs). Ms Hoffmann expressed her gratitude to the many donors, including the Global Environment Facility, the Green Climate Fund and the World Bank, that support country programmes on genetic resources for food and agriculture (GRFA), and for the extra-budgetary contributions received from the Governments of Canada, France, Germany, the Netherlands, Norway, Spain and Switzerland for the implementation of the Commission's work programme.

10. The Chair reported on the intersessional activities of the Bureau and provided a summary of the outcomes of the Special Event on Biodiversity for Food and Agriculture and the post-2020 global biodiversity framework held by the Commission Secretariat on 21 September 2021. The event provided an opportunity for delegates and stakeholders to explore synergies between FAO's work on biodiversity mainstreaming, the Commission's instruments on the conservation and sustainable use of BFA, and the future post-2020 global biodiversity framework. The importance of galvanizing efforts at all levels to bend the curve of biodiversity loss was noted, as was the need to establish specific post-2020 global biodiversity framework targets and policy instruments for mainstreaming biodiversity across the agri-food sector and to build partnerships for implementation. It was underlined that this session of the Commission would be pivotal in terms of setting the stage for the next decade of action on BFA.

11. The Commission adopted the Agenda as given in *Appendix A*.

II. THE ROLE OF BIODIVERSITY FOR FOOD AND AGRICULTURE FOR FOOD SECURITY, NUTRITION AND HUMAN HEALTH

12. The Commission considered the document *Biodiversity for food and agriculture for food security, nutrition and human health*³ and took note of the document *FAO activities on biodiversity for food and agriculture for food security, nutrition and human health*.⁴ It noted FAO's evolving work in this area, especially on the "One Health" approach, in the context of global efforts aiming at the transformation of food systems in line with the SDGs. It stressed the need to avoid duplication of the work of other bodies and instruments, including FAO strategies and action plans. It requested FAO to monitor relevant developments at the nexus of BFA, food security, nutrition and human health in other fora and report them to the Commission, as appropriate.

13. The Commission noted the importance of the "One Health" approach and other holistic approaches for achieving the 2030 Agenda for Sustainable Development and related SDGs.

³ CGRFA-18/21/2.

⁴ CGRFA-18/21/2/Inf.1.

14. It recommended that FAO continue collaboration with its partners to promote healthy diets and nutrition from sustainable food systems, increase the sustainability of agricultural practices and protect the livelihoods of farmers from the impacts of plant and animal diseases, promote food safety, and prevent and control infectious diseases and antimicrobial resistance, as appropriate. It requested FAO to continue raising awareness of, and increasing knowledge on, the important roles that GRFA and BFA may play in food system transformations and in addressing challenges related to food security, nutrition and human health. It further requested FAO to consider the contribution of BFA and GRFA to nutrition and the “One Health” approach, based on scientific evidence and within FAO’s mandate.

15. The Commission, moreover, requested FAO to strengthen its support to Members, at their request, in integrating the conservation and sustainable use of BFA and GRFA across their food security, nutrition and health policies, plans and activities.

III. THE ROLE OF GENETIC RESOURCES FOR FOOD AND AGRICULTURE IN MITIGATION OF AND ADAPTATION TO CLIMATE CHANGE

16. The Commission considered the document *Climate change and genetic resources for food and agriculture*⁵ and took note of the document *FAO activities on climate change*.⁶ It noted the potential GRFA offer for climate change adaptation and mitigation, including the improvement of related pest and disease resistance, and stressed the need for their conservation and sustainable use to fully explore this potential. It further stressed the importance of sufficient funding and capacity to support relevant research and development in the fields of GRFA and BFA, especially in developing countries. Moreover, it requested FAO to fully consider GRFA in its work on climate change.

17. The Commission took note of the scoping study on *The role of genetic resources for food and agriculture in climate change adaptation and mitigation*⁷ and invited FAO to publish it in the official UN languages, subject to the availability of the necessary resources.

18. The Commission took note of the revised workstream on climate change, as contained in *Appendix B*, and stressed that future work of the Commission on climate change should build on existing work on GRFA and be complementary to the work of other relevant international organizations and instruments.

19. The Commission requested FAO to review and revise, as appropriate, the draft questions on climate change and GRFA,⁸ with a view to shortening, simplifying and testing them and streamlining the reporting process, for consideration by the intergovernmental technical working groups (Working Groups). It further requested FAO to reflect the questions, as revised by the Working Groups, in future reporting formats through which countries report on the implementation of Global Plans of Action.

20. The Commission 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*,⁹ 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.

21. The Commission requested FAO to increase capacity-building and training programmes on climate change adaptation and mitigation in collaboration with existing intergovernmental and international bodies. The Commission further requested that FAO consider – once responses to the questions have been received and compiled, and taking the outcome into account – organizing regional workshops on climate change and GRFA for National Focal Points/Coordinators to allow for the sharing of country experiences and for the discussion of opportunities for collaboration, as well as a global multi-stakeholder workshop on GRFA and climate change.

⁵ CGRFA-18/21/3.

⁶ CGRFA-18/21/3/Inf.2.

⁷ CGRFA-18/21/3/Inf.1.

⁸ CGRFA-18/21/3, *Appendix II*.

⁹ FAO. 2015. *Voluntary Guidelines to Support the Integration of Genetic Diversity into National Climate Change Adaptation Planning*. Rome. (also available at <http://www.fao.org/3/i4940e/i4940e.pdf>).

IV. ACCESS AND BENEFIT-SHARING FOR GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Report of the Fifth Session of the Team of Technical and Legal Experts on Access and Benefit-Sharing

22. The Commission considered the *Report of the Fifth Session of the Team of Technical and Legal Experts on Access and Benefit-Sharing*.¹⁰ Ms Nina Sæther (Norway), Co-Chair of the Working Group, introduced the report. The Commission thanked the Members of the Team of Technical and Legal Experts on Access and Benefit-Sharing (ABS Expert Team) for their excellent work and endorsed the report.

Past and future work on access and benefit-sharing for genetic resources for food and agriculture

23. The Commission considered the document *Access and benefit-sharing for genetic resources for food and agriculture: Review and outlook*¹¹ and took note of the document *Inputs by Members on access and benefit-sharing for genetic resources for food and agriculture*¹² and the *Survey of access and benefit-sharing country measures accommodating the distinctive features of genetic resources for food and agriculture and associated traditional knowledge*.¹³

24. The Commission reviewed its past work on access and benefit-sharing (ABS) and recalled the important role it has played over the past two decades in advancing work on ABS for GRFA. It took note of relevant developments under other international agreements and instruments, including the ongoing preparation of the post-2020 global biodiversity framework, and emphasized the need to avoid duplication of work and ensure consistency.

25. The Commission welcomed the *Survey of access and benefit-sharing country measures accommodating the distinctive features of genetic resources for food and agriculture and associated traditional knowledge* and thanked the Working Groups and the ABS Expert Team for the comments they had provided on an earlier draft.

26. The Commission requested the Secretariat to compile, as a stand-alone document, specific examples of existing country legislative, administrative or policy ABS measures that directly or indirectly accommodate distinctive features of GRFA and associated traditional knowledge (TKGRFA) for review by the Working Groups, the ABS Expert Team and the Commission at their next sessions. To the extent country ABS measures address “digital sequence information” (DSI),¹⁴ such measures may be included in the compilation.

27. The Commission also supported future work that further deepens the empirical evidence needed to understand the effects of ABS measures. It requested the Secretariat to prepare, based on responses to a pre-tested country questionnaire, a report on the practical application of ABS country measures to the different subsectors of GRFA and TKGRFA, including monitoring of ABS compliance, with a view to identifying the effects of ABS measures on the utilization and conservation of the different subsectors of GRFA and TKGRFA and the sharing of benefits. In addition, the Commission requested the Secretariat to prepare, based on responses to the same questionnaire, an

¹⁰ CGRFA-18/21/4.1.

¹¹ CGRFA-18/21/4.2.

¹² CGRFA-18/21/4.2/Inf.1.

¹³ Humphries, F., Laird, S., Wynberg, R., Morrison, C. Lawson, C. and Kolesnikova, A. 2021. *Survey of access and benefit-sharing country measures accommodating the distinctive features of genetic resources for food and agriculture and associated traditional knowledge*. Rome, FAO on behalf of the Commission on Genetic Resources for Food and Agriculture. (also available at <https://doi.org/10.4060/cb6525en>).

¹⁴ The term is taken from decision CBD COP XIII/16. It may not be the most appropriate term and it is used as a placeholder until an alternative term is agreed, as referenced in decision CBD COP XIV/20, being subject to further discussion. The use of DSI in this guidance is without prejudice to the outcome of ongoing discussions regarding the appropriate term or terms to be used.

evaluation of the usefulness of the ABS Elements¹⁵ for the development and implementation of ABS measures, with the aim of identifying and addressing gaps and weaknesses in the ABS Elements.

28. The Commission requested that the Secretariat, in close collaboration with other relevant international organizations and instruments, including the Treaty and the CBD, continue to raise awareness among key stakeholders, including breeders, and provide capacity-building and training programmes on ABS for GRFA, in particular for developing countries. It requested the Secretary to bring the ABS Elements with Explanatory Notes to the attention of the Open-ended Working Group on the Post-2020 Global Biodiversity Framework.

29. The Commission requested the Secretariat to collaborate with the Secretariats of the Treaty and the CBD, as needed, on means of assembling relevant information for measuring and monitoring monetary and non-monetary benefit-sharing, within their respective mandates and existing frameworks, and report the results for consideration by the Working Groups and the Commission.

30. The Commission encouraged ministries responsible for the different subsectors of GRFA to engage in the development and implementation of ABS policies relating to GRFA and share information on experiences with the implementation of ABS measures; it also invited FAO, regional networks and collaborative partnerships to raise awareness of, and enhance capacity to deal with, matters related to ABS.

31. The Commission requested the Secretariat to continue monitoring relevant developments under other international agreements and instruments relevant to ABS and report them back to the Commission.

V. “DIGITAL SEQUENCE INFORMATION” ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

32. The Commission considered the document *Digital sequence information on genetic resources for food and agriculture: Innovation opportunities, challenges and implications*.¹⁶ The Commission took note of the actual and potential applications of DSI relevant to the conservation and sustainable use of GRFA, as given in Table 2 of the said document. While noting that databases cannot take the place of germplasm collections, it stressed the innovation opportunities DSI offers for research and development related to GRFA as well as the challenges many countries face in developing the technical, institutional and human capacity necessary to use DSI for research and development.

33. The Commission stressed the need for an internationally agreed definition of DSI,¹⁷ or of an alternative term, and noted that its work on DSI would in no way prejudice the outcome of ongoing discussions on DSI, including its scope and definition, in other fora.

34. The Commission requested FAO to support countries, in particular developing countries and countries with economies in transition, in building the technical, institutional and human capacity necessary to utilize DSI for research and development related to GRFA.

35. The Commission requested the Secretary to prepare a document reflecting key practices and experiences on how DSI is generated, stored, accessed and used for research and development related to GRFA, including relevant information on intellectual property protection, for review by the Working Groups and the ABS Expert Team at their next sessions.

36. The Commission requested the Secretary to submit the content of Table 2 of document CGRFA-18/21/5 to the CBD in order to provide information on the potential future importance of DSI for characterization, conservation, sustainable use and fair and equitable benefit-sharing and its importance and potential implications for GRFA.

37. The Commission further requested the Secretariat to monitor relevant developments under the CBD and in other fora, including in the context of the post-2020 global biodiversity framework, as

¹⁵ See FAO. 2019. *ABS Elements. Elements to facilitate domestic implementation of access and benefit-sharing for different subsectors of genetic resources for food and agriculture with Explanatory Notes*. Rome. 84 pp (also available at <http://www.fao.org/3/ca5088en/CA5088EN.pdf>).

¹⁶ CGRFA-18/21/5.

¹⁷ For the term “DSI”, see footnote 13.

they relate to DSI on GRFA, to contribute to the analysis of options, including ABS multilateral mechanisms, discussed under the CBD, and to report back on implications for GRFA, including potential opportunities, challenges and gaps associated with the different options for consideration by the Working Groups, the ABS Expert Team and the Commission at their next sessions, for future work.

38. The Commission requested the Secretariat to hold an intersessional workshop, in collaboration with relevant instruments and organizations, to raise awareness among relevant stakeholders of the role of DSI for the conservation and sustainable use of GRFA and the sharing of benefits derived from them, address the state of the art of DSI on genetic resources, present possible implications that related technologies might have for research and development related to GRFA, and consider the challenges associated with accessing and making full use of DSI.

39. It also requested the Secretariat to continue monitoring developments relevant to DSI in other fora and to consider the implications of these developments for access to, use of and the sharing of benefits derived from GRFA, with a view to identifying, as appropriate, key aspects that should be taken into consideration in addressing DSI and in creating an enabling environment for, and facilitating, access to GRFA as well as to building capacity to generate, use, share and access data for the conservation, development and sustainable use of GRFA.

40. The Commission requested the Secretariat to inform other relevant instruments and organizations about the Commission's work on DSI, including the important role the Commission attaches to DSI for the characterization, conservation and sustainable use of GRFA.

VI. REVIEW OF THE WORK ON BIOTECHNOLOGIES FOR THE CONSERVATION AND SUSTAINABLE USE OF GENETIC RESOURCES FOR FOOD AND AGRICULTURE

41. The Commission considered the document *Biotechnologies for the sustainable use and conservation of genetic resources for food and agriculture*¹⁸ and took note of the document *Recent developments in biotechnologies relevant to the characterization, sustainable use and conservation of genetic resources for food and agriculture*.¹⁹ The Commission noted: that a wide range of agricultural biotechnologies and agroecology and other innovative approaches should be seen as complementary approaches that can contribute to the SDGs, sustainable agri-food systems and improving nutrition; the relevance of intellectual property rights and their potential contributions and effects related to agricultural biotechnologies; and the importance of building awareness of and improving communication on agricultural biotechnologies.

42. The Commission requested FAO to continue to review traditional, maturing and emerging biotechnologies for the characterization, sustainable use and conservation of GRFA.

43. The Commission further requested FAO to regularly assemble and disseminate, through its existing databases, networks and newsletters, updated factual information on the role of biotechnologies in the characterization, sustainable use and conservation of GRFA and on infrastructure and capacity requirements for the use of such biotechnologies. In addition, it requested FAO to explore mechanisms for future cooperation with relevant international and regional organizations, including for fostering North–South, South–South and triangular cooperation, in promoting appropriate biotechnologies for the characterization, sustainable use and conservation of GRFA.

44. The Commission noted that countries may wish to conduct socio-economic analyses of the value and potential impacts of biotechnological applications prior to their deployment, as appropriate and in coherence with relevant international agreements, considering also how the use of biotechnology applications impacts on indigenous peoples and local communities.

45. The Commission requested FAO to develop and strengthen, including through international and regional workshops, the national and regional capacities of developing countries to develop and

¹⁸ CGRFA-18/21/6.

¹⁹ CGRFA-18/21/6/Inf.1.

apply appropriate biotechnologies for the characterization, sustainable use, management and conservation of GRFA, taking into consideration relevant benefits and risks, relevant national and regional laws and regulations, and international instruments, including those related to risk assessment.

46. The Commission invited countries to continue to strengthen their national education systems and capacity-development efforts with respect to all relevant biotechnologies, as appropriate, and invited FAO to support national efforts, upon request.

VII. BIODIVERSITY

Report of the Second Meeting of the Group of National Focal Points on Biodiversity for Food and Agriculture

47. The Commission considered the *Report of the first part of the Second Meeting of the Group of National Focal Points for Biodiversity for Food and Agriculture*²⁰ and the *Report of the second part of the Second Meeting of the Group of National Focal Points for Biodiversity for Food and Agriculture*.²¹ Mr Desterio Nyamongo (Kenya) and Mr Jens Weibull (Sweden), Co-Chairs of the Group, introduced the reports and also presented the *Co-chairs' report on the informal consultations on Biodiversity for Food and Agriculture – Revised draft Needs and Possible Actions*.²² The Commission thanked the Members of the Group for their excellent work and endorsed the reports.

Needs and possible actions in response to *The State of the World's Biodiversity for Food and Agriculture*

48. The Commission considered the document *Biodiversity for Food and Agriculture – Revised Draft Needs and Possible Actions*²³ and took note of the information document *Co-chairs' report on the informal consultations on Biodiversity for Food and Agriculture – Revised Draft Needs and Possible Actions*.²⁴

49. The Commission welcomed the dissemination of the report on *The State of the World's Biodiversity for Food and Agriculture* and noted the worldwide attention it received. It invited countries to continue disseminating the report and its key messages at national level in order to raise awareness of the subject, and to consider using the findings of the report in the elaboration of future policies, programmes and activities, as appropriate and in accordance with their needs and capabilities.

50. The Commission requested FAO to continue to assist Members in awareness-raising activities and in the implementation and monitoring of policies, programmes and activities related to the findings of the report, and invited donors to provide extra-budgetary funds to support Members in this regard.

51. Considering the need for a timely and cross-sectoral follow-up to the report, the Commission endorsed the document contained in *Appendix C* as a Framework for Action on Biodiversity for Food and Agriculture. Its implementation is voluntary and does not entail regular monitoring and reporting obligations.

52. The Commission requested the Secretary to convene, after the adoption of the post-2020 global biodiversity framework by the 15th meeting of the Conference of the Parties to the CBD, and subject to the availability of the necessary extra-budgetary resources, an open-ended meeting of the Group of National Focal Points for Biodiversity for Food and Agriculture.

53. The Commission requested the open-ended meeting of the Group of National Focal Points for Biodiversity for Food and Agriculture and the Working Groups to assess the post-2020 global biodiversity framework, once approved, to consider the need for adjustments or additions to the work of the Commission to address the implementation of the post-2020 global biodiversity framework, including assessing the need for a Global Plan of Action on Biodiversity for Food and Agriculture or

²⁰ CGRFA-18/21/7.1.1.

²¹ CGRFA-18/21/7.1.2.

²² CGRFA-18/21/7.2/Inf.1.

²³ CGRFA-18/21/7.2.

²⁴ CGRFA-18/21/7.2/Inf.1.

other policy tools, within the Commission's mandate and avoiding duplication of work, and to make recommendations in this regard to the Nineteenth Regular Session of the Commission. In addressing this, these bodies should build on the Framework for Action on Biodiversity for Food and Agriculture and the sectoral Global Plans of Action, taking into account the recommendations contained in paragraphs 44 and 45 of the report of the Commission's Seventeenth Regular Session²⁵ and the need to contribute to the implementation of the SDGs and the post-2020 global biodiversity framework.

54. The Commission called upon FAO to strengthen, within its Strategic Framework 2022–2031²⁶ and the *FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors*,²⁷ technical support to Members for the implementation of the sectoral Global Plans of Action and the Framework for Action on Biodiversity for Food and Agriculture.

VIII. AQUATIC GENETIC RESOURCES

Presentation of *The State of the World's Aquatic Genetic Resources for Food and Agriculture*

55. The Commission considered the document *Finalization of The State of the World's Aquatic Genetic Resources for Food and Agriculture*.²⁸ It welcomed the report on *The State of the World's Aquatic Genetic Resources for Food and Agriculture*²⁹ and took note of its key findings, including the needs and challenges identified. It requested FAO to continue distributing the report and communicating its key messages widely, including through regional and subregional workshops. It further requested FAO to make available the key terminology from the report (e.g. as a stand-alone glossary) and integrate relevant terms into FAO's Term Portal.³⁰

Report of the Third Session of the Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture

56. The Commission considered the *Report of the Third Session of the Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture*.³¹ Mr Alexis Peña (Panama), Chair of the Working Group, introduced the report. The Commission thanked the Members of the Working Group for their excellent work and endorsed the report.

Draft Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture

57. The Commission considered the document *Draft Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture*³² and took note of other relevant documents.³³

58. The Commission noted the inclusive preparation process, approved the *Draft Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture* as contained in *Appendix D* and invited the Director-General to bring it to the attention of the 168th Session of the Council with a view to its being adopted.

59. The Commission highlighted the need for the development of quantifiable indicators for the monitoring of the Global Plan of Action and requested that these be incorporated into the global

²⁵ CGRFA-17/19/Report.

²⁶ FAO. 2021. *Strategic Framework 2022-31*. Rome (also available at <https://www.fao.org/3/cb7099en/cb7099en.pdf>).

²⁷ FAO. 2020. *FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors*. Rome. (also available at <https://doi.org/10.4060/ca7722en>).

²⁸ CGRFA-18/21/8.1.

²⁹ 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. (also available at <http://www.fao.org/3/ca5256en/CA5256EN.pdf>).

³⁰ <http://www.fao.org/faoterm/en/>

³¹ CGRFA-18/21/8.2.

³² CGRFA-18/21/8.3.

³³ CGRFA-18/21/8.3/Inf. 2–10.

information system under development by FAO,³⁴ as appropriate. Furthermore, it requested FAO to assist Members in the implementation of the Global Plan of Action, especially in terms of financial resources and technical assistance, and invited donors to provide extra-budgetary funds to support Members in its implementation. The Commission noted that difficulties in obtaining data from the private sector and differences among countries with regard to the species economically most relevant to them could impact the implementation of the Global Plan of Action.

IX. FOREST GENETIC RESOURCES

Report of the Sixth Session of the Intergovernmental Technical Working Group on Forest Genetic Resources

60. The Commission considered the *Report of the Sixth Session of the Intergovernmental Technical Working Group on Forest Genetic Resources*.³⁵ Mr Yongqi Zheng (China), Chair of the Working Group, introduced the report. The Commission thanked the Members of the Working Group for their excellent work and endorsed the report.

Implementation of the Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources

61. The Commission considered the document *Status of implementation of the Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources*³⁶ and took note of the document *Development of a new global information system on forest genetic resources*.³⁷ Furthermore, it noted the activities reported and acknowledged the progress made in the implementation of the Global Plan of Action.

62. The Commission invited countries to strengthen their efforts to implement the Global Plan of Action and to contribute, through their National Focal Points, to the development and testing of the new global information system on forest genetic resources (FGR), and to continue providing data on FGR. In addition, it encouraged countries to continue mainstreaming FGR into larger and holistic actions on sustainable forest management and forest-based adaptation and mitigation measures, as well as to identify needs for specific and strategic actions on FGR.

63. The Commission requested FAO to continue coordinating and supporting the implementation of the Global Plan of Action, in collaboration with regional networks on FGR and relevant international organizations. It further requested FAO to continue its efforts in developing the new user-friendly global information system on FGR and in increasing international awareness of the Global Plan of Action and the importance of FGR, and to make the *Voluntary Guidelines for Preparing a National Strategy for Forest Genetic Resources*³⁸ available in the official UN languages.

64. The Commission also encouraged donors to support the implementation of the Global Plan of Action and its Funding Strategy.

Status of preparation of *The Second Report on the State of the World's Forest Genetic Resources*

65. The Commission considered the document *Status of preparation of The Second Report on the State of the World's Forest Genetic Resources*³⁹ and took note of the progress made. It invited countries that have not yet done so to nominate a National Focal Point and alternates, as needed. It also urged countries, regional networks and relevant international organizations that have not yet done so to submit their reports to FAO by 31 October 2021, or as soon as possible thereafter.

66. The Commission requested FAO to present the draft Second Report for review by the Working Group at its Seventh Session and then for consideration by the Commission at its Nineteenth

³⁴ CGRFA-18/21/8.3/Inf. 1.

³⁵ CGRFA-18/21/9.1.

³⁶ CGRFA-18/21/9.2.

³⁷ CGRFA-18/21/9.2/Inf.1.

³⁸ CGRFA-17/19/10.2/Inf.3.

³⁹ CGRFA-18/21/9.3.

Regular Session. It also requested FAO to ensure an inclusive process for the four expert meetings that will gather additional information on FGR from the scientific community for the preparation of the Second Report.

67. The Commission requested FAO to explore innovative and cost-effective ways of publishing and distributing the Second Report and its key findings. Furthermore, it encouraged FAO to make the country reports available on its website and invited donors to support the reporting by countries, in particular developing countries, as well as the finalization and publication of the Second Report.

X. ANIMAL GENETIC RESOURCES

Report of the Eleventh Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture

68. The Commission considered the *Report of the Eleventh Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture*.⁴⁰ Mr Hongjie Yang (China), Chair of the Working Group, introduced the report. The Commission thanked the Members of the Working Group for their excellent work and endorsed the report.

Implementation of the Global Plan of Action for Animal Genetic Resources

69. The Commission considered the document *Review of implementation of the Global Plan of Action for Animal Genetic Resources*⁴¹ and took note of relevant information documents.⁴² It welcomed the progress made in the implementation of the Global Plan of Action by countries and the support provided by FAO and its partners.

70. The Commission called upon countries (i) to continue implementing the Global Plan of Action and (ii) to consider developing national and regional strategies for the sustainable and culturally sensitive use of livestock, including animal genetic resource for food and agriculture (AnGR), with a view to transforming food systems towards more sustainability and resilience to meet future challenges. It also called upon countries to place particular emphasis on the conservation of AnGR through either *in vivo* or *in vitro* methods, as appropriate, and requested FAO to provide complementary technical and policy support.

71. The Commission requested the Working Group to discuss, at its next session, the implementation and monitoring of SDG Indicator 2.4.1 (Proportion of agricultural area under productive and sustainable agriculture) and to identify synergies and discuss options for the effective use of this indicator as another tool for assessing the implementation of the Global Plan of Action.

72. The Commission requested FAO, and invited countries, to continue raising awareness on the importance of AnGR and the roles of livestock keepers and of livestock species and breeds and their production systems in the provision of ecosystem services. Moreover, it requested FAO, in partnership with relevant stakeholders and donors, to continue supporting countries, especially developing countries and countries with economies in transition, in the implementation of the Global Plan of Action, and, considering specific regional priorities and needs, in the development and implementation of national and regional strategies and studies. It requested FAO to invite countries to report on projects that contribute to the implementation of the Global Plan of Action, for consideration by the Working Group and the Commission.

73. The Commission invited donors to contribute to the implementation of the Global Plan of Action, including by contributing to the Funding Strategy.

Technical guidelines for the implementation of the Global Plan of Action for Animal Genetic Resources

⁴⁰ CGRFA-18/21/10.1.

⁴¹ CGRFA-18/21/10.2.

⁴² CGRFA-18/21/10.2/Inf.1–6.

74. The Commission took note of the *Draft practical guide on innovations in cryoconservation of animal genetic resources*⁴³ and the *Draft practical guide on genomic characterization of animal genetic resources*,⁴⁴ and requested FAO to finalize and disseminate them and to encourage countries to make full use of them, according to their specific needs. Additionally, the Commission requested FAO to continue developing and updating, in consultation with the Commission and its Working Group, practical guides and other technical documents to support the implementation of the Global Plan of Action, and to organize workshops to raise awareness and support regional and subregional networks.

Status of the development of the Domestic Animal Diversity Information System

75. The Commission requested FAO to continue to provide Regular Programme and technical support to further maintain, develop and increase the user-friendliness of the Domestic Animal Diversity Information System (DAD-IS), especially with regard to tools for regular data updating, and to include in DAD-IS tools for visualizing data on the diversity of managed honey bees. It further requested FAO to investigate the potential integration into DAD-IS of data fields related to: ecosystem services; production environment descriptors; publicly available information on breeders, producers and breeding organizations; and genetic and genomic data and indicators of genetic diversity. The Commission requested FAO to develop a tool allowing automated translation of DAD-IS content provided by National Coordinators for the Management of Animal Genetic Resources from and into English, French and Spanish and to investigate the feasibility of translation across all official UN languages.

76. The Commission requested FAO to undertake, subject to the availability of financial resources, a feasibility study on the availability of, access to, and optimal use of genomic and/or breed demographic data to estimate parameters that may be suitable to complement breed population size data as indicators for monitoring the genetic diversity within livestock breeds.

77. The Commission also requested FAO to continue to: (i) provide technical support to countries in the estimation of breed population sizes; (ii) share with countries the methodology developed for collecting and estimating breed population data in a cost-efficient way; and (iii) provide assistance to countries in updating their data in DAD-IS. The Commission also requested FAO to investigate further the rationale behind the population size thresholds used to identify breeds *considered to be* at risk of extinction and to present its findings to the next session of the Working Group.

78. The Commission stressed the need for countries to regularly update their national data in DAD-IS or in the European Farm Animal Biodiversity Information System network (EFABIS-net), including data on the diversity of managed honey bees and information on the conservation of animal genetic resources both *in situ* and *ex situ*. It further stressed the need for other database owners to continue to work with FAO on improving the interoperability of national and regional databases with DAD-IS in order to ensure that decisions on the implementation of the Global Plan of Action and achievement of SDG Target 2.5 are informed by the most up-to-date data and information available. It noted the need for countries and FAO to raise awareness of the United Nations Statistical Commission on the necessity to broaden the scope of SDG Indicator 2.5.1b to include all breeds registered in DAD-IS, to account for the entire spectrum of AnGR, and for FAO to report the outcomes of this awareness raising to the Commission and its Working Group.

⁴³ CGRFA-18/21/10.2/Inf.1.

⁴⁴ CGRFA-18/21/10.2/Inf.2.

XI. MICRO-ORGANISM AND INVERTEBRATE GENETIC RESOURCES

Pollinators, including honey bees

79. The Commission considered the document *Sustainable use and conservation of invertebrate pollinators, including honey bees*⁴⁵ and took note of the *Draft study on sustainable use and conservation of invertebrate pollinators, including honey bees*.⁴⁶
80. The Commission welcomed the draft study and expressed its appreciation for the work of the expert authors who contributed to its preparation. It stressed the importance of all bees, and of other invertebrate pollinators, for food security, and therefore requested that the mention of “honey bees” in the title of the final study be deleted. It requested FAO to finalize the study, publish it as a background study paper and disseminate it.
81. The Commission noted that follow-up actions are needed in response to the findings and recommendations of the study. It invited countries, and requested FAO, to ensure that the findings of the study are taken into consideration in their work relevant to pollinators and in the implementation of the International Pollinator Initiative for the Conservation and Sustainable Use of Pollinators (IPI), and to ensure that regional specificities in terms of main pollinators and food crops are taken into consideration. Activities may include increased capacity-building and training of farmers and other relevant stakeholders in order to promote agricultural practices that favour sustainable pollination management and/or assess how pollinators could be used to foster sustainable production. The Commission also requested FAO to continue its support to the IPI and collaborate with pollinator initiatives and networks, such as Promote Pollinators, and encourage increased engagement.
82. The Commission invited countries to promote research and knowledge sharing on pollinators, drivers of pollinator decline and impacts of management practices on pollinators. It further invited countries to promote the sustainable use and conservation of invertebrate pollinators, ensure invertebrate pollinators are given due consideration in local, national, regional and international policies and policy-development processes, and report national data on the diversity of managed honey bees to DAD-IS.
83. The Commission requested FAO to consider the need for, and modalities of, a global pollinator platform to address pollinators and pollination services at global level, and to report on this matter to the Commission at its next session. It noted that such a platform should facilitate and coordinate international, regional and national action, promote capacity-building, support reference studies at regional and national levels, collect and share information on the conservation and sustainable use of pollinator genetic resources and agree on activities at global scale in line with and in support of existing activities and initiatives, in particular the IPI and any further work on pollinators that the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services may undertake.

Biological control agents and biostimulants

84. The Commission considered the document *Sustainable use and conservation of microbial and invertebrate biological control agents, and biostimulants*⁴⁷ and took note of the information document *Draft study on sustainable use and conservation of microbial and invertebrate biological control agents, and biostimulants*.⁴⁸
85. The Commission noted that sustainable management of biological control agents (BCAs) and biostimulants can help to reduce the need for pesticides and other inputs and can have benefits for other components of biodiversity such as pollinators. It further noted that international sharing of information about BCAs and invasive pests is especially important given that these species do not respect international borders.

⁴⁵ CGRFA-18/21/11.1.

⁴⁶ CGRFA-18/21/11.1/Inf.1.

⁴⁷ CGRFA-18/21/11.2.

⁴⁸ CGRFA-18/21/11.2/Inf.1.

86. The Commission welcomed the draft study and expressed its appreciation for the work of the expert authors who contributed to its preparation. It requested FAO to finalize the study taking into account comments provided, publish it as a background study paper and disseminate it.

87. The Commission requested FAO to ensure that the findings of the study are taken into consideration in its work relevant to BCAs and biostimulants, particularly with regard to restrictions of the exchange of BCAs and biostimulants, and to knowledge gaps, research, education, training, funding, management, and the development and strengthening of policies and legal frameworks for the management of BCAs and biostimulants, and also to ensure that the work of relevant international initiatives and instruments, such as the International Organization for Biological Control and the International Plant Protection Convention, is taken into consideration.

88. The Commission noted the potential value of developing an inventory of BCAs and biostimulants used around the world, including information on source countries, and on countries, environments and production systems where they are used.

89. The Commission invited countries to promote the sustainable management of BCAs and biostimulants and to ensure they are given due consideration in relevant local, national, regional and international policies and policy-development processes.

Review of the work on micro-organism and invertebrate genetic resources

90. The Commission considered the document *Review of work on micro-organism and invertebrate genetic resources for food and agriculture*⁴⁹ and took note of the information documents *Progress report on the implementation of the International Initiative for the Conservation and Sustainable Use of Pollinators*⁵⁰ and *Progress report on the implementation of the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity*.⁵¹

91. The Commission welcomed progress made in the implementation of the Work Plan on Micro-organism and Invertebrate Genetic Resources. It requested FAO to continue reporting to the Commission on progress in the implementation of the international initiatives for the conservation and sustainable use of pollinators and of soil biodiversity established by the Conference of the Parties to the CBD.

92. The Commission decided that work on micro-organisms of relevance to ruminant digestion should be addressed by the next session of the Working Group on Animal Genetic Resources and that therefore the only functional group to be addressed under the Work Plan at its Nineteenth Regular Session would be soil micro-organisms and invertebrates, with emphasis on bioremediation and nutrient-cycling organisms.

93. The Commission requested the Secretariat, in order to maintain momentum in addressing the various functional groups of micro-organisms and invertebrates, to collaborate with relevant expert groups in the drafting of recommendations for further consideration by the Commission.

94. The Commission requested FAO, and invited relevant international organizations, to strengthen technical support to countries, in particular developing countries, in relation to their efforts to identify, characterize, conserve and sustainably use micro-organism and invertebrate genetic resources. It invited donors to contribute to the implementation of the Work Plan.

95. The Commission noted that collections of micro-organisms and invertebrates and other biodiversity, and of related data, require stable funding.

⁴⁹ CGRFA-18/21/11.3.

⁵⁰ CGRFA-18/21/11.3/Inf.1.

⁵¹ CGRFA-18/21/11.3/Inf.2.

XII. PLANT GENETIC RESOURCES

Report of the Tenth Session of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture

96. The Commission considered the *Report of the Tenth Session of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture*.⁵² Mr Godfrey Mwila (Zambia), Chair of the Tenth Session of the Working Group, introduced the report. The Commission thanked the Members of the Working Group for their excellent work and endorsed the report.

Implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture

97. The Commission considered the document *FAO activities in support of the implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture*⁵³ and took note of other relevant documents.⁵⁴

In situ conservation and on-farm management

98. The Commission commended FAO for convening, in collaboration with the Global Crop Diversity Trust and the Treaty, the First International Multi-stakeholder Symposium on Plant Genetic Resources for Food and Agriculture, which focused on *in situ* conservation and on-farm management of plant genetic resources for food and agriculture (PGRFA)⁵⁵ and was held prior to the Tenth Session of the Working Group, in March 2021.⁵⁶ The Commission requested FAO to finalize, publish and distribute widely the proceedings of the symposium. It also requested FAO to organize, subject to the availability of the necessary extra-budgetary resources, symposia (which may be held virtually) and webinars on *in situ* conservation and on-farm management of PGRFA, at regular intervals, in collaboration with the Treaty and other relevant international instruments or organizations, in support of the implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture (Second GPA) and relevant articles of the Treaty.

99. The Commission requested FAO, in collaboration with other international organizations with relevant experience, to support countries, in particular developing countries, in the development or revision of their national plans for the conservation and sustainable use of farmers' varieties/landraces as well as crop wild relatives and wild food plants, taking into account the two relevant Voluntary Guidelines⁵⁷ of the Commission. It further requested FAO to compile examples of the use of the two Guidelines with a view to improving their relevance and widening their use. It also requested FAO to support countries, at their request, in the development of national inventories of crop wild relatives and wild food plants conserved *in situ* and of farmers' varieties/landraces managed on farm. It also requested FAO, and invited donors, to continue to support countries in their efforts to conserve PGRFA *in situ* and on-farm and to strengthen the links and complementarity between *ex situ* and *in situ* conservation.

Ex situ conservation

100. The Commission requested FAO to continue providing support, including capacity development, to countries in their efforts to maintain genebanks, including community seed banks, for the continued collection, conservation, characterization, evaluation and distribution of crop germplasm and associated information. The Commission took note of the *Draft practical guides for the*

⁵² CGRFA-18/21/12.1.

⁵³ CGRFA-18/21/12.2.

⁵⁴ CGRFA-18/21/12.2/Inf.1–3.

⁵⁵ CGRFA18/21/12.2/Inf.3.

⁵⁶ See <http://www.fao.org/about/meetings/multi-stakeholder-symposium-on-pgrfa/en/>

⁵⁷ FAO. 2019. *Voluntary Guidelines for the Conservation and Sustainable Use of Farmers' Varieties/Landraces*. Rome. (also available at <http://www.fao.org/3/ca5601en/CA5601EN.pdf>); FAO. 2017. *Voluntary Guidelines for the Conservation and Sustainable Use of Crop Wild Relatives and Wild Food Plants*. Rome. (also available at <http://www.fao.org/3/I7788EN/i7788en.pdf>).

application of the Genebank Standards for Plant Genetic Resources for Food and Agriculture,⁵⁸ as revised in the light of comments received following the Tenth Session of the Working Group. It requested FAO to finalize and disseminate the Practical Guides, in the official UN languages, to decision-makers, practitioners and other relevant stakeholders. The Commission also requested FAO to develop further additional practical guides, especially for the conservation in genebanks of species producing recalcitrant seeds, and for cryopreservation, in collaboration with relevant international and national partners, including the CGIAR and the Global Crop Diversity Trust.

101. The Commission invited Members, international institutions and other relevant eligible bodies and organizations to consider making use of the Svalbard Global Seed Vault for long-term storage of PGRFA.

Sustainable use

102. The Commission requested FAO to continue assisting countries in strengthening national seed systems, including plant breeding, for the delivery of diverse and high-quality seeds and planting materials, in particular to meet the needs and priorities of smallholder farmers. It requested FAO to continue supporting countries, at their request, in collaboration with the Treaty, in strengthening their capacity in crop improvement, including pre-breeding, in support of the implementation of the Second GPA and Article 6 of the Treaty.

Building sustainable institutional and human capacities

103. The Commission called for extra-budgetary funds to support countries, at their request, in the implementation of the Second GPA, including through the development and implementation of national strategies for PGRFA, in close coordination with the Treaty and its Funding Strategy.

104. The Commission requested FAO to continue reporting, on an annual basis, on the status of implementation of SDG Target 2.5 and sharing the results with the Working Group and the Commission. It welcomed the report clarifying the different roles of the three global information systems on PGRFA, the World Information and Early Warning System on PGRFA (WIEWS), the Global Information System (GLIS) and Genesys,⁵⁹ and requested FAO to continue developing and simplifying the WIEWS portal while strengthening cooperation with the other information systems, with a view to avoiding duplication of efforts and facilitating reporting by countries.

Status and trends of seed policies

105. The Commission considered the document *Effects of seed policies, laws and regulations*⁶⁰ and took note of the study *Impact of implementation of seed legislation on diversity of plant genetic resources for food and agriculture*.⁶¹ It requested FAO, in cooperation with relevant international organizations, to continue to support countries in the development or revision of their national seed policies, as appropriate and according to their specific situations, taking into account the Commission's *Voluntary Guide for National Seed Policy Formulation*.⁶² It requested FAO to undertake, in collaboration with the Treaty, further research on the impact of seed policies, laws and regulations, taking into account the variety of factors that may affect, and possibly improve, farmers' ability to access sufficient and affordable seeds and planting materials of diverse, locally adapted varieties, including farmers' varieties/landraces. Furthermore, it requested FAO to take a bottom-up, demand-driven approach to seed security and promote farmers' participation in seed-related FAO activities. It also requested the Secretariat to raise awareness of the Inventory of National Measures,

⁵⁸ CGRFA-18/21/12.2/Inf.1.

⁵⁹ CGRFA-18/21/12.2.

⁶⁰ CGRFA-18/21/12.3.

⁶¹ CGRFA18/21/12.3/Inf.1.

⁶² FAO. 2015. *Voluntary Guide for National Seed Policy Formulation*. Rome. (also available at <http://www.fao.org/3/i4916e/i4916e.pdf>).

Best Practices and Lessons Learned on the Realization of Farmers' Rights,⁶³ which contains many submissions on seed policy and legislation.

Status of preparation of *The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture*

106. The Commission considered the document *Preparing The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture*.⁶⁴

107. The Commission agreed to extend the deadline for country reporting on the state of PGRFA to the end of December 2021. It urged National Focal Points that have not yet done so to report through WIEWS on the implementation of the Second GPA and to provide a summative narrative of the overall progress made in the conservation and sustainable use of PGRFA, as well as on the remaining gaps and constraints. The Commission requested FAO to continue providing assistance to countries in reporting for the Third Report.

108. The Commission considered the list of thematic background studies, as given in *Appendix I* of the document *Preparing The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture*.⁶⁵ The Commission supported their preparation, subject to the availability of extra-budgetary resources, and recommended that FAO build upon existing and ongoing studies in other fora on similar subjects.

109. The Commission requested FAO, based on the findings of the Third Report, and following regional consultations, to review and revise, as appropriate and necessary, the Second GPA for consideration by the Working Group at its Twelfth Session, and subsequently the Commission at its Twentieth Regular Session. The Commission requested FAO to propose a revision and significant simplifications of the WIEWS Reporting Tool, and the priority activities and indicators on which countries shall report, to increase the participation of national stakeholders, once the Third Report has been completed and the Second GPA has been reviewed, for the consideration of the Working Group and the Commission.

110. The Commission invited donors to continue to provide extra-budgetary resources for the finalization and publication of the Third Report and for the review process of the Second GPA.

XIII. FUTURE ORGANIZATION OF INTERSESSIONAL WORK

111. The Commission considered the document *Possible re-organization of the Commission's future intersessional work*.⁶⁶ It endorsed the Model Terms of Reference contained in *Appendix E* and encouraged countries to take them into consideration in the preparation or revision of terms of reference for their National Focal Points/Coordinators. It also encouraged FAO country offices to support, upon request by countries, national activities related to the conservation and sustainable use of genetic resources. The Commission welcomed the possibility of holding virtual and hybrid information webinars, consultations or regional workshops, taking into account the need for inclusiveness and equal participation and noting the limitations of virtual meetings.

112. The Commission mandated its Bureau to conduct informal open-ended consultations with the aim of: (i) developing, in a first step, criteria against which the different options for the reorganization of the Commission's intersessional work should be assessed; (ii) reviewing and revising, as appropriate, the options contained in the document CGRFA-18/21/13 and developing new options, if necessary, with a view to establishing a set of options that reflects all views Members and the Working Groups hold with regard to the re-organization of the Commission's work; and (iii) assessing the set of consolidated options against the criteria identified, with a view to agreeing on recommendations for the re-organization of the Commission's intersessional work, for consideration by the Commission at its Nineteenth Regular Session.

⁶³ <https://www.fao.org/plant-treaty/areas-of-work/farmers-rights/overview-inventory/en/>

⁶⁴ CGRFA-18/21/12.4.

⁶⁵ CGRFA-18/21/12.4.

⁶⁶ CGRFA-18/21/13.

XIV. DEVELOPMENTS IN OTHER FORA

113. The Commission considered the document *Commission linkages with the FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors and the post-2020 global biodiversity framework*.⁶⁷ It noted the complementarity and synergies between the Commission's Global Plans of Action on sectoral GRFA, the *FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors*⁶⁸ and the draft post-2020 global biodiversity framework, currently under development under the CBD. It noted with appreciation the high level of expertise of its Working Groups that guide the implementation of the Global Plans of Action.

114. The Commission welcomed the *FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors* and the *2021–23 Action Plan* for its implementation⁶⁹ as a means of strengthening coordination and collaboration within FAO. It stressed the need to ensure that FAO's support to countries takes into account biodiversity-related considerations, including the Commission's Global Plans of Action. It further took note of the status of preparations for the post-2020 global biodiversity framework and welcomed the close collaboration of FAO and the CBD.

115. The Commission endorsed the draft Resolution contained in *Appendix F* and invited the Director-General to bring it to the attention of the Council with a view to its being adopted.

XV. COOPERATION WITH INTERNATIONAL INSTRUMENTS AND ORGANIZATIONS

116. The Commission considered the document *Cooperation with international instruments and organizations*⁷⁰ and took note of the relevant information documents.⁷¹ It thanked the international instruments and organizations for providing information on their policies, programmes and activities relevant to the prioritized themes of this session.

117. The Commission requested the Secretary to continue seeking inputs on the prioritized themes of the regular sessions from international instruments and organizations and to make them available to the Commission for its information. It further requested the Secretary to continue providing information to Parties of the CBD on the work of the Commission and on how it may contribute to the post-2020 global biodiversity framework.

118. The Commission welcomed Resolution 9/2019 of the Governing Body of the Treaty.⁷² Furthermore, it welcomed the joint activities of the Secretariats of the Treaty and the Commission on PGRFA during the past intersessional period and requested the Secretary to continue strengthening collaboration and coordination with the Secretary of the Treaty to promote coherence and synergies, while avoiding duplication, in the development and implementation of the respective relevant programmes of work of the two bodies, including on:

- i. the preparation of the Third Report, the review and possible update of the Second GPA, and the revision of the WIEWS reporting system;
- ii. the organization of symposia on *in situ* conservation and on-farm management of PGRFA;
- iii. the effects of seed policies, laws and regulations;
- iv. the implementation and monitoring of the Second GPA, including technical instruments that facilitate its implementation, such as the Genebank Standards for Plant Genetic Resources for Food and Agriculture and work on sustainable use of PGRFA;
- v. ABS and DSI on PGRFA;

⁶⁷ CGRFA-18/21/14.

⁶⁸ FAO. 2020. *FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors*. Rome. (also available at <https://doi.org/10.4060/ca7722en>).

⁶⁹ FAO. 2021. *2021-23 Action Plan for the Implementation of the FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors*. Rome. (also available at <https://doi.org/10.4060/cb5515en>).

⁷⁰ CGRFA-18/21/15.

⁷¹ CGRFA-18/21/15/Inf.1–6.

⁷² IT/GB-8/19/Report, *Appendix B.9*. The Resolution is also available at AR, FR, EN, ES, RU and ZH.

- vi. joint efforts to advocate for the consideration of the objectives and relevant work and policies of the Commission and the Governing Body of the Treaty in global strategies and frameworks, such as the *FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors* and the post-2020 global biodiversity framework, as well as to update FAO Members on progress in the implementation of their respective mandates and work programmes, for example through briefings for Permanent Representations; and
- vii. the GLIS and WIEWS and targets and indicators.

XVI. OTHER BUSINESS

119. The Commission requested its Bureau to review the Commission's mode of in-session operations, including the preparation of the meeting report, in order to improve it before its Nineteenth Regular Session, taking into account the working methods of other bodies of FAO.

XVII. DATE AND PLACE OF THE COMMISSION'S NINETEENTH REGULAR SESSION

120. The Commission agreed that its Nineteenth Regular Session would be convened in Rome, Italy, in 2023, provided that health regulations allow. Taking this into account, the Secretary indicated 24 to 28 July 2023 as tentative dates for the next Session.

XVIII. ELECTION OF CHAIR, VICE-CHAIRS AND *RAPPORTEUR* AND MEMBERS AND ALTERNATES OF THE INTERGOVERNMENTAL TECHNICAL WORKING GROUPS

121. The Commission elected its Chair and Vice-Chairs for its Nineteenth Regular Session. Ms Deidré A. Januarie (Namibia) was elected as Chair. Ms Mariana Marshall Parra (Brazil), Mr Benoît Girard (Canada), Mr Hongjie Yang (China), Mr William Wigmore (Cook Islands), Ms Neveen Abdel Fattah Hassan (Egypt) and Ms Kim van Seeters (the Netherlands) were elected as Vice-Chairs. Ms van Seeters was elected *Rapporteur*.

122. The Commission elected the Members and Alternates of its Working Groups, as given in *Appendix G*, and requested the Working Groups to meet before the next regular session of the Commission.

XIX. CLOSING STATEMENTS

123. Regional representatives took the floor to thank the Chair, the Bureau, delegates, the Secretariat and all the staff, including those working behind the scenes, including the translators and interpreters. They expressed their satisfaction with the outcomes of the meeting. Thanks were also expressed to governments that had provided financial assistance to the Commission's work.

124. Ms Hoffmann thanked the Chair for his leadership during this session and for his support during the intersessional period. She also thanked the Vice-Chairs of the Bureau and the Members of the Commission's subsidiary bodies for their valuable contributions to the success of this meeting. She further thanked all delegates and observers for their attendance and diligence, and the support staff for their tireless efforts to ensure the success of the meeting. She highlighted the important decisions that had been made, in particular the agreement on the Global Plan of Action for Aquatic Genetic Resources for Food and Agriculture, and the endorsement of the Framework for Action on Biodiversity for Food and Agriculture, noting that national implementation will be the testing ground for future global policies, and the continued need for all stakeholders to work together to achieve global food security and sustainable development, for present and future generations.

125. Mr Pythoud noted that despite the challenges of a virtual session a positive outcome had been achieved. He echoed others in thanking the FAO's technical departments and the Commission's Secretariat, along with the interpreters, translators and other support staff. He thanked the Vice-Chairs and the *Rapporteur* and extended best wishes to the incoming Chair and Bureau. Finally, he thanked delegates for their hard work, good spirit, clarity and willingness to compromise.

APPENDIX A

**AGENDA OF THE EIGHTEENTH REGULAR SESSION OF THE COMMISSION
ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE**

1. Adoption of the agenda and time-table

CROSS-SECTORAL MATTERS

2. The role of biodiversity for food and agriculture for food security, nutrition and human health
3. The role of genetic resources for food and agriculture in mitigation of and adaptation to climate change
4. Access and benefit-sharing for genetic resources for food and agriculture
 - 4.1 Report of the Fifth Session of the Team of Technical and Legal Experts on Access and Benefit-Sharing
 - 4.2 Past and future work on access and benefit-sharing for genetic resources for food and agriculture
5. “Digital sequence information” on genetic resources for food and agriculture
6. Review of the work on biotechnologies for the conservation and sustainable use of genetic resources for food and agriculture

BIODIVERSITY FOR FOOD AND AGRICULTURE

7. Biodiversity
 - 7.1 Report of the Second Meeting of the Group of National Focal Points on Biodiversity for Food and Agriculture
 - 7.2 Needs and possible actions in response to *The State of the World’s Biodiversity for Food and Agriculture*
8. Aquatic genetic resources
 - 8.1 Presentation of *The State of the World’s Aquatic Genetic for Food and Agriculture*
 - 8.2 Report of the Third Session of the Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture
 - 8.3 Draft Global Plan of Action for Aquatic Genetic Resources for Food and Agriculture
9. Forest genetic resources
 - 9.1 Report of the Sixth Session of the Intergovernmental Technical Working Group on Forest Genetic Resources
 - 9.2 Implementation of the Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources
 - 9.3 Status of preparation of *The Second Report on the State of the World’s Forest Genetic Resources*
10. Animal genetic resources
 - 10.1 Report of the Eleventh Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture
 - 10.2 Implementation of the Global Plan of Action for Animal Genetic Resources
11. Micro-organism and invertebrate genetic resources

- 11.1 Pollinators, including honey bees
- 11.2 Biological control agents and bio-stimulants
- 11.3 Review of the work on micro-organism and invertebrate genetic resources
12. Plant genetic resources
 - 12.1 Report of the Tenth Session of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture
 - 12.2 Implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture
 - 12.3 Effects of seed policies, laws and regulations
 - 12.4 Status of preparation of *The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture*

THE COMMISSION'S MODE OF OPERATION

13. Future organization of intersessional work

DEVELOPMENTS IN OTHER FORA AND COOPERATION

14. Developments in other fora
15. Cooperation with international instruments and organizations

OTHER MATTERS

16. Other business
17. Date and place of the Commission's Nineteenth Regular Session
18. Election of Chair, Vice-Chairs and *Rapporteur*
19. Adoption of the Report

APPENDIX B

**REVISED WORKSTREAM ON CLIMATE CHANGE
(2021–2029 MULTI-YEAR PROGRAMME OF WORK)**

	18th Session 2021	19th Session 2023	20th Session 2025	21st Session 2027	22nd Session 2029
Climate change	Review of work on climate change and GRFA	Review of draft questions on climate change and GRFA Review of revised Voluntary Guidelines		Review of work on climate change and GRFA	

APPENDIX C

FRAMEWORK FOR ACTION ON BIODIVERSITY FOR FOOD AND AGRICULTURE

I. Introduction

1. Biodiversity for food and agriculture (BFA), along with the ecosystem services it supports, is essential to sustainable agri-food systems. It enables production systems and livelihoods to cope with, and evolve under, changing social, economic and environmental conditions, and is a key resource in efforts to ensure food security and nutrition while limiting or reducing negative impacts on the environment and also contributing to environment protection and restoration and sustainable use.

2. Over recent decades, the importance of biodiversity and ecosystem services to food security and nutrition, rural and coastal livelihoods, human well-being and sustainable development more generally has gradually acquired greater recognition on international agendas. Global assessments overseen by the Commission on Genetic Resources for Food and Agriculture (Commission) have led to the adoption of Global Plans of Action for specific sectors of genetic resources (referred to in this Framework as the “sectoral Global Plans of Action”).⁷³ The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, include a number of targets related to the sustainable use and conservation of biodiversity in the context of food and agriculture. Other global assessments, such as those undertaken by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, and reporting by countries on the implementation of their National Biodiversity Strategies and Action Plans in the context of past and present global biodiversity frameworks under the Convention on Biological Diversity (CBD), have increased awareness of biodiversity and its contributions to livelihoods and human well-being.

3. *The State of the World’s Biodiversity for Food and Agriculture*⁷⁴ was published in February 2019 built on submissions from countries. The needs and possible actions for the sustainable use and conservation of BFA identified in the present Framework are based on the outcomes of regional and global consultations.

4. The Framework for Action on Biodiversity for Food and Agriculture identifies needs and possible actions for BFA, i.e. “the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that sustain the ecosystem structures, functions and processes in and around production systems, and that provide food and non-food agricultural products”.⁷⁵ “Production systems” are taken to include those in the crop, livestock, forest, fishery and aquaculture sectors. As per FAO’s definition, agriculture is inclusive of forestry, fisheries and aquaculture. Concepts used in this Framework are described, in detail, in Annex 1.

⁷³ FAO. 1996. *The State of the World’s Plant Genetic Resources for Food and Agriculture*. Rome; FAO. 2007. *The State of the World’s Animal Genetic Resources for Food and Agriculture*. Rome; FAO. 2007. *The Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration*. Rome; FAO. 2010. *The Second Report on the State of the World’s Plant Genetic Resources for Food and Agriculture*. Rome; FAO. 2011. *Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture*. Rome; FAO. 2014. *The State of the World’s Forest Genetic Resources*. Rome; FAO. 2014. *Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources*. Rome; FAO. 2015. *The Second Report on the State of World’s Animal Genetic Resources for Food and Agriculture*. Rome; FAO. 2019. *The State of the World’s Aquatic Genetic Resources for Food and Agriculture*. Rome.

⁷⁴ FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

⁷⁵ FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

Rationale

5. BFA, i.e. the biodiversity that in one way or another contributes to agriculture and food production, is indispensable to food security, nutrition and health, sustainable development and the supply of many vital ecosystem services. Many countries have taken action to sustainably use and conserve, through various strategies, a range of plant, animal, forest and aquatic genetic resources. The Commission has provided, and continues to provide, guidance on the sustainable use and conservation of components of BFA through various, mainly sector-specific, instruments and decisions, including the sectoral Global Plans of Action. FAO monitors the implementation of these instruments and reports back to the Commission on the status of their implementation and the status of the respective sectors of genetic resources for food and agriculture (GRFA). However, guidance on the management of components of BFA not covered by the sectoral Global Plans of Action has so far been limited. There is a need to manage the various components of BFA in a more systematic and integrated way and go beyond sector-specific strategies. Reversing the ongoing loss of BFA, ensuring its conservation and improving its sustainable use require holistic and cross-sectoral approaches that include actions at genetic, species and ecosystem levels. Such approaches must consider that agricultural production systems also produce ecosystem services that are relevant to, and can be positive for, enhancing our environments and well-being.

6. Key findings of the report on *The State of the World's Biodiversity for Food and Agriculture* include the following:

Biodiversity is essential to food and agriculture

- Many components of BFA at genetic, species and ecosystem levels are key to the current and future productivity of all agricultural sectors.
- Plant, animal, aquatic and micro-organism and invertebrate genetic resources for food and agriculture and forest genetic resources – and their diversity at species and within-species (variety, breed, strain, etc.) levels – are vital to the current and future productivity and resilience of the crop, livestock, forest, aquaculture and fisheries sectors. Wild relatives of domesticated species have potential for domestication and provide a pool of genetic resources for hybridization and selection.
- Associated biodiversity present in and around production systems is essential to the supply of many ecosystem services that underpin agriculture and food production, including pollination, control of pests, maintenance of soil fertility, carbon sequestration and regulation of water supplies.
- Wild foods – a wide range of fungi, plants and animals, including invertebrates – are important for food security and nutrition in many countries. They are often harvested and consumed locally, but are also traded over long distances. In the case of capture fisheries, they form the basis of a major sector of food and agriculture.

Biodiversity for food and agriculture is declining

- Many key components of BFA at genetic, species and ecosystem levels are in decline.
- Knowledge of the state of associated biodiversity, ecosystem services and wild foods varies from region to region and is often incomplete. Many invertebrate and micro-organism species, as well as some plant and other animal species, found in and around production systems, have not been recorded or characterized, and their functions within ecosystems remain poorly understood.
- The underdeveloped state of monitoring programmes for associated biodiversity and wild foods means that data on their status and trends are patchy. Population surveys and proxy measures provide an indication of the status of individual categories of associated biodiversity at local, national or regional levels. Data of this kind present a mixed picture, but there are many reasons for concern about the decline of key components of associated biodiversity.

- Information on the status and trends of plant, animal, aquatic genetic resources for food and agriculture and forest genetic resources is more complete. However, many knowledge gaps remain, particularly in the developing regions of the world.

Multiple interacting drivers of change are affecting biodiversity for food and agriculture

- BFA and the ecosystem services it delivers are being affected by a variety of drivers, ranging from local to global in scale, and from developments in technology and management practices within the food and agriculture sector to wider environmental, economic, social, cultural and political factors. Trends in markets and demography may give rise to drivers of biodiversity loss such as climate change, land-use change, inappropriate use of external inputs, overharvesting of natural resources, and invasive species. The drivers mentioned by the highest number of countries that contributed to *The State of the World's Biodiversity for Food and Agriculture* as having negative effects on BFA were changes in land and water use and management. In contrast, reporting countries tended to view policy measures and advances in science and technology as positive drivers that offer ways of reducing the negative effects of other drivers on BFA. Both provide potential entry points for interventions supporting sustainable use and conservation.

The use of many biodiversity-friendly⁷⁶ practices is reported to be increasing

- Efforts to manage BFA, especially associated biodiversity, to promote the supply of regulating and supporting ecosystem services are widely reported.
- The use of a wide range of management practices and approaches regarded as favourable to the sustainable use and conservation of BFA is reported to be increasing.⁷⁷ However, knowledge of how these practices influence the status of BFA still needs to be improved.
- Although efforts to conserve BFA *in situ* and *ex situ* are increasing, levels of coverage and protection are often inadequate and the complementarity between these approaches needs to be enhanced.

Enabling frameworks for the sustainable use and conservation of biodiversity for food and agriculture remain insufficient

- Most countries have put in place policy and legal frameworks targeting the sustainable use and conservation of biodiversity as a whole, often complemented by specific policies for specific GRFA, or they may integrate GRFA into policies for specific sectors of food and agriculture, food and agriculture in general or rural development. Policies addressing the management of food and agricultural production systems are increasingly based on ecosystem, landscape and seascape approaches. However, legal and policy frameworks often lack a specific focus on associated biodiversity or wild foods. While national and international agreements are in place to reduce overexploitation of captured fish species or forests, legal and policy measures explicitly targeting other wild foods or components of associated biodiversity and their roles in supplying ecosystem services are not widespread.
- Sustainable management of BFA and promotion of its role in the supply of ecosystem services require multi-stakeholder cooperation across the sectors of food and agriculture and between the food and agriculture sector and the environment/nature conservation sector and other relevant sectors at local, national and regional and global levels. The use of BFA spans international borders and the conventional boundaries between sectors. Frameworks for cooperation at national, regional and international levels in the management of GRFA are relatively well developed in the individual sectors of food and agriculture.

⁷⁶ The term “biodiversity-friendly” is taken in *The State of the World's Biodiversity for Food and Agriculture* and in this Framework to refer to production and to practices and approaches that promote the conservation and sustainable use of biodiversity.

⁷⁷ See Chapter 5 of FAO. 2019. *The State of the World's Biodiversity for Food and Agriculture*. Rome, for a description of the status and trends in the adoption of over 20 such practices and approaches.

- A number of obstacles constrain the development and implementation of effective policies addressing the sustainable use and conservation of BFA, and of associated biodiversity in particular. Implementation is sometimes hampered by a lack of human and financial resources, a lack of awareness and knowledge on the part of stakeholders, a lack of political will and/or governance and a lack of cooperation among relevant agencies.

7. The sustainable use and conservation of BFA face numerous challenges. BFA cannot be managed effectively if its components are considered in isolation from each other. A system approach is needed in order to allow the full benefit of BFA in terms of promoting transition towards more sustainable and resilient agri-food systems to be realized. Cross-sectoral and multi-stakeholder cooperation mechanisms that address multiple components of BFA are thus vital.

8. The Commission's sectoral Global Plans of Action set out strategic priorities for the sustainable use, development and conservation of GRFA, as well as provisions related to collaboration, financing and implementation. The Commission guides, supports and monitors the implementation of the sectoral Global Plans of Action and assesses, at regular intervals, the status of their implementation and of the respective components of GRFA.

9. The needs and possible actions contained in this Framework reflect the challenges and potential responses identified by countries during the preparation of *The State of the World's Biodiversity for Food and Agriculture*. To complement the sectoral Global Plans of Action, a strong emphasis is placed on actions that seek to further improve knowledge of BFA, in particular of associated biodiversity, wild foods and ecosystem services, including those from production systems, which are lagging behind in this respect, and of the impacts of management practices and approaches on BFA. Also stressed is the need to implement practical approaches and actions to improve the management of BFA. Even greater emphasis is given to the importance of cooperation and collaboration, at all levels, in the sustainable use and conservation of BFA.

II. Nature of the Framework for Action on Biodiversity for Food and Agriculture

10. Recognizing the importance of avoiding duplication, the Framework for Action on Biodiversity for Food and Agriculture aims to provide a framework for the management of BFA as a whole and to promote coordinated action across all the sectors of food and agriculture – and more widely – to improve the sustainable use and conservation of BFA at genetic, species and ecosystem levels. It is voluntary and non-binding. It is not intended to replace, duplicate or change the Commission's existing sectoral Global Plans of Action for GRFA, or other international agreements, but to strengthen their harmonious implementation, as applicable. It should be updated as and when required. Action should be taken by countries in accordance with their national priorities and international commitments, as appropriate.

III. Objectives

11. The Framework for Action on Biodiversity for Food and Agriculture aims to:

- create a contextual framework for the coherent and consistent implementation of the Commission's sectoral Global Plans of Action and for the sustainable use and conservation of BFA, including associated biodiversity and wild foods, as a basis for food security, nutrition and health, sustainable food and agriculture, and poverty reduction and livelihoods;
- promote transition towards more sustainable agri-food systems;
- contribute to the achievement of the SDGs and the implementation of the post-2020 global biodiversity framework;⁷⁸
- raise awareness of the importance of BFA, including associated biodiversity and wild foods, and the ecosystem services it provides among all stakeholders, from producers to consumers and policy-makers;

⁷⁸ Developed under the Convention on Biological Diversity.

- promote the sustainable use and conservation of BFA, including associated biodiversity and wild foods, within production systems and other relevant terrestrial and aquatic ecosystems, as a basis for ecosystem services and resilience, in order to foster sustainable economic development, reduce poverty and ensure food security and nutrition, particularly in developing countries, as well as to provide options for adapting to and mitigating climate change;
- set the conceptual basis for the development and adoption of national policies, legislation and programmes for the sustainable use and conservation of BFA;
- increase national, regional and international cross-sectoral cooperation, information-sharing and technology transfer and enhance institutional capacity, including in research, education and training on the sustainable use and conservation of BFA;
- improve data collection and the development of metrics and indicators to measure the impact of management practices and approaches on the sustainable use and conservation of BFA at genetic, species and ecosystem levels; and
- provide guidance to FAO's work on the provision of support to countries, at their request, in their efforts to strengthen the sustainable use and conservation of BFA, including in the context of its Strategy on Mainstreaming Biodiversity across Agricultural Sectors.⁷⁹

12. It should be borne in mind that the actions will need to be implemented in a wide range of different circumstances. Implementation will need to account for variation in the characteristics of production systems and components of BFA, in the needs of producers and other stakeholders and in the capacity and resources available. It should also be noted that while some actions may be rapidly realizable, others may require more time to implement.

IV. Operative principles

13. Across all strategic priority areas, the implementation of the possible actions contained in this Framework should be guided by the following operative principles:

- The implementation of actions should be based on sound scientific evidence. Where relevant, indigenous and local traditional knowledge and practices should be taken into consideration. Participatory and inclusive research and innovation approaches should be utilized and promoted, as appropriate.
- The actions are intended for implementation, as appropriate, in all types of production system and in countries at all levels of development. Where relevant, special attention should be given to the needs of smallholder producers.
- The implementation of the actions should promote the participation of all food producers, giving special attention to the needs of family-based and smallholder agriculture, forestry, fisheries and aquaculture, and giving special attention to the needs of developing countries.
- The implementation of the actions should, where relevant, take into consideration the particular roles of women as managers of BFA and holders of BFA-related knowledge and should involve the effective participation of women.
- The implementation of the actions should, where relevant, take into consideration the particular roles of indigenous peoples and local communities as managers of BFA and holders of BFA-related knowledge and should involve the effective participation of indigenous peoples and local communities.
- The implementation of the actions should promote and support the implementation of the sectoral Global Plans of Action, ensuring to the extent possible that synergies are promoted and duplication of efforts avoided. Including in this regard, the implementation of the actions should ensure to the extent possible that relevant cross-sectoral interactions are

⁷⁹ CL 163/11 Rev.1.

taken into account.

V. Structure and organization

14. The Framework for Action on Biodiversity for Food and Agriculture presents a set of integrated and interlinked possible actions, organized into three strategic priority areas, for the sustainable use and conservation of BFA. Many of these actions are relevant to more than one strategic priority area.

Strategic Priority Area 1: Characterization, assessment and monitoring of biodiversity for food and agriculture

Strategic Priority Area 2: Management of biodiversity for food and agriculture

Strategic Priority Area 3: Institutional frameworks for biodiversity for food and agriculture

15. The actions are not listed in order of priority, as the relative priority of each action and associated timelines may vary significantly across countries and regions. Relative priority may depend on the components of BFA, environments or production systems involved or on the current state of capacities, financial resources or policies for the management of BFA. When a list of practices or approaches is presented within an action, it is intended to be non-prescriptive and non-exhaustive. There is no one-size-fits-all solution and case-by-case analyses are needed.

16. For each strategic priority area, an introduction presents the needs identified on the basis of the country reports prepared as contributions to *The State of the World's Biodiversity for Food and Agriculture* and the consultative processes referred to above. A number of specific priorities are then presented. Each priority consists of a rationale and a set of individual actions.

**STRATEGIC PRIORITY AREAS FOR THE SUSTAINABLE USE AND CONSERVATION
OF BIODIVERSITY FOR FOOD AND AGRICULTURE**

**STRATEGIC PRIORITY AREA 1: CHARACTERIZATION, ASSESSMENT AND
MONITORING OF BIODIVERSITY FOR FOOD AND AGRICULTURE**

1.1 Improve availability of, and access to, information on biodiversity for food and agriculture

**STRATEGIC PRIORITY AREA 2: MANAGEMENT OF BIODIVERSITY FOR FOOD AND
AGRICULTURE**

2.1 Promote sustainable use of biodiversity for food and agriculture and integrated approaches to its management

2.2 Improve conservation and restoration of biodiversity for food and agriculture

**STRATEGIC PRIORITY AREA 3: INSTITUTIONAL FRAMEWORKS FOR
BIODIVERSITY FOR FOOD AND AGRICULTURE**

3.1 Build capacity through awareness raising, research, education and training

3.2 Strengthen legal, policy and incentive frameworks

3.3 Improve cooperation and funding

STRATEGIC PRIORITY AREA 1: CHARACTERIZATION, ASSESSMENT AND MONITORING OF BIODIVERSITY FOR FOOD AND AGRICULTURE

Introduction

The characterization, assessment and monitoring of BFA are essential to its sustainable use and conservation. The assessment and monitoring of the state and trends of BFA and of its management, at national, regional and global levels, are uneven and often limited and partial. The extent and character of existing knowledge gaps also vary significantly across the various categories of BFA.

In the case of domesticated plant, animal and aquatic GRFA – and of species that are widely harvested from the wild (e.g. forest trees and other woody plant species and species targeted by capture fisheries) – inventories and other information exist, although to varying degrees across the regions of the world and across food and agriculture sectors. At global level, monitoring systems for sectoral GRFA have been developed, for example the World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture (WIEWS), the Domestic Animal Diversity Information System (DAD-IS) and the FAO global information system on forest genetic resources.

Major ecosystem categories of importance to food and agriculture, for example inland wetlands, coral reefs, mangroves, seagrass beds, forests and rangelands, are monitored at national, regional and global levels, although at varying levels of comprehensiveness.

In contrast, many associated biodiversity species that provide regulating and supporting ecosystem services, particularly micro-organisms and invertebrates, have not been identified or documented. Population trends are relatively well known for some taxonomic groups (such as some vertebrates) but, for others, knowledge is almost non-existent. In many cases, characterization and systematization of individual species are very difficult, and metagenomics and other “omics” methods can be used to identify assemblages. Significant gaps in taxonomic capacity to assess biodiversity need to be addressed.

There are also many gaps in knowledge on the characteristics and on the status and trends of species that are sources of wild foods, including on risks associated with spillover of zoonotic and other pathogens.

In many cases, the contributions of components of BFA to the supply of ecosystem services are poorly understood, as are the effects of particular drivers on population sizes and distributions and on the ecological relationships that underpin the supply of ecosystem services.

In view of the above, there is an overall need to improve the availability of data and information. More specific needs include improving methodologies for recording, storing, sharing and analysing data (including spatial data) on changes in the abundance and distribution of species and ecosystems and improving capacity for monitoring and assessment, for example by increasing the number of skilled taxonomists.

Strategic Priority 1.1 Improve availability of, and access to, information on biodiversity for food and agriculture

Rationale

The sectoral Global Plans of Action include provisions for the assessment and monitoring of the respective categories of GRFA. However, there is a need to improve knowledge of other components of BFA, for example associated biodiversity and wild foods, at genetic, species and ecosystem levels, as relevant, and their roles in the supply of ecosystem services, building on existing data where possible. Given that each country has its own set of circumstances, needs and capacities, priority species, ecosystems or ecosystem services for assessment and monitoring need to be established at national level. Where possible, efforts need to be made to promote synergies in assessment and monitoring activities for the various components of BFA, including those covered by the sectoral Global Plans of Action.

A wide range of management practices and approaches make use of components of BFA in a sustainable way and thus potentially contribute to their conservation.⁸⁰ These include specific production practices and approaches (e.g. conservation agriculture, pollinator-friendly practices, permaculture, organic agriculture and integrated pest management), the use of mixed production systems (e.g. agroforestry and integrated crop–livestock–aquatic systems), restoration practices, and integrated approaches at ecosystem level (e.g. ecosystem approaches to fisheries and aquaculture, sustainable forest management and agroecology). In most cases, it is difficult to evaluate the extent to which such practices and approaches are being used, owing to the variety of scales and contexts involved and the absence of relevant data. Although impacts on BFA are generally perceived to be positive, there is a need for more research and for the development of appropriate assessment methods in this regard.

Actions

- 1.1.1 Improve the inventory, monitoring and characterization of associated biodiversity and wild foods, including at population level, as appropriate.
- 1.1.2 Improve the assessment of how BFA, including associated biodiversity and wild foods, is being managed and, as appropriate, the monitoring of the extent to which management practices and approaches contributing to its sustainable use and conservation are being adopted, taking into account indigenous and local knowledge, as relevant, and the characteristics of local production systems.
- 1.1.3 Improve the assessment and, as appropriate, monitoring of drivers of change and their effects on BFA.
- 1.1.4 Take action to reduce knowledge gaps on the roles of BFA in the supply of ecosystem services, including on how these are influenced by management practices in the food and agriculture sector.
- 1.1.5 For all relevant components of BFA, take action to reduce gaps in knowledge on their nutritional contents and their potential significance in efforts to improve food security, nutrition and health, including gaps in knowledge related to cultural and social aspects of their use.
- 1.1.6 As relevant, identify priority species, ecosystems or ecosystem services for assessment and monitoring at national level.
- 1.1.7 In strengthening and streamlining assessment and monitoring programmes for BFA, use and integrate – as relevant, and to the extent feasible – existing assessment and monitoring systems (e.g. those developed for the SDGs, CBD or the FAO Commission on Genetic Resources for Food and Agriculture) and existing data and indicators, at national, regional and global levels, and explore the potential of indicators that serve multiple purposes.
- 1.1.8 Taking into account relevant initiatives and existing tools, methodologies and frameworks, strengthen existing and/or develop new tools, standards and protocols for the inventory, assessment and monitoring of BFA and support the development of voluntary international reference frameworks.
- 1.1.9 Support the improvement of global, regional, national and local information systems for BFA.
- 1.1.10 For aspects of the assessment and monitoring of BFA, strengthen the role of citizen scientists, indigenous peoples and local communities, and other participatory research stakeholders, as appropriate.

⁸⁰ See Chapter 5 of FAO. 2019. The State of the World's Biodiversity for Food and Agriculture. Rome for a description of the status and trends in the adoption of over 20 such practices and approaches.

STRATEGIC PRIORITY AREA 2: MANAGEMENT OF BIODIVERSITY FOR FOOD AND AGRICULTURE

Introduction

Management of BFA is taken here to comprise the various activities involved in its sustainable use, its conservation *in situ* and *ex situ* and its restoration.

Use of BFA includes the cultivation or raising of domesticated species, the implementation of formal or informal genetic-improvement activities and the domestication of additional wild species, the introduction of domesticated or wild species into new production systems, the management of associated biodiversity in and around production systems to promote the delivery of ecosystem services, and the harvesting of food and other products from the wild. Some of these practices and approaches contribute to the maintenance of BFA, while others are major drivers of its loss, including via damaging changes in land and water use and management, pollution, unsustainable use of external inputs, and unsustainable exploitation and harvesting. Sustainable use is the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

In situ conservation of BFA comprises measures taken to promote the maintenance, protection, recovery and continued evolution of biodiversity in and around crop, livestock, forest, aquatic and mixed production systems. Restoration also contributes to *in situ* conservation efforts. *Ex situ* conservation comprises the maintenance of components of BFA outside their normal habitats in and around production systems. This may involve the storage of seeds, pollen or vegetative plant tissues or of cryoconserved materials, such as animal semen or embryos, in genebanks and maintenance of live organisms at sites such as botanical gardens, aquaria, field genebanks, zoos or rare-breed farms.

Managing BFA more sustainably will require efforts to address threats and drivers of biodiversity loss and ecosystem degradation and build on opportunities associated with a wide range of interacting drivers of change.

The sectoral Global Plans of Action include priorities for the conservation and sustainable use of the respective components of GRFA. Recent times have, in general, seen progress made in terms of strengthening *ex situ* conservation in all the sectors of food and agriculture. Promoting *in situ* and on-farm conservation and sustainable use has been more challenging.

The management of BFA is constrained by widespread knowledge gaps, exacerbated in places by the loss of traditional knowledge of BFA. Other challenges include the fact that each component of BFA depends on, and interacts with, others across a range of scales, including at landscape or seascape scale. Effective management therefore often requires collaboration among a variety of different stakeholders, both within and beyond the various sectors of food and agriculture.

Inadequate funding, shortages of trained personnel (including in taxonomy and systematics) and shortages of technical resource are widespread constraints, often making it difficult to bridge knowledge gaps, implement management programmes and enforce regulations and policies aimed at protecting biodiversity. Research on management methods and strategies is often hampered by a lack of interdisciplinary collaboration. BFA-related education, training and awareness-raising activities for stakeholders at all levels from producers to policy-makers need to be strengthened. Addressing weaknesses in legal, policy and administrative frameworks is also essential (see Strategic Priority Area 3).

Strategic Priority 2.1 Promote sustainable use of biodiversity for food and agriculture and integrated approaches to its management

Rationale

Management practices and approaches for BFA range in scale from that of the landscape or seascape to that of the production system or the individual plot. Landscape and seascape approaches and integrated land- and water-use planning have been adopted, at least to some extent, in many countries. Sustainable forest management, the ecosystem approach to fisheries and aquaculture, agroecology and restoration practices, among others, are also applied in many countries. At production-system level, practices related to the diversification of production systems, and specific management practices and production approaches, may contribute to the sustainable use and conservation of BFA. Such approaches and practices should be more widely applied. However, a lack of research, knowledge, capacity, resources and/or appropriate legal, policy and administrative frameworks often constrains their adoption and implementation.

Many of the management practices and approaches that make use of diverse components of BFA are relatively complex and require a good understanding of the species composition of the local ecosystem, the functions of these species within the ecosystem, the trophic relationships among them and their interactions with downstream and other interdependent ecosystems. Such practices and approaches can be knowledge-intensive and context-specific and may provide benefits in the long term rather than the short term. Overcoming these challenges and promoting wider implementation require capacity development and technical and policy support.

Actions

- 2.1.1 When developing or implementing approaches to the management of BFA, identify and take into account drivers of change affecting BFA and associated ecosystem services.
- 2.1.2 Promote sustainable food and agricultural production practices and approaches, including integrated management approaches at production system, ecosystem, landscape and seascape levels, that make sustainable use of, conserve and restore BFA while improving livelihoods and supporting economic performance, healthy ecosystems and the supply of ecosystem services.
- 2.1.3 Promote measures to reduce the risks to and impacts on BFA from the inappropriate use of chemical pesticides and veterinary medicines and from the excess use of fertilizers.
- 2.1.4 Promote measures to reduce the risk and impact of overgrazing and to enhance and promote best practices in rangeland management.
- 2.1.5 Identify, and develop methodologies based on, best management practices (including those based on indigenous and local knowledge) that contribute to the sustainable use and conservation of BFA, and develop tools and guidance to facilitate their implementation, as appropriate.
- 2.1.6 Promote, where relevant, agricultural inputs and practices based on the use of BFA, in particular associated biodiversity, for pest control and nutrient management.
- 2.1.7 Develop and implement strategies, plans and actions to manage soil biodiversity to ensure soil health and soil fertility.
- 2.1.8 Promote, as appropriate, production systems that serve several purposes, including the sustainable use, conservation and restoration of BFA, the supply of food and other products, and the supply of a range of other ecosystem services.
- 2.1.9 Improve, where appropriate, landscape structure, and connectivity in particular, to provide habitats for associated biodiversity and wild food species.

Strategic Priority 2.2 Improve conservation and restoration of biodiversity for food and agriculture

Rationale

The sectoral Global Plans of Action set out priorities for action to promote the conservation of components of GRFA. Conservation programmes have been put in place, but their coverage and effectiveness need to be improved, particularly in some regions of the world. The conservation of associated biodiversity is constrained by a number of factors, including a lack of adequate information on relevant conservation methods and strategies. Especially with respect to *ex situ* conservation, there are still biological and technical barriers to the long-term conservation of some species. Another constraint is the difficulty of targeting individual associated biodiversity species for conservation programmes. In many cases, it may prove more efficient to prioritize conservation methods and approaches targeting ecosystems rather than those targeting individual species. The complementarity between *in situ* and *ex situ* conservation needs to be enhanced.

Conservation programmes are widely constrained by underlying knowledge gaps, resource limitations and policy weaknesses. Action is needed to address these constraints (see Strategic Priority Areas 1 and 3). With respect to conservation activities and strategies *per se*, priority should be given to expanding the use of *in situ* conservation via biodiversity-friendly management practices in crop and livestock production, forestry, fisheries and aquaculture, including, where relevant, traditional management practices associated with local or indigenous communities. It is important in this context to improve landscape structure so as to provide habitat for associated biodiversity species. This may involve, for example, maintaining areas of natural or semi-natural habitat within and around production systems, including systems that are intensively managed, and where necessary reconnecting fragmented habitats. Where ecosystems are degraded, restoration activities may be required, and there is a need to ensure that such activities are given due priority in BFA management strategies, including with regard to research, resource allocation and policy development. Threats to BFA, including biodiversity-damaging practices in crop and livestock production, forestry, fisheries and aquaculture and the unsustainable exploitation of wild foods, need to be addressed via action at all relevant levels. Intercommunity and intracommunity, as well as intergenerational, transfer of knowledge and skills that contribute to conservation, restoration and sustainable use of BFA should be promoted.

Actions

2.2.1 Identify priority species, ecosystems and ecosystem services for conservation and restoration and establish targets or goals relative to these priorities at national level.

2.2.2 Strengthen conservation programmes, in particular *in situ* and on-farm conservation, focusing on associated biodiversity and wild foods, and seek to optimize complementarity between *in situ* and *ex situ* conservation approaches, where appropriate.

2.2.3 Establish or strengthen effective infrastructure, including at the local level, for the *ex situ* conservation of BFA, including micro-organisms, invertebrates and other components of associated biodiversity, and wild foods, and improve documentation and overviews of collections within countries.

2.2.4 Maintain, develop or expand designated areas, such as protected areas (including International Union for Conservation of Nature Categories 5 and 6), relevant UNESCO sites and other effective area-based conservation measures, for BFA and related ecosystem services, as well as Globally Important Agricultural Heritage Systems.

STRATEGIC PRIORITY AREA 3: INSTITUTIONAL FRAMEWORKS FOR BIODIVERSITY FOR FOOD AND AGRICULTURE

Introduction

Proper institutional frameworks – including appropriate policies and legislation, effective mechanisms for their implementation and effective mechanisms for raising awareness, engaging stakeholders and promoting cooperation and exchange of information – are vital to the conservation and sustainable use of BFA and to maintaining its role in the supply of ecosystem services.

Institutional frameworks for the management of BFA, and in particular for associated biodiversity and wild foods, are often inadequate. For example, BFA is often insufficiently mainstreamed into sectoral policies, both within the food and agriculture sector and beyond. General biodiversity-related policy frameworks usually give limited attention to the links between biodiversity and food and agriculture. Where relevant policies and laws exist, their implementation is often weak. As noted under Strategic Priority Area 2, lack of collaboration and coordination among stakeholders is a widespread constraint to improving the management of BFA. Significant gaps often include a lack of adequate links between ministries, between researchers and policy-makers and between policy-makers and stakeholders at production-system and community levels.

Producers, particularly small-scale and indigenous producers – including women – are often marginalized and excluded from decision-making processes that affect their production systems. However, many producers' and community-based organizations play significant roles both in providing practical support to the sustainable management of BFA and in advocating policies or marketing strategies that support the roles of producers as custodians of BFA. Social and economic policies need to aim to ensure equity for rural populations – including by protecting, and ensuring equitable access to, the communal resources relied upon by many small-scale producers – so that they are able to build up their productive capacity in a sustainable way.

One of the major constraints to the development, adoption and implementation of effective policies and legislation for the sustainable use and conservation of BFA is a lack of data on the characteristics of ecosystems and limited understanding of ecosystem functions and services, and specifically the roles of BFA in this context (see Strategic Priority Area 1 for actions addressing such gaps). Research in these fields therefore needs to be strengthened.

Many of the regulating, supporting and cultural ecosystem services provided by BFA are generally not traded on markets and hence their values are often not recorded in economic statistics. This may contribute to their being overlooked in policy-making. Economic analysis, including economic valuation, can help to make the hidden benefits of biodiversity and hidden costs of biodiversity loss more visible and hence increase awareness of the need for conservation and sustainable use and drive more effective conservation and sustainable use policies. National planning needs to ensure the long-term supply of public goods associated with the maintenance of BFA and the supply of ecosystem services.

Incentives and other economic instruments for promoting the sustainable use and conservation of BFA can take a range of forms and originate from public programmes, private-sector investments or civil-society initiatives. Incentives, including subsidies, harmful to biodiversity still exist and need to be eliminated, phased out or reformed in order to avoid negative impacts. Incentive measures positive to biodiversity are still often absent and where they do exist a lack of coordination in their implementation often constrains their success. In many countries, the growing market for products that comply with environmental standards can provide opportunities to promote biodiversity-friendly production. Incentives and other economic instruments should be promoted in a manner fully consistent with international obligations.

Overall, the management of BFA needs to be properly integrated into short- and long-term policies for the development of the food and agriculture sector in collaboration with the conservation and natural resource management sectors and into broader cross-sectoral planning frameworks for the achievement of the SDGs.

Strategic Priority 3.1 Build capacity through awareness raising, research, education and training

Rationale

Awareness raising, research, education and training, at all levels, are widely recognized as key means of promoting the sustainable management of BFA. As noted under Strategic Priority Areas 1 and 2, despite their vital contributions to food and agriculture, knowledge of components of BFA and the ecosystem services they provide, as well as of how they are affected by management practices and approaches and other drivers of change, needs to be improved.

In many developing countries in particular, a lack of human capacity is – along with a lack of financial resources – a major obstacle to efforts to improve the management of BFA. Many countries will need to devote particular attention to establishing and building up research, educational and training institutions and establishing a strong and diverse skills base, including in taxonomy and through citizen science.⁸¹

Research at national and international levels into all aspects of BFA management needs to be strengthened, including through support for National Agricultural Research Systems (NARS) and the establishment or strengthening of research networks on associated biodiversity.

Actions

3.1.1 Raise awareness, at all levels, of the importance of BFA, of the ecosystem services it provides and of the need for its sustainable use, conservation and restoration, including by supporting regional and international awareness-raising campaigns, with a view to strengthening support from governments, institutions and other relevant stakeholders. Develop relevant capacity to support these efforts, as required.

3.1.2 Improve capacity for research on BFA, in particular soil biodiversity and other associated biodiversity, wild foods and ecosystem services, including through the formation of multi-, inter- and transdisciplinary research teams and by strengthening mechanisms for cooperation and exchange of information between scientists and producers and other stakeholders involved in the management of BFA. Promote innovative ways of building capacity, for example through the use of information and communication technologies and through participatory approaches involving, *inter alia*, indigenous and local communities of traditional-knowledge holders.

3.1.3 Improve the communication of research findings on BFA, and promote their uptake and use by producers and policy-makers.

3.1.4 Assess gaps and strengthen the teaching of all relevant areas of knowledge related to BFA in universities, schools and in professional and informal education and training, targeting various stakeholders, including citizen scientists, and promoting interdisciplinary skills.

3.1.5 Promote opportunities for ongoing training and education for farmers, fisherfolk, livestock keepers and forest dwellers, including via farmer field schools, producer group extension programmes or community-based organizations, to strengthen the sustainable use and conservation of BFA and the ecosystem services it supports.

3.1.6 Strengthen research-related policy frameworks for BFA to ensure support for long-term research activities, and increase the availability of human, physical and financial resources for this purpose.

3.1.7 Promote, through various means (e.g. increasing recognition, including through adequate remuneration, providing adequate infrastructure, such as laboratories, and logistical support), education and research in the field of BFA.

3.1.8 Strengthen capacity to use assessment and monitoring systems, including by improving the dissemination of information to users.

⁸¹ Citizen science refers here to the collection of data relating to biodiversity by the general public.

3.1.9 Promote awareness raising and sharing of information on BFA-friendly management practices and approaches, including through the use of participatory techniques (for instance community-made videos, photo, stories and infographics).

3.1.10 Promote research, including interdisciplinary, transdisciplinary, cross-cultural and participatory research, on BFA and its roles in agri-food systems and on management practices and approaches that contribute or potentially contribute to the sustainable use, conservation and restoration of BFA.

Strategic Priority 3.2 Strengthen legal, policy and incentive frameworks

Rationale

Appropriate legal and policy frameworks are essential for the effective management of BFA, but often remain underdeveloped or poorly implemented. Improving such frameworks is challenging, particularly in view of the multiple stakeholders and interests involved and the need for provisions to keep up with emerging issues in BFA management. Laws and policies beyond the field of BFA management with indirect or unintended effects on BFA are also often overlooked. With regard to associated biodiversity and ecosystem services in particular, a lack of adequate coordination between the food and agriculture, natural resource management and conservation sectors and limited understanding of these aspects of biodiversity and of their significance to food and agriculture among policy-makers are major constraints to the development of adequate laws and policies.

The importance of valuation of biodiversity and ecosystem services is widely recognized, as is the need to mainstream it into all relevant policies. Nevertheless, the integration of the results of economic analyses, including valuation studies, into national accounting systems or into broader measures of social welfare is limited, and major knowledge gaps remain, including with respect to microbial genetic resources, wild pollinators and wild medicinal plants. Economic analyses and ecosystem service valuation data could play a more prominent role in BFA management, *inter alia* in the development of conservation strategies and research programmes.

Countries often use incentives and other economic instruments to promote various aspects of the sustainable management of BFA. However, these instruments are often used in isolation and not coordinated with each other. While individual public programmes, private-sector investments or civil-society initiatives may provide incentives related to their own particular purposes, a coordinated package of economic measures can create a much larger impact in terms of improving outcomes for BFA. Challenges to the establishment of multiple-incentive programmes include the need for a suitable enabling environment to support the high level of coordination required between institutions and across scales (international, national and subnational), the need to engage with the private sector and promote responsible investment, and the need for cross-sectoral dialogue, e.g. among the environmental, food and agriculture and other sectors. Overall, there is also a need to better document and map economic instruments that are used, or could be used, to promote the sustainable management of BFA. Incentives and other economic instruments should be promoted in a manner fully consistent with relevant international agreements and obligations, with a view, among others, to avoiding trade-distorting policy measures.

Actions

3.2.1 Inventory and review existing legislative, administrative and policy frameworks relevant to the sustainable use, conservation and restoration of BFA, with a view to identifying gaps, weaknesses or inefficiencies. In reviewing and, as relevant, updating them, consider options for adequately mainstreaming all components of BFA and addressing drivers of change, as well as cross-sectoral considerations, as appropriate.

3.2.2 In reviewing and, as relevant, updating legislative, administrative and policy frameworks for the management of BFA, ensure that they are aligned, to the extent feasible, with the SDG Framework and promote the contributions of BFA and its management to efforts to meet the SDGs.

- 3.2.3 Encourage the governing bodies of relevant international organizations to consider – as appropriate and consistent with their respective mandates – the importance of BFA and the ecosystem services it supplies when revising global agreements on biodiversity and on crop and livestock production, forestry, fisheries and aquaculture.
- 3.2.4 Promote the implementation of studies, including participatory assessments, that identify the use and non-use values of BFA and the ecosystem services it provides – and of other relevant economic analyses – including by developing and standardizing economic methodologies and tools. Such studies should, as far as possible, build on existing information and assessments.
- 3.2.5 Promote the integration of the outcomes of economic analyses, including valuation studies, into conservation strategies and other aspects of BFA management.
- 3.2.6 Document and map existing incentive schemes and other economic instruments related to the management of BFA across the environmental and food and agriculture sectors and the public, non-governmental and private sectors. Where gaps, weaknesses or inefficiencies are identified, address them by developing new instruments or strengthening or harmonizing existing instruments, as appropriate and in a manner fully consistent with relevant international agreements and obligations.
- 3.2.7 Promote and incentivize – in a manner fully consistent with relevant international agreements and obligations – production systems that sustainably use and conserve BFA, including markets, sustainable sourcing policies and value chains for products from production systems that favour the conservation and sustainable use of BFA.
- 3.2.8 Eliminate, phase out or reform incentives harmful to biodiversity, in a manner fully consistent with other relevant international agreements and obligations, taking into account national socio-economic conditions.
- 3.2.9 Adapt policies and investment decisions in the various sectors of food and agriculture in a way that reduces ecosystem degradation and promotes the sustainable management of biodiversity and sustainable production systems.
- 3.2.10 Promote sustainable consumption and production patterns, including through applying circular economy and other relevant approaches to resource-use efficiency, in order to support the sustainable use, conservation and restoration of BFA.
- 3.2.11 Promote, as appropriate, the implementation of access and benefit-sharing measures for GRFA as a means of improving the sustainable use of these resources, raising awareness of their roles and values and building capacity to strengthen research, education and training for their sustainable use and conservation, while recognizing the special nature and distinctive features of GRFA.
- 3.2.12 Enhance national frameworks for the assessment and monitoring of BFA, in particular associated biodiversity and wild foods, engaging national agencies and strengthening interagency coordination.
- 3.2.13 In planning and implementing designated areas, such as protected areas and other effective area-based conservation measures, raise awareness of, and take into account, as relevant, the roles of components of BFA.
- 3.2.14 Support the mainstreaming of conservation, restoration and sustainable use of BFA into food value chains.

Strategic Priority 3.3 Improve cooperation and funding

Rationale

The management of BFA spans the conventional boundaries between the sectors of food and agriculture and those between food and agriculture and nature conservation. Strengthening the sustainable use and conservation of BFA often requires actions on a large geographical scale (e.g. across watersheds or along migration routes) and involving a wide range of different stakeholders. The distributional ranges of associated biodiversity species, in particular, are often transboundary. Multi-stakeholder, cross-sectoral and international cooperation in BFA assessment, monitoring and management is therefore vital. Cooperation within and between countries is needed in order to develop national and regional networks. Networks are important in linking stakeholders and in supporting research, knowledge exchange, institutional development and capacity building.

Numerous subregional, regional and international collaborative initiatives target the sustainable use and conservation of crop, livestock, forest and aquatic genetic resources. There are generally far fewer such efforts targeting associated biodiversity and its roles in providing ecosystem services to food and agriculture, although a number of initiatives at these levels contribute to the management of specific components of associated biodiversity, including through projects targeting pollinators, biological control agents or *ex situ* collections.

Along with deficiencies in terms of political will and/or governance, capacity, awareness, knowledge and cooperation, shortages of financial resources are among the major constraints to the effective implementation of all the actions listed in all the three strategic priority areas of this Framework.

Actions

3.3.1 Inventory and describe national and regional institutions with mandates related to the management of BFA to enable the establishment or strengthening of relevant coordination mechanisms.

3.3.2 Improve cooperation on BFA between relevant stakeholders, including producers, researchers, consumers and policy-makers within the sectors of food and agriculture and natural resources management and more widely, in order to facilitate the development of more relevant and effective BFA-related policies and to support participatory innovation and transfer of knowledge.

3.3.3 Strengthen existing and/or establish new networks, including at national and regional levels, linking users and communities that manage associated biodiversity and ecosystem services on-farm and *in situ*, research institutes, scientists and other relevant stakeholders, *inter alia* to facilitate the sharing of data and of best practices.

3.3.4 Further develop and strengthen international cooperation to mainstream BFA within and beyond agriculture sectors. Disseminate examples of successful cooperation.

3.3.5 Further develop and strengthen international cooperation, including triangular and South–South cooperation, to foster capacity-building, technical assistance and technology transfer related to the management of BFA, especially in and to developing countries.

3.3.6 Promote facilitated access to GRFA and the sharing of benefits arising from their use through implementation of relevant international instruments and/or other domestic regulatory mechanisms, considering the importance of such monetary and non-monetary benefits to the conservation and sustainable use of GRFA, especially in developing countries, and the special nature of GRFA and its distinctive features.

3.3.7 Explore opportunities to increase support, including financial, for activities related to BFA, including research, innovation, monitoring and assessment, sustainable use and conservation, outreach, training and capacity-building.

3.3.8 Identify opportunities for efficient use of resources, for example by promoting synergies and cooperation between projects at national and regional levels.

3.3.9 Support the funding strategies of the FAO Commission on Genetic Resources for Food and Agriculture's sectoral Global Plans of Action and the implementation of its Multi-year Programme of Work.

3.3.10 Contribute to the implementation of the international initiatives for the conservation and sustainable use of soil biodiversity and of pollinators.

ANNEX 1

Table 1. Concepts used in the Framework for Action on Biodiversity for Food and Agriculture.

Biodiversity	Biological diversity (often referred to as biodiversity) is defined in Article 2 of the Convention on Biological Diversity (CBD) as “the variability among living organisms from all sources including, <i>inter alia</i> , terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems”. ⁸²
Biodiversity for food and agriculture (BFA)	BFA is a subcategory of biodiversity taken for the purposes of <i>The State of the World's Biodiversity for Food and Agriculture</i> to correspond to “the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that sustain the ecosystem structures, functions and processes in and around production systems, and that provide food and non-food agricultural products.” ⁸³
Production systems	“Production systems” are taken to include those in the crop, livestock, forest, fishery and aquaculture sectors. As per FAO’s definition, agriculture is inclusive of forestry, fisheries and aquaculture.
Plant genetic resources for food and agriculture (PGRFA)	The term PGRFA refers to “any genetic material of plant origin of actual or potential value for food and agriculture.” ⁸⁴ This includes farmers’ varieties/landraces maintained on-farm, improved varieties, breeding materials in crop improvement programmes, genebank accessions (i.e. <i>ex situ</i> collections), crop wild relatives and wild plants harvested for food.
Animal genetic resources for food and agriculture (AnGR)	AnGR are genetic resources of animal origin “used or potentially used for food and agriculture.” ⁸⁵ The scope of global assessments undertaken by FAO on animal genetic resources for food and agriculture was the genetic resources of domesticated avian and mammalian species used in food and agriculture. ⁸⁶
Forest genetic resources (FGR)	FGR are “the heritable materials maintained within and among tree and other woody plant species that are of actual or potential economic, environmental, scientific or societal value.” ⁸⁷
Aquatic genetic resources for food and agriculture (AqGR)	AqGR “include DNA, genes, chromosomes, tissues, gametes, embryos and other early life history stages, individuals, strains, stocks and communities of organisms, of actual or potential value for food and agriculture.” ⁸⁸ The scope of the global assessment undertaken for <i>The State of the World's Aquatic Genetic Resources for Food and Aquaculture</i> was farmed aquatic species and their wild relatives within national jurisdiction.
Micro-organism and invertebrate genetic resources for food and agriculture (MIGR)	MIGR are micro-organism and invertebrate genetic resources of actual or potential value for food and agriculture. Important groups include pollinators, in particular honey bees, micro-organisms of relevance to ruminant digestion, food processing and agro-industrial processes, biological control agents and soil micro-organisms and invertebrates. ⁸⁹
Associated biodiversity	“Associated biodiversity comprises those species of importance to ecosystem function, for example, through pollination, control of plant, animal and aquatic pests, soil formation and health, water provision and quality, etc., including <i>inter alia</i> :

⁸² CBD. 1992. Convention on Biological Diversity. Montreal, Canada, Secretariat of the Convention on Biological Diversity.

⁸³ FAO. 2019. *The State of the World's Biodiversity for Food and Agriculture*. Rome.

⁸⁴ FAO. 2009. *International Treaty on Plant Genetic Resources for Food and Agriculture*. Rome.

⁸⁵ FAO. 2007. *The State of the World's Animal Genetic Resources for Food and Agriculture*. Rome; FAO. 2007. *The Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration*. Rome.

⁸⁶ FAO. 2007. *The State of the World's Animal Genetic Resources for Food and Agriculture*. Rome; FAO. 2015. *The Second Report on the State of World's Animal Genetic Resources for Food and Agriculture*. Rome.

⁸⁷ FAO. 2014. *The State of the World's Forest Genetic Resources*. Rome.

⁸⁸ FAO. 2019. *The State of the World's Aquatic Genetic Resources for Food and Agriculture*. Rome.

⁸⁹ CGRFA/16/17/Report Rev.1, paragraph 79.

	<p>a) Micro-organisms (including bacteria, viruses and protists) and fungi in and around production systems of importance to use and production such as mycorrhizal fungi, soil microbes, planktonic microbes, and rumen microbes;</p> <p>b) Invertebrates, including insects, spiders, worms, and all other invertebrates that are of importance to crop, animal, fish and forest production in different ways, including as decomposers, pests, pollinators, and predators, in and around production systems;</p> <p>c) Vertebrates, including amphibians, reptiles, and wild (non-domesticated) birds and mammals, including wild relatives, of importance to crop, animal, fish and forest production as pests, predators, pollinators or in other ways, in and around production systems;</p> <p>d) Wild and cultivated terrestrial and aquatic plants other than crops and crop wild relatives, in and around production areas such as hedge plants, weeds, and species present in riparian corridors, rivers, lakes and coastal marine waters that contribute indirectly to production.”⁹⁰</p>
Wild foods	<p>“Wild foods are food products obtained from non-domesticated species. They may be harvested (gathered or hunted) from within food and agricultural production systems or from other ecosystems. The group of species that supplies wild foods overlaps to various degrees with those in the ... ‘sectoral’ categories of genetic resources and with associated biodiversity. For example, capture fisheries are probably the largest single example of the human use of wild foods, and many aquaculture facilities use wild-caught stocks for broodstock or larval grow-out.”⁹¹</p>
Ecosystem services	<p>Ecosystem services are “the benefits humans derive from ecosystems”.⁹² The Millennium Ecosystem Assessment identified four categories of ecosystem service: provisioning, regulating, supporting and cultural. “Provisioning services” are “the products obtained from ecosystems”, i.e. food and raw materials of various kinds, including the products of agri-food systems. “Regulating services” are “benefits obtained from the regulation of ecosystem processes”. Examples include regulation of the climate, air and water quality, diseases and natural disasters. “Cultural services” are the “nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences”. “Supporting services” are services “that are necessary for the production of all other ecosystem services”. Examples include photosynthesis and nutrient cycling. The distinguishing feature of supporting services is that they have a less direct effect on human welfare.</p>
Management of BFA	<p>Management of BFA is taken in the Framework for Action on Biodiversity for Food and Agriculture to comprise the various activities involved in its sustainable use, its conservation <i>in situ</i> and <i>ex situ</i> and its restoration.</p>
Conservation	<p>Conservation of BFA includes all actions implemented with the aim of preventing the loss of diversity in the populations, species and ecosystems that constitute this subset of biodiversity.⁹³ <i>Ex situ</i> conservation is “the conservation of components of biological diversity outside their natural habitats.”⁹⁴ <i>In situ</i> conservation is “the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties”.⁹⁵ This includes on-farm conservation.</p>

⁹⁰ FAO. 2013. *Guidelines for the preparation of the Country Reports for The State of the World’s Biodiversity for Food and Agriculture*. Rome.

⁹¹ FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

⁹² Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: synthesis*. Washington DC, Island Press.

⁹³ FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

⁹⁴ CBD. 1992. *Convention on Biological Diversity*. Montreal, Canada, Secretariat of the Convention on Biological Diversity.

⁹⁵ CBD. 1992. *Convention on Biological Diversity*. Montreal, Canada, Secretariat of the Convention on Biological Diversity.

Sustainable use	Sustainable use is “the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.” ⁹⁶
Restoration	Restoration is “any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state. Active restoration includes a range of human interventions aimed at influencing and accelerating natural successional processes to recover biodiversity ecosystem service provision.” ⁹⁷

⁹⁶ CBD. 1992. *Convention on Biological Diversity*. Montreal, Canada, Secretariat of the Convention on Biological Diversity.

⁹⁷ IPBES. 2018. *Summary for policymakers of the assessment report on land degradation and restoration of the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services*. R. Scholes, L. Montanarella, A. Brainich, N. Barger, B. ten Brink, M. Cantele, B. Erasmus, J. Fisher, T. Gardner, T. G. Holland, F. Kohler, J. S. Kotiaho, G. Von Maltitz, G. Nangendo, R. Pandit, J. Parrotta, M.D. Potts, S. Prince, M. Sankaran & L. Willemsen, eds. IPBES secretariat, Bonn, Germany. 44 pp.

APPENDIX D
**DRAFT GLOBAL PLAN OF ACTION FOR THE CONSERVATION, SUSTAINABLE USE
AND DEVELOPMENT OF AQUATIC GENETIC RESOURCES
FOR FOOD AND AGRICULTURE**

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LIST OF ACRONYMS/ABBREVIATIONS

ABS	access and benefit-sharing
AqGR	aquatic genetic resources for food and agriculture
ASFIS	Aquatic Sciences and Fisheries Information System
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COFI	Committee on Fisheries
COFI Working Group	COFI Advisory Working Group on Aquatic Genetic Resources and Technologies
COFI/AQ	COFI Sub-Committee on Aquaculture
Commission	Commission on Genetic Resources for Food and Agriculture
EAF	ecosystem approach to fisheries
EBM	ecosystem-based management
EIFAAC	European Inland Fisheries and Aquaculture Advisory Commission
ICES	International Council for the Exploration of the Sea
ITWG-AqGR	Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture

PART I – INTRODUCTION

1. Global production of aquatic animals (fish, crustaceans, molluscs and other aquatic animals) reached an all-time high in 2018 at approximately 179 million tonnes, valued at USD 401 billion. In addition, 33.3 million tonnes of aquatic plants, mainly marine macroalgae (seaweeds), were produced. Of this production, 46 percent of aquatic animal production and 97 percent of seaweed production came from aquaculture. Aquaculture has been the fastest growing sector of food production in this century, increasing at 5.3 percent annually from 2001 to 2018. Overall, aquaculture production and value now exceed those from capture fisheries. This production confirms the long-term transition from wild harvest to farming for many aquatic species. Harvest from capture fisheries has plateaued over recent decades, and there is an indication that yields from capture fisheries are unlikely to increase significantly from current levels and thus that the continuing increase in demand for aquatic food must be met from sustainable growth of aquaculture.

2. Global aquaculture is regionally imbalanced and occurs primarily in developing countries, with the Asia-Pacific region responsible for 92 percent of production and with the greatest diversity of species under culture. China alone accounts for over 60 percent of global aquaculture production. Aquatic animal production makes up 71 percent of global aquaculture production. Over 60 percent of this comes from inland aquaculture and sixty-six percent is finfish with molluscs representing just over 20 percent and crustaceans 11 percent. FAO records production of seaweeds but production of freshwater aquatic macrophytes and microalgae is generally not recorded by countries.

3. Many millions of people around the world find a source of income and livelihood in the aquatic sector, with about 59.5 million people engaged in the primary sector (34 percent in aquaculture). The highest numbers were found in Asia (85 percent), followed by Africa (9 percent), the Americas (4 percent), and Europe and Oceania (1 percent each). The total engagement of women across both fisheries and aquaculture was about 14 percent of the workforce in the primary sector. In 2017, global apparent per capita fish consumption was estimated at 20.3 kg (projected to increase to 21.5kg by 2030), with aquatic foods accounting for about 17.3 percent of the global population's intake of animal proteins and 6.8 percent of all proteins consumed. Globally, fish provides about 3.3 billion people with almost 20 percent of their average per capita intake of animal protein, and 5.6 billion people with at least 10 percent of such protein. Fish and fish products are some of the world's most traded food commodities.

4. The status of aquatic diversity has been impacted by capture fishing activities over hundreds of years with fishing pressure ever increasing globally. In 2017, over 34 percent of assessed fish stocks were considered to be fished unsustainably, with this proportion increasing from just 10 percent in 1974. Such fishing activities inevitably will impact biodiversity at all levels (including ecosystem, species and genetic diversity). Some data on biodiversity impacts are available for fished stocks, but, due to its relatively recent and dramatic rise in production, similar information is rarely available regarding diversity in aquaculture, especially at the level below species.

5. Aquatic genetic resources for food and agriculture (AqGR) underpin production in this sector. Over 1 700 species are harvested from capture fisheries, and nearly 700 species are farmed in aquaculture (2018 data), with this latter number increasing rapidly (from 472 species recorded in 2006). While the number of species under culture continues to increase there is also a concentration of production around a small number of species. Over 90 percent of finfish production involves just 27 species or species groups and the top ten global aquaculture species (including plants) account for around 50 percent of aquaculture production volume.

6. AqGR are the basis on which the aquaculture sector and capture fisheries will be able to exist and grow sustainably. Effective management of AqGR is essential to improve the growth of aquatic plants and animals, to adapt them to natural and human-induced impacts such as climate change, to resist diseases, pests and parasites, and to allow continued evolution. The diversity of AqGR determines the adaptability and resilience of species to changing environments and contributes to the wide variety of shapes, colours and other characteristics of aquatic species. AqGR are crucial for human survival and well-being given the acknowledged nutritional benefits of aquatic food. They play

a vital role in supplying food from seas, rivers and lakes, providing a source of healthy diets and livelihoods for millions of people while their culture alleviates pressure on wild stocks. They are thus indispensable for sustainable aquaculture production. The conservation, sustainable use and development of AqGR, and the fair and equitable sharing of the benefits from their use, are of vital international concern, and the Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture (Global Plan of Action) provides, for the first time, an agreed international framework for the sector.

Development of the Global Plan of Action

7. Since 2007, the FAO Commission on Genetic Resources for Food and Agriculture (Commission) has recognized the importance and vulnerability of AqGR, their roles in an ecosystem approach to food and agriculture, and their contributions to meeting the challenges presented by climate change. From 2014, the Commission guided a country-driven process for the preparation of the report on *The State of the World's Aquatic Genetic Resources for Food and Agriculture* (SoW-AqGR). The SoW-AqGR, published in 2019, provides the first comprehensive assessment of the status of AqGR of farmed species and their wild relatives.

8. The SoW-AqGR is based on 92 country reports, with these countries representing 96 percent of global aquaculture and 82 percent of capture fisheries production. The report provides a comprehensive global assessment of, *inter alia*, the status, use and exchange, drivers and trends, conservation efforts, stakeholders, policies and legislation, research, education, training and extension, and international collaboration, relevant to AqGR that are cultured, and their wild relatives, within national jurisdictions.

9. At its Seventeenth Regular Session, in February 2019, the Commission, recognizing the need to maintain momentum following the preparation of the SoW-AqGR, requested FAO to review the objectives, overall structure and list of follow-up strategic priorities, as presented to the Second Session of the Intergovernmental Technical Working Group on AqGR (ITWG-AqGR), and to prepare a draft Global Plan of Action for consideration by the ITWG-AqGR and the Commission at their next sessions.

10. The Commission further agreed that the Global Plan of Action should be prepared upon consultation with the regions and in collaboration with the Committee on Fisheries (COFI) and its relevant subsidiary bodies. It noted that the Global Plan of Action should be voluntary and collaborative and be implemented in line with the needs and priorities of Members.

11. The preparation of a Global Plan of Action has been further endorsed by COFI and its subsidiary bodies, namely the COFI Sub-Committee on Aquaculture (COFI/AQ) and the COFI Advisory Working Group on Aquatic Genetic Resources and Technologies (COFI Working Group).

12. Furthermore, input to the objectives, structure and list of follow-up strategic priorities has been provided by Members through responses to a written request for feedback sent to all Members and through input provided during five regional consultation workshops.

Nature of the Global Plan of Action

13. The Global Plan of Action is voluntary and non-binding and should not be interpreted or implemented in contradiction with existing national legislation and international agreements where applicable.

14. The Global Plan of Action constitutes a rolling document that can be updated in line with any follow-up that the Commission considers necessary. Its initial time horizon is ten years (concordant with the expected implementation of global assessments), with provisions for the conservation, sustainable use and development of AqGR, at national, regional and global levels.

15. The relative importance of each strategic priority and associated actions may differ significantly between countries and between regions. Relative importance may depend on the genetic

resources themselves, the natural environment or production systems involved, current management capacities, financial resources or policies already in place for the management of AqGR.

Rationale for the Global Plan of Action

16. The strategic priorities for action, contained within this Global Plan of Action propose specific measures to address the needs and challenges related to enhancing the conservation, sustainable use and development of AqGR. The implementation of the strategic priorities for action will make a significant contribution to international efforts to promote food security and sustainable development and to alleviate poverty in line with the Sustainable Development Goals (SDGs) and other international commitments.

17. The farming of aquatic species is, overall, a much younger production sector than the farming of crops and livestock in terrestrial agriculture. Domestication in aquaculture is relatively recent, with 97 percent of cultured aquatic species having commenced domestication only in the twentieth century. The consequence is that most present-day cultured farmed types are little different from their wild relatives and still retain high levels of genetic diversity. In contrast, many terrestrial species (both animal and plant) used for food and agriculture have been domesticated for up to 10 000 years and are thought to have lost much of the genetic diversity present in their wild ancestors and indeed many wild relatives of these species have been lost to humankind. This sectoral dichotomy generates different imperatives for AqGR relative to livestock and crop genetic resources when considering their conservation, sustainable use and development.

18. Despite the crucial role of AqGR in contributing to global food security and sustainable livelihoods, information available on AqGR, prior to the SoW-AqGR, tended to be scattered and incomplete. For example, the lineage of farmed types in some aquaculture species is often limited to a few companies that may restrict access to related information. In addition, the lack of a standardized nomenclature with which to unequivocally identify and report information on these resources further reduces the accuracy of the available data. The SoW-AqGR is thus a first and important step towards analysing, in a coherent and consistent manner, gaps in reporting aquaculture and fisheries data to FAO and member countries, and in the identification of knowledge gaps regarding AqGR at levels below the species. However, even information in the SoW-AqGR is affected by the relative lack of ongoing monitoring of the status of AqGR and the confusing and inconsistent use of nomenclature to describe these resources.

19. Despite the relatively recent domestication of most aquatic species used in aquaculture, there is evidence of genetic degradation of these resources in some seed supply systems, due to poor genetic management and the lack of application of basic genetic principles. This increases the risk of inbreeding, loss of important genetic diversity and ultimately the decline of production performance. Over 200 species are farmed where they are not native. Nine of the top ten globally cultured species are farmed in more countries where they have been introduced than where they are native. These non-native species can become invasive and negatively impact local ecosystems, including indigenous biodiversity.

20. There remains a strong link between cultured AqGR and their wild relatives. All cultured species still have wild relatives occurring in nature, although some of these are under threat from a range of drivers. In many cases, aquaculture retains a dependency on wild relative resources with seed for culture or broodstock for hatcheries still being harvested from the wild. Wild relatives of farmed species (stocks and populations) can be impacted by aquaculture not only due to harvest of seed or broodstock but also through habitat change/loss and, following escapes or deliberate introductions, the interaction between genetically changed cultured farmed types and their wild relatives.

21. Conversely, well-managed fishery stocks can act as effective mechanisms for *in situ* conservation, along with aquatic protected areas. There are also many *ex situ* conservation programmes in the form of live or *in vitro* gene banks. The SoW-AqGR reports 200 *in vivo* conservation programmes, mostly for finfish and microalgae, and nearly 300 *in vitro* gene banks, mainly of microalgal cultures and collections of cryopreserved sperm.

22. While there are many genetic improvement technologies that have been successfully applied to aquatic species, there is a relatively low uptake of genetic improvement, particularly the core technology of selective breeding, in aquaculture today. There are, thus, relatively few developed farmed types in aquaculture. It is estimated that little more than 10 percent of aquaculture production is derived from farmed types improved by well-managed breeding programmes. According to the SoW-AqGR, 45 percent of cultured species are currently farmed as wild-types and only 55 percent of countries reported that genetic improvement is having any significant impact on their aquaculture production. Thus, there is a largely unmet opportunity to significantly increase the productivity of sustainable aquaculture through accelerated adoption of genetic improvement across the sector.

23. Policies and institutions addressing AqGR are many and often complex because they usually deal with multiple influences and drivers. Policies addressing AqGR usually do not pay particular attention to the species and below-species levels, thus often compromising the management of these resources. Relevant policies and management plans are often ineffective, for a range of reasons.

24. Overall, there is a lack of awareness of the value of AqGR in fisheries and aquaculture, and key stakeholders in AqGR generally lack the capacity to fully address the complexities of their conservation, sustainable use and development. Furthermore, capacity-building needs and priorities differ among regions. There is evidence that regional or international networks dedicated to AqGR have been partially successful at capacity building and awareness raising but have often not been sustained.

25. Improved knowledge of the status and trends of the management of AqGR will facilitate the development of more comprehensive policies, better planning and improved management of these essential resources. Loss and degradation of aquatic habitats and populations have resulted in genetic impoverishment. In light of this, the changing environmental and economic conditions, and the advancement of biotechnology, the SoW-AqGR and its follow-up actions provide a long-overdue opportunity to define strategic priorities to enhance the contribution of AqGR to food security and sustainable rural development.

26. The SoW-AqGR identifies 37 specific needs and challenges across four identified priority areas:

1. Characterization, inventory and monitoring
2. Conservation and sustainable use
3. Development of AqGR for aquaculture
4. Policies, institutions, capacity building and cooperation

Building on the momentum of the launch of the first SoW-AqGR, this Global Plan of Action provides a framework to address, in a strategic and sustainable manner, the identified opportunities, gaps and needs. Global collaboration and coordination among countries and relevant stakeholders will be essential to address capacity needs of developing countries in particular, to respond to the findings of the SoW-AqGR and to implement this Global Plan of Action.

Objectives and Strategies of the Global Plan of Action

27. The Global Plan of Action aims to address the conservation, sustainable use and development of AqGR with a view to making a significant contribution to the promotion of food security and sustainable development and to the alleviation of poverty.

28. The Global Plan of Action and its strategic priorities are based on the assumption that countries are fundamentally interdependent with respect to AqGR and that substantial international cooperation is necessary to meet the below-mentioned aims effectively and efficiently. The Global Plan of Action was developed within a broad strategic framework based on the following assumptions and principles:

- Alignment with existing policy instruments and tools, in particular the FAO Code of Conduct for Responsible Fisheries, the Sustainable Development Goals (SDGs – particularly SDGs 2 and 14), and other international instruments, as applicable. The strategic priorities should assist countries, as appropriate, to integrate AqGR conservation and management needs into wider national policies and programmes and into frameworks of action at national, regional and global levels.
- The diversity of AqGR will ensure the ability of the aquaculture sector to sustainably meet changing and expanding market and societal demands and environmental circumstances, including climate change and emerging pests, parasites and diseases. Aquaculturists require farmed types of aquatic species that meet local needs and support local, national and global food and nutritional security and provide employment, including within rural communities, and that are resilient to a variety of biotic and abiotic factors, including extreme climatic conditions, diseases and diverse and evolving production systems.
- Because of interdependence, the conservation of a diverse range of AqGR in countries throughout the world reduces risks to production and supply continuity on a global basis and strengthens global food security.
- Wild and farmed AqGR are closely interdependent and should be considered collectively with regard to the conservation, sustainable use and development of AqGR.
- The baseline characterization and inventory of AqGR, and routine monitoring of wild stocks and farmed types for variability, are fundamental to genetic management and improvement strategies and programmes, to conservation programmes and to contingency planning to protect valuable resources at risk.
- Knowledge and monitoring of the status of AqGR are essential to inform the development of policies and guidelines for the management of AqGR and to inform decisions by producers on which AqGR to utilize within production systems.
- The conservation of AqGR requires a blended approach, and – while *in situ* conservation should be prioritized for key wild relative resources – *ex situ* conservation has a role to play, and this blend will likely be the main approach for conservation of farmed types.
- The effective management of AqGR at all levels depends on the inclusion and willing participation of all relevant stakeholders. These stakeholders, including key stakeholders such as government resource managers, policy-makers, academia and researchers, and aquaculture producers and breeders, should play a role individually and collectively in the conservation and development of AqGR. It is important to understand and support the roles of these various stakeholders and their interest in AqGR such that they share fairly and equitably in the benefits arising from the utilization of these resources.

29. The main aims of the Global Plan of Action are:

- to improve the identification, characterization and description of AqGR, and their monitoring;
- to promote access to, and sharing of, information, on AqGR at global, regional and national levels;
- to ensure the conservation of the important AqGR diversity of both farmed types and wild relatives, for present and future generations;
- to promote the sustainable use and development of AqGR, for food security, sustainable aquaculture development and human well-being in all countries;

- to accelerate the appropriate genetic improvement of farmed AqGR to deliver genetic gains to support sustainable growth in aquaculture production;
- to address the need for the development of inclusive national programmes on AqGR that engage relevant stakeholders, including policy-makers, government and other resource managers, academia and researchers, aquaculture producers, intergovernmental and non-governmental agencies;
- to stress the important role that women play in the use and conservation of AqGR and to call for special efforts to be made to include women and women's cooperatives in programmes on AqGR management;
- to build capacity in the conservation, sustainable use and development of AqGR and related information on infrastructural and financial resources, training and education to enable more countries to benefit from and sustainably use AqGR;
- to promote protection of critical habitats for all development stages of AqGR and reverse the decline in many wild relatives of farmed aquatic species, including those caused by invasive alien species, promoting ecosystem and ecoregional approaches as efficient means of supporting sustainable use and management of AqGR;
- to promote access to and the fair and equitable sharing of benefits arising from the use of AqGR in line with relevant international instruments, as applicable;
- to raise awareness and increase knowledge of AqGR by, for example, developing case studies that demonstrate how genetic improvement and associated knowledge can be used to increase food security, economic development and conservation of AqGR;
- to assist countries and relevant institutions in the establishment, implementation and regular review of national priorities and strategies for the sustainable use, development and conservation of AqGR;
- to strengthen national programmes and enhance institutional capacity – in particular in developing countries and countries with economies in transition – and develop relevant regional and international programmes; such programmes should include education, research and training to address the characterization, inventory, monitoring, conservation, development and sustainable use of AqGR;
- to review relevant policies and national programmes and priorities with a view to creating an enabling environment and mobilizing the necessary human and financial resources for the sustainable use and exchange of AqGR and associated technologies, such as selective breeding; and
- to facilitate the development of voluntary guidelines and frameworks for enhancing management of AqGR, nationally and internationally.

Structure and Organization of the Global Plan of Action

30. The strategic priorities of the Global Plan of Action are grouped under four priority areas reflecting the division of the challenges and needs identified in the SoW-AqGR, as follows:

- i. Characterization, inventory and monitoring
- ii. Conservation and sustainable use
- iii. Development of AqGR for aquaculture
- iv. Policies, institutions, capacity building and cooperation

Each priority area identifies an associated long-term goal and lists a number of strategic priorities. Under each strategic priority, a specific goal is identified, along with a list of actions to meet the goal. Some strategic priorities are related and interlinked or overlapping, and thus actions foreseen may be relevant to more than one strategic priority.

31. Monitoring the implementation of the Global Plan of Action is crucial and efforts will be made to establish adequate indicators for this purpose. In some cases, indicators that may be used for the monitoring of the implementation of the Global Plan of Action are currently available; for others, indicators may need to be developed. The indicators proposed must be provable, and other indicators will be developed as needed. Indicators can potentially be generated from the AqGR information system currently being developed by FAO or from other sources, including stand-alone targeted surveys.

PART II – STRATEGIC PRIORITIES FOR ACTION

PRIORITY AREA 1 – INVENTORY, CHARACTERIZATION AND MONITORING

Establish and strengthen national and global characterization, monitoring and information systems for AqGR

Introduction

32. Monitoring and reporting on the status of AqGR are essential to enable their effective and efficient conservation, sustainable use and development. According to the SoW-AqGR, monitoring and reporting of AqGR are currently insufficient, especially below the level of species. While countries do monitor, and report to FAO, aquaculture production by species or species groups, there are inconsistencies in these reporting systems. When reporting for the SoW-AqGR, for example, many countries listed farming of species that they do not record in the country production data routinely reported to FAO, and vice versa. As a result, access to standardized and authoritative information on AqGR is difficult, and data can be completely lacking, especially at the level below species.

33. There is considerable inconsistency and confusion in the use of terms to describe farmed types of genetic resources below the level of species. In order to enable data collection, monitoring and reporting of AqGR, greater harmonization and standardization of procedures and terminology are required.

34. A small number of countries maintain information systems on the AqGR within their jurisdiction; however, neither the structure nor the approach to the collection and classification of information follow the same standards or principles. There is an urgent need for an agreed harmonized system for recording information on AqGR that allows the comparison of information provided by different countries and ensures interoperability of information systems that are globally comparable and compatible.

35. Given the importance of non-native species in global aquaculture production and the development of improved farmed types of AqGR in some countries, introductions and transfers of AqGR across national boundaries are commonplace. While some countries record these transfers, there is no globally standardized system for recording such exchanges of AqGR.⁹⁸

Long-term Goal

Information on AqGR made accessible for and usable by Members and stakeholders via a detailed, institutionalized and sustainably resourced global information system utilizing standardized terminology.

Strategic Priority 1.1

Promote the globally standardized use of terminology, nomenclature and descriptions of AqGR.

Rationale

The SoW-AqGR identifies the lack of standardized nomenclature for describing AqGR below the level of species as a critical constraint to sharing and understanding information on farmed types. FAO has proposed a standardized nomenclature for farmed types of AqGR as a component of a prototype information system for AqGR.⁹⁹

⁹⁸ FAO does maintain a Database on Introductions of Aquatic Species (DIAS), but this is not regularly updated and records only first introductions of species (available at <http://www.fao.org/fishery/topic/14786/en>).

⁹⁹ The concept of farmed types and their definitions are provided in Mair, G.C. & Lucente, D. 2020. What are “Farmed Types” in Aquaculture and why do they Matter? *FAO Aquaculture Newsletter 61* (also available at <http://www.fao.org/3/ca8302en/CA8302EN.pdf#page=40>).

There are multiple genetic processes and technologies that change the genetic status of aquatic species under domestication, including: domestication selection, inbreeding; genetic drift, selective breeding, hybridization and crossbreeding, ploidy manipulation, and development of monosex populations. These processes and technologies lead to multiple different farmed types in addition to the so-called wild-sourced farmed types that are represented by individuals that are directly collected from the wild for farming purposes. Inventory, characterization and monitoring of status and trends and associated risks will be greatly facilitated and strengthened by a common understanding of standardized descriptors of these farmed types.

Goal

Greater harmonization of terminology used to describe AqGR in the aquaculture community at all levels.

Actions

- Develop and disseminate among key stakeholders a web-based glossary or thesaurus of key terms for describing AqGR, including examples of usage, in multiple languages, to promote the globally standardized use of terminology.
- Disseminate standardized nomenclature among key stakeholders through implementation of a communication strategy including presentation at key aquaculture events (conferences and workshops), publication of a guide or article on terminology usage, and promotion of usage through social media and by key influencers in academia, industry and government.
- Establish or strengthen catalogues of standardized description of AqGR, including phenotypic and/or genetic characterization of AqGR at/or beneath the species level.

Strategic Priority 1.2

Improve and harmonize monitoring and reporting procedures and expand existing species-based information systems to cover unreported or underreported AqGR.

Rationale

Existing national reporting systems on aquaculture production, with global reporting coordinated by FAO,¹⁰⁰ focus only at the level of species or collective species groups. Given the discrepancy between species lists communicated to FAO as part of production reporting and species lists provided in the country reports submitted in the preparation of the SoW-AqGR, there is a lack of harmonization of reporting. The species for which production is reported to FAO are based on the Aquatic Sciences and Fisheries Information System (ASFIS) list of species, which includes a large number of species items (i.e. mainly groupings of species, but also including a small number of hybrids) that do not enable identification of the genetic resource to the species level and thus cannot also be used to further classify farmed types of species.

The country reports contributing to the SoW-AqGR identified a number of species produced in aquaculture that are not indicated in the reporting of production data. Many of these species were non-food species, such as ornamental species and micro-organisms. While priority should be given to food species, these non-food species should not be excluded from reporting systems, as ornamental fish farming is an important livelihood option for rural communities, in particular rural women. Lastly, there are traditional culture systems for freshwater aquatic macrophytes in many countries, especially in Asia. Most of this production goes unrecorded.

¹⁰⁰ Production data provided by countries are collected and made available by FAO through the FishstatJ information system, which is updated semi-annually (available at <http://www.fao.org/fishery/statistics/software/fishstatj/en>).

Goal

Long-term resourcing and adoption of global metadata standards to facilitate exchange of AqGR records, at least at the species level, between information systems.

Actions

- Develop standardized reporting procedures and guidelines (including standard species and common names) for data collection and capture, including digital recording tools and reporting templates, and incentivize their use.
- Develop and conduct pilot studies on the development of national inventories of AqGR.
- Build the capacity of the national and regional institutions on standardized reporting procedures and systems.
- Secure long-term funding resources for information systems nationally, regionally and internationally.
- Produce and disseminate national, regional and global reports on the status of AqGR through established communication tools.

Strategic Priority 1.3

Maintain and/or develop, promote and institutionalize national, regional and global standardized information systems for the collection, validation and monitoring of, and reporting on, AqGR below the level of species (i.e. genetic diversity of farmed types and stocks).

Rationale

With the exception of a very few national systems on aquatic biodiversity, existing information systems do not record information on AqGR below the level of species. The extreme paucity of data on these resources renders it extremely difficult to develop strategies and policies for their effective conservation, sustainable use and development. It also means that producers often have no independent information on the farmed types available for culture, including information on their relative properties and the history of their genetic management.

This lack of information also means that it is impossible to fully evaluate and monitor the national, regional and global status of AqGR, especially below the level of species, for example in the context of SDG target 2.5 “...maintain genetic diversity of seeds, cultivated plants, farmed and domesticated animals and their related wild species...”, with the result that AqGR are often ignored in actions taken to meet development goals or report against specific biodiversity indicators.

Goal

Long-term funding secured for the development and maintenance of an appropriate information system for AqGR.

Actions

- FAO to continue to develop and promote an information system for AqGR that is capable of recording and generating information globally, regionally and nationally and to train key stakeholders in its use.
- FAO to complete implementation of the global information system and seek long-term funding resources.
- Develop and implement a strategy to communicate and disseminate key messages on the value and benefits of the information system for farmed types of AqGR to relevant stakeholders, including governments, fishers and fish farmers.

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- Strengthen monitoring systems at national and regional levels for AqGR (e.g. through Technical Cooperation Programmes).
 - Identify national information systems on AqGR and promote integration with the FAO AqGR information system.
 - Raise awareness among all stakeholders on the importance of the establishment of an information system on AqGR, with a view to facilitating their participation.

PRIORITY AREA 2 – CONSERVATION AND SUSTAINABLE USE OF AQGR

Promote the conservation and sustainable use of cultured and wild relative AqGR

Introduction

36. Given the relatively recent domestication of most species used in aquaculture, most present-day cultured farmed types still retain most of the genetic diversity present in their wild relatives and thus have the potential to deliver significant gains in commercially important traits through selective breeding. This presents the opportunity to retain this genetic diversity for the future, ensuring the potential for long-term genetic gains, through effective management and development of genetic diversity in domesticated farmed types.

37. Wild relatives still exist for all aquaculture species, although some are threatened. Threats come from habitat change and loss, environmental change, including climate change, overfishing, spread of diseases, parasites and invasive species, and even sometimes from aquaculture, including through the deliberate (e.g. for enhancement of commercial and recreational fisheries) or accidental release of genetically changed aquaculture farmed types into the wild. Climate change represents a growing challenge, particularly with extreme and increasingly frequent events such as storms and marine heatwaves capable of wiping out entire populations, and also through modifying the relative distribution of species. Climate change can also present opportunities, for example by making culture of species possible in locations where it was not previously possible.

38. There is often a lack of information on the conservation status of wild relative stocks. As of April 2021, up to 5.4 percent of aquatic species used for food are listed in the appendices of the Convention on International Trade in Endangered Species (CITES) and 10.5 percent of cultured species referenced by the International Union for Conservation of Nature (IUCN) are classified as vulnerable or with a higher risk status. Wild relatives of farmed species are essential reservoirs of genetic diversity for the species in the wild and also for the future development of farmed types, and thus need to be conserved.

39. In the context of AqGR, conservation focuses on preserving the genetic diversity present in the national, regional and global gene pools of AqGR species. Given that there are relatively few developed farmed types (e.g. strains and varieties) that are under threat and must be conserved, current conservation efforts need to focus mainly on wild relative genetic resources. Thus, for AqGR, the current priority for conservation is to preserve the genetic resources of wild relatives as the main reservoirs of genetic diversity for the future development of farmed types of aquatic species, with a focus on those most under threat both locally and globally.

40. Sustainable use, in this context, relates more narrowly to farmed aquatic species under domestication, and it is important to recognize the opportunity to effectively manage and thus sustainably utilize these resources and conserve this genetic diversity before it is lost. Lack of attention to management of genetic diversity in domesticated farmed types can lead to loss of genetic diversity and inbreeding, and there are many documented cases of this occurring. Also, uncontrolled hybridization in aquaculture can lead to species introgression, resulting in the loss of the discrete species. Such practices of poor genetic management amount to unsustainable utilization of the genetic resource.

41. Sustainable use, in the context of AqGR, applies to the effective genetic management of farmed types during and subsequent to the domestication process. However, the genetic status of most farmed types of species under domestication is unknown and is not monitored.

42. Use of non-native species is common in aquaculture, and introductions and exchange of genetic resources (both native and non-native) between countries occur frequently. Introduction of non-native species or even of farmed types of native species carries potential risk of impacts on the ecosystem and genetic contamination of indigenous genetic diversity.

Long-term Goal

AqGR, including native and non-native species, their farmed types and wild relatives, are conserved and sustainably used for the benefit of aquaculture, culture-based fisheries, commercial and recreational fisheries, and sustainable ecosystems.

Strategic Priority 2.1

Identify wild relatives of AqGR most at risk (e.g. through an AqGR information system) and ensure that they are managed sustainably and appropriate conservation measures are implemented where necessary, nationally and regionally.

Rationale

Wild relative genetic resources represent the principal reservoir of genetic diversity for most aquaculture species and some are under threat and thus need to be conserved. Due to the relative lack of information on AqGR and particularly of the threat status of the majority of cultured species, it is important to put in place monitoring systems, for example by incorporating data on risk levels in an information system on AqGR.

Once at-risk wild relative genetic resources are identified, appropriate conservation measures will need to be developed at a national, regional or even global level, prioritizing *in situ* conservation where feasible. Measures of *in situ* conservation can include effective fisheries management (for fished stocks), aquatic protected areas, spatial management and zoning, and habitat protection/restoration.

There is a need to maintain the genetic resources of migratory species and to maintain the heterogeneity of the species through the preservation of their habitats.

In situ conservation may be supplemented, or in extreme cases supplanted by *ex situ* conservation in the form of live gene banks or *in vitro* gene banks, such as cryoconservation of gametes or embryos (in some species).

Goal

Wild relative genetic resources conserved as reservoirs of genetic diversity and local/global extinction of wild relative species prevented.

Actions

- Promote, develop and implement participatory processes to identify the risk status of stocks of wild relative species and develop lists of those at risk.
- Promote effective *in situ* conservation to protect threatened wild relatives of AqGR, supplemented by *ex situ* conservation where needed.
- Put in place monitoring systems to assess the abundance and genetic status of at-risk stocks of wild relatives.

Strategic Priority 2.2

Anticipate the current and future impacts of environmental change, including climate change, on AqGR, and respond accordingly.

Rationale

The SoW-AqGR identifies climate change as an important driver of predominantly, but not exclusively, negative changes in both farmed AqGR and their wild relatives, especially where species may already be cultured at the limit of their thermal tolerance range. Fifty percent of responding countries indicated that climate change would have a negative or strongly negative impact on farmed type genetic resources, and the report lists a series of such potential impacts. Some positive impacts were also noted.

There is a need to expand assessments of anthropogenic and environmental factors affecting aquatic ecosystems. Efforts to address the implications of climate change for fisheries and aquaculture should strongly emphasize the ecological and economic resilience of fisheries and aquaculture operations in the development of effective and adaptive management systems.

Many of the identified impacts concerned terrestrial and freshwater ecosystems and coastal environments, with correspondingly fewer concerning marine systems. The impacts were typically related to effects on wild relatives but also included culture systems (farmed types) in some instances. General ecosystem-level changes affect water availability, hydrological regimes and habitats, leading to a variety of knock-on effects on AqGR, particularly on wild relatives.

It is important to be able to recognize these changes and the threats they pose to AqGR and develop appropriate responses, including targeted conservation programmes.

Goal

Impacts of environmental change on AqGR and wild relatives effectively monitored, and conservation and mitigation measures implemented.

Actions

- Monitor and anticipate the current and future impacts of environmental change, including climate change, on AqGR, and respond accordingly.
- Develop climate change scenarios for key habitats (including acidification) and their impact on cultured species, including wild relatives.
- Expand research and development into impacts of climate change and mitigation measures involving AqGR, including the genetic basis for resilience and adaptation to changing environment.
- Implement appropriate conservation measures for AqGR most at risk from impacts of environmental change.
- Identify where genetic management and improvement can play a role in mitigating the impacts of environmental change (e.g. selection for greater environmental tolerance traits).

Strategic Priority 2.3

Actively incorporate in situ conservation of AqGR in the development of fisheries management and ecosystem-based management plans, particularly for threatened species.

Rationale

The SoW-AqGR identifies managed fisheries and aquatic protected areas as important components of the conservation of wild relative stocks of farmed fish species. Under certain conditions, well-managed fisheries can be considered as a form of *in situ* conservation when the objective of the fishery management plan is to maintain natural populations and the ecosystem that supports them.

The ecosystem approach to fisheries (EAF) encompasses a broad view of fishery management, and fishery managers around the world are adopting the EAF and similar approaches. The objectives of a fishery management plan or an aquatic protected area should be clearly stated and should indicate whether it is considered as *in situ* conservation. Furthermore, the relevance of any conservation objective, including retention and management of unique genetic diversity, to aquaculture should be acknowledged.

Restocking or stock enhancement, for example in support of commercial and recreational fisheries (both of which can provide economic benefit to coastal communities), should consider risks associated with these releases but also the opportunities they present to meet conservation goals.

Goal

Proportion of fisheries management plans (including stock enhancement programmes) and aquatic protected area management plans that acknowledge their role in managing and, where appropriate, conserving AqGR for wild relative species increased, including as a resource for aquaculture.

Actions

- Follow EAF and ecosystem-based management (EBM) to address fished species (used in aquaculture) and also relevant non-target species.
- Promote collaboration among fishery managers, aquaculture managers and conservationists.
- Incorporate conservation into fishery management and stock enhancement objectives where appropriate, considering genetic variability as well as real stock size.
- Promote use of genetic tools in fishery stock assessment and management.

Strategic Priority 2.4

Promote ex situ conservation for AqGR, including wild relatives and threatened species.

Rationale

While *in situ* conservation (including *in situ* on farm conservation) should be the preferred approach for conservation of species and genetic diversity of AqGR, *ex situ* conservation can be an important adjunct or alternative where wild relatives are not or cannot be effectively conserved *in situ*. *Ex situ* conservation should be integrated with any *in situ* management efforts and should consider the future genetic status of both wild relative and farmed resources.

In vivo ex situ conservation is generally practised in live gene banks and breeding centres but requires significant resources in the case of large and fecund species, such as many finfish and crustaceans, although it can be more feasible and cost-effective for micro-organisms.

In vitro conservation can be effective for certain AqGR, particularly micro-organisms, male gametes (e.g. cryopreserved sperm banks) and some early life history stages of molluscs, but currently has limited application for many aquaculture species due to the difficulties of cryopreserving eggs and embryos.

The goal of *ex situ* conservation should be to maintain the genetic diversity and integrity of the conserved genetic resource, allowing for minimum genetic change such as genetic drift or inbreeding, for example through control of effective population size and controlling and minimizing selection forces.

Goal

Threatened and important AqGR conserved in *ex situ* gene banks in support of aquaculture development and *in situ* conservation.

Actions

- Develop and promote guidelines and best practices for both *in vivo* and *in vitro ex situ* conservation that ensure effective maintenance of genetic diversity.
- Develop methodologies for *ex situ in vitro* conservation, including cryoconservation of oocytes and embryos.
- Identify the most at-risk AqGR that cannot be conserved effectively *in situ*.
- Establish *ex situ* conservation programmes, as required.
- Link *ex situ* and *in situ* conservation in regard to threatened and important species.

- Support networking of existing gene banks within regions and globally.
- Consider the role of aquaculture, and specifically hatcheries, in *ex situ* conservation of genetic resources.

Strategic Priority 2.5

Improve sustainable use of domesticated farmed types through improved management of genetic diversity.

Rationale

In aquaculture, sustainable use of AqGR is the management of the domesticated genetic resources with a focus on retaining genetic diversity and genetic integrity of species and farmed types within seed supply systems. Many domesticated AqGR retain relatively high levels of genetic diversity they inherited from their wild relatives, but this can and is being lost without careful management of genetic diversity, for example through monitoring of effective population size and inbreeding.

Deliberate and accidental hybridization is relatively common in aquaculture given the ease of breeding between species and even between some genera, and hybrids are often fertile. While benefits can arise from hybridization through hybrid vigour or specific combinations of desirable traits, indiscriminate or unconscious application of hybridization can lead to species introgression and loss of genetic integrity of species in the aquaculture environment and even potentially in wild relative resources in the case of release or escape of aquacultured farmed types.

Culture of species for release into the natural environment (e.g. in support of commercial and recreational fisheries or for conservation) should be considered as a special case, and genetic diversity and the risk to the genetic integrity of wild stocks must be considered and mitigated in such programmes.

Goal

Productivity improved through retention of genetic diversity and genetic integrity of species and farmed types in seed supply systems.

Actions

- Promote application of basic principles of broodstock management within seed supply systems, including by applying minimum effective population sizes and preventing unplanned introgression between species/farmed types.
- Develop and promote use of effective tools for monitoring the genetic status of farmed types within seed supply systems.
- Develop recommendations and guidelines for genetic management of cultured resources for release into the natural environment.

Strategic Priority 2.6

Safely manage and control the use and exchange of AqGR, taking into account national and international instruments, as applicable.

Rationale

Given the risks associated with introductions, especially of non-native species and genetically changed and modified farmed types, and the high frequencies of exchanges and transfers that occur in aquaculture, it is important that introductions and exchanges of AqGR for aquaculture (including for non-food purposes such as ornamental species) are effectively managed and regulated, and based on appropriate analysis of risks and benefits. Existing codes of practice do not address the products of many genetic improvement technologies, and international guidelines do not exist for the responsible use and control of non-native species and genetically changed farmed types.

Goal

Farmed types safely exchanged and used.

Actions

- Promote more widely existing codes of practice and guidelines on the introduction and transfers of aquatic species and farmed types.
- Revise or develop and promote guidelines on risk-based best practices for use and exchange of different farmed types of AqGR incorporating key elements of existing codes of practice (e.g. ICES¹⁰¹ and EIFAC¹⁰²).
- Promote development and use of material transfer agreements to ensure responsible use of AqGR and prevent or mitigate the risks associated with introductions, especially of non-native species and genetically changed and modified farmed types.
- Promote evaluation and monitoring of the properties of farmed types of AqGR.
- Increase public and industry awareness and communication on risks and benefits of genetic improvement technologies.

¹⁰¹ ICES (International Council for the Exploration of the Sea). 2005. *ICES Code of Practice on the Introductions and Transfers of Marine Organisms* 2005. 30 pp. (available at <https://www.nobanis.org/globalassets/ices-code-of-practice.pdf>).

¹⁰² Turner, G.E. 1988. *Codes of practice and manual of procedures for consideration of introductions and transfers of marine and freshwater organisms*. EIFAC/CECPI Occasional Paper No. 23. 44 pp. (available at <http://www.fao.org/3/ae989e/ae989e00.htm>).

PRIORITY AREA 3 – DEVELOPMENT OF AQGR FOR AQUACULTURE

Accelerate the development and uptake of genetic improvement of aquaculture farmed types, with a focus on the expansion of selective breeding programmes

Introduction

43. There is great potential to further improve aquaculture production through the genetic improvement of AqGR. Though numerous genetic improvement technologies exist for improving production efficiency and profitability in aquaculture, their advantages and disadvantages are not always well understood and appropriate assessment of risks and benefits is often lacking. Misunderstanding and miscommunication of the roles and risk of different technologies are commonplace. Hence, risk-benefit assessment based on scientific facts of all technologies used in aquaculture should be considered a high priority.

44. Planned development and management of AqGR are lacking for most farmed aquatic species, and countries are not realizing the benefits of effective and appropriate application of genetic management and improvement. The slow adoption of genetic improvement programmes limits their impact on global aquaculture production, even for some major aquaculture species.

45. Adoption of conventional selective breeding is still limited, even though it is considered the core approach that is needed to underpin progression in genetic improvement. Such programmes can be expensive to initiate and are often considered the remit of government agencies. There is, however, evidence that public–private partnerships, cooperatives and commercial breeding companies can be effective in building and sustaining long-term genetic improvement programmes. As in crops and livestock, selective breeding programmes have proven effective in a range of aquatic species across different taxa and have been shown to deliver strong returns on investment.

46. Other genetic improvement approaches, such as hybridization, crossbreeding, ploidy manipulation, monosex production and transgenesis, can be applied to enhance production and further improve targeted traits. While these can, in most cases, also be applied in standalone programmes, they are better integrated with selective breeding programmes to add value to cumulative improvements in quantitative traits while retaining effective management of genetic diversity. This combined approach more effectively delivers long-term, sustained improvement focused on an expanding list of specific and important traits.

47. Genetic improvement of the majority of aquatic species lags far behind that in the majority of terrestrial crop and livestock species, due primarily to their relatively recent domestication. However, given that much of the genetic diversity present in wild relative stocks is retained within these domesticated farmed types, there is a huge opportunity, if managed effectively, to deliver impressive gains through selective breeding. Gains of 10 percent per generation are feasible for commercially important traits in a range of species across different taxa.

Long-term Goal

Increased adoption of demand-driven genetic improvement programmes enhancing the efficiency and sustainability of aquaculture production and delivering benefits to consumers, broader society and the environment.

Strategic Priority 3.1

Improve understanding of the properties, benefits and potential risks (and effective risk mitigation mechanisms) of genetic improvement technologies and their application to AqGR.

Rationale

Lack of awareness of the potential benefits and risks of, and the requirements for, breeding programmes constrains their adoption or can lead to inappropriate application of genetic improvement technologies. In the development of any aquaculture sector there comes a point where genetic

improvement programmes are warranted based on a number of factors, including the scale and value of production, the entities involved in production, the maturity of the sector and the extent of demand for improvement in key traits of the farmed types produced. It is important to recognize when it is appropriate to initiate genetic improvement programmes and what genetic technology and breeding programme approach are likely to best address the demand. For example, hybridization can be relatively straightforward to apply and cost effective, and can deliver improvements in commercial traits through heterosis (also known as hybrid vigour) or a specific combination of traits. However, it does not deliver cumulative gains over generations and carries the risk of unwanted and uncontrolled species introgression and loss of species purity.

Lack of awareness among decision-makers can lead to inappropriate policies governing the use of genetic improvement technologies. Improved awareness of the properties of different genetic improvement technologies, including methods and resource requirements, can provide confidence for government and private sector investors to plan and support appropriate applications of genetic improvement. For this, understanding of the associated risks generated by the genetic changes resulting from improvement and of the costs vs. the benefits is also crucial.

While transgenesis currently plays a very minor role in aquaculture production, more recent developments, such as gene editing, may have significant potential to contribute to production gains and, in some cases, to reduce the risks of aquaculture. However, the relative risks and benefits of this nascent technology are not yet well understood. Hence, broad, independent and interdisciplinary investigations of responsible research and innovation processes are required in order to secure trust and support responsible applications of such new genetic improvement technologies.

Goal

Understanding among key stakeholders in AqGR of the relevant and important issues, needs and challenges inhibiting the greater uptake of appropriate and impactful development of genetic resources in aquaculture broadened.

Actions

- Develop and distribute guidelines on appropriate application of genetic improvement technologies, including their risks and benefits, to be used as a decision support tool in the development of genetic improvement strategies at national and regional levels.
- Develop and disseminate genetic improvement risk assessment and mitigation tools and programmes.
- Develop and organize (online) courses and webinars on basic genetic improvement in aquaculture species for different target groups (e.g. farmers, breeders and governmental officers).
- Conduct national and/or regional stakeholder consultations on appropriate genetic improvement strategies for key species.
- Develop and implement media communication strategies on benefits and risks for producers and consumers (sensitization).
- Review and identify lessons learned from genetic improvement strategies and related communication within terrestrial agriculture and the history of aquaculture breeding strategies and communication, including the importance of accurate trait measurement.
- Develop or support the role of biosafety committees in the development of genetic resources for aquaculture.
- Encourage discussion among stakeholders and discipline experts in a range of fora to deepen understanding of genetic improvement technologies to optimize practical and sustainable solutions to a range of aquaculture issues.

Strategic Priority 3.2

Promote greater adoption of well-managed, long-term, selective breeding programmes as a core genetic improvement technology with a focus on major aquaculture species.

Rationale

Well-managed selective breeding programmes combine selection for commercially important quantitative traits with effective management of genetic diversity and are considered a core technology for genetic improvement in aquaculture. Nevertheless, adoption rates remain relatively low, and growth is slow, especially for major aquaculture species in developing countries that are important to food security (e.g. Indian and Chinese major carps).

It is necessary to address the constraints to adoption of selective breeding and promote its wider uptake. The reasons for the relatively slow adoption of genetic improvement in aquaculture are complex and not well understood but are likely to include: lack of responsible research and innovation processes; lack of appreciation of the scale of benefits that can arise; lack of private investment and long-term public support; the perception that programmes must be large in scale and thus resource-intensive; limited focus on short-term public-sector programmes and consequent lack of engagement of the private sector (especially for lower-value species in the developing world); challenges in protecting the results of improvement programmes; concerns over the negative genetic impacts of selectively bred farmed escapees on their wild relatives; and lack of human resource and infrastructure capacity to implement breeding programmes.

Goal

Enabling environment created for accelerating the adoption of well-managed breeding programmes leading to a doubling of the contribution of improved farmed types to aquaculture production in the next ten years.

Actions

- Develop regionally applicable training packages for breeders/producers on the benefits and risks of genetic improvement for national and regional delivery.
- Promote development of value propositions (e.g. through workshops with national focal points) for genetic improvement in relation to food security, economic development and livelihoods.
- Identify and communicate to key stakeholders case studies of well-managed, successful and impactful local, national and/or regional breeding programmes identifying the roles of public and private agencies.
- Foster public/private collaboration, including with farmer associations, in the development of long-term breeding programmes, including provision of tools to support knowledge-based management of broodstock (locally, nationally, regionally and globally).
- Develop guidelines for national and/or regional benchmarking of performance characteristics (including genetic diversity indices) of available native and non-native farmed types and promote their application.
- Support scientific research to underpin the development of appropriate policies on: (i) effective access to and integration of molecular technologies, such as genomic selection and genotyping services, in selective breeding programmes; (ii) risks to the environment posed by genetically improved farmed types; and (iii) genetics-based climate change mitigation and monitoring strategies.
- Promote international and regional cooperation and networking on genetic improvement of transboundary AqGR, including exchange of data and information among institutions

responsible for AqGR for fisheries and aquaculture, development agencies and relevant international organizations.

Strategic Priority 3.3

Establish national and/or regional development strategies and programmes for species and farmed types, responsive to market and societal needs, to unlock the full potential of AqGR.

Rationale

Relatively few countries have national strategies that prioritize species and traits for development of farmed types for aquaculture or that provide a framework for research priorities, infrastructure development, risk management and mitigation, and investment. In part, such strategies need baseline information on the genetic resources available, which could be generated by an AqGR information system (as proposed under priority area 1). Strategies would also need to be informed by future priorities such as changes in market demand and environmental changes such as might arise from climate change. Countries also need to have in place the minimum requirements for sustainable management of AqGR¹⁰³ and consider the appropriate respective role of public and private sector stakeholders and the management of intellectual property issues.

Strategies should create an enabling environment to support stakeholders in seed supply systems to sustainably manage their genetic resource and initiate genetic improvement when it is timely to do so and using the most appropriate technology to realize the optimum benefit to the specific sector.

Strategies and associated policies and legal frameworks should also respect relevant international instruments, as applicable, such as the Convention on Biological Diversity (CBD), the Cartagena Protocol on Biosafety and the Nagoya Protocol on Access and Benefit-sharing, and be consistent with national policy.

Strategies and policies should also consider the evaluation, monitoring and registration of new farmed types arising from genetic improvement programmes.

Goal

Countries and intergovernmental organizations develop and implement strategies for the development of key AqGR based on understanding of risks and benefits of different approaches.

Actions

- Conduct foresight and market analysis and involve different stakeholders (e.g. consumers, retailers, farmers, non-government organizations and scientists) to establish priority goals for genetic improvement and develop benefit–cost analysis models as decision support tools.
- Create enabling environments for genetic improvement within seed supply sectors by identifying and addressing the key concerns of stakeholders and through development and implementation of supporting strategies and policies.
- Develop and implement strategies and policies (supported by capacity building and technical input) to enable implementation of local, national and regional breeding programmes. These may include appropriate integration with conservation initiatives and should incorporate monitoring and evaluation of the impact of these strategies and policies.
- Promote development and implementation of local, national and regional breeding programmes for development of improved farmed types of native and non-native species suited to local conditions and markets, including delivery of improved farmed types to the market.

¹⁰³ FAO. 2018. *Development of aquatic genetic resources: A framework of essential criteria*. Aquaculture Development 9. TG5 Suppl. 9. Rome. 88 pp (also available at <http://www.fao.org/3/ca2296en/ca2296en.pdf>).

- Encourage public and/or private entities and regional funding agencies to support genetic improvement of economically important aquaculture species.
- Review legal frameworks underpinning species selection and farmed type development, in line with relevant international instruments such as the CBD, the Cartagena Protocol and the Nagoya Protocol on Access and Benefit-sharing.
- Develop systems for evaluation and registration of improved farmed types.
- Ensure an appropriate balance between the development of aquaculture of new species (both native and non-native) and development of farmed types of existing cultured species.

Strategic Priority 3.4

Raise capacity of stakeholders in aquaculture to develop improved farmed types.

Rationale

Significant know-how and expertise are required to implement comprehensive and well-managed breeding programmes capable of delivering optimized genetic gains and to avoid inbreeding and negative impacts on organisms' health and welfare. Such expertise includes quantitative genetics and data management and analysis expertise, and in some cases molecular biology expertise, in addition to an understanding of aquaculture, husbandry and breeding of the target species. This expertise is often lacking, especially in the area of quantitative genetics expertise.

Some cultured species can represent transboundary resources both in terms of the original source populations and in terms of the development of improved farmed types. In such cases, opportunities can arise for cooperative approaches to genetic improvement through regional breeding programmes, and global programmes may even be possible. Such programmes can utilize a wider network of experts to assist with the design and operation of genetic improvement programmes.

Goal

Human resources are no longer a limitation to the appropriate implementation of genetic improvement and the adoption of improved farmed types in aquaculture. Capacity development programmes ensure long-term availability of capacity, including succession planning.

Actions

- Establish national and/or regional stakeholder networks, platforms or partnerships (or integrate these into existing networks), including directories of experts in the region, to develop cooperative actions in genetic improvement and quantitative genetics. Call upon donors to support such platforms.
- Engage partners with expertise in genetic resource development and management and advanced scientific institutions to develop training materials and develop a roster of experts for training in genetic improvement technologies.
- Conduct national and/or regional workshops/conferences (independently or within sessions in aquaculture conferences) to discuss and provide updates on new technologies in the development of AqGR. Conduct regular training needs assessments at the national and regional levels to ensure capacity building is appropriate to the future needs of the sector.
- Encourage funding agencies to support capacity building in the identified areas (e.g. quantitative genetics) that lack the necessary human resource.
- Educate and train key stakeholders on genetic improvement and improved husbandry and biosecurity for selective breeding by providing training and technical support for the breeding activities within farming communities and the integration of improved husbandry practices in AqGR development programmes.

PRIORITY AREA 4 – POLICIES, INSTITUTIONS AND CAPACITY BUILDING

Promote the development of AqGR-related policies, support the development of stakeholder institutions and build capacity to support the management of AqGR

Introduction

48. The SoW-AqGR indicates that policies and institutions addressing AqGR are many and must deal with multiple drivers and a diversity of stakeholders in the aquatic environment. Where policies and management plans exist for AqGR, be they at national or international levels, they are often ineffective due to a lack of awareness and lack of human and financial resources necessary for proper implementation, monitoring and enforcement.

49. In addressing AqGR, policy-makers and institutions face the challenge of having to cover a wide variety of habitats, economic situations and sociocultural environments, and multiple stakeholders and users of AqGR. Aquaculture competes with many other economic sectors, such as fisheries, agriculture, tourism and other industries, for the same habitats and resources.

50. Given the frequency of imports and exports of AqGR, driven in part by the extensive use of non-native species in aquaculture, policies addressing AqGR need to consider the transboundary dimension of managing AqGR. Policies must also consider access and benefit-sharing (ABS), long-term development strategies for aquaculture, conservation, stock enhancement, climate change, the role of financial subsidies and non-food uses. Aquaculture is also indirectly impacted by policies and legislation outside those directly impacting agriculture and fisheries.

51. This complexity inherent to regulating aquaculture has resulted in inconsistencies and gaps in national policies. For example, conservation policies may be critical of or ban introductions of non-native aquatic species that are promoted by the aquaculture sector. There is often both a lack of awareness of the value of AqGR and the needs of people that depend on them and a corresponding lack of awareness of the risks associated with introductions and how these may be mediated.

52. While the conservation, sustainable use and management of AqGR fall within the scope of various international instruments and are explicitly addressed by soft law instruments such as the FAO Code of Conduct for Responsible Fisheries and the ICES Code of Practice on the Introductions and Transfers of Marine Organisms, comprehensive national policies or strategies, let alone legal measures, addressing the conservation, sustainable use and development of AqGR at national level are often lacking.

53. Increasingly, legislative, administrative and policy measures addressing access to and the sharing of benefits arising from the utilization of genetic resources might play a role in research and development on AqGR. However, ABS measures accommodating the distinctive features of AqGR are rare. Intellectual property rights could play an increasingly important role in the development of AqGR.

54. Key stakeholders, including institutions, policy-makers, extension providers, resource managers, fishers and fish farmers, generally lack the capacity to fully address the complexities of conservation, sustainable use and development of AqGR within or across the fishery and aquaculture sectors. Also, capacity-building needs and priorities differ among regions and according to countries' status of aquaculture development and economic status. Overall, there is a lack of awareness of the value of AqGR in fisheries and aquaculture, and thus there is a need to build awareness and capacity in research, development, education and training in order to ensure the conservation, sustainable use and development of AqGR based on sound science and effective natural resources management.

55. According to the SoW-AqGR, countries have varying training and capacity-building priorities but overall identify basic knowledge of AqGR and capacity building in the characterization and genetic improvement of AqGR as priorities. Research priorities also vary based on the state of aquaculture research and development of countries.

56. Opportunities for cooperation and collaboration in managing AqGR exist, especially for transboundary resources. Regional and global networks have, in the past, facilitated capacity building and communication/collaboration on management of AqGR, but these mechanisms have generally not been sustained.

Long-term Goal

Capacity to support sustainable and efficient implementation of AqGR policy that takes into consideration environmental and economic dimensions enhanced through dedicated institutions.

Strategic Priority 4.1

Develop or revise, implement and monitor strategies and policies for the conservation, sustainable use and development of AqGR, in cooperation with relevant stakeholders.

Rationale

The development of dedicated national policies or strategies is essential for the conservation, sustainable use and development of AqGR. Given the importance of AqGR and the value associated with their effective and sustainable management, it is important that relevant policies and strategies are reviewed or developed, as appropriate, in cooperation with relevant stakeholders. Inconsistencies between different policy instruments (for example those governing aquatic food species and ornamental species) need to be identified and addressed.

The implementation of national policies or strategies needs to be monitored to ensure they are delivering the targeted outcomes.

Goal

Dedicated policies or national strategies addressing the conservation, sustainable use and development of AqGR are implemented and implementation is monitored.

Actions

- Raise awareness and enhance capacity of policy-makers to support management of AqGR through training programmes and sharing of knowledge on AqGR.
- Promote the review or development, as appropriate, of national policies/strategies for the conservation, sustainable use and development of AqGR in consultation with relevant stakeholders.
- Support the implementation of national and regional strategies for the conservation and sustainable use and development of AqGR, including transboundary resources.
- Develop and support networks of private/public gene banks (*in vivo* and *in vitro*) at national and regional levels to support the conservation and sustainable use of AqGR.

Strategic Priority 4.2

Improve global, regional and national exchange of information and network activities on AqGR and raise awareness of the importance of AqGR among relevant stakeholders, including of the roles that indigenous peoples and local communities, youth and women, play in the conservation, sustainable use and development of AqGR.

Rationale

Aquaculture and fishing of wild relative species involve numerous sectoral stakeholders, including women, youth, indigenous peoples and local communities. It is thus important to promote understanding among regulators and policy-makers of the roles and interests of all stakeholders, including indigenous peoples and local communities, women and youth, and to develop means to effectively engage these stakeholders.

The effective management of AqGR has a vital role to play in securing the future of aquatic food supply and in enabling continuing and sustainable expansion of production from aquaculture, delivering in turn socio-economic benefits from the sector. However, this role of AqGR is not well understood nor effectively communicated to and among the stakeholders in aquaculture, including the consumers of aquatic food.

This Global Plan of Action and its effective implementation have an important role to play in promoting awareness of the importance of the role of AqGR in aquatic food supply.

Goal

Stakeholders and public better informed about aquaculture, the important role that the management of genetic resources plays in securing the future availability of sustainably produced aquatic food, and the opportunities and risks associated with genetic improvement of AqGR.

Actions

- Establish campaigns and outreach models to raise awareness on the role of management of AqGR, including by women, indigenous peoples and local communities and youth.
- Develop and promote material, including in local languages, to be used at key aquaculture events to raise awareness on aquaculture and to increase the involvement of specific target groups in the conservation, sustainable use and development of AqGR.
- Hold regular meetings to share information on AqGR, including on the implementation of the Global Plan of Action.

Strategic Priority 4.3

Support the responsible introduction, exchange and use of AqGR, including through appropriate risk assessments, adequate policies and their effective implementation.

Rationale

Given the ongoing importance of non-native species in aquaculture and the economic benefits they can deliver, consideration of the risks that they can pose to native genetic resources, and to the environment more generally, is very important. The introduction, exchange and use of non-native AqGR must be carried out responsibly and be regulated through legislation to incorporate appropriate assessment and management of risks to be considered alongside the potential benefits. Well-designed decision-support tools may support this process.

As the genetic development of farmed types progresses, for example through the accelerated uptake of selective breeding, the properties of farmed types will change and thus the risks involved in their use may also change. It is thus important to carefully consider the risks associated with developed farmed types, including of native species, when developing national and regional legislation concerning their introduction, exchange and use for aquaculture.

Responsible introduction, exchange and use of non-native species and developed farmed types will require control systems to enable the international traceability of these AqGR.

Goal

Responsible use of AqGR incorporated into national legislation.

Actions

- Develop measures, including guidelines, to ensure responsible introduction and exchange of AqGR for aquaculture based on the ICES Code of Practice on the Introductions and Transfers of Marine Organisms and other relevant policy instruments.

- Develop and effectively implement national and regional legislation for the responsible use and exchange of AqGR, also in line with relevant international agreements.
- Incorporate AqGR issues into risk assessment processes to improve control systems in international traceability including farmed types as well as species.
- Consider the development or expansion of information systems on introductions and transfers of AqGR, ensuring timely notification of imminent imports of AqGR that may pose risks to countries' native genetic resources and the environment more generally.

Strategic Priority 4.4

Implement existing international agreements and instruments relevant to the conservation, sustainable use and development of AqGR.

Rationale

There are a range of international agreements that relate to the conservation, sustainable use and development of AqGR, such as the CBD and CITES. The SoW-AqGR demonstrates that awareness of the role of these agreements in the long-term management of AqGR is rather limited among relevant stakeholders. There is therefore a need to raise awareness of the specific provisions of, and obligations under, these instruments in relation to AqGR.

Goal

International and regional agreements fully implemented in relation to AqGR, taking into account the specific needs of the sector.

Actions

- Raise awareness and implement existing international agreements relevant to the conservation, sustainable use and development of AqGR while ensuring that national policies and regulatory frameworks meet international obligations and reflect the importance of AqGR for food security, the distinctive features of these resources, the importance of science and innovation, the need to balance the goals and objectives of the various agreements, and the interests of regions, countries and stakeholders (including fishers and farmers).

Strategic Priority 4.5

Establish or strengthen national institutions, including national focal points, for planning, implementing and monitoring AqGR measures, for aquaculture and fishery sector development.

Rationale

The number of national focal points (NFPs) for AqGR has increased significantly since the initial request for nominations was made by FAO. In April 2021, 67.5 percent of the Commission's Members had nominated NFPs for AqGR. However, a significant number of Members have not yet nominated NFPs. NFPs can be important catalysts for improvement of the management of AqGR in their countries and regionally, and efforts should be made to enhance engagement with and among them and to build their capacity. NFPs could develop platforms for relevant institutions and stakeholders in the private and public sectors to develop concerted action plans and share relevant information, for example through national AqGR status reports.

According to the SoW-AqGR, almost all countries have at least one institution specifically dedicated to AqGR. National and regional institutions dedicated to aquaculture and/or the management of genetic resources are important and may act as catalysts for change. They may play a key role in building capacity and raising awareness of the needs and challenges AqGR management faces in mobilizing resources, in engaging more proactively the sector and in building linkages and enhancing cooperation and collaboration.

Goal

National institutions, including NFPs, established or strengthened.

Actions

- Nominate NFPs for AqGR and build capacity of NFPs through regular training, information sharing, regional networking and participation in research calls.
- Mobilize national and international resources for institutional development programmes for AqGR and support NFPs and institutions to engage in development of national strategies on AqGR.
- Establish better linkages and mechanisms to enhance coordination and collaboration between institutions on technology policy implementation and information sharing.

Strategic Priority 4.6

Establish or strengthen national and regional institutions for characterization, inventory, and monitoring of trends and associated risks, as well as for education and research on AqGR, and establish intersectoral coordination of their management, including economic valuation, characterization and genetic improvement.

Rationale

According to the SoW-AqGR, almost all countries have one or more institutions that engage in research and/or education and training in relation to AqGR, but many reported the need to build capacity in these institutions. The report further identifies, as main capacity-building needs for research institutions, basic knowledge on AqGR, characterization and monitoring, and genetic improvement of AqGR. Capacity-building needs are also identified for education and training institutions that included genetic resource management and conservation as well as characterization and monitoring of AqGR.

There is a strong need to build the capacity of these institutions, especially in developing countries, and to enhance the national, regional and international networking of these institutions to enable sharing of experience and knowledge and promote cooperation and collaboration. There is a clear role to play for intergovernmental organizations in developing and sharing key resource materials.

Goal

Institutions for education and research established or strengthened and intersectoral coordination enhanced.

Actions

- Support the establishment and strengthening of existing national, regional and international networks that will share information, experiences and theoretical knowledge on AqGR and their management.
- Establish, strengthen and promote national and international courses, pilot projects and training programmes on specific topics on AqGR at higher education level, including online training and the use of international research networks on AqGR, and provide certification to local farmers.
- Build capacity through the establishment of training programmes from schools to universities, field visits and expert exchange programmes for characterization, inventory and monitoring of trends and associated risks, and for conservation, sustainable use and development of AqGR, including economic valuation, characterization and genetic improvement.
- Improve data collection, including tools and methodologies, through the creation of a registry of institutions.

- FAO and other intergovernmental organizations to make relevant resource material available to educators, trainers and researchers.

Strategic Priority 4.7

Facilitate access to and the fair and equitable sharing of benefits arising from the use of AqGR.

Rationale

There is a need to ensure adequate access to AqGR and associated traditional knowledge for research and development as well as the fair and equitable sharing of benefits arising from the utilization of AqGR and associated traditional knowledge. Countries that decide to adopt ABS measures need to be aware of the distinctive features of AqGR and the special role they play in food security.

Many countries have adopted, or are in the process of adopting, ABS measures relevant to AqGR and associated traditional knowledge, but there is a wide variation in these measures and a lack of knowledge of how ABS measures and intellectual property rights may affect AqGR research and development.

The awareness and understanding of stakeholders of ABS and intellectual property protection (e.g. patents) and their capacity to operate within this legal environment at national, regional and global levels need to be improved. When adapting, developing or implementing ABS measures, the distinctive features of AqGR and associated traditional knowledge, and the special role of AqGR and associated traditional knowledge for food security, should be taken into account. It is important to maintain adequate access to AqGR and associated traditional knowledge since such access is essential for progress in research and development and for food security.

Goal

Adequate policies and measures developed or adapted and implemented, reflecting the distinctive features of AqGR and associated traditional knowledge and the special role of AqGR and traditional knowledge associated with them for food security.

Actions

- Consider developing, adapting or implementing access and benefit-sharing measures to take into account the importance of AqGR and associated traditional knowledge, their special role for food security, and their distinctive features, while complying, as applicable, with international instruments.
- Promote understanding, through capacity-building initiatives among AqGR stakeholders, of ABS measures for AqGR and their relevance to the use and exchange of materials.
- Support governments, including policy-makers, in reflecting the distinctive features of AqGR and the special role of AqGR for food security when developing, adapting or implementing ABS and other measures.
- Develop and share national and regional case studies of the lessons learned from aquaculture-specific benefit-sharing examples.
- Support ABS policy-makers in the consideration of regional or special ABS arrangements that facilitate exchange of AqGR for research and development within a specific region or group of countries under pre-agreed terms of reference, including those concerning benefit-sharing.
- Consider the important role of academic research, international research organizations and regional and international collaboration in research and development on AqGR.
- Encourage regional networks to support responsible exchange of AqGR among members and support the development of instruments for regulating transfers and exchanges, including development of material transfer agreements, in line with international instruments, as applicable.

Strategic Priority 4.8

Mobilize resources, including financial resources, for the conservation, sustainable use and development of AqGR.

Rationale

Most countries report that the conservation, sustainable use and development of AqGR are under-resourced and that identifying funding sources is challenging. In order for this Global Plan of Action to be a catalyst for change and to support the significant improvement in the management of AqGR across its four priority areas, it is necessary to significantly enhance efforts at national, regional and international levels to better resource and fund key initiatives most relevant to the needs of individual members and regions.

Goal

Increased resources mobilized.

Actions

- Develop a funding strategy for the implementation of the GPA or any of its key elements, considering:
 - support from national funding agencies;
 - support from regional bodies;
 - public contribution and donation to conservation programmes;
 - developing detailed value proposition(s); and
 - collaboration with the private sector.
- Strengthen countries' and regions' exchange of resources, including technology transfer, including through South–South cooperation and FAO's Hand-in-Hand initiative.

Summary table of the Strategic Priorities of the Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture

Inventory, characterization and monitoring	Conservation and sustainable use of AqGR	Development of AqGR for aquaculture	Policies, institutions, capacity building
1.1 Promote the globally standardized use of terminology, nomenclature and descriptions of AqGR	2.1 Identify wild relatives of AqGR most at risk (e.g. through an AqGR information system) and ensure that they are managed sustainably and that appropriate conservation measures are implemented where necessary, nationally and regionally.	3.1 Improve understanding of the properties, benefits and potential risks (and effective risk mitigation mechanisms) of genetic improvement technologies and their application to AqGR.	4.1 Develop or revise, implement and monitor strategies and policies for the conservation, sustainable use ⁴ and development of AqGR in cooperation with relevant stakeholders.
1.2 Improve and harmonize monitoring and reporting procedures and expand existing species-based information systems to cover unreported or underreported AqGR.	2.2 Anticipate the current and future impacts of environmental change, including climate change, on AqGR and respond accordingly.	3.2 Promote greater adoption of well-managed, long-term, selective breeding programmes as a core genetic improvement technology with a focus on major aquaculture species.	4.2 Improve global, regional and national exchange of information and network activities on AqGR and raise awareness of the importance of AqGR among relevant stakeholders, including of the roles that indigenous peoples and local communities, youth and women, play in the conservation, sustainable use and development of AqGR.
1.3 Maintain and/or develop, promote and institutionalize national, regional and global standardized information systems for the collection, validation and monitoring of, and reporting on, AqGR below the level of species (i.e. genetic diversity of farmed types and stocks).	2.3 Actively incorporate <i>in situ</i> conservation of AqGR in the development of fisheries management and ecosystem-based management plans, particularly for threatened species.	3.3 Establish national and/or regional development strategies and programmes for species and farmed types, responsive to market and societal needs, to unlock the full potential of AqGR.	4.3 Support the responsible introduction, exchange and use of AqGR, including through appropriate risk assessments, adequate policies and their effective implementation.
	2.4 Promote <i>ex situ</i> conservation for AqGR, including wild relatives and threatened species.	3.4 Raise capacity of stakeholders in aquaculture to develop improved farmed types.	4.4 Implement existing international agreements and instruments relevant to the conservation, sustainable use and development of AqGR.
	2.5 Improve sustainable use of domesticated farmed types through improved management of genetic diversity.		4.5 Establish or strengthen national institutions, including national focal points, for planning, implementing and monitoring AqGR measures, for aquaculture

			and fishery sector development.
	2.6 Safely manage and control the use and exchange of AqGR, taking into account national and international instruments, as applicable.		4.6 Establish or strengthen national and regional institutions for characterization, inventory, and monitoring of trends and associated risks, as well as for education and research on AqGR, and establish intersectoral coordination of their management, including economic valuation, characterization and genetic improvement.
			4.7 Facilitate access to and the fair and equitable sharing of benefits arising from the use of AqGR.
			4.8 Mobilize resources, including financial resources, for the conservation, sustainable use and development of AqGR

APPENDIX E

MODEL TERMS OF REFERENCE OF THE NATIONAL FOCAL POINTS FOR PLANT, AQUATIC AND FOREST GENETIC RESOURCES AND FOR BIODIVERSITY FOR FOOD AND AGRICULTURE AND THE NATIONAL COORDINATORS FOR ANIMAL GENETIC RESOURCES FOR FOOD AND AGRICULTURE

The National Focal Points for plant, aquatic and forest genetic resources and for biodiversity for food and agriculture and the National Coordinators for animal genetic resources serve as national contact persons for communication with FAO and its Commission on Genetic Resources for Food and Agriculture (Commission) with regard to work on the respective genetic resources or components of biodiversity. They play a coordinating role at national level, including with regard to the preparation of inputs to the Commission's global assessments and, as appropriate, the implementation and monitoring of Global Plans of Action and other relevant instruments. In the execution/deployment of their function, National Focal Points/Coordinators may delegate to their alternates or other stakeholders.

The tasks of National Focal Points/Coordinators may include:

- responding to requests from the Commission and suggestions by the Commission's subsidiary bodies and FAO, including, as appropriate, by coordinating joint responses from relevant stakeholders at national level;
- coordinating the preparation of national inputs to the Commission's global assessments (country reports);
- supporting and facilitating national implementation of Global Plans of Action and other relevant instruments, as appropriate, at technical and policy level, including, as appropriate, the development or review of national strategy and action plans and other relevant sectoral and cross-sectoral policies and programmes and the establishment or strengthening of national stakeholder networks;
- coordinating the preparation of national inputs to the monitoring of the implementation of Global Plans of Action and other relevant instruments, as appropriate;
- coordinating, as appropriate, the collection and management of national data on relevant genetic resources and components of biodiversity (including data relevant to the monitoring of relevant Sustainable Development Goal targets) and the reporting and management of these data at global level via appropriate information systems;
- coordinating national preparation for meetings of relevant subsidiary bodies of the Commission, as appropriate, including by ensuring that relevant stakeholders (ministry officials, technical experts, producers' organizations, indigenous peoples and local communities, etc.) are informed in good time of the dates and agendas of these meetings, that relevant inputs are obtained from these stakeholders and that any necessary stakeholder consultations are organized;
- coordinating, as appropriate, the identification of experts and stakeholders to participate in meetings, consultations and assessment processes initiated by the Commission, its subsidiary bodies or FAO;
- providing support to the Bureaus of relevant subsidiary bodies of the Commission to ensure effective two-way communication between national and the regional levels;
- strengthening links with the country's National Focal Point for the Commission and other National Focal Points/Coordinators to promote interagency and cross-sectoral communication and collaboration;

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- collaborating, as appropriate, with National Focal Points/Coordinators in other countries, and regional focal points and networks where established, to facilitate sectoral and cross-sectoral work, including particularly the work of the Commission and the implementation of instruments developed by the Commission; and
 - supporting and facilitating, as appropriate, the preparation of communication materials on relevant genetic resources and components of biodiversity and their contributions to food security and rural development, for relevant stakeholders, including government officials, producers, the media and the general public.

*APPENDIX F***THE CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY FOR FOOD AND AGRICULTURE AND THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK****DRAFT RESOLUTION**

THE COUNCIL,

Having considered the report of the Eighteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture (Commission);

Recalling that the Commission has a coordinating role and deals with policy, sectoral and cross-sectoral matters related to the conservation and sustainable use of genetic resources of relevance to food and agriculture, including their conservation and sustainable use and the fair and equitable sharing of benefits derived from their utilization;

Noting the Commission's vision of valuing and conserving biodiversity for food and agriculture and promoting its use in support of global food security and sustainable development, for present and future generations; and its strive to halt the loss of genetic resources for food and agriculture, and to ensure world food security and sustainable development by promoting their conservation and sustainable use, including exchange, and the fair and equitable sharing of the benefits arising from their use;

Recognizing the importance of the Commission's Global Plans of Action and other policy tools as voluntary frameworks for action at local, national, regional and global levels;

Recalling the importance of the International Treaty on Plant Genetic Resources for Food and Agriculture and its support for conservation and sustainable use of plant genetic resources for food and agriculture and equitable sharing of benefits derived from their use;

Acknowledging the important work of the Commission in the development of targets and indicators on genetic resources for food and agriculture in the context of monitoring the implementation of the Commission's Global Plans of Action, and the achievement of the Sustainable Development Goals and the development of the Convention on Biological Diversity post-2020 global biodiversity framework;

Noting that the Commission's sectoral Global Plans of Action and other policies and tools, and the *FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors* and the *2021-23 Action Plan* for its implementation, provide important contributions to global efforts for the sustainable use and conservation of biodiversity, and the sharing of benefits arising from their use;

Stressing the importance of mutual supportiveness of the Commission's Global Plans of Action and the post-2020 global biodiversity framework, once adopted, and the need to closely keep under review the implementation of the different instruments, avoiding duplication:

1. **Reiterates** the need for FAO, the Commission and the International Treaty on Plant Genetic Resources for Food and Agriculture to contribute, within their mandate, to the development and implementation of the post-2020 global biodiversity framework currently being developed under the auspices of the Convention on Biological Diversity.
2. **Invites** all Members of the Commission to request the Secretariat of the Commission to convey to the Convention on Biological Diversity open-ended working group on the post-2020 global biodiversity framework, when developing the framework, the need to, and also invites the Conference of the Parties to the Convention on Biological Diversity, when adopting the post-2020 global biodiversity framework, to:

- i. recognize the importance of sustainable use of components of biodiversity for food and agriculture as a contribution to the conservation and restoration of biodiversity;
 - ii. take into account the special nature of agricultural biodiversity, in particular genetic resources for food and agriculture, their distinctive features and problems needing distinctive solutions; and
 - iii. take into account the Global Plans of Action, the Framework for Action on Biodiversity for Food and Agriculture, the International Treaty on Plant Genetic Resources for Food and Agriculture and, other instruments related to the conservation and sustainable use of genetic resources for food and agriculture negotiated and developed under the aegis of FAO.
3. **Encourages** FAO to take a leading position in the implementation of the post-2020 global biodiversity framework, once adopted, on issues within its mandate and, for this purpose, closely collaborate with relevant international organizations and instruments at national, regional and international levels, research institutes, non-governmental organizations, civil society organizations, indigenous peoples and local communities and the private sector with a view to avoid duplications and to enhance effectiveness.
4. **Invites** the private sector to support the implementation of the Commission's Global Plans of Action, and encourages donors to provide support to their implementation as part of the global effort to achieve the Sustainable Development Goals, particularly Target 2.5 on genetic diversity noting the challenges faced by developing countries and countries with economies in transition.
5. **Calls** for support of FAO's capacity-development efforts with regard to the conservation and the sustainable use of biodiversity for food and agriculture in developing countries including for smallholder and family farmers, including through South–South and triangular cooperation.
6. **Invites** Members to:
 - i. integrate the Commission's sectoral Global Plans of Action, the Framework for Action on Biodiversity for Food and Agriculture and policy tools into policies, programmes and national and regional plans of action on agriculture, forestry, fisheries and aquaculture, biodiversity, climate change, food security, nutrition and health, and other relevant sectors, as appropriate;
 - ii. actively support, as appropriate and according to national contexts, priorities and capacities, the transformation to more efficient, inclusive, resilient and sustainable agri-food systems that promote the sustainable use, conservation and restoration of biodiversity for food and agriculture, including genetic resources, leaving no farmer, livestock keeper and pastoralist, forest-based producer, fisher or aquaculturalist behind; and taking into account the contributions and needs of women, indigenous peoples and local communities; and
 - iii. consider developing funding proposals on biodiversity for food and agriculture including genetic resources, consistent with their national priorities, as appropriate, when seeking funding from various sources, including the Global Environment Facility, the Green Climate Fund and other funding mechanisms and modalities.

APPENDIX G

**MEMBERS AND ALTERNATES OF THE INTERGOVERNMENTAL TECHNICAL
WORKING GROUPS, ELECTED AT THE EIGHTEENTH REGULAR SESSION OF THE
COMMISSION**

**MEMBERS AND ALTERNATES OF THE INTERGOVERNMENTAL TECHNICAL
WORKING GROUP ON ANIMAL GENETIC RESOURCES FOR FOOD AND
AGRICULTURE**

<i>Composition (no. of countries per region)</i>	<i>Country</i>
Africa (5)	Kenya Malawi Namibia South Africa Tunisia <i>First Alternate:</i> Uganda <i>Second Alternate:</i> Cameroon
Asia (5)	China India Malaysia Philippines Republic of Korea <i>First Alternate:</i> Bangladesh <i>Second Alternate:</i> Thailand
Europe (5)	Netherlands Norway Poland Spain Switzerland <i>First Alternate:</i> France <i>Second Alternate:</i> Slovenia
Latin America and the Caribbean (5)	Argentina Brazil Costa Rica Peru Uruguay <i>First Alternate:</i> Chile <i>Second Alternate:</i> Colombia
Near East (4)	Iraq Jordan Sudan Yemen <i>First Alternate:</i> Saudi Arabia <i>Second Alternate:</i> Syrian Arab Republic
North America (2)	United States of America Canada
Southwest Pacific (2)	Fiji Tonga <i>First Alternate:</i> Vanuatu <i>Second Alternate:</i> Samoa

**MEMBERS AND ALTERNATES OF THE INTERGOVERNMENTAL TECHNICAL
WORKING GROUP ON AQUATIC GENETIC RESOURCES FOR FOOD AND
AGRICULTURE**

<i>Composition (no. of countries per region)</i>	<i>Country</i>
Africa (5)	Cameroon Morocco Namibia Zambia Zimbabwe <i>First Alternate:</i> South Africa <i>Second Alternate:</i> Malawi
Asia (5)	Indonesia Myanmar Philippines Sri Lanka Thailand <i>First Alternate:</i> Malaysia <i>Second Alternate:</i> India
Europe (5)	Czechia Finland France Germany Italy <i>First Alternate:</i> Turkey <i>Second Alternate:</i> Poland
Latin America and the Caribbean (5)	Argentina Brazil Chile Costa Rica Ecuador <i>First Alternate:</i> Peru <i>Second Alternate:</i> Colombia
Near East (4)	Egypt Iran (Islamic Republic of) Kuwait Yemen <i>First Alternate:</i> Oman <i>Second Alternate:</i> Iraq
North America (2)	Canada United States of America
Southwest Pacific (2)	Fiji Palau <i>First Alternate:</i> Tonga <i>Second Alternate:</i> Marshall Islands

**MEMBERS AND ALTERNATES OF THE INTERGOVERNMENTAL TECHNICAL
WORKING GROUP ON FOREST GENETIC RESOURCES**

<i>Composition (no. of countries per region)</i>	<i>Country</i>
Africa (5)	Cameroon Kenya Malawi Uganda Zambia <i>First Alternate:</i> Eritrea <i>Second Alternate:</i> Namibia
Asia (5)	Bhutan China Japan Malaysia Republic of Korea <i>First Alternate:</i> Indonesia <i>Second Alternate:</i> India
Europe (5)	Finland Italy Norway Poland Russian Federation <i>First Alternate:</i> Netherlands <i>Second Alternate:</i> Spain
Latin America and the Caribbean (5)	Argentina Brazil Ecuador Peru Venezuela (Bolivarian Republic of) <i>First Alternate:</i> Costa Rica <i>Second Alternate:</i> Cuba
Near East (4)	Iran (Islamic Republic of) Lebanon Oman Syrian Arab Republic <i>First Alternate:</i> Sudan <i>Second Alternate:</i> Egypt
North America (2)	United States of America Canada
Southwest Pacific (2)	Papua New Guinea Vanuatu <i>First Alternate:</i> Solomon Islands <i>Second Alternate:</i> Samoa

**MEMBERS AND ALTERNATES OF THE INTERGOVERNMENTAL TECHNICAL
WORKING GROUP ON PLANT GENETIC RESOURCES FOR FOOD AND
AGRICULTURE**

<i>Composition (no. of countries per region)</i>	<i>Country</i>
Africa (5)	Kenya Morocco South Africa Tunisia Uganda <i>First Alternate: Namibia</i> <i>Second Alternate: Zambia</i>
Asia (5)	Bangladesh Indonesia Japan Malaysia Thailand <i>First Alternate: Philippines</i> <i>Second Alternate: India</i>
Europe (5)	Azerbaijan France Germany Norway Russian Federation <i>First Alternate: Czechia</i> <i>Second Alternate: Switzerland</i>
Latin America and the Caribbean (5)	Brazil Chile Costa Rica Ecuador Peru <i>First Alternate: Cuba</i> <i>Second Alternate: Argentina</i>
Near East (4)	Egypt Jordan Kuwait Saudi Arabia <i>First Alternate: Yemen</i> <i>Second Alternate: Lebanon</i>
North America (2)	Canada United States of America
Southwest Pacific (2)	Cook Islands Samoa <i>First Alternate: Tonga</i> <i>Second Alternate: Fiji</i>

APPENDIX H**LIST OF DOCUMENTS****Working and information documents**

Provisional agenda	CGRFA-18/21/1
Provisional annotated agenda and timetable	CGRFA-18/21/1 Add.1 Rev.2
Statutes of the Commission on Genetic Resources for Food and Agriculture	CGRFA-18/21/1/Inf.1
Rules of Procedure of the Commission on Genetic Resources for Food and Agriculture	CGRFA-18/21/1/Inf.2
Declaration of competences and voting rights submitted by the European Union and its 28 Member States	CGRFA-18/21/1/Inf.3
List of documents	CGRFA-18/21/1/Inf.4
Biodiversity for food and agriculture for food security, nutrition and human health	CGRFA-18/21/2
FAO activities on biodiversity for food and agriculture for food security, nutrition and human health	CGRFA-18/21/2/Inf.1
Climate change and genetic resources for food and agriculture	CGRFA-18/21/3
The role of genetic resources for food and agriculture in climate change adaptation and mitigation	CGRFA-18/21/3/Inf.1
FAO activities on climate change	CGRFA-18/21/3/Inf.2
Report of the Fifth Session of the Team of Technical and Legal Experts on Access and Benefit-sharing	CGRFA-18/21/4.1
Access and benefit-sharing for genetic resources for food and agriculture: Review and outlook	CGRFA-18/21/4.2
Inputs by Member on access and benefit-sharing for genetic resources for food and agriculture	CGRFA-18/21/4.2/Inf.1
Digital sequence information on genetic resources for food and agriculture: Innovation opportunities, challenges and implications	CGRFA-18/21/5
Biotechnologies for the sustainable use and conservation and of genetic resources for food and agriculture	CGRFA-18/21/6
Recent developments in biotechnologies relevant to the characterization, sustainable use and conservation of genetic resources for food and agriculture	CGRFA-18/21/6/Inf.1

Report of the first part of the Second Meeting of the Group of National Focal Points for Biodiversity for Food and Agriculture	CGRFA-18/21/7.1.1
Report of the second part of the Second Meeting of the Group of National Focal Points for Biodiversity for Food and Agriculture	CGRFA-18/21/7.1.2
Biodiversity for Food and Agriculture – Revised Draft Needs and Possible Actions	CGRFA-18/21/7.2
Co-Chairs' report on the informal consultations on Biodiversity for Food and Agriculture – Revised Draft Needs and Possible Actions	CGRFA-18/21/7.2/Inf.1
Finalization of <i>The State of the World's Aquatic Genetic Resources for Food and Agriculture</i>	CGRFA-18/21/8.1
Report of the Third Session of the Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture	CGRFA-18/21/8.2
Statutes of the Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture, and Members and Alternates elected by the Commission at its Seventeenth Regular Session	CGRFA-18/21/8.1/Inf.1
Draft Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture	CGRFA-18/21/8.3
Progress report on the development of a global information system for farmed types of aquatic genetic resources for food and agriculture	CGRFA-18/21/8.3/Inf.1
African regional workshop on development of a global information system for farmed types of aquatic genetic resources (incorporating a review of strategic priorities for a global plan of action)	CGRFA-18/21/8.3/Inf.2
Regional workshop for Asia and the Pacific Region on the development of a global information system of farmed types of aquatic genetic resources (incorporating a review of strategic priorities for a global plan of action)	CGRFA-18/21/8.3/Inf.3
Regional workshop for Europe and Central Asia on the development of a global information system of farmed types of aquatic genetic resources (incorporating a review of strategic priorities for a global plan of action)	CGRFA-18/21/8.3/Inf.4

Regional workshop for Latin America and the Caribbean and North America on the development of a global information system of farmed types of aquatic genetic resources (incorporating a review of strategic priorities for a global plan of action)	CGRFA-18/21/8.3/Inf.5
Regional workshop for the Near East on the development of a global information system of farmed types of aquatic genetic resources (incorporating a review of strategic priorities for a global plan of action)	CGRFA-18/21/8.3/Inf.6
Report of the Third Session of the Committee on Fisheries Advisory Working Group on Aquatic Genetic Resources and Technologies	CGRFA-18/21/8.3/Inf.7
Report of the Thirty-fourth Session of the Committee on Fisheries	CGRFA-18/21/8.3/Inf.8
Report of the Tenth Session of the Committee on Fisheries Sub-Committee on Aquaculture	CGRFA-18/21/8.3/Inf.9
Draft Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture – Submissions by Members	CGRFA-18/21/8.3/Inf.10
Report of the Sixth Session of the Intergovernmental Technical Working Group on Forest Genetic Resources	CGRFA-18/21/9.1
Statutes of the Intergovernmental Technical Working Group on Forest Genetic Resources, and Members and Alternates elected by the Commission at its Seventeenth Regular Session	CGRFA-18/21/9.1/Inf.1
Status of implementation of the Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources	CGRFA-18/21/9.2
Development of a new global information system on forest genetic resources	CGRFA-18/21/9.2/Inf.1
Status of preparation of <i>The Second Report on the State of the World's Forest Genetic Resources</i>	CGRFA-18/21/9.3
Report of the Eleventh Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture	CGRFA-18/21/10.1
Statutes of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture, and Members and Alternates elected by the Commission at its Seventeenth Regular Session	CGRFA-18/21/10.1/Inf.1
Review of implementation of the Global Plan of Action for Animal Genetic Resources	CGRFA-18/21/10.2

Draft practical guide on innovations in cryoconservation of animal genetic resources	CGRFA-18/21/10.2/Inf.1
Draft practical guide on genomic characterization of animal genetic resources	CGRFA-18/21/10.2/Inf.2
Status of the development of the Domestic Animal Diversity Information System	CGRFA-18/21/10.2/Inf.3
Detailed analysis of the factors influencing the reporting of information in the Domestic Animal Diversity Information System	CGRFA-18/21/10.2/Inf.4
Synthesis progress report on the implementation of the Global Plan of Action for Animal Genetic Resources – 2020	CGRFA-18/21/10.2/Inf.5
Status and trends of animal genetic resources – 2020	CGRFA-18/21/10.2/Inf.6
Sustainable use and conservation of invertebrate pollinators, including honey bees	CGRFA-18/21/11.1
Draft study on sustainable use and conservation of invertebrate pollinators, including honey bees	CGRFA-18/21/11.1/Inf.1
Sustainable use and conservation of microbial and invertebrate biological control agents, and biostimulants	CGRFA-18/21/11.2
Draft study on sustainable use and conservation of microbial and invertebrate biological control agents, and biostimulants	CGRFA-18/21/11.2/Inf.1
Review of work on micro-organism and invertebrate genetic resources for food and agriculture	CGRFA-18/21/11.3
Progress report on the implementation of the International Initiative for the Conservation and Sustainable Use of Pollinators	CGRFA-18/21/11.3/Inf.1
Progress report on the implementation of the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity	CGRFA-18/21/11.3/Inf.2
Report of the Tenth Session of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture	CGRFA-18/21/12.1
Statutes of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture, and Members and Alternates elected by the Commission at its Seventeenth Regular Session	CGRFA-18/21/12.1/Inf.1

FAO Activities in Support of the Implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture	CGRFA-18/21/12.2
Draft Practical Guides for the Application of the Genebank Standards for Plant Genetic Resources for Food and Agriculture	CGRFA-18/21/12.2/Inf.1
Strengthening cooperation among global information systems on plant genetic resources for food and agriculture	CGRFA-18/21/12.2/Inf.2
Report of the First International Multi-stakeholder Symposium on Plant Genetic Resources for Food and Agriculture	CGRFA-18/21/12.2/Inf.3
Effects of seeds policies, laws and regulations	CGRFA-18/21/12.3
Impact of implementation of seed legislation on diversity of plant genetic resources for food and agriculture	CGRFA-18/21/12.3/Inf.1
Preparing <i>The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture</i>	CGRFA-18/21/12.4
Preparation of Country Reports for <i>The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture</i>	CGRFA-18/21/12.4/Inf.1 Rev.1
Possible re-organization of the Commission's future intersessional work	CGRFA-18/21/13
Commission linkages with the FAO Strategy on Mainstreaming Biodiversity Across Agricultural Sectors and the post-2020 global biodiversity framework	CGRFA-18/21/14 Rev.1
Cooperation with international instruments and organizations	CGRFA-18/21/15
Submissions by international instruments and organizations	CGRFA-18/21/15/Inf.1
Report from the Secretariat of the Convention on Biological Diversity	CGRFA-18/21/15/Inf.2
Report from the Global Crop Diversity Trust	CGRFA-18/21/15/Inf.3
Report from CGIAR	CGRFA-18/21/15/Inf.4
Report from the International Treaty on Plant Genetic Resources for Food and Agriculture	CGRFA-18/21/15/Inf.5
Collaboration with the International Treaty on Plant Genetic Resources for Food and Agriculture	CGRFA-18/21/15/Inf.6

Other documents

How the world's food security depends on biodiversity

FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors

2021-23 Action Plan for the Implementation of the FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors

The State of the World's Aquatic Genetic Resources for Food and Agriculture

The State of the World's Aquatic Genetic Resources for Food and Agriculture -In brief

State of knowledge of soil biodiversity - Status, challenges and potentialities, Report 2020

Background Study Papers

Survey of access and benefit-sharing measures accommodating the distinctive features of genetic resources for food and agriculture and associated traditional knowledge | Background Study Paper No. 70

APPENDIX I**MEMBERS OF THE COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE**

AFRICA	ASIA	EUROPE	LATIN AMERICA AND THE CARIBBEAN
Algeria Angola Benin Botswana Burkina Faso Burundi Cameroon Cabo Verde Central African Republic Chad Comoros Congo Côte d'Ivoire Democratic Republic of the Congo Equatorial Guinea Eritrea Ethiopia Gabon Gambia Ghana Guinea Guinea-Bissau Kenya Lesotho Liberia Madagascar Malawi Mali Mauritania Mauritius Morocco Mozambique Namibia Niger Nigeria Rwanda Sao Tome and Principe Senegal Seychelles Sierra Leone South Africa Eswatini Togo Tunisia Uganda United Republic of Tanzania Zambia Zimbabwe	Bangladesh Bhutan Cambodia China Democratic People's Republic of Korea India Indonesia Japan Kazakhstan Lao People's Democratic Republic Malaysia Maldives Mongolia Myanmar Nepal Pakistan Philippines Republic of Korea Sri Lanka Thailand Viet Nam Bangladesh	Albania Armenia Austria Azerbaijan Belarus Belgium Bosnia and Herzegovina Bulgaria Croatia Cyprus Czechia Denmark Estonia European Union Finland France Georgia Germany Greece Hungary Iceland Ireland Israel Italy Latvia Lithuania Luxembourg Malta Montenegro The Netherlands Norway Poland Portugal Republic of Moldova Romania Russian Federation San Marino Serbia Slovakia Slovenia Spain Sweden Switzerland North Macedonia Turkey Ukraine United Kingdom of Great Britain and Northern Ireland	Antigua and Barbuda Argentina Bahamas Barbados Belize Bolivia (Plurinational State of) Brazil Chile Colombia Costa Rica Cuba Dominica Dominican Republic Ecuador El Salvador Grenada Guatemala Guyana Haiti Honduras Jamaica Mexico Nicaragua Panama Paraguay Peru Saint Kitts and Nevis Saint Lucia Saint Vincent and the Grenadines Suriname Trinidad and Tobago Uruguay Venezuela (Bolivarian Republic of)
	NEAR EAST		NORTH AMERICA
	Afghanistan Egypt Iran (Islamic Republic of) Iraq Jordan Kuwait Kyrgyzstan Lebanon Libya Oman Qatar Saudi Arabia Sudan Syrian Arab Republic Tajikistan United Arab Emirates Yemen		Canada United States of America
			SOUTH WEST PACIFIC
			Australia Cook Islands Fiji Marshall Islands New Zealand Palau Papua New Guinea Samoa Solomon Islands Tonga Vanuatu