



COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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SUBMISSIONS BY INTERNATIONAL INSTRUMENTS AND ORGANIZATIONS

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I. INTRODUCTION

1. The Commission, at its Eighteenth Regular Session, thanked the international instruments and organizations for their submissions and commended their work in supporting the activities of the Commission. The Commission requested its 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.¹

2. The Commission operates under a Multi-Year Programme of Work or MYPOW, a planning tool to schedule and review its work, with a rolling horizon of five Commission sessions (i.e. ten years). The MYPOW was adopted by the Commission in 2007 and last revised in 2019. In the context of its MYPOW, the Commission has welcomed the proposal to reduce routine reporting, in favour of focused consultations of international instruments and organizations on prioritized themes of the session.

3. On 27 March 2023, FAO invited through Circulate State Letter C/CBD-725-ORG-11 relevant international instruments and organizations to provide focused information on their policies, programmes and activities relevant to the Commission's Eighteenth Regular Session by completing a questionnaire. This document compiles the eight submissions received by the Secretariat, for information of the Commission.

¹ CGRFA-18/21/Report, paragraph 117.

II. SUBMISSIONS BY INTERNATIONAL INSTRUMENTS AND ORGANIZATIONS

A. The Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)

تعمل منظمة المركز العربي "أكساد" منذ أكثر من ستة عقود على تطوير الزراعة بمختلف جوانبها في المنطقة العربية ببيئاتها المختلفة الممتدة من شرقي البحر الأبيض المتوسط وبلاد ما بين النهرين، مروراً بشبه الجزيرة العربية والخليج، وصولاً إلى مصر وشمال إفريقيا، وتلقى المصادر الوراثية للأغذية والزراعة النباتية والحيوانية إهتماماً خاصاً في برامج عمل منظمة أكساد التي تغطي القمح والشعير والذرة البيضاء والأنواع المتحملة للجفاف من الأشجار المثمرة لاسيما الزيتون واللوز والتين والرمان والفسق الحلي، والنباتات الطبية والعطرية، ونباتات المراعي وأشجار الغابات، إضافة إلى الغنم العواس والماعز الشامي.

وتشمل برامج العمل التي يقوم بها مركز أكساد المحاور التالية:

- تقييم التأثيرات السلبية للتغيرات المناخية على التنوع الحيوي والغطاء النباتي والمياه والإنتاج الزراعي والأمن الغذائي والأمن المائي في الدول العربية.
- دراسة الخصائص البيولوجية للموارد الوراثية النباتية والحيوانية المتوفرة في البيئات العربية وقدرتها على تحمل ظروف الجفاف، وإمكانيات الاستفادة منها في تطوير الإنتاج الزراعي.
- حفظ المصادر الوراثية الحيوانية والنباتية في المكان *In - situ* وخارج المكان *Ex - situ*.
- إنشاء البنوك الوراثية لبذور محاصيل الحبوب والأنواع الرعوية.
- إنشاء بنوك وراثية حيوانية (قشاة سائل منوي مجمد وأجنة وحيوانات حية).
- إصدار المراجع العلمية الخاصة بنتائج الدراسات المتعلقة بالمصادر الوراثية وحفظها والاستفادة منها في تطوير الزراعة.
- التوسع بزراعة نباتات مخصصة لإكثار بذور النباتات الرعوية ذات الأهمية الاقتصادية.
- إنشاء مشاتل لإكثار أصناف مختلفة مقاومة للجفاف من الزيتون والفسق الحلي والرمان والتين.
- إنشاء مخبر لإكثار الأنواع النباتية وأصناف الأشجار المثمرة المهتدة بالانقراض بتقنية زراعة النسيج.
- تزويد الدول العربية بكميات كبيرة من بذور الحبوب وغراس الأشجار المثمرة للتوسع بزراعتها.
- حماية الأنواع المهتدة بالانقراض وإعادة تأهيل مساحات من المراعي في المنطقة العربية، وزراعة المناطق التي تدهور فيها الغطاء النباتي ببذور وشتول الأنواع الرعوية الجيدة المقاومة للجفاف.
- الاستفادة من الأصناف المحلية في تطوير أصناف حديثة من القمح والشعير والذرة البيضاء تتميز بمقاومة الجفاف بشكل خاص.

- المحافظة على سلالات الحيوانات الزراعية المتأقلمة مع ظروف الإنتاج القاسية في المنطقة العربية من خلال برامج تحسين ورعاية مناسبة وخاصة المجترات الصغيرة (أغنام العواس والماعز الشامي والإبل).
- استخدام التقانات الحيوية في تسريع عمليات التحسين الوراثي في الموارد الوراثية الحيوانية مثل إدخال جين البورولا لتحسين الخصوبة في عروق الأغنام العربية.
- مراقبة الأمراض والأمراض العابرة للحدود وأثرها على الأنواع الحيوانية النادرة.
- دراسة التنوع الحيوي للنحل ودوره في التوازن البيئي وتحسين سبل العيش في المناطق الريفية.
- تطوير تكنولوجيات زراعية تسهم في التخفيف من الآثار السلبية للتغيرات المناخية و قلة الأمطار وارتفاع الحرارة، مثل زراعة أنواع المحاصيل وأصناف الحبوب المتحملة للجفاف، والزراعة الحافظة، وحصاد المياه وغيرها.

وكان لهذه الأعمال نتائج جيدة ومنعكسات اقتصادية على الزراعة في الدول العربية تمثلت في:

- استنباط 85 صنفاً من القمح والشعير ذات إنتاجية جيدة ومتحملة للجفاف والحرارة العالية، وهي تزرع بشكل واسع في الدول العربية.
- تزويد الدول العربية بكمية 450 طناً من البذور عالية النوعية من أصناف القمح التي استنبطتها منظمة أكساد من أجل تعزيز قدرات الدول العربية على إنتاج القمح.
- توزيع 8 طن من بذار النباتات الرعوية المقاومة للجفاف وعالية الاستساغة للحيوانات الزراعية لاستخدامها في تحسين الغطاء النباتي في المراعي المتدهورة في المنطقة العربية بسبب الجفاف والرعي الجائر.
- توزيع أكثر من 3.5 مليون غرسة على الدول العربية من الأصناف المحلية من الزيتون والفسق الحلبي واللوز وغيرها من الأشجار المثمرة المتحملة لنقص الأمطار والحرارة العالية وفق التربة، وكان لها أهمية اقتصادية كبيرة من خلال التوسع بزراعتها في المنطقة العربية، وأسهمت في تحسين الأوضاع الاقتصادية للفلاحين الفقراء في الدول العربية.
- تزويد الدول العربية بنحو 22 ألف رأس من عرق الغنم العواس وعرق الماعز الشامي والإبل لتوزيعها على مربي الثروة الحيوانية والاستفادة منها في تحسين إنتاجية العروق المحلية المتوفرة لديهم.
- تزويد الدول العربية ب 37 ألف قنشة من السائل المنوي المجدد (أغنام عواس وماعز شامي) لتحسين إنتاجية السلالات المحلية من الحليب واللحم.
- تحسين الوعي الشعبي العام حول أنواع المصادر الوراثية للأغذية والزراعة المتوفرة في المنطقة العربية، وضرورة الحفاظ عليها، والاستفادة منها لتطوير الزراعة والأمن الغذائي، وذلك من خلال إقامة الندوات واللقاءات الجماهيرية العامة، والتركيز على طلاب المدارس والجامعات.

- بناء القدرات البشرية وإقامة الكثير من الدورات التدريبية و الندوات العلمية التي تهدف إلى تطوير الحالة المعرفية للفنيين في الدول العربية حول المصادر الوراثية للأغذية والزراعة.

B. Convention on Biological Diversity (CBD)

1. The Secretariat of the Convention on Biological Diversity (CBD) is providing this brief report for the information of the Nineteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture (CGRFA).
2. The report covers activities since the Eighteenth Regular Session of the CGRFA and focusses on inter-sessional activities relevant to the prioritized themes of the Nineteenth Regular Session of the CGRFA as requested by its Secretariat.
3. The report provides information on outcomes from:
 - the fifteenth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 15),
 - the tenth meeting of the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol on Biosafety (COP-MOP 10), and
 - the fourth meeting of the Conference of the Parties serving as the meeting of the Parties to the Nagoya Protocol on ABS (COP-MOP 4).
4. These meetings were held concurrently in two parts: part one was a hybrid virtual and in-person meeting held from 11 to 15 October 2021 with the in-person component convened in Kunming, China; part two was held in-person from 7 to 19 December 2022 in Montreal, Canada.

Review of progress in the implementation of the Convention and the Strategic Plan for Biodiversity 2011-2020 and the achievement of the Aichi Biodiversity Targets

5. At its fifteenth meeting, the Conference of the Parties to the Convention adopted decision [15/3](#) on the review of progress in the implementation of the Convention and the Strategic Plan for Biodiversity 2011-2020 and the achievement of the Aichi Biodiversity Targets. In paragraph 5, Parties *noted with deep concern* that, while there had been encouraging progress towards achievement of the Aichi Biodiversity Targets, national targets set by Parties through their national biodiversity strategies and action plans were collectively not commensurate with the level of ambition set out in the Aichi Biodiversity Targets and implementation has been limited, and further, that the lack of adequate means of implementation has been a persistent obstacle to the implementation of the Convention and of the Strategic Plan for Biodiversity 2011–2020 in developing country Parties, thus highlighting the need for enhanced international cooperation.

Kunming-Montreal Global Biodiversity Framework

6. The key outcome from COP 15 was the adoption of the Kunming-Montreal Global Biodiversity Framework (decision [15/4](#)). The Framework supports the achievement of the Sustainable Development Goals, builds on the Convention's previous Strategic Plans, and sets out an ambitious pathway to reach the global vision of a world living in harmony with nature by 2050. Among the Framework's key elements are 4 goals for 2050 and 23 targets for 2030. The text of the Framework is provided in appendix I to this report.
7. The implementation of the Kunming-Montreal Global Biodiversity Framework will be guided and supported through a comprehensive package of decisions also adopted at COP 15. In addition to decision 15/4, this package includes decisions on:
 - a. monitoring framework for the Kunming-Montreal Global Biodiversity Framework (decision [15/5](#));
 - b. mechanisms for planning, monitoring, reporting and review (decision [15/6](#));
 - c. resource mobilization (decision [15/7](#));
 - d. capacity-building and development and technical and scientific cooperation (decision [15/8](#));
 - e. digital sequence information on genetic resources (decision [15/9](#)); and
 - f. cooperation with other Conventions and international organizations (decision [15/13](#)).

8. In decision [15/5](#), the COP adopted the monitoring framework for the Kunming-Montreal Global Biodiversity Framework. The monitoring framework is composed of several groups of indicators for monitoring the implementation of the Kunming-Montreal Global Biodiversity Framework, including a minimum set of high-level headline indicators, global level indicators collected from national reporting,

and sets of optional indicators such as component indicators and complimentary indicators. The COP encouraged Parties and invited other Governments and other relevant organizations to support national, regional and global biodiversity monitoring systems, recognizing the need for enhanced international cooperation and capacity-building especially for developing countries (para. 5); and invited relevant organizations to support the operationalization of the monitoring framework for the Kunming-Montreal Global Biodiversity Framework (para. 7). The monitoring framework also invited organizations identified in the indicator metadata sheets¹ as data providers, to provide guidelines and information for the design or improvement and implementation of national monitoring systems to support the collection of data and the calculation of headline indicators.

9. In decision [15/6](#), the COP adopted an enhanced multidimensional approach to planning, monitoring, reporting and review with a view to enhancing implementation of the Convention and the Framework. The enhanced multidimensional approach to planning, monitoring, reporting and review comprises:

- a. National biodiversity strategies and action plans (NBSAPs), revised or updated in alignment with the Kunming-Montreal Global Biodiversity Framework;
- b. National reports submitted in 2026 and 2029;
- c. Global analysis of information NBSAPs to assess the contribution to the Kunming-Montreal Global Biodiversity Framework considered at COP-16 and subsequent COPs;
- d. Global review of collective progress in the implementation of the Kunming-Montreal Global Biodiversity Framework to be considered by COP-17 and 19;
- e. Voluntary peer reviews;
- f. Further development and testing of an open-ended forum for voluntary country reviews;
- g. Information on non-State actor commitments towards the Kunming-Montreal Global Biodiversity Framework.

10. The decision includes a section on 'cooperation, synergies and stakeholder engagement'. Among other things, a range of different actors, including intergovernmental organizations, research organizations, the business and finance community and representatives of sectors related to or dependent on biodiversity are invited to develop, on a voluntary basis, commitments contributing to NBSAPs and to the Kunming-Montreal Global Biodiversity Framework, and to share them through the online platform for the Sharm El-Sheikh to Kunming and Montreal Action Agenda for Nature and People (para. 26).

11. The same decision also invited relevant international, regional, subregional or national organizations to support Parties in updating and revising NBSAPs and in the preparation of national reports, including through the provision of relevant data, support for implementation of the monitoring framework and information and capacity-development activities (para. 28).

12. Decision [15/7](#) addressed resource mobilization. In it, the COP adopted the strategy for resource mobilization for the Kunming-Montreal Global Biodiversity Framework. The COP invited relevant international organizations and initiatives as well as multi-stakeholder partnerships to support the implementation of the strategy for resource mobilization (para. 14). The Executive Secretary was requested to continue and intensify collaboration with relevant organizations and initiatives with a view to further promoting supportive action on scaling and aligning incentive measures in accordance with Article 11 of the Convention (para. 47 (f)).

13. In decision [15/8](#) (section A on capacity-building and development), the COP adopted the long-term strategic framework for capacity-building and development and urged Parties and invited other Governments, relevant organizations, and other actors to use the long-term strategic framework for capacity-building and development as a flexible framework in the design, implementation, monitoring and evaluation of their capacity-building and development initiatives and programmes supporting the achievement of the vision, mission, goals and targets of the Kunming-Montreal Global Biodiversity Framework (para. 4). The decision also invited relevant organizations and regional and subregional bodies, including regional economic integration organizations, to promote the sharing of expertise and information; to strengthen existing regional and subregional support networks or establish new ones, as appropriate, and to provide, upon request, assistance to enable national and subnational government institutions, local authorities and non-government actors within the respective regions or subregions to strengthen their capacities, while also mobilizing and fostering effective use and retention of the

capacities developed (para. 13). The Executive Secretary was requested to enable Parties, indigenous peoples and local communities, women and youth organizations, and other relevant organizations to prepare thematic capacity-building and development action plans for specific 2030 targets or groups of related targets, as appropriate, taking into account needs and gaps identified and decided by Parties (para. 16 (d)).

14. Section B of decision 15/8 addresses technical and scientific cooperation. In it, the COP urged Parties and invited other Governments and relevant organizations to recognize the important role of, and to promote, science, technology, innovation and other knowledge systems in supporting the implementation of the goals and targets of the Kunming-Montreal Global Biodiversity Framework towards achieving the 2050 Vision of living in harmony with nature (para. 17). The same decision reminded Parties, pursuant to paragraph 6 of decision XIII/23, to identify and communicate their biodiversity-related technical and scientific needs and requests for assistance, and invited Parties, other Governments and relevant organizations to register as providers of technical assistance and offer support to address the needs identified by Parties through the central portal of the clearing-house mechanism and the clearing-houses of the Protocols, to facilitate capacity-building and development and technical and scientific cooperation (para. 18).

15. Parties, other Governments and relevant organizations were encouraged to take practical steps to promote and strengthen relevant networks of institutions and communities of practice to facilitate the exchange of biodiversity-related information, experiences, skills and technical know-how, among others, through networks of national and regional clearing-house mechanisms (para. 21). Parties, other Governments, relevant organizations and other stakeholders were urged to scale up financial, technical and human resources to further promote technical and scientific cooperation and technology transfer in support of the Kunming-Montreal Global Biodiversity Framework (para. 28).

16. The COP also decided to establish a mechanism comprising a network of regional, and/or additional subregional technical and scientific cooperation support centres to be coordinated at the global level by a global coordination entity. The decision sets out a process for the further development and operationalization of the mechanism.

17. The Executive Secretary was requested to further promote and facilitate technical and scientific cooperation in support of the Kunming-Montreal Global Biodiversity Framework, in collaboration with Parties, relevant partners, the regional and/or subregional support centres and the global coordination entity, other organizations and indigenous peoples and local communities; and to maintain synergy and collaboration with biodiversity-related conventions, and relevant organizations, initiatives and networks that have technical and scientific expertise, technologies and information, and/or are involved in biodiversity-related technical and scientific cooperation activities (para. 32).

18. See below for information on decision 15/9 on digital sequence information on genetic resources and on decision 15/13 on cooperation with other conventions and international organizations.

19. As part of the third phase of the Multilateral Environmental Agreements in African, Caribbean and Pacific countries (ACP MEAs 3) programme, funded by the European Union, the Food and Agriculture Organization of the United Nations (FAO) has developed a series of webinars in partnership with the Secretariat of the Convention on Biological Diversity to inform FAO's regional officers and national focal points about the outcomes of the CBD COP15 and unpack the Kunming-Montreal Global Biodiversity Framework with a focus on targets related to agricultural biodiversity. The main objective of the ACP MEAs webinars is to promote environmental sustainability in agriculture by providing technical assistance to ACP countries in implementing multilateral environmental agreements.

Biodiversity and agriculture

20. The Conference of the Parties adopted decision [15/28](#) on biodiversity and agriculture, and the Executive Secretary was requested to bring this decision to the attention of the FAO (para. 12). Accordingly, the text of the decision is provided in appendix II to this report. Through this decision, the Conference of the Parties adopted a Plan of Action (2020-2030) for the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity. Moreover, the Conference of the Parties invited FAO, including through the framework of the Global Soil Partnership, to facilitate the implementation of the Plan of Action, involving Parties, including their ministries of agriculture and environment at the national level, as appropriate (para. 7).

Biodiversity and climate change

21. The Conference of the Parties adopted decision [15/30](#) on biodiversity and climate change. The decision requested Parties and invited other Governments and international organizations to submit their views and information on biodiversity and climate change, and requested the Executive Secretary to compile these views and information and to make the compilation available to the Subsidiary Body on Scientific, Technical and Technological Advice.

Biodiversity and health

22. At its fifteenth meeting, the Conference of the Parties, through decision [15/29](#) on biodiversity and health, recognized that the COVID-19 pandemic had further highlighted the importance of the relationship between health and well-being, and biodiversity, including the urgent need to reduce pressures on habitats, and to decrease ecosystem degradation and consequently reduce the risk of pathogen spillover and outbreaks, the importance of early warning, surveillance and prompt information-sharing for pandemic prevention, preparedness and response, and the need to address inequities in global health, including with respect to equitable access to medicines, vaccines, diagnostics, and medical equipment.

23. The COP also emphasized the critical role of genetic resources, digital sequence information on genetic resources, and traditional knowledge associated with genetic resources, in the research and development of health products and services, and the importance of the fair and equitable sharing of benefits arising from their utilization in this regard, in line with the Convention and its Protocols, as applicable and in a mutually supportive manner with other relevant international agreements and instruments.

24. The COP, through the same decision, requested the Executive Secretary, subject to the availability of resources, to produce an updated version of the draft global action plan for biodiversity and health and targeted messages in collaboration with the Quadripartite for One Health.

25. Finally, biodiversity and health are also addressed in the Kunming-Montreal Global Biodiversity Framework. Section C of the Framework addresses ‘considerations for the implementation of the Kunming-Montreal Global Biodiversity Framework’. In paragraph 7(r), the Framework acknowledged the interlinkages between biodiversity and health and the three objectives of the Convention. It also stated that the Framework “is to be implemented with consideration of the One Health Approach, among other holistic approaches that are based on science, mobilize multiple sectors, disciplines and communities to work together, and aim to sustainably balance and optimize the health of people, animals, plants and ecosystems, recognizing the need for equitable access to tools and technologies including medicines, vaccines and other health products related to biodiversity, while highlighting the urgent need to reduce pressures on biodiversity and decrease environmental degradation to reduce risks to health, and, as appropriate, develop practical access and benefit-sharing arrangements.”

Cooperation with other conventions and international organizations

26. The Conference of the Parties adopted decision [15/13](#) on Cooperation with other conventions and international organizations. In the decision, the COP welcomed the contributions of multilateral agreements and international organizations and processes to enhancing synergies in the implementation of the Kunming-Montreal Global Biodiversity Framework and encouraged the strengthening of cooperation and synergies among relevant conventions and multilateral agreements by, as appropriate and in line with their respective mandates, legal authority and responsibilities, establishing or renewing cooperation frameworks, as needed.

27. Decision 15/13 encouraged FAO and other organizations to support the secretariats and Parties to biodiversity-related conventions to continue to enhance synergies among the conventions, including through key actions outlined in decisions XIII/24 and 14/30 to enhance synergies among biodiversity-related conventions and to cooperate with other relevant multilateral agreements at the international level.

28. The same decision invited the governing bodies of relevant multilateral environmental agreements and organizations: to formally endorse the Kunming-Montreal Global Biodiversity Framework through their own governance processes in order to support its operationalization and contribute to the transparency and monitoring of progress in its implementation, and; to contribute to

the implementation and monitoring of the Framework, in particular by further strengthening cooperation at the global level and enhancing synergies among themselves, to encourage mutually supportive decisions, to coordinate their own strategies with the Kunming-Montreal Global Biodiversity Framework and to propose key issues for thematic discussions facilitated by the Liaison Group of Biodiversity-related Conventions, taking into account, where appropriate, the conclusions of the Bern II workshop included in document CBD/SBI/3/10.

29. The importance of other conventions and international organizations in supporting the successful implementation of the Kunming-Montreal Global Biodiversity Framework was recognized in several other decisions including on: the Kunming-Montreal Global Biodiversity Framework (decision 15/4); the monitoring framework (decision 15/5); mechanisms for planning, monitoring, reporting and review (decision 15/6); resource mobilization (decision 15/7); capacity building and technical and scientific cooperation (decision 15/8); benefit-sharing from the use of digital sequence information on genetic resources (decision 15/9), among others.

30. Cooperation and synergies among conventions is also an integral part of the Kunming-Montreal Global Biodiversity Framework, as noted under its Section C (q), which states that enhanced collaboration, cooperation and synergies between the Convention on Biological Diversity and its Protocols, other biodiversity-related conventions, other relevant multilateral agreements and international organizations and processes, in line with their respective mandates, including at the global, regional, subregional and national levels, would contribute to and promote the implementation of the Framework in a more efficient and effective manner.

Digital sequence information on genetic resources

31. COP-15 adopted decision 15/9 on digital sequence information on genetic resources. Key elements of the decision include:

- that benefits arising from the use of DSI should be shared fairly and equitably;
- calls for capacity-building, technical and scientific cooperation and technology transfer;
- a decision to establish, as part of the Kunming-Montreal Global Biodiversity Framework, a multilateral mechanism for benefit-sharing from the use of DSI, including a global fund.

32. The decision also established a process to further develop and operationalize the mechanism, to be finalized at COP-16. The process includes work by an Ad Hoc Open-ended Working Group on Benefit-sharing from the Use of Digital Sequence Information on Genetic Resources to undertake further development of the multilateral mechanism, including a list of issues for further consideration set out in the annex to the decision, and to make recommendations to the Conference of the Parties at its sixteenth meeting. The process also includes the submission of views, the compilation of lessons learned from other international funding mechanisms and the commissioning of studies. In decision NP-4/6, the COP-MOP to the Nagoya Protocol welcomed decision 15/9, endorsed the multilateral mechanism for benefit-sharing from the use of DSI established therein and also endorsed the process established in the decision and requested the Working Group to also report to the fifth meeting of the COP-MOP to the Nagoya Protocol.

33. The multilateral mechanism for benefit-sharing from the use of DSI is also linked to decision 15/7 on resource mobilization whereby the Global Environment Facility is requested to establish, in 2023, a Special Trust Fund, with its own equitable governing body, to support implementation of the Kunming-Montreal Global Biodiversity Framework. Decision 15/7 also establishes an Advisory Committee on Resource Mobilization which is to consider funding mechanisms, including in relation to DSI.

34. Decision 15/9 also addressed capacity-building, technology transfer and technical and scientific cooperation related to DSI. It welcomed section I of the Kunming-Montreal Global Biodiversity Framework (the section on ‘Implementation and support mechanism and enabling conditions’), the long-term strategic framework for capacity-building and development, and the strengthening of technical and scientific cooperation. It also called for specific and targeted capacity-building and development, technology transfer, technical and scientific cooperation and as appropriate, support for developing countries to generate, access and use DSI for research and innovation. Capacity development and technology transfer are among the issues to be further considered by the DSI Working Group.

35. DSI is also included Goal C and target 13 of the Kunming-Montreal Global Biodiversity Framework both of which address benefit-sharing from genetic resources and digital sequence

information on genetic resources. The full text of the Goal C and target 13 can be found in Appendix I below.

36. During the process for the development of the Kunming-Montreal Global Biodiversity Framework, the Secretary of the Commission on Genetic Resources for Food and Agriculture conveyed information on access to genetic resources and benefit-sharing as well as digital sequence information on genetic resources to the Executive Secretary of the Convention to be made available to the Open-ended Working Group on the Post-2020 Global Biodiversity Framework. The information was included among the documentation for the third meeting of the Working Group (document [CBD/WG2020/3/INF/9](#)).

37. The CBD Secretariat also collaborated with the Secretariat of the Commission on a Global Workshop on Digital Sequence Information and Genetic Resources for Food Agriculture held virtually from 14 to 15 November 2022. More information on the workshop is available on the Commission's website: <https://www.fao.org/cgrfa/meetings/dsi-workshop-2022/en/>.

Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization

38. The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization ('Nagoya Protocol') was adopted on 29 October 2010 and entered into force on 12 October 2014. The Nagoya Protocol has 140 Parties as of 5 June 2023.

39. As mentioned above, Goal C and target 13 of the Kunming-Montreal Global Biodiversity Framework address access to genetic resources and benefit-sharing. Both the goal and the target make reference to international access and benefit-sharing instruments and as such, their application is not limited to Parties to the Nagoya Protocol, but also includes the CBD and the International Treaty of Plant Genetic Resources for Food and Agriculture.

40. In decision NP-4/5 on 'enhancing the implementation of the Nagoya Protocol in the context of the Kunming-Montreal Global Biodiversity Framework', the Conference of the Parties serving as the meeting of the Parties to the Nagoya Protocol endorsed the Kunming-Montreal Global Biodiversity Framework. It also invited Parties and encouraged other Governments to make use of the approach to planning, monitoring, reporting and review under the Convention to enhance the implementation of the Nagoya Protocol and the integration of access and benefit-sharing in revised or updated national biodiversity strategies and action plans.

41. Countries continue to publish national information in the Access and Benefit-Sharing Clearing-House. As of 12 May 2023, more than 4,700 access permits or their equivalent constituting internationally recognized certificates of compliance have been published. In addition, more than 80 checkpoint communiqués have been published as part of the system for monitoring utilization of genetic resources.

Cartagena Protocol on Biosafety and Nagoya – Kuala Lumpur Supplementary Protocol on Liability and Redress

42. The Cartagena Protocol on Biosafety is an international treaty governing the movements of living modified organisms resulting from modern biotechnology from one country to another. The Cartagena Protocol was adopted on 29 January 2000 as a supplementary agreement to the Convention on Biological Diversity and entered into force on 11 September 2003. The Cartagena Protocol has 173 Parties as of 11 May 2023.

43. In 2010, the Nagoya – Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety was adopted providing international rules and procedures in the field of liability and redress relating to living modified organisms. The Supplementary Protocol entered into force on 5 March 2018 and has 52 Parties as of 11 May 2023.

44. At its tenth meeting, the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol on Biosafety (COP-MOP) adopted the Implementation Plan for the Cartagena Protocol on Biosafety as a follow up to the Strategic Plan for the period 2011-2020 (decision CP-10/3). The Implementation Plan is a framework of broad desirable achievements and accomplishments to help guide Parties in their implementation of the Protocol and measure progress in this regard for the period up to 2030. For each goal, a number of objectives and indicators are outlined. Outcomes describe what the effect will be of achieving each goal.

45. The Implementation Plan is complemented by the Capacity-building Action Plan for the Cartagena Protocol on Biosafety (adopted in [decision CP-10/4](#)) with the purpose of facilitating the development and strengthening of the capacities of Parties to implement the Protocol by: (a) identifying key areas for capacity-building related to the different goals of the Implementation Plan; (b) facilitating the engagement of partners, including donors; (c) fostering a coherent and coordinated approach to capacity-building for the implementation of the Protocol; and (d) promoting regional and international cooperation and coordination.

46. The COP-MOP urged Parties and invited other Governments to review and align their national action plans and programmes relevant to the implementation of the Protocol, including their national biodiversity strategies and action plans, with the Implementation Plan and the Capacity-Building Action Plan.

47. The COP-MOP recognized the complementarity of the Implementation Plan to the Kunming-Montreal Global Biodiversity Framework and that the Implementation Plan can contribute to the achievement of its goals and targets relevant to biosafety, especially for Parties to the Convention that are also Parties to the Cartagena Protocol. The COP-MOP also recognized the complementarity of the Capacity-Building Action Plan with the Long-Term Strategic Framework for Capacity-Building and Development adopted by the fifteenth meeting of the Conference of the Parties in its decision 15/8.

48. At its tenth meeting, the COP-MOP welcomed the analysis of the Ad Hoc Technical Expert Group on Risk Assessment (AHTEG) on the topics of living modified organisms containing engineered gene drives and living modified fish according to decision CP-9/13, annex I, and endorsed the AHTEG's recommendation that additional voluntary guidance materials be developed to support case-by-case risk assessment of living modified organisms containing engineered gene drives. The COP-MOP also decided to establish an AHTEG to work in accordance with the terms of reference annexed to the decision. Decision CP-10/10 requested the Executive Secretary to commission the preparation of a detailed outline of additional guidance materials on risk assessment of living modified organisms containing engineered gene drives as a base for the work of the AHTEG. The same decision invited submissions of information relevant to the work of the AHTEG, and invited Parties to also submit information on their needs and priorities for further guidance materials on specific topics of risk assessment of living modified organisms, including a rationale following the criteria set out in decision CP-9/13. The COP-MOP requested the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) at its twenty-sixth meeting, to consider the outcomes of the AHTEG and prepare a recommendation to the eleventh meeting of the COP-MOP.

Appendix I

Kunming-Montreal Global Biodiversity Framework

Section A. Background

1. Biodiversity is fundamental to human well-being, a healthy planet, and economic prosperity for all people, including for living well in balance and in harmony with Mother Earth. We depend on it for food, medicine, energy, clean air and water, security from natural disasters as well as recreation and cultural inspiration, and it supports all systems of life on Earth.

2. The Kunming-Montreal Global Biodiversity Framework seeks to respond to the *Global Assessment Report of Biodiversity and Ecosystem Services* issued by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES),² the fifth edition of the *Global Biodiversity Outlook*,³ and many other scientific documents that provide ample evidence that, despite ongoing efforts, biodiversity is deteriorating worldwide at rates unprecedented in human history. As the IPBES global assessment report states:⁴

An average of around 25 per cent of species in assessed animal and plant groups are threatened, suggesting that around 1 million species already face extinction, many within decades, unless action is taken to reduce the intensity of drivers of biodiversity loss. Without such action, there will be a further acceleration in the global rate of species extinction, which is already at least tens to hundreds of times higher than it has averaged over the past 10 million years.

The biosphere, upon which humanity as a whole depends, is being altered to an unparalleled degree across all spatial scales. Biodiversity – the diversity within species, between species and of ecosystems – is declining faster than at any time in human history.

Nature can be conserved, restored and used sustainably while other global societal goals are simultaneously met through urgent and concerted efforts fostering transformative change.

The direct drivers of change in nature with the largest global impact have been (starting with those with the most impact) changes in land and sea use, direct exploitation of organisms, climate change, pollution and invasion of alien species. Those five direct drivers result from an array of underlying causes, the indirect drivers of change, which are, in turn, underpinned by social values and behaviours (...) The rate of change in the direct and indirect drivers differs among regions and countries.

3. The Kunming-Montreal Global Biodiversity Framework, building on the Strategic Plan for Biodiversity 2011–2020, its achievements, gaps, and lessons learned, and the experience and achievements of other relevant multilateral environmental agreements, sets out an ambitious plan to implement broad-based action to bring about a transformation in our societies' relationship with biodiversity by 2030, in line with the 2030 Agenda for Sustainable Development and its Sustainable Development Goals, and ensure that, by 2050, the shared vision of living in harmony with nature is fulfilled.

Section B. Purpose

4. The Kunming-Montreal Global Biodiversity Framework aims to catalyze, enable and galvanize urgent and transformative action by Governments, and subnational and local authorities, with the involvement of all of society, to halt and reverse biodiversity loss, to achieve the outcomes it sets out in its Vision, Mission, Goals and Targets, and thereby contribute to the three objectives of the Convention on Biological Diversity and to those of its Protocols. Its purpose is the full implementation of the three objectives of the Convention in a balanced manner.

5. The Framework is action- and results-oriented and aims to guide and promote, at all levels, the revision, development, updating, and implementation of policies, goals, targets, and national biodiversity strategies and actions plans, and to facilitate the monitoring and review of progress at all levels in a more transparent and responsible manner.

6. The Framework promotes coherence, complementarity and cooperation between the Convention on Biological Diversity and its Protocols, other biodiversity related conventions, and other relevant multilateral agreements and international institutions, respecting their mandates, and creates opportunities for cooperation and partnerships among diverse actors to enhance implementation of the Framework.

Section C. Considerations for the implementation of the Kunming-Montreal Global Biodiversity Framework

7. The Kunming-Montreal Global Biodiversity Framework, including its Vision, Mission, Goals and Targets, is to be understood, acted upon, implemented, reported and evaluated, consistent with the following:

Contribution and rights of indigenous peoples and local communities

(a) The Framework acknowledges the important roles and contributions of indigenous peoples and local communities as custodians of biodiversity and as partners in its conservation, restoration and sustainable use. The Framework's implementation must ensure that the rights, knowledge, including traditional knowledge associated with biodiversity, innovations, worldviews, values and practices of indigenous peoples and local communities are respected, and documented and preserved with their free, prior and informed consent,⁵ including through their full and effective participation in decision-making, in accordance with relevant national legislation, international instruments, including the United Nations Declaration on the Rights of Indigenous Peoples,⁶ and human rights law. In this regard, nothing in this framework may be construed as diminishing or extinguishing the rights that indigenous peoples currently have or may acquire in the future;

Different value systems

(b) Nature embodies different concepts for different people, including biodiversity, ecosystems, Mother Earth, and systems of life. Nature's contributions to people also embody different concepts, such as ecosystem goods and services and nature's gifts. Both nature and nature's contributions to people are vital for human existence and good quality of life, including human well-being, living in harmony with nature, and living well in balance and harmony with Mother Earth. The Framework recognizes and considers these diverse value systems and concepts, including, for those

countries that recognize them, rights of nature and rights of Mother Earth, as being an integral part of its successful implementation;

Whole-of-government and whole-of-society approach

(c) This is a framework for all - for the whole of government and the whole of society. Its success requires political will and recognition at the highest level of government and relies on action and cooperation by all levels of government and by all actors of society;

National circumstances, priorities and capabilities

(d) The goals and targets of the Framework are global in nature. Each Party would contribute to attaining the goals and targets of the Framework in accordance with national circumstances, priorities and capabilities;

Collective effort towards the targets

(e) The Parties will catalyse implementation of the Framework through mobilization of broad public support at all levels;

Right to development

(f) Recognizing the 1986 United Nations Declaration on the Right to Development,⁷ the Framework enables responsible and sustainable socioeconomic development that, at the same time, contributes to the conservation and sustainable use of biodiversity;

Human rights-based approach

(g) The implementation of the Framework should follow a human rights-based approach, respecting, protecting, promoting and fulfilling human rights. The Framework acknowledges the human right to a clean, healthy and sustainable environment;⁸

Gender

(h) Successful implementation of the Framework will depend on ensuring gender equality and empowerment of women and girls, and on reducing inequalities;

Fulfilment of the three objectives of the Convention and its Protocols and their balanced implementation

(i) The goals and targets of the Framework are integrated and are intended to contribute in a balanced manner to the three objectives of the Convention on Biological Diversity. The Framework is to be implemented in accordance with these objectives, with the provisions of the Convention on Biological Diversity, and with the Cartagena Protocol on Biosafety and the Nagoya Protocol on Access and Benefit-sharing, as applicable;

Consistency with international agreements or instruments

(j) The Framework needs to be implemented in accordance with relevant international obligations. Nothing in this Framework should be interpreted as agreement to modify the rights and obligations of a Party under the Convention or any other international agreement;

Principles of the Rio Declaration

(k) The Framework recognizes that reversing the loss of biological diversity, for the benefit of all living beings, is a common concern of humankind. Its implementation should be guided by the principles of the Rio Declaration on Environment and Development;⁹

Science and innovation

(l) The implementation of the Framework should be based on scientific evidence and traditional knowledge and practices, recognizing the role of science, technology and innovation;

Ecosystem approach

(m) This Framework is to be implemented based on the ecosystem approach of the Convention;¹⁰

Intergenerational equity

(n) The implementation of the Framework should be guided by the principle of intergenerational equity which aims to meet the needs of the present without compromising the ability of future generations to meet their own needs and to ensure meaningful participation of younger generations in decision-making processes at all levels;

Formal and informal education

(o) Implementation of the Framework requires transformative, innovative and transdisciplinary education, formal and informal, at all levels, including science-policy interface studies and lifelong learning processes, recognizing diverse world views, values and knowledge systems of indigenous peoples and local communities;

Access to financial resources

(p) The full implementation of the Framework requires adequate, predictable and easily accessible financial resources;

Cooperation and synergies

(q) Enhanced collaboration, cooperation and synergies between the Convention on Biological Diversity and its Protocols, other biodiversity-related conventions, other relevant multilateral agreements and international organizations and processes, in line with their respective mandates, including at the global, regional, subregional and national levels, would contribute to and promote the implementation of the Framework in a more efficient and effective manner;

Biodiversity and health

(r) The Framework acknowledges the interlinkages between biodiversity and health and the three objectives of the Convention. The Framework is to be implemented with consideration of the One Health Approach, among other holistic approaches that are based on science, mobilize multiple sectors, disciplines and communities to work together, and aim to sustainably balance and optimize the health of people, animals, plants and ecosystems, recognizing the need for equitable access to tools and technologies including medicines, vaccines and other health products related to biodiversity, while highlighting the urgent need to reduce pressures on biodiversity and decrease environmental degradation to reduce risks to health, and, as appropriate, develop practical access and benefit-sharing arrangements.

Section D. Relationship with the 2030 Agenda for Sustainable Development

8. The Kunming-Montreal Global Biodiversity Framework is a contribution to the achievement of the 2030 Agenda for Sustainable Development. At the same time, progress towards the Sustainable Development Goals and the achievement of sustainable development in all its three dimensions (environmental, social and economic) is necessary to create the conditions necessary to fulfil the goals and targets of the Framework. It will place biodiversity, its conservation, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, at the heart of the sustainable development agenda, recognizing the important linkages between biological and cultural diversity.

Section E. Theory of change

9. The Kunming-Montreal Global Biodiversity Framework is built around a theory of change which recognizes that urgent policy action is required globally, regionally and nationally to achieve sustainable development so that the drivers of undesirable change that have exacerbated biodiversity loss will be reduced and/or reversed to allow for the recovery of all ecosystems and to achieve the Convention's Vision of living in harmony with nature by 2050.

Section F. 2050 vision and 2030 mission

10. The vision of the Kunming-Montreal Global Biodiversity Framework is a world of living in harmony with nature where “by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.”

11. The mission of the Framework for the period up to 2030, towards the 2050 vision is:
To take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery for the benefit of people and planet by conserving and sustainably using biodiversity and by ensuring the fair and equitable sharing of benefits from the use of genetic resources, while providing the necessary means of implementation.

Section G. Global goals for 2050

12. The Kunming-Montreal Global Biodiversity Framework has four long-term goals for 2050 related to the 2050 Vision for biodiversity.

GOAL A

The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050;

Human induced extinction of known threatened species is halted, and, by 2050, the extinction rate and risk of all species are reduced tenfold and the abundance of native wild species is increased to healthy and resilient levels;

The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.

GOAL B

Biodiversity is sustainably used and managed and nature’s contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development for the benefit of present and future generations by 2050.

GOAL C

The monetary and non-monetary benefits from the utilization of genetic resources and digital sequence information on genetic resources, and of traditional knowledge associated with genetic resources, as applicable, are shared fairly and equitably, including, as appropriate with indigenous peoples and local communities, and substantially increased by 2050, while ensuring traditional knowledge associated with genetic resources is appropriately protected, thereby contributing to the conservation and sustainable use of biodiversity, in accordance with internationally agreed access and benefit-sharing instruments.

GOAL D

Adequate means of implementation, including financial resources, capacity-building, technical and scientific cooperation, and access to and transfer of technology to fully implement the Kunming-Montreal Global Biodiversity Framework are secured and equitably accessible to all Parties, especially developing country Parties, in particular the least developed countries and small island developing States, as well as countries with economies in transition, progressively closing the biodiversity finance gap of \$700 billion per year, and aligning financial flows with the Kunming-Montreal Global Biodiversity Framework and the 2050 Vision for biodiversity.

Section H. Global targets for 2030

13. The Kunming-Montreal Global Biodiversity Framework has 23 action-oriented global targets for urgent action over the decade to 2030. The actions set out in each target need to be initiated immediately and completed by 2030. Together, the results will enable achievement towards the outcome-oriented goals for 2050. Actions to reach these targets should be implemented consistently and in harmony with the Convention on Biological Diversity and its Protocols, and other relevant international obligations, taking into account national circumstances, priorities and socioeconomic conditions.

*1. Reducing threats to biodiversity***TARGET 1**

Ensure that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes addressing land- and sea-use change, to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities.

TARGET 2

Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.

TARGET 3

Ensure and enable that by 2030 at least 30 per cent of terrestrial and inland water areas, and of marine and coastal areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories, where applicable, and integrated into wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities, including over their traditional territories.

TARGET 4

Ensure urgent management actions to halt human induced extinction of known threatened species and for the recovery and conservation of species, in particular threatened species, to significantly reduce extinction risk, as well as to maintain and restore the genetic diversity within and between populations of native, wild and domesticated species to maintain their adaptive potential, including through in situ and ex situ conservation and sustainable management practices, and effectively manage human-wildlife interactions to minimize human-wildlife conflict for coexistence.

TARGET 5

Ensure that the use, harvesting and trade of wild species is sustainable, safe and legal, preventing overexploitation, minimizing impacts on non-target species and ecosystems, and reducing the risk of pathogen spillover, applying the ecosystem approach, while respecting and protecting customary sustainable use by indigenous peoples and local communities.

TARGET 6

Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 per cent by 2030, and eradicating or controlling invasive alien species, especially in priority sites, such as islands.

TARGET 7

Reduce pollution risks and the negative impact of pollution from all sources by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects, including: (a) by reducing excess nutrients lost to the environment by at least half, including through more efficient nutrient cycling and use; (b) by reducing the overall risk from pesticides and highly hazardous chemicals by at least half, including through integrated pest management, based on science, taking into account food security and livelihoods; and (c) by preventing, reducing, and working towards eliminating plastic pollution.

TARGET 8

Minimize the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions, including through nature-based solution and/or ecosystem-based approaches, while minimizing negative and fostering positive impacts of climate action on biodiversity.

*2. Meeting people's needs through sustainable use and benefit-sharing***TARGET 9**

Ensure that the management and use of wild species are sustainable, thereby providing social, economic and environmental benefits for people, especially those in vulnerable situations and those most dependent on biodiversity, including through sustainable biodiversity-based activities, products and services that enhance biodiversity, and protecting and encouraging customary sustainable use by indigenous peoples and local communities.

TARGET 10

Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity friendly practices, such as sustainable intensification, agroecological and other innovative approaches, contributing to the resilience and long-term efficiency and productivity of these production systems, and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services.

TARGET 11

Restore, maintain and enhance nature's contributions to people, including ecosystem functions and services, such as the regulation of air, water and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters, through nature-based solutions and/or ecosystem-based approaches for the benefit of all people and nature.

TARGET 12

Significantly increase the area and quality, and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably, by mainstreaming the conservation and sustainable use of biodiversity, and ensure biodiversity-inclusive urban planning, enhancing native biodiversity, ecological connectivity and integrity, and improving human health and well-being and connection to nature, and contributing to inclusive and sustainable urbanization and to the provision of ecosystem functions and services.

TARGET 13

Take effective legal, policy, administrative and capacity-building measures at all levels, as appropriate, to ensure the fair and equitable sharing of benefits that arise from the utilization of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge associated with genetic resources, and facilitating appropriate access to genetic resources, and by 2030, facilitating a significant increase of the benefits shared, in accordance with applicable international access and benefit-sharing instruments.

*3. Tools and solutions for implementation and mainstreaming***TARGET 14**

Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, and fiscal and financial flows with the goals and targets of this framework.

TARGET 15

Take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions:

- a. Regularly monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity, including with requirements for all large as well as transnational companies and financial institutions along their operations, supply and value chains, and portfolios;
- b. Provide information needed to consumers to promote sustainable consumption patterns;
- c. Report on compliance with access and benefit-sharing regulations and measures, as applicable;

in order to progressively reduce negative impacts on biodiversity, increase positive impacts, reduce biodiversity-related risks to business and financial institutions, and promote actions to ensure sustainable patterns of production.

TARGET 16

Ensure that people are encouraged and enabled to make sustainable consumption choices, including by establishing supportive policy, legislative or regulatory frameworks, improving education and access to relevant and accurate information and alternatives, and by 2030, reduce the global footprint of consumption in an equitable manner, including through halving global food waste, significantly reducing overconsumption and substantially reducing waste generation, in order for all people to live well in harmony with Mother Earth.

TARGET 17

Establish, strengthen capacity for, and implement in all countries, biosafety measures as set out in Article 8(g) of the Convention on Biological Diversity and measures for the handling of biotechnology and distribution of its benefits as set out in Article 19 of the Convention.

TARGET 18

Identify by 2025, and eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while substantially and progressively reducing them by at least \$500 billion per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity.

TARGET 19

Substantially and progressively increase the level of financial resources from all sources, in an effective, timely and easily accessible manner, including domestic, international, public and private resources, in accordance with Article 20 of the Convention, to implement national biodiversity strategies and action plans, mobilizing at least \$200 billion per year by 2030, including by:

- (a) Increasing total biodiversity related international financial resources from developed countries, including official development assistance, and from countries that voluntarily assume obligations of developed country Parties, to developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, to at least \$20 billion per year by 2025, and to at least \$30 billion per year by 2030;
- (b) Significantly increasing domestic resource mobilization, facilitated by the preparation and implementation of national biodiversity finance plans or similar instruments according to national needs, priorities and circumstances;
- (c) Leveraging private finance, promoting blended finance, implementing strategies for raising new and additional resources, and encouraging the private sector to invest in biodiversity, including through impact funds and other instruments;
- (d) Stimulating innovative schemes such as payment for ecosystem services, green bonds, biodiversity offsets and credits, and benefit-sharing mechanisms, with environmental and social safeguards;
- (e) Optimizing co-benefits and synergies of finance targeting the biodiversity and climate crises;

(f) Enhancing the role of collective actions, including by indigenous peoples and local communities, Mother Earth centric actions¹¹ and non-market-based approaches including community based natural resource management and civil society cooperation and solidarity aimed at the conservation of biodiversity;

(g) Enhancing the effectiveness, efficiency and transparency of resource provision and use;

TARGET 20

Strengthen capacity-building and development, access to and transfer of technology, and promote development of and access to innovation and technical and scientific cooperation, including through South-South, North-South and triangular cooperation, to meet the needs for effective implementation, particularly in developing countries, fostering joint technology development and joint scientific research programmes for the conservation and sustainable use of biodiversity and strengthening scientific research and monitoring capacities, commensurate with the ambition of the goals and targets of the Framework.

TARGET 21

Ensure that the best available data, information and knowledge are accessible to decision makers, practitioners and the public to guide effective and equitable governance, integrated and participatory management of biodiversity, and to strengthen communication, awareness-raising, education, monitoring, research and knowledge management and, also in this context, traditional knowledge, innovations, practices and technologies of indigenous peoples and local communities should only be accessed with their free, prior and informed consent,¹² in accordance with national legislation.

TARGET 22

Ensure the full, equitable, inclusive, effective and gender-responsive representation and participation in decision-making, and access to justice and information related to biodiversity by indigenous peoples and local communities, respecting their cultures and their rights over lands, territories, resources, and traditional knowledge, as well as by women and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders.

TARGET 23

Ensure gender equality in the implementation of the Framework through a gender-responsive approach, where all women and girls have equal opportunity and capacity to contribute to the three objectives of the Convention, including by recognizing their equal rights and access to land and natural resources and their full, equitable, meaningful and informed participation and leadership at all levels of action, engagement, policy and decision-making related to biodiversity.

Section I. Implementation and support mechanism and enabling conditions

14. Implementation of the Kunming-Montreal Global Biodiversity Framework and the achievement of its goals and targets will be facilitated and enhanced through support mechanisms and strategies under the Convention on Biological Diversity and its Protocols, in accordance with its provisions and the decisions adopted by the Conference of the Parties at its fifteenth meeting.

15. The full implementation of the Framework will require the provision of adequate, predictable and easily accessible financial resources from all sources on a needs basis. It further requires cooperation and collaboration in building the necessary capacity and transfer of technologies to allow Parties, especially developing country Parties, to fully implement the Framework.

Section J. Responsibility and transparency

16. The successful implementation of the Kunming-Montreal Global Biodiversity Framework requires responsibility and transparency, which will be supported by effective mechanisms for planning, monitoring, reporting and review, forming an agreed, synchronized and cyclical system.¹³ This includes the following elements:

- a. National biodiversity strategies and action plans, revised or updated in alignment with the Framework and its goals and targets as the main vehicle for implementation of the Framework, including national targets communicated in a standardized format;
 - b. National reports, including the headline and, as appropriate, other indicators in the monitoring framework of the Kunming-Montreal Global Biodiversity Framework;
 - c. Global analysis of information in national biodiversity strategies and action plans, including national targets to assess the contribution towards the Framework;
 - d. Global review of collective progress in the implementation of the Framework, including the means of implementation, based on national reports and, as appropriate, other sources;
 - e. Voluntary peer reviews;
 - f. Further development and testing of an open-ended forum for voluntary country reviews;
 - g. Information on non-state actor commitments towards the Framework, as applicable.
17. Parties may take the outcome of the global reviews into account in the future revisions and implementation of their national biodiversity strategies and action plans, including the provision of means of implementation to developing country Parties, with a view to improving actions and efforts, as appropriate.
18. The mechanisms recognize the specific challenges faced by developing countries and the need for international cooperation to support them accordingly. Means of implementation, including capacity building and development, and technical and financial support will be provided to Parties, especially to developing country Parties, to enable the implementation of these mechanisms for responsibility and transparency, including information on transparency of the support provided and received, and provide a full overview of aggregate support provided.
19. The mechanisms will be undertaken in a facilitative, non-intrusive, non-punitive manner, respecting national sovereignty, and avoiding placing undue burden on Parties.
20. Further recommendations on the transparency and responsibility mechanisms will be provided by the Conference of the Parties as necessary with a view to achieving the goals and targets of the Framework.
21. Future meetings of the Conference of the Parties will consider and provide any additional recommendation, as necessary, including on the basis of the outcomes from the reviews, with a view to achieving the goals and targets of the Framework.

Section K. Communication, education, awareness and uptake

22. Enhancing communication, education, and awareness on biodiversity and the uptake of the Kunming-Montreal Global Biodiversity Framework by all actors is essential to achieve its effective implementation and behavioural change, and to promote sustainable lifestyles and biodiversity values, including by:
- (a) Increasing awareness, understanding and appreciation of the knowledge systems, diverse values of biodiversity and nature's contributions to people, including ecosystems functions and services and traditional knowledge and worldviews of indigenous peoples and local communities as well as of biodiversity's contribution to sustainable development;
 - (b) Increasing awareness on the importance of conservation and sustainable use of biodiversity and of the fair and equitable sharing of the benefits arising from the utilization of genetic resources for sustainable development, including improving sustainable livelihoods and poverty eradication efforts and its overall contribution to global and/or national sustainable development strategies;
 - (c) Raising awareness among all sectors and actors of the need for urgent action to implement the Framework, while enabling their active engagement in the implementation and monitoring of progress towards the achievement of its goals and targets;
 - (d) Facilitating understanding of the Framework, including by targeted communication, adapting the language used, level of complexity and thematic content to relevant groups of actors,

considering their socioeconomic and cultural context, including by developing material that can be translated into indigenous and local languages;

(e) Promoting or developing platforms, partnerships and action agendas, including with media, civil society and educational institutions, including academia, to share information on successes, lessons learned and experiences and to allow for adaptive learning and participation in acting for biodiversity;

(f) Integrating transformative education on biodiversity into formal, non-formal and informal educational programmes, promoting curriculum on biodiversity conservation and sustainable use in educational institutions, and promoting knowledge, attitudes, values, behaviours and lifestyles that are consistent with living in harmony with nature;

(g) Raising awareness on the critical role of science, technology and innovation to strengthen scientific and technical capacities to monitor biodiversity, address knowledge gaps and develop innovative solutions to improve the conservation and sustainable use of biodiversity.

Appendix II

Decision 15/28. Biodiversity and Agriculture

The Conference of the Parties,

Recalling decisions III/11, V/5, [VI/5](#), [VIII/23](#) and [X/34](#),

Acknowledging the importance of soil biodiversity in underpinning the functioning of terrestrial ecosystems and, therefore, most of the services it delivers,

Recognizing that activities to promote the conservation, restoration and sustainable use of soil biodiversity, and the ecosystem functions and services they provide, are key in the functioning of sustainable agricultural systems for food and nutrition security for all, for climate change mitigation, adaptation and co-benefits, for the transition towards more sustainable agricultural and food systems and to enhance the achievement of the Sustainable Development Goals,

1. *Adopts* the Plan of Action (2020–2030) for the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity, as contained in the annex to the present decision, and considers it an instrument for supporting the implementation of the Kunming-Montreal Global Biodiversity Framework on a voluntary basis and in accordance with national circumstances and priorities;

2. *Takes note* of the report entitled *State of Knowledge on Soil Biodiversity - Status, Challenges and Potentialities*,¹⁴ prepared by the Food and Agriculture Organization of the United Nations in collaboration with the Intergovernmental Technical Panel on Soils of the Global Soil Partnership, the Global Soil Biodiversity Initiative, the European Commission and the Secretariat of the Convention on Biological Diversity;

3. *Encourages* Parties, other Governments and relevant organizations to support the implementation of, and capacity-building and development for, the Plan of Action (2020–2030) for the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity through, among other things, the integration of appropriate measures into national biodiversity strategies and action plans and national reports, sustainable soil management and relevant agricultural policies, plans, legislation, standards, programmes and practices, in accordance with national priorities and circumstances;

4. *Urges* Parties to address the direct and indirect drivers of soil biodiversity loss and land degradation;

5. *Encourages* Parties to integrate the conservation, restoration and sustainable use of soil biodiversity into agricultural systems, other managed ecosystems and other relevant sectors, land and soil management, development programmes and relevant policies;

6. *Invites* academic and research bodies, relevant organizations, networks and indigenous peoples and local communities, farmers, women and youth, to increase knowledge and promote awareness-raising activities on the importance of soil biodiversity and to promote further research in order to address gaps identified in the plan of action, including through different modalities of technology transfer, capacity-building and development, in accordance with the Convention;

7. *Invites* the Food and Agriculture Organization of the United Nations, including through the framework of the Global Soil Partnership, to facilitate the implementation of the plan of action,

involving Parties, including their ministries of agriculture and environment at the national level, as appropriate;

8. *Invites* the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations, the United Nations Convention to Combat Desertification, the Intergovernmental Technical Panel on Soils of the Global Soil Partnership and the Global Initiative for Soil Biodiversity to support the implementation of the Kunming-Montreal Global Biodiversity Framework with regard to soil-related targets and actions, including their monitoring and reporting;

9. *Urges* Parties, in accordance with Article 20 of the Convention, and invites other Governments and organizations in a position to do so, to provide financial and technical support, as appropriate, to enable developing country Parties, in particular least developed countries, small island developing States, as well as countries with economies in transition, to promote the research, technology transfer, monitoring and assessment of soil biodiversity;

10. *Invites* the Global Environment Facility, other donors, funding agencies and the private sector to provide financial assistance to developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, including capacity-building and development activities, for national, subnational and regional projects that address the implementation of the Plan of Action (2020–2030) for the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity;

11. *Invites* Parties to provide, on a voluntary basis, information on their activities and results from the implementation of the Plan of Action, in alignment with the Kunming-Montreal Global Biodiversity Framework, as appropriate, and requests the Executive Secretary to compile the submissions and to make them available for consideration by the Subsidiary Body on Scientific, Technical and Technological Advice at a meeting held prior to the seventeenth meeting of the Conference of the Parties;

12. *Requests* the Executive Secretary to bring the present decision to the attention of the Food and Agriculture Organization of the United Nations, the United Nations Convention to Combat Desertification, the United Nations Framework Convention on Climate Change, other United Nations organizations, programmes and biodiversity-related conventions and the United Nations Decade on Ecosystem Restoration (2021–2030).¹⁵

Annex

PLAN OF ACTION (2020–2030) FOR THE INTERNATIONAL INITIATIVE FOR THE CONSERVATION AND SUSTAINABLE USE OF SOIL BIODIVERSITY

I. INTRODUCTION

1. Since the launch of the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity, a significant amount of new scientific, technical and other types of knowledge relevant to soils and their biodiversity has been released.

2. The Plan of Action (2020–2030) for the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity is based on the review of the Initiative, the *Status of the World's Soil Resources* report¹⁶ and on the findings of the report on the *State of Knowledge on Soil Biodiversity - Status, Challenges and Potentialities*,¹⁷ prepared by the Food and Agriculture Organization of the United Nations (FAO) and the Intergovernmental Technical Panel on Soils.

3. Improved management of soil and its biodiversity offers solutions for all sectors that rely on soils, including forestry and farming, while it can simultaneously increase carbon storage, improve water and nutrient cycling, resilience to climate change, while preventing and avoiding potential impacts arising from the implementation of soil mitigation approaches and practices on indigenous peoples and local communities, including through nature-based solutions,¹⁸ and/or ecosystem-based approaches, and mitigate pollution. Soil biodiversity depends on the type of climate, mineral soil and type of vegetation and, in turn, this biodiversity has an effect on soil. In order to maintain or restore the biodiversity of soils, it is necessary to maintain or restore their biophysical, biochemical and biological properties. Soil biodiversity and its biotic interactions are important levers to improve soil quality and function, highlighting the importance of research, monitoring and management that is geared directly at soil biodiversity, as an integrative part and key element of soil quality. Soil biodiversity is also crucial to improve not only soil health,¹⁹ but also plant, animal and human health.

4. However, soil is one of the world's most vulnerable resources in the face of pollution, climate change, desertification, land degradation, drought, land-use change, unsustainable agriculture practices, biodiversity loss, increased demand for water and food production, urbanization and industrial development. Therefore, in order to safeguard soils and ecosystems, it is necessary to prevent the loss of soil and soil biodiversity from anthropogenic drivers related to climate change, such as the increase in temperature, droughts or extreme rainfall, and to land-use change.

5. The present plan of action presents global actions to support the integration of soil biodiversity considerations into the context of the Kunming-Montreal Global Biodiversity Framework, as well as within and across productive sectors.

6. The elements of this plan of action recognize the need to mainstream soil biodiversity across sectors and the need for integrated approaches to better address the complex interactions that come into play as the conservation and sustainable use of soil biodiversity usually involve economic, environmental, cultural and social factors. The importance of implementation at the field level with due consideration of gender roles, local context and specificities is another element reflected in the plan, while awareness-raising, sharing of knowledge, capacity-building and research remain key to ensuring a better understanding of the role of soil biodiversity for sustainability.

7. The present plan of action has been prepared jointly by FAO, the Secretariat of the Global Soil Partnership (GSP) and the Secretariat of the Convention on Biological Diversity, in consultation with other partners and relevant experts, pursuant to decision [14/30](#).

II. PURPOSE AND OBJECTIVES

8. The *Status of the World's Soil Resources* report identified 10 threats critical to soil functions. The loss of soil biodiversity was identified as one of these threats, and a respective call for action was strongly recommended. The Voluntary Guidelines for Sustainable Soil Management²⁰ provide a framework for reverting it through a number of policies, research and field actions.

9. The *purpose* of this plan of action is to provide ways to encourage conservation, restoration and sustainable use of soil biodiversity and to support Parties, other Governments, subnational and local governments, indigenous peoples and local communities, women and youth, relevant organizations and initiatives, in accelerating and upscaling efforts towards the conservation, restoration and sustainable use of soil biodiversity, and towards the assessment and monitoring at the corresponding level of soil organisms to promote their conservation, sustainable use and/or restoration, and to respond to challenges that threaten soil biodiversity.

10. The *overall objective* of this plan of action is to mainstream soil biodiversity science, knowledge, and understanding into public policies, at all levels, and to foster coordinated action to invest in soil biodiversity assessments at the global level to safeguard and promote the conservation, restoration and sustainable use of soil biodiversity and its ecosystem functions and services, which are essential for sustaining life on Earth, while acknowledging that economic, environmental, cultural and social factors contribute to sustainable soil management, and to promote investment in soil biodiversity research, monitoring and assessment at the corresponding level. Achieving this objective will ensure that soil biodiversity recovers and continues to provide a full range of functions. It will also formally promote sustainable soil management practices, including artisanal forms of food production, which can enhance soil biodiversity while maintaining the productivity of managed ecosystems.

11. The *specific objectives* of this plan of action are to help Parties, other Governments, indigenous peoples and local communities, women and youth, and other stakeholders, in accordance with national priorities and circumstances, consistent with the Convention and other applicable international obligations, as well as relevant organizations and initiatives, with the following:

(a) Implementing coherent and comprehensive policies for the conservation, restoration and sustainable use of soil biodiversity at the local, subnational, national, regional and global levels, considering the different economic, environmental, cultural and social factors of all relevant productive sectors and their soil management practices, and mainstreaming their integration into relevant sectoral and cross-sectoral plans, programmes and strategies;

(b) Encouraging the use of sustainable soil management practices and existing tools, sustainable traditional practices, guidance and frameworks to maintain and restore soil biodiversity and to encourage the transfer of knowledge and enable women, particularly rural women, indigenous peoples

and local communities and all stakeholders to harness the benefits of soil biodiversity for their livelihoods, taking into account national circumstances;

(c) Promoting education, awareness-raising and developing capacities in the public and private sectors on the multiple benefits and application of soil biodiversity, sharing knowledge and improving the tools for decision-making, fostering engagement through collaboration, intergenerational transmission of traditional knowledge of indigenous peoples and local communities and partnerships, and providing practical and feasible actions to avoid, reduce or reverse soil biodiversity loss;

(d) Developing voluntary standard protocols to assess the status and trends of soil biodiversity, as well as monitor activities, in accordance with national legislation, to address gaps in knowledge and foster relevant research, and to enable compilation of large data sets to support research and monitoring activities;

(e) Recognizing and supporting the role, and land and resource rights of indigenous peoples and local communities, in accordance with national legislation and international instruments, as well as the role of women, smallholders and small-scale food producers, particularly family farmers, in maintaining biodiversity through sustainable agricultural practices.

12. The plan of action seeks to contribute to the achievement of the Sustainable Development Goals, in particular Goals 2, 3, 6, 13, 14 and 15, the Kunming-Montreal Global Biodiversity Framework, the 2050 vision, the FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors,²¹ the 2018–2030 Strategic Framework under the United Nations Convention to Combat Desertification (UNCCD)²² and the objectives, commitments and initiatives under other conventions and multilateral environmental agreements, including the three Rio conventions, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal,²³ the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade²⁴ and the Stockholm Convention on Persistent Organic Pollutants,²⁵ and the Minamata Convention on Mercury.

III. SCOPE AND PRINCIPLES

13. The *scope* of this updated plan of action focusses on soils across agricultural, other productive landscapes and other relevant ecosystems. It is wide and far-reaching and context-dependent to ensure that it responds to specific situations and farmer typologies and that it prioritizes actions on the basis of country goals and the needs of direct beneficiaries.

14. The International Initiative for the Conservation and Sustainable Use of Soil Biodiversity continues to be implemented as a cross-cutting initiative by Parties to the Convention, the Secretariat, FAO and its Global Soil Partnership in partnership with the work of the Intergovernmental Technical Panel on Soils, the Global Soil Biodiversity Initiative, the Science-Policy Interface under UNCCD, education, academic and research bodies, donor agencies and the private sector, as well as relevant organizations, farmers, land owners and land managers, indigenous peoples and local communities, women, youth, subnational governments and civil society.

15. When linked to the Kunming-Montreal Global Biodiversity Framework, the United Nations Decade on Ecosystem Restoration,²⁶ the United Nations Decade of Family Farming 2019–2028, the 2030 Agenda for Sustainable Development and its Sustainable Development Goals,²⁷ the United Nations Framework Convention on Climate Change and the Paris Agreement,²⁸ and United Nations Convention to Combat Desertification and land degradation neutrality targets, the scope of this plan of action can achieve multiple co-benefits of soil biodiversity processes for improved and more sustainable land-use practices.

16. The plan of action adheres to the *principles* of the ecosystem approach,²⁹ which is aimed at providing better biological, physical, economic and human interactions associated with sustainable and productive ecosystems.

17. The plan of action focuses on the improvement of livelihoods, on the implementation of integrated and holistic solutions adapted to national and subnational contexts and in developing synergies for better soil biodiversity research, monitoring and assessment at the corresponding level while ensuring multi-stakeholder participation.

18. The plan of action recognizes the role of farmers, smallholders, small-scale food producers, family farmers, peasants, landowners, land managers, foresters, ranchers, indigenous peoples, local communities, women, youth, education, academia and research bodies, civil society, subnational

governments, the private sector, and other relevant stakeholders in the conservation, restoration and sustainable use of soil biodiversity and for the implementation of the plan.

19. FAO is invited to facilitate the implementation of the plan of action, and it is intended to align activities on soil biodiversity more closely with other FAO-related activities including the International Network on Soil Biodiversity and the Global Soil Biodiversity Observatory, to monitor and forecast the conditions of soil biodiversity and soil health as well as with regional and country offices in order to create synergies and provide broader support. The full implementation of the plan of action at the national and subnational levels will depend on the availability of resources.

IV. GLOBAL ACTIONS

20. To support the implementation of coherent and comprehensive policies for the conservation, restoration and sustainable use of soil biodiversity at all levels, the following global actions have been identified and can be considered, as appropriate and on a voluntary basis, by Parties and other Governments, in collaboration with relevant organizations:

(a) Develop protocols, adopt harmonized methods and use tools to collect and digitize soil biodiversity data and to improve mapping capabilities of Parties, acknowledging the differences in soil types across regions;

(b) Include soil biodiversity as an important component of soil description surveys using a large range of tools, including state-of-the-art methods and technology, and the development of bioindicators;

(c) Establish or strengthen, as appropriate, a monitoring network to assess and keep track of the abundance and diversity of multiple soil taxa or units and of the changes in soil biodiversity and its functioning, in accordance with national legislation;

(d) Develop or identify and implement feasible indicators of soil biodiversity that are related to key ecosystem functions and services;

(e) Strengthen education, research and capacity-building to use tools to monitor soil microbiobiodiversity and contribute to human, plant and soil health;

(f) Promote ecosystem-based approaches to conserve, restore and sustainably manage soil biodiversity in response to numerous challenges, such as loss of soil organic carbon and the need for sustainable management of soil in the context of climate change, soil degradation, the control, prevention and suppression of soil-borne diseases, enhancement of soil nutrients, food security and food safety, reducing water scarcity and disaster risk;

(g) Engage with the United Nations Decade on Ecosystem Restoration to pursue restoration of degraded soils and their multifunctionality, including the utilization of restored areas and degraded agricultural areas for food production and avoiding expansion to natural areas where feasible;

(h) Encourage civil society groups, research bodies, subnational governments, cities and other local authorities, traditional authorities from indigenous peoples and local communities, to become involved in the implementation of the plan of action;

(i) Encourage awareness-raising on the importance of soil biodiversity and its functions and services through subnational, national, regional and global platforms, such as FAO and GSP, which provide existing channels to be leveraged;

(j) Promote both in-situ and ex-situ conservation, restoration and sustainable use activities and management practices while strengthening the systems of knowledge of indigenous peoples and local communities;

(k) Identify the cumulative impacts of multiple sectors on the quality of soil biodiversity;

(l) Promote good agricultural practices, including integrated pest management in order to prevent and address possible negative impacts of fertilizers and pesticides on soil biodiversity, based on risk assessment approaches and scientific evidence;

(m) Identify sources of financial resources for the implementation of the action plan.

V. KEY ELEMENTS AND ACTIVITIES

21. The plan of action comprises four main elements that could be undertaken, as appropriate, by Parties and other Governments, in collaboration with relevant organizations:

(a) Policy coherence and mainstreaming;

(b) Encouraging the use of sustainable soil management practices;

- (c) Awareness-raising, sharing of knowledge, technology transfer and capacity-building and development;
- (d) Research, monitoring and assessment.

Element 1: Policy coherence and mainstreaming

Rationale

Soil loss and soil biodiversity loss is a cross-cutting issue, and policies should be designed to integrate considerations not only into the context of sustainable agriculture and sustainable forest management, but also within other sectors, especially infrastructure, mining, energy, transport and spatial planning. Appropriate and coherent national and subnational policies are needed to provide an effective and enabling environment to support activities by farmers, with emphasis on small-holders, small-scale food producers, family farmers, women farmers, peasants, and land managers, foresters, indigenous peoples and local communities, youth and all relevant stakeholders. Inclusive policies that take soil biodiversity into consideration and promote its conservation, restoration and sustainable use can provide multiple benefits by linking agriculture, food production, forestry, marine, water, air, human health, culture, spiritual and environmental policies.

Activities

- 1.1** Promote the importance of mainstreaming soil biodiversity, including the conservation, restoration, sustainable use and management of soil biodiversity into policies aimed at the sustainability of agriculture, and other relevant sectors and support the development and implementation of coherent and comprehensive policies for the conservation, sustainable use and restoration of soil biodiversity at the local, subnational, national, regional and global levels;
- 1.2** Foster activities to safeguard and promote the importance as well as the practical application of soil biodiversity, and integrate them into broader policy agendas for food security, ecosystem and landscape restoration, climate change adaptation and mitigation, urban planning and sustainable development, including the Kunming-Montreal Global Biodiversity Framework, UNCCD 2018–2030 Strategic Framework and the Sustainable Development Goals;
- 1.3** Promote the implementation of good practices of sustainable soil management³⁰ as a vehicle to promote integrated and holistic solutions that recognize the key role of above-ground/below-ground biodiversity interactions and of indigenous peoples and local communities and their traditional knowledge and practices, and that consider local contexts and integrated land-use planning, in a participatory manner;
- 1.4** Promote integrated ecosystem approaches for the conservation, restoration and sustainable use of soil biodiversity, considering, as appropriate traditional sustainable agricultural practices;
- 1.5** Promote policies that protect or help increase soil biodiversity;
- 1.6** Develop policies and actions based on the recognition that soil biodiversity is central for sustaining all ecosystems and a key asset in restoring soil multi-functionality in degraded and degrading ecosystems;
- 1.7** Strengthen synergies between scientific evidence, conservation, restoration and sustainable practices, farmer-researcher community practices, agricultural advisory services and traditional knowledge of indigenous peoples and local communities to better support policies and actions;
- 1.8** Address linkages between soil biodiversity and human health, nutritious and healthy diets and pollutants exposure;
- 1.9** Promote ways and means to overcome obstacles to the adoption of good practices in sustainable soil management associated with land tenure, the rights of users of land and water, in particular women, the rights of indigenous peoples and local communities, and the rights of peasants and other people working in rural areas, in accordance with national legislation and international instruments, recognizing their important contributions through their knowledge and practices, gender equality, access to financial services, agricultural advisory services and educational programmes;
- 1.10** Consider the use and implementation of existing tools and guidance at the national, subnational, regional and global levels, such as the FAO agroecology knowledge hub, the FAO Voluntary Guidelines for Sustainable Soil Management,¹⁸ the FAO's Revised World Soil Charter,³¹ the Code of Conduct on Pesticide Management,³² the International Code of Conduct for the Sustainable Use and Management of Fertilizers,³³ and the Committee on World Food Security's Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forest in the Context of National Food Security;³⁴

1.11 Encourage Parties to include soil biodiversity in national reports and national biodiversity strategies and action plans, and coordinate at the national and subnational levels, in order to increase and improve public and private actions that improve soil biodiversity;

1.12 Promote coordinated spatial planning and other approaches to reduce the loss of soil and soil biodiversity and implement adequate monitoring of soil sealing.

Element 2: Encouraging the use of sustainable soil management practices

Rationale

Management practices and land-use decisions undertaken by farmers, ranchers, landowners, land managers, foresters, indigenous peoples, local communities, women and youth and all relevant stakeholders influence ecological processes, including soil-water-plant-atmosphere interactions with biodiversity. There is increasing recognition that the sustainability of agriculture and other managed systems depends on the optimal use of the available natural resources, biogeochemical cycles, biodiversity, including soil biodiversity, its functions and its contribution to ecosystem services. Improvement in sustainability requires the optimal use and management of soil fertility and soil physical properties and soil restoration, which rely, in part, on soil biological processes and soil biodiversity. Direct and indirect drivers of soil biodiversity loss need to be addressed at multiple scales, and special attention is needed at the farm and forestry level and across entire ecosystems.

Activities

2.1 Promote the improvement of soil health and the enhancement of soil organism abundance and diversity, by improving their food, water and habitat conditions through sustainable agricultural practices, such as, inter alia, integrated pest and nutrient management, organic agriculture, agroecological practices, soil and water conservation practices, conservation agriculture, agroforestry, silvopastoral systems, irrigation management, small or patch systems and practices to improve animal welfare³⁵ and the restoration of degraded soils to increase ecosystem connectivity and restore production areas;

2.2 Develop, enhance and implement science-based risk assessment procedures, in conformity with risk assessment techniques developed by relevant international organizations, on a regular basis, considering field-realistic exposures and longer-term effects of pollutants, to enhance the conservation, restoration and sustainable use of soil biodiversity and ecosystem services;

2.3 Facilitate, for all relevant stakeholders, access to information, policies, tools and enabling conditions, such as access to technologies, innovation and funding, as well as to traditional practices that promote the conservation, restoration and sustainable use of soil biodiversity at the field level, taking into account the full and effective participation of indigenous peoples and local communities, women, youth, education, academia and research bodies, subnational governments and stakeholders in the implementation of this Initiative;

2.4 Encourage sustainable agricultural practices, recognizing the wide range of approaches to enhance the sustainability of agricultural systems;

2.5 Facilitate site-specific remediation of contaminated soils,³⁶ preferring those alternatives that show minor risks to biodiversity, while exploring the implementation of bioremediation strategies that use native microorganisms;

2.6 Prevent the introduction and spreading, and minimize the impact of invasive alien species that present a direct and indirect risk to soil biodiversity, and monitor the dispersion and eradicate, control or manage those already established;

2.7 Protect, restore and conserve soils that provide significant ecosystem services, including through the use of sustainable soil management practices;

2.8 Promote sustainable soil and associated water and land management practices that maintain, restore and promote the resilience of carbon-rich soils (such as peatlands, black soils, mangroves, coastal wetlands, seagrasses and permafrost);

2.9 Promote sustainable soil and associated water and land management practices that support the achievement of land degradation neutrality;

2.10 Promote ecosystem-based approaches to avoid land-use changes that cause soil erosion, the removal of surface cover and loss of soil moisture and carbon, and implement mitigation measures to alleviate degradation while considering potential impacts on indigenous peoples and local communities, small-scale food producers and peasants;

2.11 Promote conservation, restoration and sustainable management of soil biodiversity, and implement where appropriate, ecosystem-based approaches for adaptation, mitigation and disaster risk reduction while considering potential impacts on indigenous peoples and local communities, small-scale food producers and peasants;

Element 3: Awareness-raising, sharing of knowledge and capacity-building

Rationale

Increased awareness and understanding are critical for the development and promotion of improved practices for the conservation, restoration and sustainable use of soil biodiversity, and ecosystem management. This requires collaboration that ensures the full and effective participation of, and feedback from, a broad range of stakeholders, including farmers, landowners, land managers, smallholders and smallscale food producers, indigenous peoples and local communities, women and youth, decision makers, education, academia and research bodies and relevant institutions and organizations to ensure effective actions and collaborative mechanisms. Strengthening capacities to promote integrated and multidisciplinary approaches is needed to ensure the conservation, restoration, sustainable use and enhancement of soil biodiversity. This will further improve information flows and cooperation among actors to identify best practices and foster the sharing of knowledge and information.

Activities

3.1 Increase understanding and appreciation of the role of soil biodiversity and soil health in agroecosystems, forests, silvopastoral and other managed ecosystems, and of their effect on land management practices and ecosystem health;

3.2 Increase understanding and appreciation of the causes and consequences of soil biodiversity decline in specific agroecosystems, other managed ecosystems and natural environments and engage targeted key stakeholder groups, including farmers, ranchers, foresters, civil society, education, academia and research bodies, the mass media, and consumer organizations on the importance of soil biodiversity for health, wellbeing and livelihoods;

3.3 Strengthen understanding and appreciation of the impacts of sustainable land-use and soil-management practices, as an integral part of agricultural and their importance for sustainable livelihoods;

3.4 Promote awareness-raising and sharing of knowledge through tools and digital technology, and promote capacity-building and mutual learning, including at the local and field levels by developing collaborative activities, such as peer-to-peer learning, for the promotion of best practices for soil biodiversity assessment, management and monitoring for all land management activities;

3.5 Enhance education on, and knowledge of, soil biodiversity, soil health and the ecosystem functions and services they provide, through the update of educational curricula for professionals, in such fields as economy, agronomy, veterinary, taxonomy, microbiology, zoology and biotechnology, and through the creation and dissemination of training and information materials on soil biodiversity;

3.6 Support citizen science campaigns and awareness-raising activities to engage relevant stakeholders in the conservation, restoration and sustainable use of soil biodiversity, including celebrations on 5 December of World Soil Day, which was designated by the General Assembly of the United Nations in 2013;³⁷

3.7 Build and strengthen the capacities of farmers, landowners, land managers, foresters, ranchers, the private sector, education, academia and research bodies, indigenous peoples and local communities, women and youth, and vulnerable communities, as appropriate, in designing and implementing sustainable soil management practices and the sustainable application of soil biodiversity and consider traditional knowledge and practices;

3.8 Compile, protect, maintain and promote traditional knowledge, innovations and sustainable practices of indigenous peoples and local communities, with their free, prior and informed consent, as appropriate, related to soil biodiversity maintenance, soil fertility and sustainable soil management and promote work mechanisms between traditional agricultural knowledge and scientific knowledge that contribute to implementing sustainable agricultural practices in accordance with local agroecological and socioeconomic contexts and needs;

3.9 Develop partnerships and alliances that support multi-disciplinary approaches, foster synergies and ensure multi-stakeholder participation with respect to sustainable soil management;

3.10 Foster scientific and technical cooperation and transfer of technology to promote access to the latest technologies and molecular tools for modern soilless agriculture, soil biodiversity assessment and monitoring in developing countries.

Element 4: Research, monitoring and assessment

Rationale

Assessing and monitoring the status and trends of soil biodiversity, of measures for the conservation, restoration and sustainable use of soil biodiversity and of the outcomes of such measures, is fundamental to inform adaptive management and to guarantee the functioning of all terrestrial ecosystems, including the long-term productivity of agricultural soils. Soil biodiversity data that can be globally aggregated is needed to guide the decision-making process, with particular focus on those regions and areas currently lacking data. Education, academia and research bodies and relevant international organizations and networks should be encouraged to undertake further research, taking into consideration soil biodiversity functions, regional pedodiversity,³⁸ and relevant traditional knowledge, free, prior and informed consent, as appropriate, to address gaps in knowledge, and to expand research and to support coordinated global, regional, national, subnational and local monitoring efforts.

Activities

- 4.1** Increase national capacities on soil biodiversity taxonomy and address taxonomic assessment needs in different regions, and design targeted strategies to fill the existing gaps;
- 4.2** Promote further research to identify ways to integrate the application of soil biodiversity into farming systems as part of efforts to improve yield quantity and facilitate the harmonization of protocols for research, data collection, management and analysis, storage and curation of samples;
- 4.3** Promote further research to identify risks to soil biodiversity under climate change and potential adaptation measures and mitigation tools, as well as risks caused by the use of hazardous or toxic chemicals, including the potential loss of key species and their habitats, as well as the role of soil biota in wider ecosystem resilience and restoration that contributes, as appropriate, to the formulation of policy plans;
- 4.4** Promote research and implementation of integrated pest management practices that support functions and services provided by soil biodiversity;
- 4.5** Promote capacitybuilding and research in order to qualify and quantify soil biodiversity in agriculture and in other managed ecosystems and cultural landscapes, and to develop consistent and comparable protocols to monitor soil quality;
- 4.6** Promote research, information management and dissemination, data collection and processing, community-based monitoring, transfer of knowledge and technologies and networking;
- 4.7** Promote access to the fair and equitable sharing of the benefits arising out of the utilization of genetic resources in the soil, considering the potential to develop new products and medicines, in line with the third objective of the Convention and with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization;
- 4.8** Mobilize targeted participatory research and development, promote gender-responsive approaches to ensure gender equality, women's empowerment, youth engagement and the full and effective participation of indigenous peoples and local communities in all stages of research and development;
- 4.9** Develop and apply tools to assess the status of soil biodiversity in all regions and to address gaps in knowledge in all levels, by using a range of available tools, from traditional macroorganisms and soil fauna observation and analysis, national and subnational statistics, soil surveys, to cutting-edge approaches and new technologies, as appropriate;
- 4.10** Generate data sets on soil biodiversity, pedodiversity and on soil degradation at the national, subnational and regional levels through a standard monitoring process that allows the creation of regional, national, subnational and local visual maps, georeferenced information systems and databases to indicate the status and trends of soil biodiversity and crop-specific vulnerability to support informed decision-making and comparisons;
- 4.11** Promote dissemination, co-creation of knowledge and exchange of information and data, in line with Articles 8(j) and 8(h) of the Convention on Biological Diversity and, through transdisciplinary approaches, ensure that all decision makers and stakeholders have access to reliable and up-to-date information;

4.12 Encourage the development of harmonized definitions, standard baselines, indicators and national and subnational-level monitoring activities of soil biodiversity with the inclusion of a vast range of soil organisms, from microorganisms to fauna, as well as monitoring the effectiveness of soil management interventions in the field;

4.13 Promote regional cooperation to compile, systematize and share data and lessons resulting from experiences or case studies on the implementation of sustainable soil management practices in the context of agricultural practices with positive impacts on soil biodiversity;

4.14 Encourage and support the development of community-based monitoring and other information systems or simplified assessment methodologies and tools for measuring soil biodiversity;

4.15 Promote research and capacity-building on sustainable soil management practices that ensure conservation, restoration and sustainable use of soil biodiversity;

4.16 Promote development of commercial application, in a sustainable manner, of products based on soil biodiversity.

VI. SUPPORTING VOLUNTARY GUIDANCE, TOOLS, ORGANIZATIONS AND INITIATIVES RELATING TO THE CONSERVATION AND SUSTAINABLE USE OF SOIL BIODIVERSITY

22. Relevant voluntary guidance and tools developed under the Convention, and those developed by partner and relevant organizations and initiatives, such as the Voluntary Guidelines for Sustainable Soil Management and the World Soil Charter, issued by FAO, will be made available in the clearing-house mechanisms.

C. CGIAR

I. Introduction

This report has been prepared by CGIAR in response to an invitation from the Secretariat of the FAO Commission on Genetic Resources for Food and Agriculture. It is structured to correspond, in general, to agenda items 2-11 of the Nineteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture (CGRFA-19). Some sections of this report were previously included in the CGIAR submission to the Eleventh Session of the Intergovernmental Technical Working Group on Plant Genetic Resources (ITWG-PGRFA-11), in April 2023.² In the interest of keeping the document short, as requested by the Secretariat, where possible, we are providing links to on-line documents which include additional information that is relevant to agenda item under consideration.

II. Cross-sectoral matters

Agenda item 2. Biodiversity, nutrition and human health

Building on 45 years of experience on animal health research in Africa and Asia, the International Livestock Research Institute (ILRI) adopted its One Health strategy. ILRI's One Health research and development work is delivered under three interconnected pillars (technical, policy and institutional) with four areas of focus: epidemics and pandemics, endemic zoonoses, foodborne disease and antimicrobial resistance.³

The three-year CGIAR Initiative on One Health, *Protecting human health through a One Health approach*, was launched in January 2022 with the following target geographical areas: Central and West Asia and North Africa (CWANA), East and Southern Africa (ESA), South Asia (SA), Southeast Asia and the Pacific (SEA), and West and Central Africa (WCA). The initiative is implemented by four CGIAR research Centers — ILRI, the International Food Policy Research Institute (IFPRI), the International Water Management Institute (IWMI) and WorldFish — in collaboration with the Centre Suisse de Recherches Scientifiques en Côte d'Ivoire, EcoHealth Alliance and the University of Liverpool. National research and development organizations in the target regions, private sector organizations and UN agencies FAO and WHO are partners in the initiative. The CGIAR One Health Initiative has a twofold objective. First, to demonstrate the efficacy of implementing One Health principles and tools in food systems to tackle zoonotic disease outbreaks which would also improve food and water safety and reduce the burden of antimicrobial resistance. Second, to foster the adoption of a One Health approach in the countries it works in to improve the health of people, animals and the environment.⁴

Practically all CGIAR Centers that have breeding programs are integrating nutritional aspects in their breeding work, as detailed in the following text box.

Box 1: Examples of nutrition-related breeding or pre-breeding by CGIAR Centers/Initiatives

From 2017, Bioversity and IITA, in collaboration with national research partners in East Africa, tested, selected, bred and promoted pro-vitamin A-rich banana cultivars.

IITA selected cassava genotypes with best physiochemical properties for high quality flour and developed new varieties of yam with strong yield stability, high tuber yields, improved cooking and nutritional qualities compared to existing varieties. They were released in Nigeria.

The International Potato Center (CIP) has used potato biodiversity to develop iron biofortified potatoes that contain 50% more iron than the conventional varieties produced in the target areas. CIP has conducted studies to estimate the iron absorption in humans using stable isotopes and it

² See Annex 4: Report from CGIAR, in 'Submissions from International Organizations and Instruments', available at <https://www.fao.org/3/cc4983en/cc4983en.pdf>

³ ILRI. 2022. ILRI One Health Strategy: Stopping the global rise of high-impact zoonotic disease, foodborne disease and antimicrobial resistance. Nairobi, Kenya: ILRI. <https://hdl.handle.net/10568/125264>

⁴ <https://www.cgiar.org/initiative/one-health/>

was demonstrated that the iron from yellow-fleshed potatoes has a remarkably high absorption rate (14-29%) that is above the expected values of 5% to 10% for other high iron plant. Due to the significant amount of absorbable iron, the iron-biofortified yellow-fleshed potatoes can efficiently contribute to reduce iron deficiency in rural areas of the Latin American highlands, Africa and Asia where potato consumption is high and iron deficiency is prevalent.⁵

As part of its hybrid breeding program, CIP has also carried out elite-crosses through true seed on orange-fleshed sweet potato (i.e., a special type of biofortified sweetpotato that contains high levels of beta-carotene), which has allowed to disseminate lines to national partners in South, East and South-West Africa, Central Asia and Latin America.

From 2018, ICRISAT continued biofortification work on certain grain legumes and dryland cereals, including the development of pearl millet and sorghum improved lines with higher levels of Fe and Zn.

High Fe and Zn content is an essential objective of ICRISAT's breeding program on pearl millet.⁶ Approximately 60% seed and restorer lines bred from ICRISAT have Fe and Zn contents in grain higher than 60ppm and 35 ppm respectively. ICRISAT developed the first biofortified pearl millet open pollinated variety (OPV) "Dhanshakti", which was released in India in 2014. It now occupies an area of 0.4 million hectares in this country. Over the last 10 years, around 10 biofortified hybrids of pearl millet with grain content higher than 70ppm of Fe and 35ppm of Zn have been released in India. ICRISAT's OPV "Chakti" was the first pearl biofortified cultivar of millet released in Africa, in 2018. Likewise, in sorghum, high Fe variety "Parbhani Shakti" has been released in India. ICRISAT is also working on chickpea improved lines with high protein content, and groundnut lines with high oleic content.

IRRI has used genetic resources to develop high zinc rice and low glycemic index rice varieties.

CIMMYT conducted a genome-wide association study (GWAS) to characterize grain Zn concentrations in 330 breeding bread wheat lines that had been grown in the field over 3 years, across a range of environments in India and Mexico as part of a HarvestPlus breeding program. GWAS analysis revealed 39 marker-trait associations for grain Zn. Two larger effect QTL regions were identified and candidate genes (among them zinc finger motif of transcription-factors and metal-ion binding genes) were associated with the QTL. The markers and candidate genes identified are being validated in new biparental mapping populations for marker-assisted breeding.

CIMMYT scientists also developed high-throughput assays for screening polyphenol oxidase (PPO) activity and phytic acid content in the wheat grain, which can reduce the bio-availability of micro-nutrients like iron and zinc. These assays can be used for routinely evaluating breeding lines, and the molecular markers identified to be associated with these traits can be used for selecting against these traits.

CIMMYT has over recent decades developed maize breeding germplasm with elevated levels of ProVitamin A and grain Zinc whilst maintaining other farmer and consumer preferred traits such

⁵ Gabriela Burgos, Reyna Liria, Christophe Zeder, Paul A. Kroon, Guy Hareau, Mary Penny, Jack Dainty, Olla Al-Jaibaji, Erick Boy, Richard Mithen, Richard F. Hurrell, Elisa Salas, Thomas zum Felde, Michael B. Zimmermann, Susan Fairweather-Tait. 2023. Total Iron Absorbed from Iron-Biofortified Potatoes Is Higher than that from Nonbiofortified Potatoes: A Randomized Trial Using Stable Iron Isotopes in Women from the Peruvian Highlands. *The Journal of Nutrition*, 153 (6), <https://doi.org/10.1016/j.tjn.2023.04.010>

⁶ Govindaraj, M.; Rai, K.N.; Cherian, B.; Pfeiffer, W.H.; Kanatti, A.; Shivade, H. 2019. Breeding Biofortified Pearl Millet Varieties and Hybrids to Enhance Millet Markets for Human Nutrition. *Agriculture*, 9. <https://doi.org/10.3390/agriculture9050106>;

Pujar, M., Govindaraj, M., Gangaprasad, S. et al. 2020. Genetic variation and diversity for grain iron, zinc, protein and agronomic traits in advanced breeding lines of pearl millet [*Pennisetum glaucum* (L.) R. Br.] for biofortification breeding. *Genet Resour Crop Evol*, 67. <https://doi.org/10.1007/s10722-020-00956-x>

as grain colour in specific markets. This effort resulted in the recent definition of multiple lines which will be released as CIMMYT maize lines (CMLs) in 2023.

CIFOR/ICARDA developed a Priority Food Tree and Crop Composition database which includes compositional information on tree foods and crops with geographical focus on sub-Saharan Africa.⁷

The Alliance of Bioversity International and CIAT and the American Heart Association provide the Secretariat for the Periodic Table of Food Initiative⁸ (PTFI) which provides data tools to catalog the biomolecular composition and function of thousands of foods using the latest mass spectrometry technologies and bioinformatics.

The Alliance of Bioversity International and CIAT promotes fruits and vegetables in production system for improving diets and nutrition, focusing on traditional crops and varieties.⁹ Under the West and Central Africa regional initiative of One CGIAR, the Alliance has developed strategies to increase access to and consumption of high-micronutrient banana-based foods in Sub-Saharan Africa.¹⁰

Agenda item 3. Genetic resources for food and agriculture for mitigation of and adaptation to climate change

CGIAR Centers appreciate plans to expand the scope of the *Voluntary Guidelines to Support the Integration of Genetic Diversity into National Climate Change Adaptation Planning*, to include climate change mitigation planning and to highlight the vulnerabilities of GRFA to climate change.

Here are some examples of how CGIAR Centers are using PGRFA for climate change mitigation:

- developing plants with more extensive root systems, able to sequester carbon more effectively;
- developing plants with biological nitrification inhibition;
- evaluating perennial crops with greater carbon storage capacities than annual crops;
- developing plant varieties that facilitate the adoption of low emission agronomic practices, such as direct seeding of rice;
- developing portfolios of diverse tree species and genotypes for planting that sequester more carbon while supporting greater climate resilience in food production, including through agroforestry production of commodities such as coffee, cocoa and banana;
- developing plant varieties with good performance under conditions of low synthetic inputs (inorganic fertilizers) and high organic inputs (compost, manure, biol, ... etc.) to reduce the carbon footprint; and

⁷ Jamnadass, R. 2019. Priority Food Tree and Crop Food Composition Database: a user guide. Version 1. Nairobi, World Agroforestry; <http://apps.worldagroforestry.org/products/nutrition/>

⁸ <https://foodperiodictable.org/>

⁹ Penafiel, Daniela, Celine Termote, and Patrick Van Damme. 2022. Traditional Individual and Environmental Determinants of Healthy Eating in Vihiga County, Western Kenya. *Nutrients*, 14 <https://doi.org/10.3390/nu14142791>

¹⁰ Fongar, A.; Nabuuma, D.; Ekesa, B. (2020) Promoting (pro) vitamin A-rich bananas: A chronology. Kampala (Uganda): The Alliance of Bioversity and CIAT 33 p.

- evaluating and selecting tropical forages for the reduction of methane emissions from livestock. This work started years ago.¹¹ Recently, the Bezos Earth Fund (BEF) has approved a project that involves the screening of CGIAR forage collections to identify accessions containing metabolites that inhibit methane production in cattle rumen.

More information about some of these examples of use of PGRFA for climate change mitigation are available in the CGIAR report to the ITWG-PGRFA-11¹².

Here are some examples of how CGIAR Centers are working with AnGR with a focus on mitigation:

- Comparing genotypic and methane emissions from dairy cattle in Tanzania and Ethiopia through the EnviroCow project. Results from Enviro-cow project will be integrated into the current certification system to rank bulls and cows in the Asian and African Dairy Genetic Gains program. Preferred breeds will be available for breeding to communities through the national artificial insemination centers in Ethiopia and Tanzania.¹³
- Collecting on-farm data to determine local livestock typologies associated to greenhouse gases (GHG) emissions and potential mitigation interventions, while developing tools for estimating live weight for local breeds.^{14 15 16 17}
- Setting up GHG emissions baselines and performance indicators for identification, prioritization and testing of climate smart practices for livestock production.
- Comparing enteric methane emission among indigenous cattle and crossbred cattle and buffaloes when fed on the same dietary regimes.¹⁸
- Adapting breeding management practices and community-based breeding programs for climate smart production of small ruminants under both small holder systems in humid

¹¹ Valencia-Salazar, S.; Jiménez-Ferrer, G.; Arango, J.; Molina-Botero, I.; Chirinda, N.; Piñeiro-Vázquez, A.; Jiménez-Ocampo, R.; Nahed-Toral, J.; Kú-Vera, J. (2021) Enteric methane mitigation and fermentation kinetics of forage species from Southern Mexico: in vitro screening. *Agroforestry Systems*, 95. Doi: 10.1007/s10457-020-00585-4;

Gaviria-Urbe Xiomara, Bolivar Diana M., Rosenstock Todd S., Molina-Botero Isabel Cristina, Chirinda Ngonidzashe, Barahona Rolando, Arango Jacobo. 2020. Nutritional Quality, Voluntary Intake and Enteric Methane Emissions of Diets Based on Novel Cayman Grass and Its Associations With Two Leucaena Shrub Legumes. *Frontiers in Veterinary Science*, 7. Doi:10.3389/fvets.2020.579189;

Ku-Vera, J., Castelán-Ortega, O., Galindo-Maldonado, F., Arango, J., Chirinda, N., Jiménez-Ocampo, R., Solorio-Sánchez, F. (2020). Review: Strategies for enteric methane mitigation in cattle fed tropical forages. *Animal*, 14(S3). Doi:10.1017/S1751731120001780

¹² See Annex 4: Report from CGIAR, in ‘Submissions from International Organizations and Instruments’, available at <https://www.fao.org/3/cc4983en/cc4983en.pdf>

¹³ <https://www.ilri.org/news/enviro-cow-genetics-approach-address-climate-change-challenges-african-livestock-production>

¹⁴ Ndung’u, P. W., Takahashi, T., du Toit, C. J. L., Robertson-Dean, M., Butterbach-Bahl, K., McAuliffe, G. A., et al. (2022). Farm-level emission intensities of smallholder cattle (*Bos indicus*; *B. indicus*–*B. taurus* crosses) production systems in highlands and semi-arid regions. *Animal*, 16(1) <https://doi.org/10.1016/j.animal.2021.100445>

¹⁵ Ndung’u, P. W., Kirui, P., Takahashi, T., du Toit, C. J. L., Merbold, L., Goopy, J. P. (2021). Data describing cattle performance and feed characteristics to calculate enteric methane emissions in smallholder livestock systems in Bomet County, Kenya. *Data in Brief*, 39 <https://doi.org/10.1016/j.dib.2021.107673>

¹⁶ Goopy, J., Ndung’u, P., Anyango Onyango, A., Kirui, P., & Butterbach-Bahl, K. (2021). Calculation of new enteric methane emission factors for small ruminants in western Kenya highlights the heterogeneity of smallholder production systems. *Animal Production Science* <https://doi.org/10.1071/AN19631>

¹⁷ Goopy JP, Pelster DE, Onyango A, Marshall K, Lukuyu M (2017) Simple and robust algorithms to estimate live weight in African smallholder cattle. *Animal Production Sciences*. doi:10.1071/AN16577

¹⁸ <https://www.ilri.org/index.php/research/projects/methane-emission-and-its-mitigation>

environments and pastoral production systems in the arid and semi-arid lands of Eastern Africa.^{19 20}

- Improving productivity of AnGR, particularly in mixed crop-livestock systems, through packages of interventions on herd-health, nutrition and genetics (as increased productivity contributes to lower GHG emissions per unit of product).

Agenda item 4. Access and benefit-sharing for plant genetic resources for food and agriculture

Details concerning CGIAR's contributions to the development and implementation of access and benefit-sharing (ABS) policies are included in the CGIAR report to the ITWG-PGRFA-11 held in April 2023. Here we briefly mention some of the main points.

CGIAR contributions to international negotiations on access and benefit-sharing.

In December 2022, the Conference of the Parties (COP) to the CBD finally adopted the Kunming-Montreal Global Biodiversity Framework (GBF). CGIAR proactively engaged in negotiations over the years, to: a) promote recognition of the Plant Treaty and its multilateral system of access and benefit-sharing in the GBF; b) recommend that new norms for benefit-sharing from the use of digital sequence information (DSI) included in the GBF were multilateral in nature, with minimal or no interruption to the open availability and use of DSI for agricultural research; and c) promote capacity building for developing countries to be able to generate and use DSI. COP 15 also decided to create a “multilateral mechanism for benefit-sharing from the use of digital sequence information on genetic resources, including a global fund”. It also created an open-ended working group to negotiate, over a two-year period, how the mechanism will function. CGIAR will continue to participate in that process.

At its Ninth Session, in September 2022, the Governing Body of the Plant Treaty decided to launch a process that will consider options for monetary benefit-sharing under the multilateral system of access and benefit-sharing, ways to lower transaction costs for users, and the expansion of the list of crops and forages included in the multilateral system. Again, this is an outcome that CGIAR supported, and CGIAR will actively engage in the negotiations.

CGIAR compliance with access and benefit-sharing obligations

In 2021, the Genebank Platform of CGIAR launched the online course 'Genetic Resource Policies for CGIAR Scientists', provided through the UK's Open University on-line Learning Platform (<https://www.open.edu/openlearncreate/>). The course focuses on access and benefit-sharing for plant genetic resources. Members of the CGRFA and Plant Treaty Secretariats have participated as resource people the course's live session. Almost 200 CGIAR staff have taken the course, including genebank managers and staff, plant breeders, pathologists, entomologists, information managers, seed system specialists, and legal and intellectual property specialists.

The research compliance team at the International Livestock Research Institute (ILRI) implement with all its partners a pathway for Access and Benefit-Sharing (ABS) and compliance for Animal Genetic Resources (AnGR).

The International Potato Center (CIP) and a range of partners have been expanding a direct voluntary benefit-sharing scheme linking seed companies and organized custodian farmers in Peru maintaining unique heritage collection of 50 to 300 landraces per household.²¹

¹⁹ Sila, W.; Gachuiiri, C.K.; Recha, J.W.; Audho, J.; Ojango, J.M.K. 2021. Adaptation and Returns from Improved Indigenous Small Ruminants in Climatically Challenged Smallholder Systems of Kenya. *Sustainability*, 13 <https://doi.org/10.3390/su13179629>

²⁰ Ojango, J.M.K., Gitau, J., Ndiwa, N. et al. 2023. Integration and adoption of climate resilient management practices for enhanced productivity of sheep and goats in pastoral communities of Northern Kenya. *Pastoralism*, 13, 14 <https://doi.org/10.1186/s13570-023-00277-5>

²¹ See 'Un nuevo modelo de auto organización para compartir beneficios', available at www.aguapan.org

Some further information about CGIAR support for capacity building for national partners to implement and operate under the Plant Treaty framework are provided below.

[Agenda item 5. “Digital sequence information” and plant genetic resources for food and agriculture](#)

Again, more detailed information about CGIAR’s engagement in international policy making concerning DSI are included in the CGIAR report to the ITWG-PGRFA-11.

As mentioned above, CGIAR engaged proactively in the CBD negotiations on DSI. As part of this work, in the last 6 months, CGIAR made the following two written submissions to the CBD:

- *Digital sequence information is changing the way genetic resources are used in agricultural research and development: implications for new benefit-sharing norms.* (Available at <https://cgspace.cgiar.org/handle/10568/125749>)
- *Issues for further consideration concerning digital sequence information: a submission from CGIAR* (Available at: <https://www.cbd.int/notifications/2023-003> - see paper number 24, under ‘Observers’).

These papers include inputs from over 30 CGIAR scientists and research leaders. They analyze how CGIAR Centers use DSI in their efforts to conserve and sustainably utilize the world’s most important crop and livestock genetic diversity. Based on that substratum of scientific information, the papers reflect on which benefit-sharing options would provide effective policy support for the continued use of DSI in agricultural research and development.

Over the course of 2023-2024, CGIAR will monitor and contribute to negotiations under the CBD regarding the operation of the “multilateral mechanism for benefit-sharing from the use of digital sequence information on genetic resources, including a global fund” that COP 15 decided to create in December 2022.

III. Plant genetic resources

[Agenda item 7.2 The Third Report on the State of the World’s Plant Genetic Resources for Food and Agriculture](#)

Scientists from various CGIAR Centers were involved in the preparation of draft chapters and thematic background papers for the Third Report on the State of the World’s Plant Genetic Resources for Food and Agriculture (3rd SOW-PGRFA). At the 11th session of the ITWG-PGRFA, CGIAR undertook to provide comments on the documents by mid-October, 2023.

[Agenda item 7.3 Implementation and review of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture](#)

CGIAR’s report to ITWG-PGRFA-11 included extensive information about CGIAR Centers’ activities that have contributed to the Second Global Plan of Action for PGRFA. To follow the Secretariat’s request to keep this report very short, we are providing a link to the CGIAR Report to the ITWG-PGRFA-11²² rather than repeat the related text here. That linked-to report includes information concerning CGIAR’s contributions to:

- *In situ* conservation and on-farm management of PGRFA
- Ex situ conservation of PGRFA, including:
 - holdings and acquisitions by CGIAR Centers’ genebanks
 - distributions by CGIAR Centers’ genebanks and breeding programs

²² See Annex 4: Report from CGIAR, in ‘Submissions from International Organizations and Instruments’, available at <https://www.fao.org/3/cc4983en/cc4983en.pdf>

- a new sub-setting tool²³ linked to Genesys that allows users to mine passport, climate, and soil data to identify sets of accessions that best suit their needs
- methods to identify gaps in *ex situ* collections of PGRFA
- Global Crop Conservation Strategies
- Global Plant Cryopreservation Initiative
- Sustainable use of PGRFA, including:
 - examples of CGIAR work on plant genetic resource characterization and breeding
 - updates about CGIAR Centers' work on phytosanitary testing and cleaning
- CGIAR's contributions to strengthening sustainable institutional and human capacities of national partners

Box 2: Highlights of new capacity sharing projects with national partners supported by the CGIAR Genebanks Initiative, in collaboration with the Plant Treaty Secretariat

Working in close collaboration with the Plant Treaty Secretariat, the CGIAR Genebank Initiative is supporting capacity sharing partnerships with national partners from 15 countries.

One group of projects, with partners from Uruguay, Guyana, Togo, Nigeria, Mauritius, and Zimbabwe, focusses on developing policy measures and standard operating procedures to implement, and operate under, the Plant Treaty's multilateral system of access and benefit-sharing. These projects also include training on use of a sub-setting tool to identify potentially useful materials in the CGIAR genebanks, training in collection gap analysis, and improved accession information management.

A second group of projects supports improved genebank operations, with partners from Chad, Niger, Mali, Rwanda, Madagascar, Zimbabwe, Tunisia, Bangladesh, Papua New Guinea, and Honduras. The projects include training for genebank personnel with respect to important genebank activities, including collecting, characterization, regeneration, evaluation, conservation, and accession level data management.

For both sets of projects, a 'medium length list' of potential partners was developed by reviewing the capacity building needs that countries expressed in their national compliance reports to the Plant Treaty's Compliance Committee and Governing Body. Invitations for expressions of interest were sent to those same countries' Plant Treaty National Focal Points. The top ranked expressions of interest were used as a basis for developing letters of agreement with lead partners from the countries listed above.

IV. Forest genetic resources

[Agenda item 8.2 The Second Report on the State of the World's Forest Genetic Resources](#)

CIFOR-ICRAF is contributing chapters on "Ex-situ conservation of forest genetic resources" and "State of other wooded lands". The chapters discuss progress made in conserving FGRs in the last decade and contribution of agroforestry and other non-forest land use systems in enhancing the Earth's tree cover.

The Alliance of Bioversity and CIAT is contributing to the chapter on "In situ conservation of forest genetic resources" documenting scientific advances supporting in situ conservation and progress in implementation of in situ conservation efforts in the last decade.

²³ <https://www.genesys-pgr.org/content/news/156/genesys-rolls-out-the-subsetting-tool>

Agenda item 8.3 Implementation and review of the Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources

Highlights in relation to area 3 of the Global Plan of Action, related to sustainable use, development and management of forest genetic resources. include the following

CIFOR-ICRAF has implemented the approach of breeding seed orchards (BSOs) and clonal seed orchards (CSOs) to ensure supply of high-quality seed material for forest and land restoration programs under “Provision of Adequate Tree Seed Portfolio (in Ethiopia)” (PATSP0)²⁴, and “Transforming Eastern Province through Adaptation (in Rwanda)” (TREPA)²⁵.

The Alliance of Bioversity and CIAT has developed an online decision-making tool (Diversity for Restoration or D4R: <https://www.diversityforrestoration.org/>) that guides the selection of tree species and tree seed sources for landscape restoration. A diverse set of species is selected based on tree-planting objectives and the conditions of the planting site, defined by the user.²⁶

V. Micro-organism and invertebrate genetic resources

Agenda item 9.1 Bioremediation and nutrient cycling soil microorganisms and invertebrates

In the last few years, ILRI has been promoting the development and wider adoption of anaerobic digestion biodigesters that can contribute to climate change mitigation and circular economies in small farms. The biodigesters utilize manure-derived anaerobic microbes to turn livestock manure, human fecal matter, food waste, and other organic wastes into clean energy (biogas) and nutrient-rich organic fertilizer.

Agenda item 9.2 Microorganisms relevant to ruminant digestion

Recently, experts at ILRI have characterized the caecum microbiome of indigenous Ethiopian chicken in different agro-ecologies in relation to feed conversion, antibiotic resistance and methane emission.

VI. Animal genetic resources

Agenda item 10.2 Implementation of the Global Plan of Action for Animal Genetic Resources

ILRI has contributed to the four strategic objectives of the Global Plan of Action for Animal Genetic Resources as follows:

Strategic Priority Area 1 Characterization, Inventory and Monitoring of Trends and Associated Risks

Ecological niche modelling for delineating livestock ecotypes and exploring environmental genomic adaptation.²⁷

ILRI maintains a Domestic Animal Genetic Resource Information System (DAGRIS) which provides data based on scientific information published in specialized literature. This database is complementary to the Domestic Animal Diversity Information System (DAD-IS) maintained by FAO, which is constructed primarily with information provided by the National Coordinators of DAD-IS. ILRI interacts closely with DAD-IS while developing DAGRIS.

Strategic Priority Area 2: Sustainable Use and Development

²⁴ <https://www.worldagroforestry.org/project/provision-adequate-tree-seed-portfolio-ethiopia>

²⁵ <https://www.iucn.org/blog/202301/iucn-held-technical-launch-gcf-funded-trepa-project-officials-eastern-province-rwanda>

²⁶ Fremont T., Thomas, E. et al. 2022. Diversity for Restoration (D4R): Guiding the selection of tree species and seed sources for climate-resilient restoration of tropical forest landscapes. *Journal of applied ecology*, 59. DOI: 10.1111/1365-2664.14079

²⁷ Vallejo-Trujillo A, Kebede A, Lozano-Jaramillo M, Dessie T, Smith J, Hanotte O and Gheyas AA (2022) Ecological niche modelling for delineating livestock ecotypes and exploring environmental genomic adaptation: The example of Ethiopian village chicken. *Front. Ecol. Evol.* 10. doi: 10.3389/fevo.2022.866587; Tenagne, A., Taye, M., Dessie, T., Muluneh, B., Kebede, D. and Mekuriaw, G. 2023. Quantifying morphometric and adaptive characteristics of indigenous cattle genetic resources in northwest Ethiopia. *PLoS ONE* 18(3).

Utilizing modern genomic technologies to identify livestock breeds/crossbreeds, traits or genes adapted to specific environments.²⁸

Strategic Priority Area 3: Conservation

Implementing the sustainable 3Rs approach for biobanking of livestock genetic resources using stem cells and training national partners to develop and implement conservation programs.²⁹

Ex-situ conservation of African indigenous chicken genetic resources using primordial germ cells.³⁰

Strategic Priority Area 4 Policies, Institutions and Capacity-building

Designing and implementing sustainable genetic improvement programs in low-income countries to produce genetically superior, climate-resilient livestock.³¹

Under the Centre for Tropical Livestock Genetics and Health (CTLGH) phase two and the Tropical Poultry Genetic Solutions projects, ILRI is developing the capacities and supporting national partners from African (Kenya, Ghana, Nigeria, Cameroon, Tanzania, Ethiopia, Zimbabwe, Uganda) and Asian (Cambodia, Vietnam, Myanmar) countries to conserve their local poultry genetic resources.

CTLGH/ILRI, FAO and AU-IBAR have jointly organized three regional webinars (South East Asia, East Africa, Southern Africa) for conservation of AnGR using the stem cell technologies, where they have shared the *Practical guide on innovations in cryoconservation of animal genetic resources* and the *Practical guide on genomic characterization of animal genetic resources*.

VII. Aquatic genetic resources

[Agenda item 11.2 Implementation of the Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture](#)

WorldFish is contributing to several aspects of the Global Plan of Action of Aquatic Genetic Resources including:

- Participation in the African Regional Workshop on Development of a Global Information System for Farmed Types of Aquatic Genetic Resources (Addis Ababa, Ethiopia, 2–4 December 2019) and the Regional Workshop for Asia and the Pacific Region on the Development of a Registry of Farmed Types of Aquatic Genetic Resources (Incorporating a review of strategic priorities for a Global Plan of Action), Virtual Workshop, 8–12 June 2020)
- Documenting the diversity of aquatic genetic resources (AqGR) in East Africa (Uganda, Kenya and Tanzania) as part of the the EU funded project TrueFish, which is led by the Lake Victoria Fisheries Organization. The biodiversity component of this project will provide an evidence base and tools for implementation of legislation for sustainable development of AqGR for aquaculture in the Lake Victoria basin, and in conjunction with FAO contribute to regional biosecurity strategies for AqGR.

²⁸ Salim, B., Alasmari, S., Mohamed, N.S., Ahmed, M.-K.A., Nakao, R. and Hanotte, O. 2023. *Genetic variation and demographic history of Sudan desert sheep reveal two diversified lineages*. BMC Genomics 24:118.

²⁹ Tiambo, C.K. and McGrew, M. 2021. *Biobanking African poultry breeds for the future*. Innovation Brief. Nairobi, Kenya: ILRI.

³⁰ Nakamura Y. Poultry genetic resource conservation using primordial germ cells. *The Journal of Reproduction and Development*. 2016 Oct;62(5):431-437. DOI: 10.1262/jrd.2016-052.

³¹ Mueller, J., Haile, A., Getachew, T., Santos, B., Rekik, M., Belay, B., Solomon, D., Yeheyis, L. and Rischkowsky, B. 2023. Going to scale - From community-based to population-wide genetic improvement and commercialized sheep meat supply in Ethiopia. *Frontiers in Genetics*, 14.

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- Leading aquaculture and fisheries work in a Southern African program that is led by the Southern African Development Community and funded by the African Development Bank, and which focuses on developing a framework for managing genetic resources and biodiversity in the region and providing technical support to regional genetic improvement programs.
 - Providing technical assistance to the Zambian and Malawian Government fish genetic improvement programs, with funds from the African Development Bank.
 - As part of the CGIAR Initiative on Aquatic Foods:
 - Developing faster growing and more feed efficient strains of globally important carp and tilapia species, which collectively account for 28% of world farmed fish production.
 - Developing new traits for tilapia resistance to emerging fish diseases (e.g. Tilapia Lake Virus – TiLV) and tolerance of reduced oxygen for greater resilience in the face of climate change.

D. Global Crop Diversity Trust (Crop Trust)

The Global Crop Diversity Trust (Crop Trust) was established as an independent international organization in 2004. It operates from Bonn, Germany within the framework of the International Treaty on Plant Genetic Resources for Food and Agriculture (the Treaty), in accordance with the policy guidance provided by the Governing Body. Crop Trust activities in the past biennium relevant to the themes of the Commission's 19th Regular Session are summarized below. A fuller report was provided to the 11th Session of the Intergovernmental Technical Working Group on PGRFA.

SCIENTIFIC AND TECHNICAL MATTERS

Global Crop Conservation Strategies

The “Breathing new life into the Global Crop Conservation Strategies” project started in July 2019, funded by the Federal Ministry of Food and Agriculture of Germany (BMEL). It delivered 5 updated global crop conservation strategies and 10 new strategies by 2023.³² In addition, an opinion paper³³ discussing options for facilitating the use of the strategies in Treaty decision-making was discussed at two expert meetings. This informed the development of a new 3-year project on “Mainstreaming the Global Crop Conservation Strategies in Plant Treaty Processes,” which started in December 2022, also funded by BMEL. This is the subject of a side event at this session.

CGIAR Genebank Platform

In 2017, funding for the essential operations of all 11 international genebanks managed by CGIAR under Article 15 of the Treaty (AfricaRice, Alliance-Bioversity, Alliance-CIAT, CIMMYT, CIP, ICARDA, ICRAF, ICRISAT, IITA, ILRI, and IRRI) was secured through a partnership between CGIAR and the Crop Trust (CGIAR Genebanks Platform). This complemented long-term funding to the CGIAR genebanks from the Crop Trust endowment fund. The Genebanks Platform³⁴ came to an end in December 2021, and was followed by the Genebanks Initiative in January 2022. Although the Crop Trust no longer plays a coordinating role, it was involved in the design of the Initiative, will continue to be a partner, and is of course continuing to provide the genebanks with long-term funding for essential operations. The value of CGIAR genebanks was documented in special issues of Food Security³⁵ (2020) and CABI Agriculture & Bioscience³⁶ (2022).

Svalbard Global Seed Vault

The SGSV³⁷ now holds 1,1214,827 samples from 98 depositors, corresponding to 1,154 genera and 6042 species. Its 15th anniversary was celebrated on 26 February 2023. More than 19,500 accessions were deposited during the event by 20 genebanks, 4 for the first time.

Biodiversity for Opportunities, Livelihoods and Development (BOLD)

BOLD,³⁸ a 10-year project is funded by the Government of Norway, started in June 2021. It is coordinated by the Crop Trust in partnership with the Norwegian University of Life Sciences (NMBU), and with the participation of NordGen and the Treaty Secretariat. The project is implemented in the following work packages (WP):

(1) **WP1: Capacity and Resource Development.** In 2022, external technical reviews were conducted in 15 partner national genebanks to identify priority needs for equipment upgrades, process

³² <https://www.croptrust.org/news-events/opinions/breathing-new-life-into-the-global-crop-conservation-strategies-1/>

³³ <https://doi.org/10.5281/zenodo.7610356>

³⁴ <https://www.genebanks.org/>

³⁵ https://link.springer.com/journal/12571/topicalCollection/AC_237153bc6fd0c500cecd8b578c865869

³⁶ <https://www.biomedcentral.com/collections/genebanks-agriculture>

³⁷ <https://seedvault.nordgen.org/>

³⁸ <https://bold.croptrust.org/>

improvements and staff training. An Emergency Reserve for Genebanks,³⁹ managed together with the Treaty Secretariat, has been established. It will provide urgent support to any genebank around the world facing an imminent threat. The first grant was made in mid-2022, to the national genebank of Yemen.

(2) **WP2: Making New Diversity Available.** Building on the work of pre-breeding and evaluation partnerships in the CWR Project, WP2 is facilitating the use of new diversity of seven crops by breeders and farmers for climate change adaptation and food security.

(3) **WP3: Genebanks and Seed Systems.** This WP, coordinated by NMBU, is exploring models for strengthening the connections between national genebanks and farmers. Innovative pilot efforts by four genebanks will be supported to proactively contribute diversity to national and regional seed systems.

(4) **WP4: Regeneration and Safety Duplication at the Svalbard Global Seed Vault.** A call for proposals⁴⁰ was launched in 2021 in coordination with the Treaty Secretariat, and eligible partners selected after expert review. Agreements have now been signed with 39 partners in 29 countries, and the first 4 partner genebanks made deposits in February 2023.

(5) **WP5: Communications, Engagement and Outreach.** The project is assisting partners to improve their communications at national level, as well as leveraging key global events to amplify the message. Audiovisual materials are being compiled and will be used to promote the project in particular and the cause of PGRFA conservation and use in general, including via social media.

National Seed Collections for Climate-Resilient Agriculture in Africa (Seeds for Resilience Project)

The Crop Trust initiated the Seeds for Resilience⁴¹ project with 5 national genebanks in Africa in mid-2020, thanks to funding from the Government of Germany. The project aims to help build the capacity of these genebanks, and strengthen links with their users.

After external reviews, key needed equipment is being delivered, including vehicles, aluminum foil bags and IT hardware. To date, the genebanks have:

- (1) Prepared and conducted documentation audits of six standard operating procedures (SOP): distribution, conservation, regeneration, characterization, acquisition and safety duplication.
- (2) Shared data on Genesys.^{42,43}
- (3) Started establishing “user groups” and conducting field activities to expose farmers, scientists and other users to the conserved diversity.
- (4) Continued to clear operational backlogs in regeneration, safety duplication, seed viability monitoring etc.

Capacity development and quality management

The Crop Trust and partners organized three types of major capacity-building events during the past biennium:

- (1) Genebank Operations and Advanced Learning⁴⁴ (GOAL) workshops are aimed at building the capacities of national and regional genebanks to manage PGRFA in a global context in alignment with international standards. Genebank staff from 6 African countries attended a GOAL workshop in 2022 under the Seeds for Resilience project.
- (2) QMS intensives provide one-on-one support in the documentation of standard operating procedures (SOP), risk management, policy compliance, user satisfaction monitoring and management of equipment and infrastructure. Four QMS intensives were conducted in 2022.

³⁹ <https://www.croptrust.org/work/emergency-reserve-for-genebanks/>

⁴⁰ <https://www.croptrust.org/svalbard-grant-call-for-proposals/>

⁴¹ <https://www.croptrust.org/work/projects/seeds-for-resilience/>

⁴² <https://www.genesys-pgr.org/wiews/ZMB048>

⁴³ <https://www.genesys-pgr.org/partners/70c7de36-d218-444b-aa3f-636196e1d185>

⁴⁴ <https://rb.gy/1975>

(3) Genebank Resources on the Web⁴⁵ (GROW) webinars are being organized to discuss new, speculative and provocative topics in PGRFA conservation and use.

In addition, the Crop Trust collaborated with FAO on the development of Practical Guides for the Application of the Genebank Standards for Plant Genetic Resources.⁴⁶ We also participated in the International Multi-stakeholder Symposium on Plant Genetic Resources for Food and Agriculture, and contributed to the proceedings.⁴⁷

GRIN-Global Community Edition

GGCE⁴⁸ is an information management system intended for internal genebank use, and focuses on supporting daily operations. GGCE integrates with Genesys, and with Easy-SMTA and the DOI Registration Service of the Treaty. GGCE is in use for genebank collection management at the World Vegetable Center and the genebank of the Alliance of Bioversity and CIAT. We presented GGCE to 60 genebanks through webinars and workshops in 2022, and 16 genebanks are currently testing it, with possible adoption in 2023.

Genesys

The Crop Trust works with existing Genesys⁴⁹ data providers to help them improve online information about their collections and supports data publication by other genebanks. About 94% of accessions in Genesys are up-to-date. Since 2021, new agreements to publish data in Genesys have been established with 7 genebanks. The objectives of the three global PGRFA information systems (GLIS, WIEWS and Genesys) and their relationships were clarified in the document “Strengthening cooperation among global information systems on plant genetic resources for food and agriculture”.⁵⁰ Genesys automatically informs the DOI Registration Service of GLIS about any changes to passport data for registered accessions, which means genebanks need not send separate updates to the two systems.

Supporting information management in national genebanks

The Crop Trust assisted national and regional genebanks in 29 countries in upgrading their information systems from 2014-2020. This was part of the CWR Project and had a significant influence on the design of the follow-up BOLD Project. BOLD will provide support to 15 national genebanks in information management, backed by GGCE. The same approach is followed in the Seeds for Resilience project, where the 5 national genebanks are receiving support to upgrade their data management. To more effectively engage with CGIAR genebank data managers, we initiated a Community of Practice on Genebank Data Management (CoP-DM) in 2019. In 2022, we extended membership to genebanks outside CGIAR, and added monthly virtual meetings in Spanish and French. The CoP-DM now includes 91 staff from 21 national and international genebanks.

RESOURCE MOBILIZATION

Up to 31 December 2022, the Crop Trust endowment fund has received USD 253 million in donor contributions. In addition, the Crop Trust has received over USD 310 million from more than 25 donors to invest in 40 projects. The endowment fund has achieved significant successes, but if it continued to grow at the current pace, it would not reach maturity until 2050. This is far too slow. After careful consideration and a feasibility study, the Crop Trust is therefore engaging in a major fundraising initiative. This will involve strengthening donor stewardship and messaging, highlighting existing partnerships and showcasing global impacts.

⁴⁵ <https://www.croptrust.org/pgrfa-hub/genebank-resources-on-the-web-grow-webinars/>

⁴⁶ <https://www.fao.org/documents/card/en/c/cc0023en/>

⁴⁷ <https://www.fao.org/documents/card/en/c/CB3683EN/>

⁴⁸ <https://rb.gy/sdt3>

⁴⁹ <https://www.genesys-pgr.org/>

⁵⁰ https://www.fao.org/fileadmin/user_upload/wiews/docs/CGRFA_WG-PGR-10_21_2_Inf1.pdf

COMMUNICATION & OUTREACH

The Crop Trust's new communications strategy, launched in 2020, fully embraces the digital era. Through engagement in influential global forums, social media campaigning, a renewed focus on traditional media, and an institutional brand refresh, we are increasing reach, followers and media placements in key channels and outlets.

E. IFOAM - Organics International

Founded in 1972, IFOAM – Organics International is a membership-based organization working to bring true sustainability to agriculture across the globe. Through our work, we build capacity to facilitate the transition of farmers to organic agriculture, raise awareness of the need for sustainable production and consumption, and advocate for a policy environment conducive to agro-ecological farming practices and sustainable development. Together with our members in over 100 countries and territories as well as regional bodies and sector platforms, we are leading change, organically! IFOAM’s activities on genetic resources are integrated into its biodiversity campaigns, international advocacy activities, conference and side event program, publications and training manuals, activism, standards and positions.

BIODIVERSITY AND GENETIC RESOURCES CONFERENCES AND MEETINGS

Seed Ambassadors: Building an International Network to Advance Organic Seed Systems (Organic World Congress 6-7 September 2022).

The two-day event focused on culinary diversity and explored potentials to breed for taste, discussed plant breeding approaches and models for supporting the transition to truly sustainable food systems, including participatory plant breeding and seeds as commons as tools to integrate biodiversity in society. The IFOAM Seeds Platform is taking up and coordinating some tasks identified and prioritized at the event.

PUBLICATIONS AND INFOGRAPHICS

2022 - [Organic agriculture and its benefits for climate and biodiversity](#)

The 16-page document published by IFOAM Organics Europe describes how organic protects species and habitat diversity, supports ecosystem functions, contributing in this way to the resilience of farming systems. It includes a chapter on policy recommendations, highlighting the importance of always taking a holistic approach when we measure the sustainability of agricultural practices considering biodiversity, climate and social benefits in their complexity.

2022 - [INFOGRAPHICS: Organic agriculture and its benefits for climate and biodiversity](#)

2021 - [Plant health care in organic farming. The role of natural substance in a biodiversity-based system approach](#)

The publication describes how from field to farm and at landscape level, a healthy agroecosystem with a high degree of biodiversity is essential for a successful plant health care strategy. It also includes the current legal and economic situation for natural substance in plant protection.

DOCUMENTING AND PROMOTING SOLUTIONS

[Coordinating the Agriculture and Biodiversity Community of the PANORAMA Platform](#)

PANORAMA – Solutions for a Healthy Planet is a partnership initiative to document and promote examples of inspiring, replicable solutions across a range of conservation and sustainable development topics, enabling crosssectoral learning and inspiration. Different thematic disciplines and communities contribute to PANORAMA. On the web platform, these communities are represented through portals. IFOAM – Organics International, together with Rare and GIZ are hosting the Agriculture and Biodiversity Community and its portal of the PANORAMA Platform. To date, you can browse 260 solutions showcasing examples of agricultural production methods that support farmers and the environment we all rely on.

SHORT VIDEOS FOR SOCIAL MEDIA CAMPAIGNS

IFOAM – Organics International published short videos on how organic farmers worldwide work together with nature instead of against it. A few examples:

[Where have all the birds gone?](#)

[Meet Pavel, Guardian of Biodiversity - Organic Farmers, Our Everyday Superheroes](#)

[Honest Food 2021 - Biodiversity](#)

These are to be used in social media campaigns. The videos from the IFOAM campaign [#IGrowYourFood](#) also contain dozens of stories where farmers tell us about how they are preserving and using the biodiversity.

STANDARDS AND POSITIONS

IFOAM's basic standard prevents the clearance of primary ecosystems and prohibits the invasive threat of genetic engineering technologies.

[Position Paper: Compatibility of Breeding Techniques in Organic Systems](#)

This position paper provides clarity and transparency on the criteria used by the organic sector as to what breeding techniques are compatible with organic systems, which techniques to exclude, and definitions on what should be considered as genetic engineering and genetically modified organisms (GMOs).

ADVOCACY

As the umbrella organization for the international organic agriculture movement IFOAM has observer status at biodiversity related UN agencies: Food and Agriculture Organization (FAO), the Convention on Biological Diversity (CBD) and the United Nations Environment Program (UNEP). IFOAM has actively collaborated with the Commission on Genetic Resources for Food and Agriculture from 2005.

F. International Fund for Agricultural Development (IFAD)

Core thematics of 19 th session	IFAD CONTRIBUTIONS
<i>Cross-sectoral matters</i>	
<input type="checkbox"/> Biodiversity, nutrition and human health	<p>IFAD has specific target to support nutrition diversity and therefore invest in biodiversity for nutrition diversity. Sustainable and resilient Indigenous Peoples' Food Systems for improved nutrition and the updated Policy on Engagement with Indigenous Peoples have specific reference to genetic resources in its principle on Food sovereignty, food security and nutrition as a pro-active policy.</p> <p>Operational Framework Toolkit was published on promoting the use of Neglected and Underutilised species varieties species for nutrition.</p>
<input type="checkbox"/> Genetic resources for food and agriculture for mitigation of and adaptation to climate change	<p>Over 40% of IFAD investment are in climate and most investments in genetic resources include climate resilience features. A large portion of projects supported by IFAD Adaptation for Smallholder Agriculture Programme (ASAP) included investments in genetics for climate adaptation.</p> <p>For instance, FAREPS Ecuador, ACCESOS Bolivia supported Conservation of phyto-genetic resources to strengthen resilience of smallholders' livelihoods/food systems. In particular, the project supported use of adapted crop varieties, for climate-shock, phyto-genetic conservation, indigenous resources, including community seed banks.</p> <p>In addition, another dedicated grants project supporting genetic diversity for climate adaptation was on Enhancing Institutional Breeding Capacity to Develop Climate Resilient Crops For African Smallholder Farmers.</p>
<input type="checkbox"/> Access and benefit-sharing for genetic resources for food and agriculture	<p>Updated SECAP has been adopted in 2021 and is implemented since 2022 with introduction of dedicated standard on biodiversity with explicit review of invasive species, access & benefit sharing, free and prior informed consent, community health etc.</p>
<i>Biodiversity for food and agriculture : Implementation of Global action plan that include</i> i) improving availability / access on information on genetic resources ; 2) ex-situ and in situ conservation of genetic resources; 3) sustainable use of genetics as well as investments in genetics /seeds etc.; 4)	<p>In 2021 and 2022, IFAD conducted stocktake on agroecology which was later complemented with specific biodiversity analysis. It reviewed that 35% of agroecology projects invested in community seeds but none had explicit activities to support policies on the topic.</p> <p>More widely, IFAD has been increasing its consideration of genetic diversity through i) adoption of its first biodiversity strategy (2022-2025) to strengthen consideration of biodiversity</p>

Policies, institutions and capacities	in its portfolio, including strong focus on agro-biodiversity and nature based solutions
For Plants	<p>2023 report on sustainable agricultural intensification in Eastern and southern Africa shows that 52% of sustainable intensification invest in crop seeds and 45 % of livestock projects invested in diverse forage crops, including support for Fodder banks. Investments in seed multiplication groups including community seed banks, e-vouchers and seed fairs is an important enabler for adoption of sustainable agriculture intensification. E.g., PRELNOR and SAPP supported seed business development linked with research services for certification and local agrodealer networks and seed fairs.</p> <p>Collaborations research program with CGIAR have been dedicated to genetic diversity: A research project closed in 2021 supported the Sustainable and Diversified Rice-based Farming Systems also invested in rice genetics and experimentations in Rwanda and Senegal.</p>
Micro-organism and invertebrate genetic resources	<p>Not tracked specifically but some projects are investing in use of micro-organisms: in Malawi, IFAD piloted the use of phosphorous mobilization microbes through the department of research to address phosphorous deficiency in the soil. Ethiopia, India and Bangladesh have been promoting production and use of vermi-compost to improve soil quality.</p>
For Forest	<p>Most IFAD projects on forest resources support community driven forest management which emphasize identification of local species and invest in nursery. Recently closed Champ2 in Philippines invested in agro-forestry and afforestation through farmer field school and local experimentations, identifying and supporting local tree species and nurseries.</p> <p>Conservation of coastal and marine resources with emphasis on fishery mangrove ecosystems NEMA, Gambia, PRAREV, Djibouti</p> <p>builds resilience, supports ecological conservation and enhances food security: In Gambia, a community-based approach helped regenerate local mangrove species and established tree nurseries.</p>
For animal genetics	<p>Livestock activities focusing on husbandry include -but are not limited to- animal genetic resources, as well as activities for livestock restocking. with 27% and 10% of IFAD investments, respectively. The 2023 report on sustainable agricultural intensification in eastern and southern Africa shows that 27% of projects SAI practices included diversifying livestock species produced on smallholder farms by rearing/introducing improved breeds or through artificial insemination.</p>

	<p>Grant dedicated to Agricultural Research for Development (AR4D) for large-scale implementation of Climate-Smart Agriculture” supported community-based small ruminant breeding programs (CBBPs) to optimize the benefits of adopted practices. In Lesotho, the ROLL project used the Tool for Agroecology Performance Evaluation (TAPE) and looked into crops, animal and pollinators biodiversity (report)</p>
For Aquatic genetic resources	<p>In Bangladesh, the Haor Infrastructure and Livelihood Improvement Project - Climate Adaptation and Livelihood Protection - HILIP project is addressing the declining fish biodiversity and productivity in the Haor Basin with the introduction of indigenous species in beels and the organisation of beel user groups. The increased number of fish and prawn species in the project's beels shows that preserving the habitats of threatened species has a positive impact on fish production.</p>

G. Islamic Organization for Food Security (IOFS)

The Islamic Organization for Food Security (IOFS), as a specialized institution of the Organization of Islamic Cooperation (OIC), has been actively involved in the activities of conservation and sustainable use of genetic resources.

The conservation, sustainable use, and enhancement of animal and plant genetic resources are central to long-term food security and sustainable agriculture in OIC countries. Therefore, developing a programme to support these resources was of crucial importance for IOFS.

The IOFS's strategic plan includes the **“Development of Gene Banks” Program** within its strategic pillar on capacity building. Moreover, **IOFS programs on support of the livestock sector, OIC strategic commodities (including wheat, rice and cassava), biotechnology, enhancing national and regional capacities for research, and tackling climate change** also involve the conservation and enhancement of genetic resources.

The IOFS program and activities on the Development of Gene Banks share the ultimate goal of sustainable management of genetic resources for enhancing global food security, promoting sustainable agriculture, and conserving biodiversity. **The key objectives that the Program is focused on include the following:**

1. **Conservation of Genetic Resources:** to conserve the genetic diversity of plant and animal species, especially those of agricultural importance.
2. **Access to High-Quality Genetic Resources:** to facilitate access to genetic resources for farmers, breeders, and researchers.
3. **Research and Development:** to support research that can help to improve productivity, resilience, and nutritional quality of crops and livestock.
4. **Sustainable Use of Genetic Resources:** to promote the sustainable use of genetic resources in agriculture, including promoting the use of locally adapted breeds and varieties, as well as supporting the development and dissemination of sustainable farming practices.
5. **Capacity Building:** to provide technical support and training to gene bank staff and other stakeholders, and supporting the development of institutional and policy frameworks for genetic resources management.
6. **Genetic Resources Data Management and Information Sharing:** to support member countries to create a comprehensive database of genetic resources conserved in the gene bank and to make the data accessible to other researchers, breeders, and policymakers.

During 2021-2022, IOFS carried out various activities (both online and physically) for the OIC countries to support them to manage their animal and plant genetic resources. This includes the following:

- Three Workshops on **Acquisition, Conservation, Exchange and Safety Duplication of Plant Genetic Resources in OIC Member Countries (Asian, Africa and MENA Chapters)**;
- An online scientific conference on **"Conservation and Reproduction of Genetic Resources for Sustainable Agriculture and Ensuring Food Security at the OIC Scale"**;
- An International Workshop on the **“Role of Animal Genetic Resources in Ensuring Food Security and Improving Livestock Production”** (online);
- An online two-days International Workshop on the **“Role of Animal Genetic Resources in Ensuring Food Security and Improving Livestock Production”**;
- A Training Workshop on **“Plant Genetic Resources and Gene Banks Management”** in partnership with the Ministry of Agriculture and Forestry of the Republic of Turkiye and Seed Gene Bank of Turkiye in Ankara, Turkiye for African and Asian OIC Member States;

- A training Workshop on “**Plant Genetic Resources and Gene Banks Management**” in partnership with the Ministry of Environment of the Republic of Tunisia and National Gene Bank of Tunisia in Tunis, Tunisia for African Francophone OIC Member States.

For 2023-2024 the following activities are planned by the IOFS:

- **2nd International Forum on “Biotechnology for Food Security and Climate Resilience”** (Astana, Kazakhstan 4-5 July 2023). The Forum will be deliberating on biotechnology with potential to improve food security, reduce the environmental impact of agriculture, and enhance the nutritional value of food.
- **Regional Capacity-Building Workshop on “Policy Making on Establishment and Management of Gene Banks for Animal and Plant Genetics”** (Tunis, Tunisia, September, 2023 (tbc)). The proposed capacity development training aims to equip policymakers to support the establishment and management of animal and plant gene banks, including understanding of the function and operation of gene banks, providing skills to support the establishment and management of gene banks, and initiating a dialogue on regional collaboration for biodiversity conservation and food security.
- **Conference on the Documentation and Information System for Plant and Animal Genetic Resources within the OIC geography.** In order to facilitate the exchange of plant and animal genetic resources within the OIC Member States the Documentation and Single Information System Database is important to be initiated as a platform for efficient and long-standing cooperation, which will allow the scientists to interact and exchange information with other counterparts and countries.
- **Regional Capacity-Building Workshop on “Enhancing Livestock Breeding Programs in OIC Countries: Strategies for Sustainable Design and Management”** (March, 2024 (tbc)). The proposed training will address the challenges and opportunities in livestock breeding, the importance of sustainable design and management of breeding programs, role of advanced biotechnologies in livestock breeding.

H. Network of Aquaculture Centres in Asia-Pacific (NACA)

I am writing in response to your letter requesting input into the CGRFA Implementation of the Multi-Year Programme (reference C/OCB-725-ORG-11). I have provided:

- Details of NACA's activities relevant to the programme where cooperation is sought with FAO and its members.
- Issues regarding the treatment of digital sequence information as a genetic resource.

NACA activities relevant to the Multi-Year Programme

NACA Activities and opportunities for collaboration in our current (2020-2024 Strategic Plan) include:

1. Research with the International Artemia Aquaculture Consortium (<https://artemia.info>): A new research network hosted by NACA investigating *Artemia* biodiversity, management of *Artemia* and salt lake habitats, selective breeding for new applications in aquaculture, and the use of *Artemia* as a human food, among other issues.
2. Establishing a regional information-sharing platform for national or internationally recognised or certified varieties on seed quality and supply chains.
3. Building capacity in aquatic genetic resource management and application of molecular tools and strategies.
4. Facilitating national and regional programs for domestication, genetic improvement, broodstock management and conservation.
5. Facilitating the responsible exchange of germplasm, safe propagation and access-benefit sharing.
6. Application of conservation aquaculture models to support diversification, fishery enhancement and in-situ conservation of indigenous fish species.

Issues regarding the treatment of digital sequence information as a genetic resource

At the 18th session of CGRFA the issue of digital sequence information (DSI) was discussed, including the lack of a clear and accepted definition of DSI, and related access and benefit sharing arrangements.

NACA has a concern that some parties appeared to conflate digital sequence information with actual physical genetic resources. The logical extension of this view was that DSI should be subject to the Convention on Biological Diversity, implying sovereign ownership of data and restrictions on access and utilisation.

NACA contends that digital sequence information is not a 'genetic resource' per se, rather it is clearly **metadata**: Data describing the characteristics of another resource.

In this case, DSI is metadata describing the characteristics of a physically instantiated genetic sequence or biological specimen containing that sequence, or the end products of such a sequence. As metadata, it is useful and necessary for resource discovery (eg. database search and retrieval), identification, planning and management. But DSI is not equivalent to, nor a substitute for, a live organism or a biological or physical specimen.

As metadata, the existing international cross-domain regulatory frameworks concerning intellectual property rights are sufficient to manage digital sequence information. A specific definition of DSI is not required.

We note that the production of DSI is already constrained via regulation of physical access to biological samples under the CBD and Nagoya Protocol ABS provisions, and that member states can use these mechanisms to impose conditions on the use of derived data if they deem it necessary.

NACA is concerned that treating DSI as the equivalent of genetic resources for the purposes of the CBD and related instruments could have adverse scientific and economic impacts, by hindering the production, free exchange and analysis of data required for research underpinning the development of

improved strains for agriculture, animal health and disease management, which may constrain farm productivity and food production.

NACA suggests that the critical distinction between metadata and physically instantiated genetic resources be put to the meeting. We suggest that exceptions for the use of DSI related to agricultural activities, including selective breeding and animal health, should also be considered at an early stage.

I. Nordic Genetic Resource Center (NordGen)

Referring to CGRFA's invitation for international and regional organisations to submit focused information on policies, programmes, and activities relevant to the themes of the Commission's Nineteenth Regular Session (C/OCB-725-ORG-11), NordGen would like to share the following:

Nordic Genetic Resource Center (NordGen) is the Nordic knowledge center for plant, forest, and animal genetic resources and the Nordic Genebank for seeds and plants. NordGen is mainly financed by the Nordic Council of Ministers and NordGen is the national genebank for all the Nordic countries (Finland, Denmark, Norway, Iceland, Sweden). In partnership with the Norwegian Ministry of Agriculture and Food and the Global Crop Diversity, NordGen also has the daily operational responsibility for the Global Seed Vault. In 2023, NordGen's new strategy came into force. The strategy increases cooperation with external stakeholders while still focusing on conservation and sustainable use of genetic resources of importance for Nordic agriculture and forestry. NordGen's strategic goals for 2023-2025 are closely linked to the Nordic Council of Ministers' vision for 2030 to make the Nordic region the most sustainable region in the world.

Cross-sectoral matters:

NordGen has led a project on the Nordic countries' view on access and benefit sharing of genetic resources, including digital sequence information, which resulted in the 2023 report [“Access and Rights to Genetic Resources: A Nordic Approach \(II\)”](#)

The Report includes, a review of the national and Nordic collaboration on genetic resources, updates on developments in the international legal framework, updates on technological advancements, in particular digital sequence information or DSI (digital data from genetic material), and how these advancements affect legal frameworks. Further, sections including wild genetic resources, microorganism, invertebrates, fish genetic resources, DSI and the rights of indigenous people with a set of recommendations for each section. The report also includes, a set of recommendations of relevance for national, Nordic and International legislation and management of genetic resources

Plant genetic resources

As part of a Nordic program funded by the Nordic Council of Ministers, a [NordGen coordinated project](#) for collection and inventory of crop wild relatives will be ongoing until 2024. NordGen is participating in PRO-GRACE, an EU-funded project for improving the genebank infrastructure in Europe. [The Nordic Public Private Partnership on pre-breeding](#), coordinated by NordGen, is ongoing with a new call expected to be announced shortly.

NordGen manages and operates the seed deposits at the Svalbard Global Seed Vault in partnership with the Norwegian Ministry of Agriculture and Food and the Global Crop Diversity Trust and in accordance with the Three-Party Agreement between the partners. The objective of the Seed Vault is to provide a safety net for the international conservation system of plant genetic resources, and to contribute to securing the maximum amount of plant genetic diversity of importance to humanity. This year, NordGen and its partners are proud to announce that the number of deposited seed samples in [Svalbard Global Seed Vault](#), the largest backup facility for crop diversity, has surpassed 1,2 million. The number of depositing genebanks is estimated to surpass one hundred during 2023.

Forest genetic resources

NordGen biannually publish statistics on forest seeds and plant material from the Nordic countries. The first report is called [Statistics: Forest Seeds and Plants in the Nordic Region](#).

Animal genetic resources

In recent years, major leaps have been made in cryoconservation technologies. The new developments in genomics and reproductive research have created new possibilities for the management of animal genetic resources. Therefore, also NordGen's Farm Animals section has put efforts into capacity building in cryoconservation activities. In practice, cryopreservation expertise has been strengthened through international collaboration, networking and hiring an expert in farm animal reproduction and

cryoconservation techniques. NordGen Farm Animals has also collaborated with FAO in the production of the new FAO Guidelines: “Innovation in cryoconservation of animal genetic resources”. The guidelines were developed through a [series of webinars that can be found at NordGen’s website](#). The network NordFrost, aiming to reach out the stakeholders working in cryopreservation and to increase co-operation in animal gene banks was recently closed. The aim of the project was to find gaps in the pipeline, optimize skills and increase knowledge levels, and to provide Nordic cryoconservation services. Recently, a concluding seminar titled “[Conservation of animal genetic resources: Towards conserving Nordic livestock biodiversity](#)” was arranged. A report summarizing the results will be published shortly.

The Faroese horse have undergone severe bottlenecks is now critically endangered with only 87 individuals left. In collaboration with the Faroese Agricultural Agency and the Faroese Horse Breeding Association, NordGen has developed a new action plan suggesting measures to increase the population of the Faroese horses. The plan will be published shortly.

A project focusing on revealing the common history and background of the three mountain cattle breeds in northern Finland, Norway and Sweden with the purpose of raising awareness about their importance for the future was finalized in September 2022. [Read more about the project here](#).