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# COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

## Item 7.2 of the Provisional Agenda

### Eighteenth Regular Session

27 September – 1 October 2021

### **CO-CHAIRS' REPORT ON THE INFORMAL CONSULTATIONS ON BIODIVERSITY FOR FOOD AND AGRICULTURE – REVISED DRAFT NEEDS AND POSSIBLE ACTIONS**

#### Note by the Secretariat

This document contains the report of the Co-Chairs of the Group of National Focal Points for Biodiversity for Food and Agriculture on the informal open-ended consultations on the document *Biodiversity for food and agriculture – needs and possible actions*, held on 4 and 5 August 2021.

## Co-Chairs' Report on the Informal Consultations on Biodiversity for Food and Agriculture – Revised Draft Needs and Possible Actions

1. At its Seventeenth Regular Session, the Commission on Genetic Resources for Food and Agriculture (Commission) welcomed the report on *The State of the World's Biodiversity for Food and Agriculture* (Report) as an important milestone for the Commission and the United Nations Decade on Biodiversity and as a valuable contribution to discussions on the post-2020 global biodiversity framework.<sup>1</sup> It agreed that the Report, along with developments in other fora that also point to declines in biodiversity of relevance to food and agriculture, called for a timely and clear cross-sectoral follow-up.
2. The Commission agreed that the response to the Report – to be based on a reviewed and revised version of the document *Biodiversity for food and agriculture – revised draft needs and possible actions* contained in *Appendix C* to the report of the session – should be: actionable at country, regional and global levels; complementary to, not duplicative of, and coherent with, other processes and initiatives in FAO, such as the Commission's Global Plans of Action and FAO's Biodiversity Strategy, and in other fora; and voluntary.<sup>2</sup> It further agreed that the response should clarify terminology, take into account characteristics of diverse ecosystems and production systems, consider the special needs of developing countries, contribute to the implementation of the Sustainable Development Goals (SDGs) and the post-2020 global biodiversity framework, and highlight areas for partnerships with multiple stakeholders.<sup>3</sup>
3. The Commission mandated the Group of National Focal Points for Biodiversity for Food and Agriculture (Group of National Focal Points) to review and revise the draft needs and possible actions, for finalization by the Commission, “with the motivation to have the document adopted as a global plan of action by the FAO Conference.”<sup>4</sup>
4. The Group of National Focal Points was convened from 2 to 4 March 2021 and from 25 to 27 May 2021.<sup>5</sup> We, Desterio Nyamongo (Kenya) and Jens Weibull (Sweden), had the honour to be elected Co-Chairs of the Second Meeting of the Group of National Focal Points.
5. While the Group of National Focal Points made considerable progress during the two meetings, it invited us and the Bureau of the Commission to consider all options for holding informal consultations prior to the Eighteenth Regular Session of the Commission with a view to reaching consensus on all open questions related to the revised draft needs and priorities.<sup>6</sup>
6. In close coordination with the Bureau of the Commission, we agreed to hold informal open-ended consultations on 4 and 5 August 2021. The consultations were attended by 120 participants, representing 49 countries, the European Union and eight international organizations.
7. Thanks to the exceptional spirit of compromise that guided our discussions, agreement on all open questions was reached during the informal consultations, except on whether or not the word “possible” should qualify the actions listed in the document.
8. Given this remarkable outcome, we requested the Secretariat to make available to the Commission the outcome of the informal consultations, as contained in the *Appendix* to this document.
9. We should like to thank all those who contributed to this work. Reaching such a level of consensus could not have been done without the dedicated efforts of all involved.

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<sup>1</sup> CGRFA-17/19/Report, paragraph 39.

<sup>2</sup> CGRFA-17/19/Report, paragraph 44.

<sup>3</sup> CGRFA-17/19/Report, paragraph 45.

<sup>4</sup> CGRFA-17/19/Report, paragraph 47.

<sup>5</sup> CGRFA-18/21/7.1.1; CGRFA-18/21/7.1.2.

<sup>6</sup> CGRFA/NFP-BFA/2.2/21/Report, paragraph 9.

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## APPENDIX

### BIODIVERSITY FOR FOOD AND AGRICULTURE – REVISED DRAFT NEEDS AND POSSIBLE ACTIONS

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#### I. Introduction

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

2. Over recent decades, the importance of biodiversity and ecosystem services to food security and nutrition, rural and coastal livelihoods, human well-being and sustainable development more generally has gradually acquired greater recognition on international agendas. Global assessments overseen by the Commission on Genetic Resources for Food and Agriculture (Commission) have led to the adoption of global plans of action for specific sectors of genetic resources (referred to in this document as the “sectoral global plans of action”).<sup>7</sup> The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, include a number of targets related to the sustainable use and conservation of biodiversity in the context of food and agriculture. Other global assessments, such as those undertaken by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, and reporting by countries on the implementation of their National Biodiversity Strategies and Action Plans in the context of past and present global biodiversity frameworks under the Convention on Biological Diversity (CBD), have increased awareness of biodiversity and its contributions to livelihoods and human well-being.

3. *The State of the World’s Biodiversity for Food and Agriculture*<sup>8</sup> was published in February 2019 built on submissions from countries. The needs and [possible] actions for the sustainable use and conservation of BFA identified in the present document are based on the outcomes of regional and global consultations.

4. This document identifies needs and [possible] actions for BFA, i.e. “the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that sustain the ecosystem structures, functions and processes in and around production systems, and that provide food and non-food agricultural products”.<sup>9</sup> “Production systems” are taken to include those in the crop, livestock, forest, fishery and aquaculture sectors. As per FAO’s definition, agriculture is inclusive of forestry, fisheries and aquaculture. Concepts used in the document are described, in detail, in Annex 1.

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<sup>7</sup> FAO. 1996. *The State of the World’s Plant Genetic Resources for Food and Agriculture*. Rome; FAO. 2007. *The State of the World’s Animal Genetic Resources for Food and Agriculture*. Rome; FAO. 2007. *The Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration*. Rome; FAO. 2010. *The Second Report on the State of the World’s Plant Genetic Resources for Food and Agriculture*. Rome; FAO. 2011. *Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture*. Rome; FAO. 2014. *The State of the World’s Forest Genetic Resources*. Rome; FAO. 2014. *Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources*. Rome; FAO. 2015. *The Second Report on the State of World’s Animal Genetic Resources for Food and Agriculture*. Rome; FAO. 2019. *The State of the World’s Aquatic Genetic Resources for Food and Agriculture*. Rome.

<sup>8</sup> FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

<sup>9</sup> FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

## Rationale

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

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

### ***Biodiversity is essential to food and agriculture***

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

### ***Biodiversity for food and agriculture is declining***

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

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

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

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

***The use of many biodiversity-friendly<sup>10</sup> practices is reported to be increasing***

- Efforts to manage BFA, especially associated biodiversity, to promote the supply of regulating and supporting ecosystem services are widely reported.
- The use of a wide range of management practices and approaches regarded as favourable to the sustainable use and conservation of BFA is reported to be increasing.<sup>11</sup> However, knowledge of how these practices influence the status of BFA still needs to be improved.
- Although efforts to conserve BFA *in situ* and *ex situ* are increasing, levels of coverage and protection are often inadequate and the complementarity between these approaches needs to be enhanced.

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

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

<sup>10</sup> The term “biodiversity-friendly” is taken in *The State of the World's Biodiversity for Food and Agriculture* and in this document to refer to production and to practices and approaches that promote the conservation and sustainable use of biodiversity.

<sup>11</sup> See Chapter 5 of FAO. 2019. *The State of the World's Biodiversity for Food and Agriculture*. Rome, for a description of the status and trends in the adoption of over 20 such practices and approaches.

management of GRFA are relatively well developed in the individual sectors of food and agriculture.

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

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

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

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

## II. Nature of the document

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

## III. Objectives

11. This document aims to:
- create a contextual framework for the coherent and consistent implementation of the Commission's sectoral global plans of action and for the sustainable use and conservation of BFA, including associated biodiversity and wild foods, as a basis for food security, nutrition and health, sustainable food and agriculture, and poverty reduction and livelihoods;
  - promote transition towards more sustainable agri-food systems;
  - contribute to the achievement of the SDGs and the implementation of the post-2020 global biodiversity framework;<sup>12</sup>

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<sup>12</sup> Developed under the Convention on Biological Diversity.

- raise awareness of the importance of BFA, including associated biodiversity and wild foods, and the ecosystem services it provides among all stakeholders, from producers to consumers and policy-makers;
- promote the sustainable use and conservation of BFA, including associated biodiversity and wild foods, within production systems and other relevant terrestrial and aquatic ecosystems, as a basis for ecosystem services and resilience, in order to foster sustainable economic development, reduce poverty and ensure food security and nutrition, particularly in developing countries, as well as to provide options for adapting to and mitigating climate change;
- set the conceptual basis for the development and adoption of national policies, legislation and programmes for the sustainable use and conservation of BFA;
- increase national, regional and international cross-sectoral cooperation, information-sharing and technology transfer and enhance institutional capacity, including in research, education and training on the sustainable use and conservation of BFA;
- improve data collection and the development of metrics and indicators to measure the impact of management practices and approaches on the sustainable use and conservation of BFA at genetic, species and ecosystem levels; and
- provide guidance to FAO's work on the provision of support to countries, at their request, in their efforts to strengthen the sustainable use and conservation of BFA, including in the context of its Strategy on Mainstreaming Biodiversity across Agricultural Sectors.<sup>13</sup>

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

#### **IV. Operative principles**

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

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

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<sup>13</sup> CL 163/11 Rev.1.

holders of BFA-related knowledge and should involve the effective participation of indigenous peoples and local communities.

- The implementation of the actions should promote and support the implementation of the sectoral global plans of action, ensuring to the extent possible that synergies are promoted and duplication of efforts avoided. Including in this regard, the implementation of the actions should ensure to the extent possible that relevant cross-sectoral interactions are taken into account.

## V. Structure and organization

14. The document presents a set of integrated and interlinked [possible] actions, organized into three strategic priority areas, for the sustainable use and conservation of BFA. Many of these actions are relevant to more than one strategic priority area.

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

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

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

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

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



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

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

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

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

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

**2.2** Improve conservation and restoration of biodiversity for food and agriculture

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

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

**3.2** Strengthen legal, policy and incentive frameworks

**3.3** Improve cooperation and funding

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

### **Introduction**

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

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

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

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

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

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

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

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

#### **Rationale**

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

monitoring activities for the various components of BFA, including those covered by the sectoral global plans of action.

A wide range of management practices and approaches make use of components of BFA in a sustainable way and thus potentially contribute to their conservation.<sup>14</sup> These include specific production practices and approaches (e.g. conservation agriculture, pollinator-friendly practices, permaculture, organic agriculture and integrated pest management), the use of mixed production systems (e.g. agroforestry and integrated crop–livestock–aquatic systems), restoration practices, and integrated approaches at ecosystem level (e.g. ecosystem approaches to fisheries and aquaculture, sustainable forest management and agroecology). In most cases, it is difficult to evaluate the extent to which such practices and approaches are being used, owing to the variety of scales and contexts involved and the absence of relevant data. Although impacts on BFA are generally perceived to be positive, there is a need for more research and for the development of appropriate assessment methods in this regard.

## **Actions**

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

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<sup>14</sup> See Chapter 5 of FAO. 2019. *The State of the World's Biodiversity for Food and Agriculture*. Rome for a description of the status and trends in the adoption of over 20 such practices and approaches.

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

### Introduction

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

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

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

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

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

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

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

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

### **Rationale**

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

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

### **Actions**

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

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

### **Rationale**

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

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

### **Actions**

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

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

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

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

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

### **Introduction**

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

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

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

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

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

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

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

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

#### **Rationale**

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

In many developing countries in particular, a lack of human capacity is – along with a lack of financial resources – a major obstacle to efforts to improve the management of BFA. Many countries will need to devote particular attention to establishing and building up research, educational and training institutions and establishing a strong and diverse skills base, including in taxonomy and through citizen science.<sup>15</sup>

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

#### **Actions**

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

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

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

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

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

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

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

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

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<sup>15</sup> Citizen science refers here to the collection of data relating to biodiversity by the general public.



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

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

### **Strategic Priority 3.2 Strengthen legal, policy and incentive frameworks**

#### **Rationale**

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

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

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

#### **Actions**

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

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

### **Strategic Priority 3.3 Improve cooperation and funding**

#### **Rationale**

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

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

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

#### **Actions**

- 3.3.1 Inventory and describe national and regional institutions with mandates related to the management of BFA to enable the establishment or strengthening of relevant coordination mechanisms.
- 3.3.2 Improve cooperation on BFA between relevant stakeholders, including producers, researchers, consumers and policy-makers within the sectors of food and agriculture and natural resources management and more widely, in order to facilitate the development of more relevant and effective BFA-related policies and to support participatory innovation and transfer of knowledge.
- 3.3.3 Strengthen existing and/or establish new networks, including at national and regional levels, linking users and communities that manage associated biodiversity and ecosystem services on-farm and *in situ*, research institutes, scientists and other relevant stakeholders, *inter alia* to facilitate the sharing of data and of best practices.
- 3.3.4 Further develop and strengthen international cooperation to mainstream BFA within and beyond agriculture sectors. Disseminate examples of successful cooperation.
- 3.3.5 Further develop and strengthen international cooperation, including triangular and South–South cooperation, to foster capacity building, technical assistance and technology transfer related to the management of BFA, especially in and to developing countries.
- 3.3.6 Promote facilitated access to GRFA and the sharing of benefits arising from their use through implementation of relevant international instruments and/or other domestic regulatory mechanisms, considering the importance of such monetary and non-monetary benefits to the conservation and sustainable use of GRFA, especially in developing countries, and the special nature of GRFA and its distinctive features.
- 3.3.7 Explore opportunities to increase support, including financial, for activities related to BFA, including research, innovation, monitoring and assessment, sustainable use and conservation, outreach, training and capacity-building.
- 3.3.8 Identify opportunities for efficient use of resources, for example by promoting synergies and cooperation between projects at national and regional levels.

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

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

## ANNEX 1

**Table 1.** Concepts used in the document

Biodiversity	Biological diversity (often referred to as biodiversity) is defined in Article 2 of the Convention on Biological Diversity (CBD) as “the variability among living organisms from all sources including, <i>inter alia</i> , terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems”. <sup>16</sup>
Biodiversity for food and agriculture (BFA)	BFA is a subcategory of biodiversity taken for the purposes of <i>The State of the World’s Biodiversity for Food and Agriculture</i> to correspond to “the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that sustain the ecosystem structures, functions and processes in and around production systems, and that provide food and non-food agricultural products.” <sup>17</sup>
Production systems	“Production systems” are taken to include those in the crop, livestock, forest, fishery and aquaculture sectors. As per FAO’s definition, agriculture is inclusive of forestry, fisheries and aquaculture.
Plant genetic resources for food and agriculture (PGRFA)	The term PGRFA refers to “any genetic material of plant origin of actual or potential value for food and agriculture.” <sup>18</sup> This includes farmers’ varieties/landraces maintained on-farm, improved varieties, breeding materials in crop improvement programmes, genebank accessions (i.e. <i>ex situ</i> collections), crop wild relatives and wild plants harvested for food.
Animal genetic resources for food and agriculture (AnGR)	AnGR are genetic resources of animal origin “used or potentially used for food and agriculture.” <sup>19</sup> The scope of global assessments undertaken by FAO on animal genetic resources for food and agriculture was the genetic resources of domesticated avian and mammalian species used in food and agriculture. <sup>20</sup>
Forest genetic resources (FGR)	FGR are “the heritable materials maintained within and among tree and other woody plant species that are of actual or potential economic, environmental, scientific or societal value.” <sup>21</sup>
Aquatic genetic resources for food and agriculture (AqGR)	AqGR “include DNA, genes, chromosomes, tissues, gametes, embryos and other early life history stages, individuals, strains, stocks and communities of organisms, of actual or potential value for food and agriculture.” <sup>22</sup> The scope of the global assessment undertaken for <i>The State of the World’s Aquatic Genetic Resources for Food and Aquaculture</i> was farmed aquatic species and their wild relatives within national jurisdiction.

<sup>16</sup> CBD. 1992. *Convention on Biological Diversity*. Montreal, Canada, Secretariat of the Convention on Biological Diversity.

<sup>17</sup> FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

<sup>18</sup> FAO. 2009. *International Treaty on Plant Genetic Resources for Food and Agriculture*. Rome.

<sup>19</sup> FAO. 2007. *The State of the World’s Animal Genetic Resources for Food and Agriculture*. Rome; FAO. 2007. *The Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration*. Rome.

<sup>20</sup> FAO. 2007. *The State of the World’s Animal Genetic Resources for Food and Agriculture*. Rome; FAO. 2015. *The Second Report on the State of World’s Animal Genetic Resources for Food and Agriculture*. Rome.

<sup>21</sup> FAO. 2014. *The State of the World’s Forest Genetic Resources*. Rome.

<sup>22</sup> FAO. 2019. *The State of the World’s Aquatic Genetic Resources for Food and Agriculture*. Rome.

Micro-organism and invertebrate genetic resources for food and agriculture (MIGR)	MIGR are micro-organism and invertebrate genetic resources of actual or potential value for food and agriculture. Important groups include pollinators, in particular honey bees, micro-organisms of relevance to ruminant digestion, food processing and agro-industrial processes, biological control agents and soil micro-organisms and invertebrates. <sup>23</sup>
Associated biodiversity	<p>“Associated biodiversity comprises those species of importance to ecosystem function, for example, through pollination, control of plant, animal and aquatic pests, soil formation and health, water provision and quality, etc., including inter alia:</p> <p>a) Micro-organisms (including bacteria, viruses and protists) and fungi in and around production systems of importance to use and production such as mycorrhizal fungi, soil microbes, planktonic microbes, and rumen microbes;</p> <p>b) Invertebrates, including insects, spiders, worms, and all other invertebrates that are of importance to crop, animal, fish and forest production in different ways, including as decomposers, pests, pollinators, and predators, in and around production systems;</p> <p>c) Vertebrates, including amphibians, reptiles, and wild (non-domesticated) birds and mammals, including wild relatives, of importance to crop, animal, fish and forest production as pests, predators, pollinators or in other ways, in and around production systems;</p> <p>d) Wild and cultivated terrestrial and aquatic plants other than crops and crop wild relatives, in and around production areas such as hedge plants, weeds, and species present in riparian corridors, rivers, lakes and coastal marine waters that contribute indirectly to production.”<sup>24</sup></p>
Wild foods	<p>“Wild foods are food products obtained from non-domesticated species. They may be harvested (gathered or hunted) from within food and agricultural production systems or from other ecosystems. The group of species that supplies wild foods overlaps to various degrees with those in the ... ‘sectoral’ categories of genetic resources and with associated biodiversity. For example, capture fisheries are probably the largest single example of the human use of wild foods, and many aquaculture facilities use wild-caught stocks for broodstock or larval grow-out.”<sup>25</sup></p>
Ecosystem services	<p>Ecosystem services are “the benefits humans derive from ecosystems”.<sup>26</sup> The Millennium Ecosystem Assessment identified four categories of ecosystem service: provisioning, regulating, supporting and cultural. “Provisioning services” are “the products obtained from ecosystems”, i.e. food and raw materials of various kinds, including the products of agri-food systems. “Regulating services” are “benefits obtained from the regulation of ecosystem processes”. Examples include regulation of the climate, air and water quality, diseases and natural disasters. “Cultural services” are the “nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences”. “Supporting services” are services “that are necessary for the production of all other ecosystem services”. Examples include photosynthesis and nutrient cycling. The distinguishing feature of supporting services is that they have a less direct effect on human welfare.</p>
Management of BFA	<p>Management of BFA is taken in this document to comprise the various activities involved in its sustainable use, its conservation <i>in situ</i> and <i>ex situ</i> and its restoration.</p>

<sup>23</sup> CGRFA/16/17/Report Rev.1, paragraph 79.

<sup>24</sup> FAO. 2013. *Guidelines for the preparation of the Country Reports for The State of the World’s Biodiversity for Food and Agriculture*. Rome.

<sup>25</sup> FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

<sup>26</sup> Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: synthesis*. Washington DC, Island Press.

Conservation	Conservation of BFA includes all actions implemented with the aim of preventing the loss of diversity in the populations, species and ecosystems that constitute this subset of biodiversity. <sup>27</sup> <i>Ex situ</i> conservation is “the conservation of components of biological diversity outside their natural habitats.” <sup>28</sup> <i>In situ</i> conservation is “the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties”. <sup>29</sup> This includes on farm conservation.
Sustainable use	Sustainable use is “the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.” <sup>30</sup>
Restoration	Restoration is “any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state. Active restoration includes a range of human interventions aimed at influencing and accelerating natural successional processes to recover biodiversity ecosystem service provision.” <sup>31</sup>

<sup>27</sup> FAO. 2019. *The State of the World’s Biodiversity for Food and Agriculture*. Rome.

<sup>28</sup> CBD. 1992. *Convention on Biological Diversity*. Montreal, Canada, Secretariat of the Convention on Biological Diversity.

<sup>29</sup> CBD. 1992. *Convention on Biological Diversity*. Montreal, Canada, Secretariat of the Convention on Biological Diversity.

<sup>30</sup> CBD. 1992. *Convention on Biological Diversity*. Montreal, Canada, Secretariat of the Convention on Biological Diversity.

<sup>31</sup> IPBES. 2018. *Summary for policymakers of the assessment report on land degradation and restoration of the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services*. R. Scholes, L. Montanarella, A. Brainich, N. Barger, B. ten Brink, M. Cantele, B. Erasmus, J. Fisher, T. Gardner, T. G. Holland, F. Kohler, J. S. Kotiaho, G. Von Maltitz, G. Nangendo, R. Pandit, J. Parrotta, M. D. Potts, S. Prince, M. Sankaran & L. Willemsen, eds. IPBES secretariat, Bonn, Germany. 44 pp.