

**PROGRAMA DAS NAÇÕES UNIDAS PARA O DESENVOLVIMENTO - PNUD**  
**RELATÓRIO DE ENTREGA DE PRODUTO**

**Consultora:** Julcéia Camillo

**Contrato:** 2017/000164

**Projeto:** BRA 11001

**Data de entrega:** 14/12/2017

**Produto 3.** Capítulos 4, 5 e 6 complementado e revisado, em inglês.



**Guidelines for the preparation of the Country  
Reports for *The State of the World's Biodiversity  
for Food and Agriculture***

**December, 2017**

---

**Guidelines for the preparation of the Country Reports for  
*The State of the World's Biodiversity for Food and Agriculture***

---

TABLE OF CONTENT

I. INTRODUCTION .....	4
II. OBJECTIVES OF THE GUIDELINES.....	6
III. SCOPE, STRUCTURE AND CONTENT .....	6
IV. TIMELINE AND PROCESS .....	7
V. DETAILED METHODOLOGY AND GUIDANCE BY CHAPTER .....	8
EXECUTIVE SUMMARY .....	8
CHAPTER 1: Introduction to the country and to the role of biodiversity for food and agriculture .....	<b>Erro! Indicador não definido.</b>
CHAPTER 2: Drivers of change.....	<b>Erro! Indicador não definido.</b>
CHAPTER 3: The state and trends of biodiversity for food and agriculture.....	<b>Erro! Indicador não definido.</b>
CHAPTER 4: The state of use of biodiversity for food and agriculture .....	9
CHAPTER 5: The state of interventions on conservation and use of biodiversity for food and agriculture .....	23
CHAPTER 6: Future agendas for conservation and sustainable use of biodiversity for food and agriculture .....	52
ANNEX 1: Recommended scope of the Country Report .....	56
ANNEX 2: Production systems .....	58
ANNEX 3: Drivers of change.....	61
ANNEX 4: Ecosystem services .....	63
ANNEX 5: Management practices supporting the use and conservation of biodiversity for food and agriculture .....	65
ANNEX 6: Diversity based interventions.....	67

## THE ESSENTIAL ROLE OF COUNTRY REPORTS

The preparation of Country Reports is one of the most important steps in the process for preparing the first report on *The State of the World's Biodiversity for Food and Agriculture* (the SoWBFA Report), and will be critical in filling in gaps to existing information and establishing baseline information on biodiversity for food and agriculture, and on its role in providing multiple ecosystem services. The preparatory process of Country Reports should also be considered a strategic planning exercise and the report generated an overview of the country's sustainable management practices of biodiversity for food and agriculture and a tool for the assessment of national priorities and future needs to be addressed. Country Reports should also be seen as an opportunity to engage and stimulate the interests of a wide range of stakeholders from different sectors, and including smallholders.

The present Guidelines for Country Reports (Guidelines) aim to help countries to assemble baseline information and highlight the importance of a collaborative process, bringing together experts (including those stakeholders with experiential knowledge, such as farmers, pastoralists, forest dwellers and fisher folk) across sectors to assess available information and analyze gaps and needs. The Guidelines are also structured as a tool to guide data collection, planning and policy making at national level.

The Guidelines make a distinction between information countries may wish to provide in support to their own strategic planning, from the information needed for the preparation of the overall SoWBFA report. Countries may wish to draw upon documents prepared for the various sector State of the World's Reports for their cross-sectoral synthesis.

### I. INTRODUCTION

1. The FAO Commission on Genetic Resources for Food and Agriculture (the Commission) is the only intergovernmental forum which specifically deals with the whole range of genetic resources for food and agriculture. Genetic resources for food and agriculture are the building blocks of biodiversity for food and agriculture. The mandate of the Commission covers all components of biodiversity for food and agriculture. To implement its broad work programme and to achieve its objectives through a planned and staged approach, the Commission adopted and subsequently revised and updated its Multi-Year Programme of Work (MYPOW).<sup>1</sup>

2. One of the major milestones of the MYPOW is the presentation of the first report on *The State of the World's Biodiversity for Food and Agriculture* (the SoWBFA Report) to the Commission's Sixteenth Regular Session (to be held in 2017) and the consideration of follow-up to the SoWBFA Report, including through a possible Global Plan of Action. The SoWBFA Report will also be a major milestone in the context of the United Nations Decade on Biodiversity.

3. The Commission requested FAO, at its Eleventh Regular Session in 2007, to prepare the SoWBFA report, for consideration at its Sixteenth Regular Session, following a process agreed

---

<sup>1</sup> CGRFA-14/13/Report, *Appendix I*, Table 1.

upon by the Commission.<sup>2</sup> It stressed that the process for preparing the SoWBFA Report should be based on information from Country Reports and should also draw on thematic studies, reports from international organizations and inputs from other relevant stakeholders, including centres of excellence from developing countries.<sup>3</sup>

4. The Commission stressed that the SoWBFA Report should focus on the interactions between sectors and on cross-sectoral matters, taking full advantage of existing information sources, including sectoral assessments. It also suggested that priority be given to key supplementary information not available in existing sources.<sup>4</sup>

5. The Commission acknowledged that the report's findings would be preliminary and incomplete in a number of areas and requested FAO to ensure that such information gaps would be assessed and highlighted in the report. It also requested FAO to include in the report lessons learned and success stories on the conservation and sustainable use of biodiversity for food and agriculture.<sup>5</sup>

6. The SoWBFA Report will provide a baseline analysis of the state of knowledge. Incompleteness and gaps in available information should be clearly identified and acknowledged and used to direct future assessments. In compiling information for their Reports countries should state clearly where information is not available on specific subject areas.

7. The present Guidelines for the preparation of Country Reports contributing to the SoWBFA Report present an overall approach and a set of objectives that can guide the preparation of Country Reports, the scope of the report and the structure that can be used, as well as an appropriate timeline and process for their preparation.

8. The Guidelines assist countries to provide information complementary to sector reports in order to address the following questions:

- What is the state of the conservation and use of biodiversity for food security and nutrition, ecosystem services and sustainability?
- What trends can be identified in the conservation and use of biodiversity for food and agriculture and in the effects of major drivers of change?
- How can conservation and use of biodiversity for food and agriculture be improved and the contributions of biodiversity to food security and nutrition, ecosystem services, sustainability and the improvement of livelihoods of farmers, pastoralists, forest dwellers and fisher folk be enhanced?

9. Major differences exist between countries with respect to the nature, conservation and use of biodiversity for food and agriculture. To provide baseline information, highlight knowledge gaps and to facilitate the regional and global synthesis of the information countries are therefore invited to follow the structure provided in the Guidelines as closely as possible in the preparation of their Country Report.

---

<sup>2</sup> CGRFA-11/07/Report

<sup>3</sup> CGRFA-14/13/Report, paragraph 14.

<sup>4</sup> CGRFA-14/13/Report, paragraph 14.

<sup>5</sup> CGRFA-14/13/Report, paragraph 15.

## II. OBJECTIVES OF THE GUIDELINES

10. These Guidelines have been prepared by FAO to assist in the preparation of Country Reports contributing to the SoWBFA Report. The Guidelines have been designed to assist countries to undertake a strategic assessment of their biodiversity for food and agriculture, with particular emphasis on components of biodiversity for food and agriculture that are not traditionally considered by the other sectoral assessments and yet contribute to the livelihoods of smallholder communities. These include uncultivated or wild food and non-food products, as well as species of importance to production systems.

## III. SCOPE, STRUCTURE AND CONTENT

### *Scope of the Country Report*

11. The scope of the Country Reports includes the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that sustain the structures, functions and processes in and around production systems, and that provide food and non-food agriculture products. A detailed description of the scope of the Country Report is provided in Annex 1. Production systems, as defined for the purposes of this report, include the livestock, crop, fisheries and aquaculture, and forest sectors (description provided in Annex 2).

12. The present Guidelines for the Country Report mainly focus on those areas not covered by sectoral reports, e.g. the biological diversity associated with different supporting and regulating ecosystem services within production systems or of importance to them, referred to hereinafter as associated biodiversity, as well as wild resources used for food. In addition to this, countries that previously presented or are currently preparing a Country Report on Plant, Animal, Aquatic or Forest Genetic Resources may wish to integrate information from these reports in the preparation of their Country Report for the SoWBFA.

13. The Guidelines should help countries to provide information from an ecosystem perspective, including on the provision of ecosystem services, and on the implementation of an ecosystem approach. They will also assist countries to report on the use of biodiversity for food and agriculture for food security and nutrition, rural livelihoods, sustainability and sustainable intensification as well as on relevant gender perspectives. In this way, the Guidelines will assist countries in describing the multiple functions and the multiple values to producers and users of biodiversity for food and agriculture.

### *Structure of the Country Report*

14. An Executive Summary is recommended, along with a section providing an Introduction to the Country, which would provide a description of the country and an overview of the different sectors.

15. Country Reports should follow as closely as possible the structure of the SoWBFA Report as presented in CGRFA-14/13/3 Appendix 1, which includes the following Chapters:

- Chapter 1: Introduction
- Chapter 2: Drivers of change
- Chapter 3: The state and trends of biodiversity for food and agriculture

- Chapter 4: The state of use of biodiversity for food and agriculture  
Chapter 5: The state of interventions in the conservation and use of biodiversity for food and agriculture  
Chapter 6: Future agendas for conservation and sustainable use of biodiversity for food and agriculture

16. An analysis of the different ways in which biodiversity for food and agriculture is used and supports cultural, social and economic values of local communities and traditional peoples will be an important aspect of the SoWBFA Report and of Country Reports. The Country Reports should therefore take full account of these aspects and seek the involvement of the widest range of stakeholders. In this respect, it is recommended that the scope of activities includes actions being taken by the public, private and nongovernmental sectors, and takes account of gender perspectives, and the needs, priorities and perspectives of indigenous peoples and local communities through their organizations.

#### IV. TIMELINE AND PROCESS

17. In line with the overall process, as established by the Commission, the Director-General of FAO sent a Circular State Letter on 10 June 2013 to countries requesting them to identify National Focal Points for the preparation of Country Reports by November 30, 2013, and invited countries to submit their Country Reports no later than 31 December 2014.

18. The following steps are recommended in preparing the Country Report, using a participatory approach:

- Each participating country should appoint a National Focal Point for the coordination of the preparation of the Country Report who will also act as focal point to FAO. National Focal Points should be communicated to Ms Linda Collette, Secretary, Commission on Genetic Resources for Food and Agriculture (cgrfa@fao.org), by November 30, 2013.
- Countries are encouraged to establish a national committee to oversee the preparation of the Country Report. Given the cross-sectoral nature of the Country Report, the national committee should consist of as many representative stakeholders as practical (representing government, research and civil society) including from different sectors (fisheries and aquaculture, forest, livestock and plants) and those able to support analysis of associated biodiversity. It is recommended that the national committee also include a gender specialist along with someone who can contribute to economic issues, with a natural resource management, environmental economics, or other relevant background. It is recommended that within the 13 months countries are given for the preparation of the Country Report, the national committee meets frequently to review progress and consults widely with key stakeholders.
- The national committee may find it useful to establish cross-sectoral and inter-departmental/inter-ministerial working groups to compile data and information for specific sections of the Country Report, or to write specific chapters of the Country Report.
- The National Focal Point should coordinate the preparation of the first draft of the Country Report, which should be reviewed by the national committee. The National Focal Point should facilitate a consultative process for broader stakeholder review, including stakeholders from various ministries, departments, NGOs, research institutions, and stakeholders with experiential knowledge, such as farmers, pastoralists, forest dwellers and fisher folk, etc.

- Following the stakeholder review, the National Focal Point should coordinate the finalization of the Country Report, submit it to the government for official endorsement and transmit it to FAO in one of the Organization's official languages (Arabic, Chinese, English, French, Russian and Spanish) by 31 December 2014. The Country Report will be an official government report.
- If countries are unable to submit final Country Reports by the set deadline, preliminary reports of findings should be provided to FAO to contribute to the identification of global priorities for inclusion in the SoWBFA Report.

The FAO contact for the preparation of Country Reports is:

Secretariat

Commission on Genetic Resources for Food and Agriculture

Food and Agriculture Organization of the United Nations

Viale delle Terme di Caracalla

00153 Rome, Italy

Fax: +39 0657055246

Email: SOW-BFA@fao.org

## V. DETAILED METHODOLOGY AND GUIDANCE BY CHAPTER

The guidelines outline the suggested content and provide questions to assist countries to undertake their strategic analysis and develop each section of their Country Report. The questions are provided to facilitate analysis, to stimulate discussion and to ensure that the Country Report contains strategic directions that address priorities and needs. Questions that are critical to enable basic understanding of the conditions in your country and facilitate regional and global synthesis of the data and information collected are indicated in **bold**. Please try to ensure that data and information are provided for these questions wherever such information is available.

Questions are organized and formulated in relation to the production systems that are present in your country. Thus it is very important to fill in Table 1 in the Introduction to establish a list of production systems that will be used throughout the Guidelines.

<b>EXECUTIVE SUMMARY</b>
--------------------------

**It is recommended that the Country Report contains an executive summary of 2-3 pages highlighting the main findings of the analysis and providing an overview of key issues, constraints and existing capacity to address the issues and challenges. The executive summary should indicate trends and driving forces and present an overview of the proposed strategic directions for future actions aimed at the national, regional and global levels.**

## CHAPTER 4: The state of use of biodiversity for food and agriculture

### *Proposed structure of the chapter and information to be included in the Country Reports*

The questions in this chapter seek to obtain information on:

- The contribution of biodiversity for food and agriculture to:
  - production (or provisioning ecosystem services) and especially to food security and nutrition and to rural poverty reduction;
  - supporting and regulating ecosystem services;
  - sustainability and resilience;
- The application of an ecosystem approach;
- The state of the sustainable use of biodiversity for food and agriculture.

Since the sectoral State of the World reports already presented or in preparation provide information separately on the use of animal, aquatic, forest and plant genetic resources, the responses here should provide available information on:

- The combined use of genetic resources coming from different sectors;
- Synergies between genetic resources of the different sectors
- The use of all types of associated biodiversity, either as separate components or in combination;
- The use of wild foods and, where information exists, other important wild harvested products.

The uses of biodiversity for food and agriculture can include:

- The direct use of genetic resources from different sectors or of associated biodiversity and wild foods, individually or in combination;
- The indirect use through the provision of supporting and regulating ecosystem services;
- The support for land/water restoration or other land/water management objectives;
- The support of cultural ecosystem services including:
  - Use for cultural, amenity or social reasons;
  - Use in education or scientific research.

To help reporting and provide a common framework for analysis of Country Reports a set of biodiversity maintaining management practices and diversity based practices have been identified in Annex 5 and Annex 6. These provide a framework for a number of the questions in this Chapter.

The information provided for this Chapter should also cover the adoption of an ecosystem approach. One such approach has been developed under the Convention on Biological Diversity and comprises 12 principles<sup>6</sup>.

A final section of this Chapter of the Country Report should address the sustainable use of different components of biodiversity for food and agriculture, wild foods and other wild harvested products.

---

<sup>6</sup> <http://www.cbd.int/ecosystem/principles.shtml>

Where information is available, comment on the different roles played by men and women in the use of genetic resources, use and consumption of wild foods and knowledge over local ecosystems.

***The use of management practices or actions that favor or involve the use of biodiversity for food and agriculture***

This section looks for information on the extent to which biodiversity maintaining management practices and diversity based practices are in use in your country.

**Considerations on questions 52 and 53:** These questions were not answered because of the complexity of the requested data. Although some information is available to the Brazilian Institute of Geography and Statistics (IBGE) and the National Supply Company (CONAB) and other federal government agencies, these are available in the form of raw data, which would depend on months of analysis of tables and graphs to arrive at an answer that is as close as possible to reality, and that, even so, would already be out of date, since the last agricultural recapture of Brazil dates from 2006. However, in the year 2017 the Brazilian Institute of Geography and Statistics (IBGE) is preparing the new Agricultural Census in the country. Data collection will be done in more than 5.3 million agricultural establishments throughout the country and will support the implementation of the National System of Agricultural Research, which will allow the creation of the National Survey by Sample of Agricultural Establishments. The research will allow to capture detailed data on income and expenses in production, credit and rural insurance, use of irrigation, protection of springs, conservation of fauna and flora, use of agrochemicals, production techniques, besides the social and family situation of the workers of the field (<https://censos.ibge.gov.br/agro/2017>). These data will be available from the second semester of 2018, when the country will then be able to respond more reliably and accurately to these issues.

**52. For each of the production systems present in your country (indicated in Table 1) indicate in Table 20 the extent of use of management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture.**

**A full description of the production practices listed is given in Annex 5 and the table below should be completed separately for each production system.**

**In each table indicate the percent of total production area or quantity under the practice (where known), changes that have occurred over the last 10 years in the production area or quantity under the practice (significant increase (2), some increase (1), no change (0), some decrease (-1), significant decrease (-2), not known (NK), not applicable (NA)), and any identified change in biodiversity for food and agriculture associated with the practice (strongly increasing (2) increasing (1), stable (0) decreasing (-1), strongly decreasing (-2), not known (NK), not applicable (NA)).**

**Table 1.** Management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture

<b>Production system Livestock grassland-based systems: Tropics [L1]</b>
--

<b>Management practices<sup>7</sup></b>	<b>Percent of production area or quantity under the practice (%)</b>	<b>Change in production area or quantity under the practice (2,1,0,-1,-2, NK, NA)</b>	<b>Effect on biodiversity for food and agriculture (2,1,0,-1,-2, NK, NA)</b>
Integrated Plant Nutrient Management (IPNM)	NK	NK	NK
Integrated Pest Management (IPM)	NK	NK	NK
Pollination management	NK	NK	NK
Landscape management	NK	NK	NK
Sustainable soil management practices	NK	NK	NK
Conservation agriculture	NK	NK	NK
Water management practices, water harvesting	NK	NK	NK
Agroforestry	NK	NK	NK
Organic agriculture	NK	NK	NK
Low external input agriculture	NK	NK	NK
Home gardens	NK	NK	NK
Areas designated by virtue of production features and approaches	NK	NK	NK
Ecosystem approach to capture fisheries	NK	NK	NK
Conservation hatcheries	NK	NK	NK
Reduced-impact logging	NK	NK	NK
Others (describe)	NK	NK	NK
	NK	NK	NK

**Note:** Data marked with NK (not known) does not necessarily mean absence of data, but only that the information was not readily available. Methodologies should be developed to answer this question, including statistical analyzes of the data.

Provide or cite references to any documentary evidence that exists to support the evaluation given above. Indicate where practices used in a production system are affecting biodiversity for food and agriculture in another production system.

Where evidence exists of an effect of any of these practices on biodiversity for food and agriculture, provide a brief summary of the effect, the components of biodiversity for food and agriculture affected, and available indicators. Include any available references or reports.

**53. For each of the production systems present in your country (indicated in Table 1) indicate in Table 21 the extent of use of diversity based practices that involve the use of biodiversity for food and agriculture.**

**A definition of the diversity based practices listed is provided in Annex 6; the table below should be completed separately for each production system.**

**In each table indicate the percent of total production area or quantity under the practice (where known), changes in the production area or quantity under the practice that have occurred over the last 10 years (strongly increasing (2), increasing (1), stable (0) decreasing (-1), strongly decreasing (-2), not known (NK)) and any identified change in biodiversity for**

<sup>7</sup> Detailed descriptions of management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture can be found in Annex 5.

food and agriculture associated with the diversity based practice (strongly increasing (2) increasing (1), stable (0) decreasing (-1), strongly decreasing (-2), not known (NK)).

**Table 2.** Diversity based practices that involve the enhanced use of biodiversity for food and agriculture

<b>Livestock grassland-based systems: Tropics [L1]</b>			
<b>Diversity based practices <sup>8</sup></b>	<b>Percent of production area or quantity under the practice (%)</b>	<b>Change in production area or quantity under the practice (2,1,0,-1,-2, NK, NA)</b>	<b>Effect on biodiversity for food and agriculture (2,1,0,-1,-2, NK)</b>
Diversification	NK	NK	NK
Base broadening	NK	NK	NK
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	NK	NK	NK
Restoration practices	NK	NK	NK
Management of micro-organisms	NK	NK	NK
Polyculture/Aquaponics	NK	NK	NK
Swidden and shifting cultivation agriculture	NK	NK	NK
Enriched forests	NK	NK	NK
Others [ <i>please specify</i> ]	NK	NK	NK

**Note:** Data marked with NK (not known) does not necessarily mean absence of data, but only that the information was not readily available. Methodologies should be developed to answer this question, including statistical analyzes of the data.

Briefly summarize the information that exists on the effect of the diversity based practice on different components of biodiversity for food and agriculture. Indicate where practices used in a production system are affecting biodiversity for food and agriculture in another production system. Include any available references or reports to support the evaluation given above.

**54. List and briefly describe any specific programmes or projects that have been undertaken in the country to support any of the practices listed in Table 20 and Table 21. Provide information where available on what types of activities were supported, areas and numbers of farmers, pastoralists, forest dwellers and fisher folk involved, state and outcome with respect to components of biodiversity for food and agriculture.**

- Programa ABC (Low Carbon Agriculture Program) – Actions to be taken to adopt the sustainable production technologies selected to meet the commitments to reduce greenhouse gas emissions. The Sectoral Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low Carbon Economy Economy - ABC is one of the sectoral plans elaborated in accordance with article 3 of Decree No. 7,390 /2010 and the organization and planning of the actions to be taken to adopt the sustainable production technologies selected to meet GHG emission reduction commitments in the agricultural sector assumed by the country. The ABC Plan is composed of seven programs, six of which are related to mitigation technologies, and one last program with actions to adapt to climate change:

<sup>8</sup> Detailed descriptions of diversity based interventions can be found in Annex 6.

- Program 1: Recovery of Degraded Pastures;
- Program 2: Integration of Livestock-Livestock-Forest (iLPP) and Agroforestry Systems (SAFs);
- Program 3: Direct Planting System (SPD);
- Program 4: Biological Fixation of Nitrogen (BNF);
- Program 5: Planted Forests;
- Program 6: Treatment of Animal Waste;
- Program 7: Adapting to Climate Change.
- The scope of the ABC Plan is national and its period of validity is from 2010 to 2020, and revisions and updates are planned in regular periods not exceeding two years ago, to re-adjust it to the demands of society, new technologies and incorporate new actions and goals, if necessary.
- To reach the objectives outlined by the ABC Plan, in the period between 2011 and 2020, it is estimated that resources of the order of R\$ 197 billion will be required, financed with budgetary sources or through credit lines.
- The ABC Plan should be understood as the instrument for integrating the actions of governments (federal, state and municipal), the productive sector and civil society, to reduce emissions of greenhouse gases (GHG) from agricultural, forestry activities and livestock. For its effectiveness an institutional arrangement will be established that involves the representations of the various entities involved. The participation of civil society is essential and reaffirms the democratic character in the design and implementation of the programs envisaged.
- The ABC Plan has a credit line - ABC Program - approved by BACEN Resolution No. 3.896 of 08/17/10.

***Sustainable use of biodiversity for food and agriculture***

Sustainable use of biodiversity for food and agriculture ensures its utilization in ways that do not compromise its continuing availability and its use by future generations. Sector reports will provide information on sustainable use of the different sector genetic resources. Here the focus is therefore on associated biodiversity and on wild foods.

**55. What are the major practices in your country that negatively impact associated biodiversity and/or wild foods? Answers can be provided in Table 22 where examples of general types of practices are listed.**

**Table 3.** Major practices that negatively impact associated biodiversity and/or wild foods in the country.

Types of practices	Major practice (Y/N)	Description	Reference
Over-use of artificial fertilizers or external inputs			
Over-use of chemical control mechanisms (e.g. disease control agents, pesticides, herbicides, veterinary drugs, etc.)			
Inappropriate water			

management			
Practices leading to soil and water degradation			
Over-grazing			
Uncontrolled forest clearing			
Fishing in protected areas			
Overharvesting			
Others [ <i>please specify</i> ]			

[Insert rows as needed]

Please comment on the reasons why the practices are in use and discuss if trade-offs are involved.

**56. Briefly describe any actions and countermeasures taken to limit unsustainable use and/or support sustainable use of associated biodiversity and/or wild foods.**

- The National Plan for the Promotion of Sociobiodiversity Production Chains (PNPPS) seeks to promote the sustainable use of biodiversity and ensure generation of alternative incomes for rural communities through access to credit, technical assistance and rural extension, markets and trade instruments and guaranteeing a minimum price.
- Demarcation of Extractivist Reserves (RESEX) as territorial spaces destined for the agrosustainable development and conservation of renewable natural resources by extractivist populations.
- Demarcation of Sustainable Development Reserves (RDS), which are natural areas that shelter traditional populations, whose existence is based on sustainable systems of exploitation of natural resources, developed over generations and adapted to local ecological conditions and which play a fundamental role in protecting the nature and the maintenance of biological diversity.
- Initiative Plants for the Future, which aims to identify native species of native flora of Brazil of current or potential economic use. This initiative has already listed more than 70 species directly used in food by rural and urban communities in the various regions of Brazil. The Initiative also considers the species used as medicine, fiber, oils, animal feed, meats and energy, among others, which are not used directly for human consumption but are part of agricultural production and linked to the food and nutritional security of the population.
- Good Practices in Sustainable Management: a series of instructional guides aimed at rural communities and family farmers, to guide the sustainable collection and integral use of fruits, fibers and honey. Information for various native fruits of the Cerrado and the Caatinga is already available, such as pequi (*Caryocar brasiliensis*) and mangaba (*Hancornia speciosa*). (<http://www.ispn.org.br/categoria/editais-e-documentos/publicacoes/>).

**57. Provide in Table 23 any information available that lack of biodiversity for food and agriculture is limiting food security and nutrition, and/or rural livelihoods in the different production systems in your country. Indicate the production systems affected together with**

any information on the extent of problem (significant lack (2), some lack (1)), describe the effects on livelihood, food security and nutrition, and the components of biodiversity for food and agriculture that are limited. The list of components of biodiversity for food and agriculture given in Annex 1 should be used where possible.

**Table 4.** Effect of the lack of biodiversity for food and agriculture on production, food security and nutrition and livelihood.

Production system	Biodiversity component for which diversity is lacking <sup>9</sup>	Extent of problem (2,1)	Effect on food security and nutrition	Effect on livelihood	Reference
Livestock grassland-based systems	NK	NK	NK	NK	NK
Livestock landless systems	NK	NK	NK	NK	NK
Naturally regenerated forests	NK	NK	NK	NK	NK
Planted forests	NK	NK	NK	NK	NK
Self-recruiting capture fisheries	NK	NK	NK	NK	NK
Culture-based fisheries	NK	NK	NK	NK	NK
Fed aquaculture	NK	NK	NK	NK	NK
Non-fed aquaculture	NK	NK	NK	NK	NK
Irrigated crops (rice)	NK	NK	NK	NK	NK
Irrigated crops (other)	NK	NK	NK	NK	NK
Rainfed crops	NK	NK	NK	NK	NK
Mixed systems (livestock, crop, forest and /or aquatic and fisheries)	NK	NK	NK	NK	NK
Mixed forests	NK	NK	NK	NK	NK
Organic systems	NK	NK	NK	NK	NK
Extractive systems	NK	NK	NK	NK	NK

**Note:** Data marked with NK (not known) does not necessarily mean absence of data, but only that the information was not readily available. Methodologies should be developed to answer this question, including statistical analyzes of the data.

*The contribution of biodiversity for food and agriculture to improving productivity, food security and nutrition, livelihoods, ecosystem services, sustainability, resilience and sustainable intensification*

<sup>9</sup> Please refer to list in Annex 1.

This section looks for information on the direct contributions of biodiversity for food and agriculture to improving productivity, food security and nutrition, livelihoods, ecosystem services, sustainability, resilience and sustainable intensification. It is concerned specifically with the combined use of genetic resources coming from different sectors, the use of all types of associated biodiversity, the use of wild foods and, where information exists, other important wild products.

*Note the ways in which biodiversity for food and agriculture contributes to food security and nutrition, livelihoods, ecosystem services, sustainability, resilience and sustainable intensification are often linked. Answers to the requests for information below may therefore be combined.*

**58. Where available, provide information that increasing the amount of biodiversity for food and agriculture, including associated biodiversity, in production systems in your country have improved the following:**

- a) **Productivity:** In the last three decades the cultivation of oil palm (*Elaeis guineensis*) in Brazil was practically unviable by a disease known as Budd root. However, studies on native biodiversity revealed a native oil palm species from Amazonia, caiaué (*Elaeis oleifera*), which once hybridized with *E. guineensis*, resulted in individuals tolerant to budd root. These hybrids currently form the basis of commercial palm oil crops in Brazil. According to data from Embrapa, the productive potential of the crops is 5-7 t/ha with the new cultivars tolerant to the diseases.
- b) **Food security and nutrition:** Rescue of native unconventional vegetables and reinsertion of these species in rural and urban feeding. Unconventional vegetables are species present in some regions that influence the feeding of populations, especially in rural areas. The recovery and appreciation of traditional varieties of vegetables represents important gains from a cultural, economic, social and nutritional point of view. The cultivation of these vegetables is done by traditional populations and small family farmers, who preserve the knowledge about their cultivation and consumption, passing from generation to generation. In addition, it provides options for the diversification of agricultural crops, as well as rich and diversified nutrient sources for the populations, especially in the poorer regions.
- c) **Rural livelihoods:** An important means of ensuring the subsistence of rural families is forest restoration. Tropical forest restoration projects help restore degraded, damaged, or destroyed ecosystems, and bring economic benefits to landowners. Forest restoration is an efficient way to increase food production and improve livelihoods, as well as a way to provide an economic return to landowners. Restored tropical forests can potentially help increase crop yields as they harbor pollinators of these crops and natural enemies of pests.
- d) **Ecosystem services:** The conservation of biodiversity and the sustainable use of its components, not only of each species for their intrinsic value, but also of their interactions and diverse roles in ecosystems, which result in ecosystem services that are essential for the maintenance of life on Earth. Land as well as to directly or indirectly sustain all economic activities. Loss of biodiversity, and / or changes in the composition of ecosystem biodiversity, inevitably results in some degree of impact on ecosystem balance and service delivery.

- e) **Sustainability:** The vast majority of species native to Brazilian biodiversity are exploited in an extractive way, which may compromise the sustainability of the activity in the short term. One way of minimizing the effects of this activity on natural populations is the genetic improvement of native species with potentials of economic use in the short term. Recently, it has been introduced two passion fruit cultivars resulting from the selection of wild materials from the Cerrado and Caatinga biomes. In 2015 the cultivar of maracuja Pérola do Cerrado, developed from the species *Passiflora setacea*, native of Cerrado and with productive potential of 25 tons / ha / year. In 2016 the cultivar BRS Sertão Forte was launched, based on the selection of accesses of the species *Passiflora cincinnata*, native to the Caatinga and with production potential of up to 30 tons / ha / year. The prospect is that in the next years, the same is done with other native food species.
  
- f) **Resilience:** Natural capital and ecosystem services have been instrumental in resilience of important sectors of the national economy, such as agriculture, energy, fisheries, forestry, and extractivism. As knowledge about Brazilian biodiversity increases, so does the variety of food options for wild relatives of cultivated species, and new sources of fiber, medicines, essential oils and a variety of other products.
  
- g) **Sustainable intensification:** The diversification of agricultural crops with the introduction of native species more resistant to drought, pests and diseases can help to significantly reduce the use of agrochemicals. In addition, it enables a more balanced environment for the organic production system, diversifying the supply of food and reducing the effects of the seasonality of some products. Increasing diversity is a fundamental condition for the implementation of mixed systems, such as agroforestry and agroforestry systems, for example, which benefit from increased possibilities of crop combinations.

**What specific actions have you undertake to strengthen the contribution of biodiversity for food and agriculture to improving these outcomes? For each of these aspects, briefly describe the nature and scale of the actions implemented, the production systems involved, and the outcomes, results obtained or lessons learned from these actions.**

Where available provide information on the components of biodiversity for food and agriculture involved, the stakeholders involved and the gender aspects of these actions. Note that information on policies, legislation or regulations should be reported in Chapter 5 and your response here should be concerned with interventions at production system level.

**59. Do you have information on the proportion of the population in your country that uses wild food on a regular basis for food and nutrition? If available, include information such as the proportion of the diet that is collected from the wild in normal time and in times of scarcity, drought, natural and human-made disaster, and the degree to which wild foods are used (for subsistence, supplementing, nutrition, other).**

- o It unknown how many people use wild foods on a regular basis, although the figures are high, mainly among rural peoples, represented by ca. 31.3 million peoples. Increasing availability of wild foods (eg. Brazil nut, pequi, açaí, umbu, pinhão, buriti, palmito, among others) is being regularly commercialized, either formally or informally, highlighting the increasing demand for products from biodiversity. In the last decade, an increasing number of products and increasing volume is being commercialized from small fairs and roadsides to large, sophisticated, supermarkets. Wild food is regularly consumed by rural people, and with not the same frequency by urban people.

- In Brazil, there are no official data on the percentage of the population that regularly consumes native (Wild) species in their diet. It is a matter of great complexity and, for a realistic analysis, needs to consider the ethnic and environmental diversity and the economic aspects that forms the population of Brazil. However, based on the observations of the feeding habits in the different regions of the country, it is possible to infer that native species are part of the diet of a very expressive contingent of the Brazilian population although the species used (plants and animals) and the intensity of the use may vary by region.
- In the case of plants, there are species of restricted regional use, such as the pequi (*Caryocar brasiliensis*) and the gueroba ( *Syagrus oleracea*) that are part of the daily diet of the central-west region of Brazil; the chicória (*Eryngium foetidum*) and the cupuaçu (*Theobroma grandiflorum*) are frequently consumed in the Northern Region; the umbu (*Spondias mombin*) is more consumed in the Northeast; the mangarito (*Xanthosoma riedeianum*) and the ora-pro-nobis (*Pereskia aculeata*) are part of important dishes of the Southeast region cuisine.
- On the other hand, species such as açai (*Euterpe oleracea*), pupunha (*Bactris gasipaes*), cará (*Dioscorea* spp.) and taioba (*Xanthosoma taioba*) are part of the daily diet, especially of the urban population, in all regions of the country and are easily found in street markets and supermarkets.
- In the specific case of the use of wild animals on diet the situation is more complex and, possibly, the number of people who regularly eat those animals is small, restricted only to indigenous peoples and some traditional communities. Brazil has a high diversity of wild animals, however, much of it is threatened with extinction, mainly, due to deforestation, habitat fragmentation and hunting pressure. Those processes act synergistically and lead to an accelerated extinction process of native fauna. Hunting is prohibited in the country, although there are some movements pressing the federal government for its legalization in special situations. The products from hunting are mostly destined to family feeding, without involving commercialization and presents very distinct regional characteristics. There is a preference for cervids, tapirs, agouti, pacas, wild pigs, armadillos, monkeys, coatis, jacus, partridges and turtles.

### *The adoption of ecosystem approaches*

**60. Describe in Table 24 the extent to which you consider that ecosystem approaches<sup>10</sup> have been adopted for the different production systems in your country (widely adopted (2), partially adopted (1), not adopted (0), not applicable (NA)) and indicate whether ecosystem approaches are considered of major importance (2), some importance (1), no importance**

---

<sup>10</sup> The ecosystem approach concept is generally understood to encompass the management of human activities, based on the best understanding of the ecological interactions and processes, so as to ensure that ecosystems structure and functions are sustained for the benefit of present and future generations. Ecosystem approaches include the Convention on Biological Diversity's Ecosystem Approach, Integrated Land Use Planning, Integrated Water Resource Management, Sustainable Forest Management, Code of Conduct for Responsible Fisheries, Ecosystem approach to fisheries management, etc.

**(0), not applicable (NA). You may also want to describe landscape approaches<sup>11</sup> that have been adopted in your country.**

**Table 5.** Adoption of and importance assigned to ecosystem approaches in production systems in the Country.

<b>Production systems</b>	<b>Ecosystem approach adopted (name)</b>	<b>Extent of adoption (2,1,0,NA)</b>	<b>Importance assigned to the ecosystem approach (2,1,0,NA)</b>
<b>Code or name</b>			
Livestock grassland-based systems	NK	NK	NK
Livestock landless systems	NK	NK	NK
Naturally regenerated forests	NK	NK	NK
Planted forests	NK	NK	NK
Self-recruiting capture fisheries	NK	NK	NK
Culture-based fisheries	NK	NK	NK
Fed aquaculture	NK	NK	NK
Non-fed aquaculture	NK	NK	NK
Irrigated crops (rice)	NK	NK	NK
Irrigated crops (other)	NK	NK	NK
Rainfed crops	NK	NK	NK
Mixed systems (livestock, crop, forest and /or aquatic and fisheries)	NK	NK	NK
Mixed forests	NK	NK	NK
Organic systems	NK	NK	NK
Extractive systems	NK	NK	NK

**Note:** Data marked with NK (not known) does not necessarily mean absence of data, but only that the information was not readily available. Methodologies should be developed to answer this question, including statistical analyzes of the data.

**61. For each production system in which an ecosystem and landscape approach has been widely adopted (as indicated in Table 24) describe:**

- a) **The specific actions that have been taken to ensure adoption;**
- b) **Any observed results from adoption;**
- c) **Plans for adoption or for further adoption in new or existing production areas;**
- d) **Lessons learned.**

### *Gaps and priorities*

<sup>11</sup> A “landscape approach” means taking both a geographical and socio-economic approach to managing the land, water and forest resources that form the foundation – the natural capital – for meeting our goals of food security and inclusive green growth. By taking into account the inter-actions between these core elements of natural capital and the ecosystem services they produce, rather than considering them in isolation from one another, we are better able to maximize productivity, improve livelihoods, and reduce negative environmental impacts.

**62. With respect to the use of management practices or actions that favor or involve the use of biodiversity for food and agriculture:**

**a) What are the major gaps in information and knowledge?**

- With regard to aquatic resources, one of the greatest challenges is still the generation of essential information on existing stocks and the development of adequate systems for monitoring and sustainable exploitation.
- As for Conservation Units, it is necessary to develop strategies to achieve effective and equitable management of protected areas, as well as to ensure ecological interconnection, integration and representativeness in broader land and sea landscapes.

**b) What are the main capacity or resources limitations?**

- There are few professionals trained to act in the identification of potentials, promotion and use of Brazilian biodiversity, in addition to the low volume of financial resources expended to meet the demands of the area.

**c) What are the main policy and institutional constraints?**

- Work in an integrated manner to comply with international commitments (CBD and Aichi Targets) and national (National Biodiversity Targets);
- Meeting national expectations for economic growth and poverty reduction, supported by a development model strongly dependent on conventional models for the use of natural resources;
- Build the necessary articulation at national level among political actors responsible for developing policies and strategies that influence (or are influenced) by the condition of ecosystems;
- Define and prioritize clear policies and sectoral instruments to foster the internalization of the economic benefits resulting from the sustainable use of natural resources, as well as engaging decision makers.

**d) What actions are required and what would be the priorities?**

- Continue and increase investments in the generation of knowledge and skills;
- Invest in the continuous improvement of environmental monitoring and inspection activities;
- Integrate biodiversity issues into sectoral programs and policies;
- Increase the scale of the several other initiatives that have already been implemented to achieve the achievement of the National Biodiversity Targets for 2020.

**63. With respect to the sustainable use of biodiversity for food and agriculture:**

**a) What are the major gaps in information and knowledge?**

- The realization of fauna and flora inventories that allow to cover larger areas within one or several biomes. In general, these records tend to be more concentrated in easily accessible and densely populated regions, leaving large ranges of biomes outside of these studies (veil line), leading to large knowledge gaps on species diversity.

- There is no technical guidance on the propagation, cultivation or management of most native species with potential for economic use. Information on productivity, sustainable use, rate of resource collection, and information that enables commercial cultivation and genetic improvement of these species is also rare.

**b) What are the main capacity or resources limitations?**

- There are few professionals trained to act in the identification of potentials, promotion and use of Brazilian biodiversity, in addition to the low volume of financial resources expended to meet the demands of the area.

**c) What are the main policy and institutional constraints?**

- Policies for changing and/or adapting the curriculum of the Agrarian and Biological Sciences courses, with the inclusion of specific disciplines on the use and importance of biodiversity for food and agriculture, with a view to expanding the training of professionals, as well as promoting a broader awareness of the use and valorization of Brazilian biodiversity.
- Improve the synergy and integration between the various existing public policies that aim at regional development and the sustainable use of biodiversity.

**d) What actions are required and what would be the priorities?**

- Expand studies of forest inventories for areas not yet fully covered;
- For native species of extractive exploitation, expand studies to define good practices for sustainable use, as has already been done for babassu (*Attalea speciosa*), Brazil nut (*Bertholletia excelsa*) and Carnauba (*Copernicia prunifera*).
- To develop agronomic studies that subsidize the elaboration of minimal packages of technology, that allow the commercial cultivation of native species;
- Discuss with the Universities the adaptation of curricula of the courses to the inclusion of specific disciplines on biodiversity, especially in undergraduate courses, where the subject is still approached quite superficially.
- Work the demands, through fairs and events that promote biodiversity and its flavors, so that society in general knows the richness of food provided by Brazilian biodiversity and understands the importance of its use, as a way of preserving the national heritage.

**64. With respect to the contribution of biodiversity for food and agriculture to improving productivity, food security and nutrition, livelihoods, ecosystem services, sustainability, resilience and sustainable intensification:**

**a) What are the major gaps in information and knowledge?**

- Know the effects of the increase or loss of biodiversity on each of the systems described above;

- There are no studies on the percentage of the Brazilian population that uses biodiversity, not only from a nutritional and nutritional point of view, but also that it makes use of phytotherapies, which grows in organic agriculture, in the production of meat, milk, honey, recovery of degraded ecosystems, among other services;

**b) What are the main capacity or resources limitations?**

- There are few professionals trained to act in the identification of potentials, promotion and use of Brazilian biodiversity, in addition to the low volume of financial resources expended to meet the demands of the area.
- Still in relation to the limitations of human capital, a deeper knowledge of biodiversity requires the presence of professionals specialized in the dynamics of each region / biome, prepared to deal with and understand the seasonal variations and climatic extremes - increasingly common - and with the ability to recognize the dynamics and potential of biological diversity.

**c) What are the main policy and institutional constraints?**

- Develop tools and policies and improve existing ones to more effectively measure the positive impacts of the use of biodiversity on the country's economy. After all, the concept of biodiversity has gained prominence because many of its elements provide environmental services that are worth billions of reais per year and can be traded; are necessary to maintain the quality of life; are closely related to many of the traditional knowledge and cultures; and make up the base of most tourist attractions.

**d) What actions are required and what would be the priorities?**

- Invest in technical vocational training, so that the knowledge generated by scientific studies can be interpreted and put into practice by the rural producers;
- To develop tools to evaluate the percentage of the Brazilian population that benefits directly and indirectly from native biodiversity, as well as the impacts thereof for food and nutritional security;
- Increase, through public policies, the incentives for agro-ecological based agriculture, which focus on maintaining biodiversity and ecosystem services.

**65. With respect to the adoption of ecosystem approaches:**

**a) What are the major gaps in information and knowledge?**

- Broaden the knowledge of biodiversity as a whole and not only of isolated parts. Biodiversity consists not only of static units (species), but also of processes such as carbon stocking, nutrient cycling, pollination and genetic selection critical to the viability of extractive, biotechnological and agricultural industries. Much of the biodiversity is in micro-organisms and it may take years of intensive study to get a sense of the hidden biodiversity within the soil and tissues of other living things.

**b) What are the main capacity or resources limitations?**

- There are few professionals trained to act in the identification of potentials, promotion and use of Brazilian biodiversity, in addition to the low volume of financial resources expended to meet the demands of the area.
  - Still in relation to the limitations of human capital, a deeper knowledge of biodiversity requires the presence of professionals specialized in the dynamics of each region / biome, prepared to deal with and understand the seasonal variations and climatic extremes - increasingly common - and with the ability to recognize the dynamics and potential of biological diversity.
- c) What are the main policy and institutional constraints?**
- Develop tools and policies and improve existing ones to more effectively measure the positive impacts of the use of biodiversity on the country's economy. After all, the concept of biodiversity has gained prominence because many of its elements provide environmental services that are worth billions of reais per year and can be traded; are necessary to maintain the quality of life; are closely related to many of the traditional knowledge and cultures; and make up the base of most tourist attractions.
- d) What actions are required and what would be the priorities?**
- Invest in technical vocational training, so that the knowledge generated by scientific studies can be interpreted and put into practice by the rural producers;
  - To develop tools to evaluate the percentage of the Brazilian population that benefits directly and indirectly from native biodiversity, as well as the impacts thereof for food and nutritional security;
  - Increase, through public policies, the incentives for agro-ecological based agriculture, which focus on maintaining biodiversity and ecosystem services.

<p><b>CHAPTER 5: The state of interventions on conservation and use of biodiversity for food and agriculture</b></p>
--

***Proposed structure of the chapter and information to be included in the Country Reports***

The main objective of this chapter is to provide an assessment and analysis of national and local interventions and activities, along with the state of international collaboration, that support conservation and sustainable use of biodiversity for food and agriculture. The analysis of interventions specific to plant, animal, forest and aquatic genetic resources will be based on the information provided in the respective State of the World Reports.

Information on the following topics should be covered in the Country Report:

- National policies, programmes and enabling frameworks that support or influence conservation and sustainable use of biodiversity for food and agriculture and the provision of ecosystem services;
- Policies, programmes and enabling frameworks governing exchange, access and benefits;

- Information management;
- Local and informal-sector actors and initiatives;
- Availability of capacity and resources;
- Participation in international and regional policies, legal frameworks and collaboration with other countries;
- Knowledge generation and science for the management and sustainable use of biodiversity for food and agriculture.

*National policies<sup>12</sup>, programmes<sup>13</sup> and enabling frameworks that support or influence conservation and sustainable use of biodiversity for food and agriculture and the provision of ecosystem services*

**66. Identify and describe the main policies, programmes and enabling frameworks that support or specifically address the objectives below, briefly describing the policies, programmes or enabling frameworks listed and provide any available information on the extent of implementation or of lessons learned. For each objective, list up to 10 major policies, programmes and enabling frameworks.**

- a) Support the integrated conservation and sustainable use of biodiversity for food and agriculture across sectors<sup>14</sup>;**
- Agricultural Policy for Planted Forests (Decree 8.375/2014).
  - Agricultural Risk Zoning (ZARC) is an instrument of agricultural policy and risk management in agriculture. The study is designed with the objective of minimizing the risks related to adverse climatic phenomena and allows each municipality to identify the best planting season of the crops, in the different types of soil and crop cycles. The technique is easily understood and adopted by farmers, financial agents and other users.
  - National Policy for the Sustainable Development of Aquaculture and Fisheries, regulates fishing activities.
  - The National Biodiversity Policy, the Biodiversity Strategy and Action Plan (NBSAP) together with the CBD National Targets for 2020 pursue the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising from the utilization of the genetic resources, components of the genetic heritage and associated traditional knowledge.
  - The National Plan for the Promotion of Sociobiodiversity Production Chains (PNPPS) seeks to promote the sustainable use of biodiversity and ensure generation of alternative incomes for rural communities through access to credit,

---

<sup>12</sup> Policies include laws and legislature, as well as regulations, certification procedures and other mechanisms that incentivize conservation and sustainable use of biodiversity for food and agriculture.

<sup>13</sup> Programmes include initiatives and actions implemented and organized at all levels from community and stakeholder groups to national and regional organizations, as well as local implementation of international programmes.

<sup>14</sup> Countries that previously presented or are currently preparing a Country Report on Forest, Aquatic, Animal or Plant Genetic Resources may wish to use information from their different sector reports.

technical assistance and rural extension, markets and trade instruments and guaranteeing a minimum price.

- The General Policy of Minimum Prices for Sociobiodiversity (PGPMBio) was established through Decree-Law No. 79 (1996), which defined criteria for the establishment of minimum prices and procurement of agricultural products. More recently, Law No. 11775 (2008) established a direct subsidy to producers, including for biodiversity products. Under this policy, a subsidy is paid to those agroextractivists that could not market their product at the minimum price established by the Federal Government. The subsidy is the difference between the minimum price and the value of the sale. The Brazilian Government has selected 30 NTFP species for priority intervention aimed to promote their sustainable use. Of these, 13 species have minimum prices established under the PGPMBio. Additionally, eight new species are being considered for inclusion in the PGPMBio policy, namely: buriti (*Mauritia flexuosa*); murumuru (*Astrocaryum murumuru*), macaúba (*Acrocomia aculeata*), fava d'anta (*Dimorphandra mollis*), licuri (*Syagrus coronata*), maracujá do mato (*Passiflora cincinnata*), erva mate (*Ilex paraguariensis*) and processed piaçava (*Attalea funifera*).
- The National Program for Strengthening of Family Agriculture (PRONAF) established in 1996 provide financing to family farmers for agricultural production. PRONAF is an important tool to promote a greater political visibility of family farming in the country and has facilitated access to credits to 781,000 farmers. Although the number is low compared to the total number of farms in the country, the program has nevertheless supported a significant increase in the volume of food produced by family farming and improvement of the socioeconomic conditions of many families, It has also had important impacts on Municipalities, increasing job opportunities, revenues and rising the municipal sector GDP. Disbursements of credits under the program increased from US\$0.72 billion in 2001 to US\$ 11 billion in 2013.
- The Food Acquisition Program (PAA) was established in 2003 with the objectives of promoting access to food by people in a situation of food insecurity and promoting social and economic inclusion in the rural areas by strengthening family agriculture. Under the program, the federal government purchases family farmers' products, paying a limited amount to each farmer, stores the products and freely distributes them in areas where social vulnerability is higher. The PAA is part of the PGPMBio, but it is not restricted to products that have a minimum price; it also purchases NTFPs and AFS products that are not supported by the PGPMBio. Between 2003-2010 the PPA invested a total of US\$ 1,6 billion purchasing farm products from an average of about 112,000 farmers annually (2.6% of Brazilian family farmers).
- The National School Lunch Program (PNAE), was established in 1955 and aims to partially meet the nutritional needs of students through the provision of at least one meal a day in all public schools registered in the school census, seeking to fulfill the nutritional requirements during the school year. Since 2009 the PNAE ensures that at least 30% of the funds transferred from the National Fund for the Development of Education (FNAE) to the Municipalities (which are in charge of purchasing and distributing products to schools) are invested in procuring family

agriculture products. In 2014, US\$ 1,6 billion will be allocated to school lunches, and 30% would represent an injection of US\$ 480 million to family farming, including NTFP food products.

- The PAA and PNAE represent major advances and opportunities for family farmers, indigenous peoples and traditional communities since both programs offer a regular and stable institutional market, and promote sustainable food production based on livelihoods. Most of the NTFP species supported by public procurement policies come from the Amazon, Cerrado and Caatinga biomes.
- The National Policy of Technical Assistance and Rural Extension (PNATER) was established in 2003 and its objective is to promote and facilitate the processes that contribute to the construction and implementation of strategies for sustainable rural development, focusing on the expansion and strengthening of family farming and their organizations, through educational and participatory methodologies integrated to the local dynamics, seeking to create viable conditions for the exercise of citizenship and improving the quality of life of society.
- The National Policy for Sustainable Development of Traditional Peoples and Communities (PNPCT) was launched in 2007 with the main objective of promoting the sustainable development of traditional peoples and communities, emphasizing in the recognition, strengthening and guaranteeing of their territorial, social, environmental, economic and cultural rights, with respect and appreciation to their identity, their organization and their institutions. A board composed of 15 federal governmental institutions, plus 15 representatives of non-governmental institutions, coordinates and works to reach the policy's objectives.

**b) Support the conservation and sustainable use of associated biodiversity;**

- Among the 1,173 species of fauna threatened with extinction that can be considered pollinators, there are 85 bird species (potentially frugivorous, nectarivorous and omnivorous), 63 lepidopteran species, 29 beetle species, seven bat species and four bee species. The later are classified in the category "Endangered (EN)":
  - *Melipona* (*Michmelia*) *capixaba* (uruçu-preto)
  - *Melipona* (*Michmelia*) *rufiventris* (tujuba)
  - *Melipona* (*Michmelia*) *scutellaris* (uruçu)
  - *Partamona littoralis* (popular name is unknown)
- Because these species are listed in the Ministerial Order n. 444/2014, they are fully protected. Therefore, the capture, transportation, storage, custody and handling of their specimens may be permitted for research purposes or for species conservation, with an official authorization. On the other side, processing and marketing are prohibited. However, such restrictions do not apply to specimens reproduced in captivity duly licensed by a competent environmental agency in accordance with National Action Plans for Conservation of Species Threatened With Extinction (PAN), when existing. PAN are elaborated with the purpose of defining actions in situ (in the natural habitat) and ex situ (outside the natural habitat) for conservation and recovery of these species.

- The National Plan for the Promotion of Sociobiodiversity Production Chains (PNPPS) seeks to promote the sustainable use of biodiversity and ensure generation of alternative incomes for rural communities through access to credit, technical assistance and rural extension, markets and trade instruments and guaranteeing a minimum price.
- The General Policy of Minimum Prices for Sociobiodiversity (PGPMBio) was established through Decree-Law No. 79 (1996), which defined criteria for the establishment of minimum prices and procurement of agricultural products. More recently, Law No. 11775 (2008) established a direct subsidy to producers, including for biodiversity products. Under this policy, a subsidy is paid to those agroextractivists that could not market their product at the minimum price established by the Federal Government. The subsidy is the difference between the minimum price and the value of the sale. The Brazilian Government has selected 30 NTFP species for priority intervention aimed to promote their sustainable use. Of these, 13 species have minimum prices established under the PGPMBio. Additionally, eight new species are being considered for inclusion in the PGPMBio policy, namely: buriti (*Mauritia flexuosa*); murumuru (*Astrocaryum murumuru*), macaúba (*Acrocomia aculeata*), fava d'anta (*Dimorphandra mollis*), licuri (*Syagrus coronata*), maracujá do mato (*Passiflora cincinnata.*), erva mate (*Ilex paraguariensis*) and processed piaçava (*Attalea funifera*).
- The National Program for Strengthening of Family Agriculture (PRONAF) established in 1996 provide financing to family farmers for agricultural production. PRONAF is an important tool to promote a greater political visibility of family farming in the country and has facilitated access to credits to 781,000 farmers. Although the number is low compared to the total number of farms in the country, the program has nevertheless supported a significant increase in the volume of food produced by family farming and improvement of the socioeconomic conditions of many families, It has also had important impacts on Municipalities, increasing job opportunities, revenues and rising the municipal sector GDP. Disbursements of credits under the program increased from US\$0.72 billion in 2001 to US\$ 11 billion in 2013.
- The Food Acquisition Program (PAA) was established in 2003 with the objectives of promoting access to food by people in a situation of food insecurity and promoting social and economic inclusion in the rural areas by strengthening family agriculture. Under the program, the federal government purchases family farmers' products, paying a limited amount to each farmer, stores the products and freely distributes them in areas where social vulnerability is higher. The PAA is part of the PGPMBio, but it is not restricted to products that have a minimum price; it also purchases NTFPs and AFS products that are not supported by the PGPMBio. Between 2003-2010 the PPA invested a total of US\$ 1,6 billion purchasing farm products from an average of about 112,000 farmers annually (2.6% of Brazilian family farmers).
- The National School Lunch Program (PNAE), was established in 1955 and aims to partially meet the nutritional needs of students through the provision of at least one meal a day in all public schools registered in the school census, seeking to fulfill the nutritional requirements during the school year. Since 2009 the PNAE

ensures that at least 30% of the funds transferred from the National Fund for the Development of Education (FNAE) to the Municipalities (which are in charge of purchasing and distributing products to schools) are invested in procuring family agriculture products. In 2014, US\$ 1,6 billion will be allocated to school lunches, and 30% would represent an injection of US\$ 480 million to family farming, including NTFP food products.

**c) Address food security and nutrition with explicit reference to biodiversity for food and agriculture, associated biodiversity and/or wild foods;**

- The Biodiversity for Food and Nutrition Project—officially the *Mainstreaming Biodiversity Conservation and Sustainable Use for Improved Human Nutrition and Well-being* project, or *BFN project*, is a multi-country initiative funded by the GEF with an ambitious goal to mainstream biodiversity conservation to improve nutrition in four countries: Kenya, Sri Lanka, Turkey, and Brazil. The BFN Project is coordinated by Bioversity International and co-implemented by FAO and UNEP. In Brazil, the BFN project tries to mainstream biodiversity conservation and sustainable use for improved nutrition into national food and livelihood security strategies formed or strengthened under Fome Zero Strategy. Part of the Project's objective is improving the enabling environment for biodiversity for food and nutrition in Brazil. The first step was to strengthen the evidence and knowledge base for the nutritional value of native biodiversity. The BFN Nutritional Composition Database will provide important evidence for the inclusion of nutritious species (wild foods) in public policies and programs focused on food and nutritional security and the promotion of healthy and diversified diets. It will also provide evidence for programs linking biodiversity conservation to income generation.
- The BFN project in Brazil has identified four existing public policies that could benefit from data on the nutritional value of wild foods. They include the Food Acquisition Program (PAA), the National School Meals Program (PNAE), the National Food and Nutrition Policy (PNAN) and the Minimum Price Guarantee Policy for Biodiversity Products (PGPM-Bio).
- The National Policy on Agroecology and Organic Production was established by the Federal Decree n. 7,794, of 20<sup>th</sup> August 2012. One of its guidelines is the promotion of food and nutritional sovereignty and security and the human right to adequate and healthy food, by means of the provision of organic and agroecological products that are free of contaminants that endanger health. One of the instruments of this policy is the National Plan of Agroecology and Organic Production (PLANAPO). In the framework of PLANAPO, in order to promote the agroecological transition by an increasing number of producers, as well as the replacement of conventional pesticides by low toxicity and biological inputs, the proposal of the National Program for Reduction of Pesticide Use (PRONARA) was developed by the Working Group on Pesticides, of the National Commission of Agroecology and Organic Production (CNAPO<sup>15</sup>). This proposal has been discussed and its publication is awaiting approval by all the Ministries involved in the issue.

---

<sup>15</sup> Available on <http://www.secretariageral.gov.br/atuacao/brasil-agroecologico/comissao-nacional-de-agroecologia-e-producao-organica>; access on 15<sup>th</sup> May 2017.

- The National Plan for the Promotion of Sociobiodiversity Production Chains (PNPPS) seeks to promote the sustainable use of biodiversity and ensure generation of alternative incomes for rural communities through access to credit, technical assistance and rural extension, markets and trade instruments and guaranteeing a minimum price.
- The National School Lunch Program (PNAE), was established in 1955 and aims to partially meet the nutritional needs of students through the provision of at least one meal a day in all public schools registered in the school census, seeking to fulfill the nutritional requirements during the school year. Since 2009 the PNAE ensures that at least 30% of the funds transferred from the National Fund for the Development of Education (FNAE) to the Municipalities (which are in charge of purchasing and distributing products to schools) are invested in procuring family agriculture products. In 2014, US\$ 1,6 billion will be allocated to school lunches, and 30% would represent an injection of US\$ 480 million to family farming, including NTFP food products.

**d) Address the maintenance of ecosystem services with explicit reference to biodiversity for food and, associated biodiversity and/or wild foods;**

- Water Producer Program - The Water Producer Program aims to reduce erosion and sedimentation of water sources in rural areas. The voluntary compliance program provides technical and financial support for the implementation of water and soil conservation actions, such as the construction of terraces and infiltration basins, the rehabilitation of secondary roads, the recovery and protection of water, reforestation of permanent protection areas and legal reserve, environmental sanitation. It also provides for the payment of incentives (or a kind of financial compensation) to rural producers who have proven to contribute to the protection and recovery of springs, generating benefits for the basin and the population. The incentives are granted only after partial or total implementation of previously contracted conservation actions and practices and the amounts to be paid are calculated according to the results: reduction of erosion and sedimentation, reduction of diffuse pollution and increase of infiltration of water in the soil.
- Environmental Reevaluation for Neonicotinoid Pesticides
  - The applications of pesticides containing imidacloprid, thiamethoxam, clothianidin or fipronil, regardless of the technology used, during the flowering season, have been prohibited, with some flexibilizations, since 2012<sup>16</sup>.
  - Normative Instruction IBAMA n. 2, of 9th February 2017<sup>17</sup>, establishes guidelines, requirements and procedures for pesticide risk assessment for pollinator insects, using bees as indicator-organisms.

---

<sup>16</sup> Federal Official Gazette, of 4<sup>th</sup> January 2013, section 1, page 10 – MAPA Joint Normative Instruction n. 1; Federal Official Gazette, of 5<sup>th</sup> December 2013, section 1, page 7 – MAPA Joint Normative Instruction n. 30; Federal Official Gazette, of 10<sup>th</sup> April 2014, section 3, page 129 – IBAMA Statement n. 1.

<sup>17</sup> Federal Official Gazette, of 10<sup>th</sup> February 2017, section 1, pages 33-36 – IBAMA Normative Instruction n. 2.

- e) Improve resilience and sustainability of production systems with explicit reference to biodiversity for food and agriculture, associated biodiversity and/or wild foods;**
- Programa ABC (Low Carbon Agriculture Program) – Actions to be taken to adopt the sustainable production technologies selected to meet the commitments to reduce greenhouse gas emissions.
  - National Policy for the Sustainable Development of Aquaculture and Fisheries, regulates fishing activities.
  - Environmental Regularization Program (PRA) - Program that aims at the environmental regularization of properties and environmental liabilities identified in the CAR (Rural Environmental Register), both in Permanent Preservation Areas (APPs) and in Legal Reserves RLs, through the elaboration, implementation and monitoring of Recovery of degraded areas projects (PRADAs).
  - Sustainable Rural Project - A cooperation project to promote sustainable rural development, aimed at the broad adoption by rural producers of low-carbon agricultural technologies that will restore the productive potential of degraded agricultural areas and allow restoration of legal maintenance areas of native vegetation.
  - Integrated Agricultural Production - Integrated Agricultural Production is focused on the adaptation of productive systems for the generation of high quality food.
  - National Plan of Agroecology and Organic Production (PLANAPO) - It aims to implement programs and actions that encourage the agroecological transition, organic production and agro-ecological basis, enabling the population to improve the quality of life through the supply and consumption of healthy food and the sustainable use of natural resources, constituting an instrument of national police (Pnapo) operationalization and monitoring, evaluation and social control of the actions organized there.
  - The National Policy for Sustainable Development of Traditional Peoples and Communities (PNPCT) was launched in 2007 with the main objective of promoting the sustainable development of traditional peoples and communities, emphasizing in the recognition, strengthening and guaranteeing of their territorial, social, environmental, economic and cultural rights, with respect and appreciation to their identity, their organization and their institutions. A board composed of 15 federal governmental institutions, plus 15 representatives of non-governmental institutions, coordinates and works to reach the policy's objectives.
- f) Support farmers, pastoralists, forest dwellers and fisher folk to adopt and maintain practices that strengthen the conservation and use of biodiversity for food and agriculture.**

- ABC Program (Low Carbon Agriculture Program) – Actions to be taken to adopt the sustainable production technologies selected to meet the commitments to reduce greenhouse gas emissions.
- The National Policy for Sustainable Development of Traditional Peoples and Communities (PNPCT) was launched in 2007 with the main objective of promoting the sustainable development of traditional peoples and communities, emphasizing in the recognition, strengthening and guaranteeing of their territorial, social, environmental, economic and cultural rights, with respect and appreciation to their identity, their organization and their institutions. A board composed of 15 federal governmental institutions, plus 15 representatives of non-governmental institutions, coordinates and works to reach the policy's objectives.
- Project Mainstreaming Biodiversity Conservation and Sustainable Use into NTFP and AFS production practices in Multiple-Use Forest Landscapes of High Conservation Value (Projeto Bem Diverso)- The project's objective is to ensure that the biodiversity of Brazilian multiple-use forest landscapes of high conservation value is conserved through a strengthened sustainable use management framework for non-timber forest products (NTFP) and agro-forestry systems (AFS). It will support Brazil's goal of promoting the conservation and sustainable use of biodiversity while reducing poverty and increasing resilience in the rural areas, which are governmental objectives stated in public policies and programs. The project will conserve biodiversity in key forest landscapes - Amazon, Caatinga and Cerrado - all renowned for their outstanding global biodiversity significance but currently under threat from increasing land use pressures across production landscapes. It will address one of the key land use threats to these forests, which is forest degradation driven by small-scale farmers that employ traditional subsistence farming and extraction practices in and around forested areas throughout the landscape, including land clearing, over-exploitation of resources, and poor fire management. This is causing increased encroachment on forest habitats both in areas under conservation and in locations that are strategic for connectivity across the landscape with the result of gradual loss of the global environmental values in these areas. It will seek to facilitate a shift from these unsustainable agricultural practices to an approach that conserves the biodiversity of multiple-use forest landscapes of high conservation value while meeting important social priorities and development goals. The project will therefore focus on the development of a strengthened sustainable use management framework for sustainable NTFP and AFS production. This will be achieved through two Outcomes: 1) Governance and capacity building framework for up-scaling best practices for BD sustainable management and production, and 2) Market and financial frameworks for up-scaling for NTFP and AFS production in high-conservation value forest landscapes. By removing current risks and uncertainties, the project will contribute to the upscaling of sustainable NTFP and AFS production while at the same time enhancing the rights and roles of communities in the sustainable management of BD and improving their livelihoods. Up-scaling and integration of AFS production will provide more environmentally friendly forms of land use in a landscape-level mosaic, increasing connectivity of forest fragments and helping to maintain ecosystem services.

**67. List up to 10 major policies, programmes and enabling frameworks in your country that enhance the application of an ecosystem approach<sup>18</sup> or a landscape approach<sup>19</sup> and that contain an explicit reference to biodiversity for food and agriculture, associated biodiversity and/or wild foods. Include a brief description of the policies, programmes and enabling frameworks together with any information on the extent of their application (production system and area) and observed effect. Where possible provide examples of best practices or lessons learned.**

Briefly describe policies, programmes and enabling frameworks that meet the objectives described in questions 68 and 69. Consider the following discussion points in your responses, where information is available:

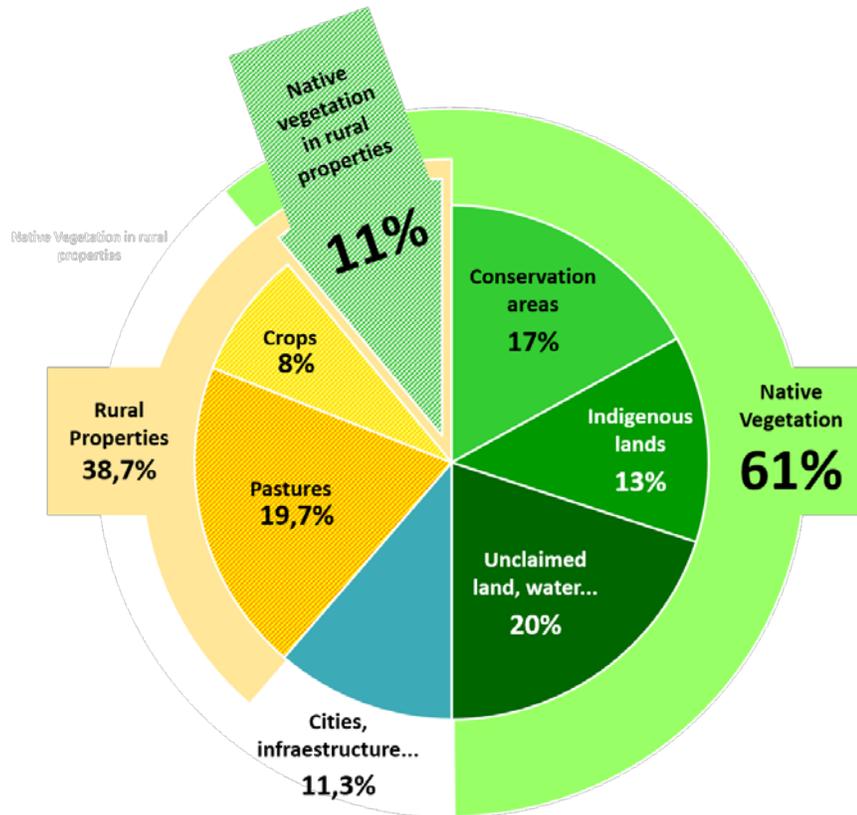
- a) extent of implementation;
  - b) production systems involved;
  - c) the extent of use of biodiversity for agriculture;
  - d) lessons learned;
  - e) evidence of indicators of vulnerability that have decreased as a result of these efforts;
  - f) describe the value added of mainstreaming gender in programmes, policies and enabling frameworks, providing sex-disaggregated data where possible.
- The application of an ecosystem/landscape/seascape approach currently occurs most at the level of programs and projects. This integrative approach allows optimizing efforts to ensure the conservation and sustainable use of biodiversity. As an example, in the political sphere we have the definition of Priority Areas for conservation, sustainable use and benefit sharing of biodiversity, that serves as a public policy instrument to support decision making in an objective and participatory way in planning and implementation of actions such as creation of conservation units, licensing, inspection and promotion of sustainable use. In addition, recent projects have presented this approach in their conception as for example the GEF Amazon Sustainable Landscapes program that seeks to promote actions within PAs and in their surroundings in order to reestablish the connectivity of the ecosystem and to guarantee the conservation and the sustainable use of biodiversity throughout the biome.
  - Rural Environmental Register (CAR): Register in a single database all the rural properties of the country with the respective spatial allocation and verification of the conservation status of the Permanent Preservation Areas (APPs), Legal Reserves (RLs) and Areas of Restricted Use (AUR). It is important to mention that up to April 2017, 4,104,247 rural properties were registered in CAR, totaling 851,576,705 ha in

---

<sup>18</sup> The ecosystem approach concept is generally understood to encompass the management of human activities, based on the best understanding of the ecological interactions and processes, so as to ensure that ecosystems structure and functions are sustained for the benefit of present and future generations. Ecosystem approaches include the Convention on Biological Diversity's Ecosystem Approach, Integrated Land Use Planning, Integrated Water Resource Management, Sustainable Forest Management, Code of Conduct for Responsible Fisheries, Ecosystem approach to fisheries management, etc.

<sup>19</sup> A "landscape approach" means taking both a geographical and socio-economic approach to managing the land, water and forest resources that form the foundation – the natural capital – for meeting our goals of food security and inclusive green growth. By taking into account the inter-actions between these core elements of natural capital and the ecosystem services they produce, rather than considering them in isolation from one another, we are better able to maximize productivity, improve livelihoods, and reduce negative environmental impacts.

Brazil. Among the several important results of CAR, it is worth mentioning that Brazil is one of the few countries in the world that has an official record on environmental conservation within rural properties, which corresponds to 11% of the total number of native forests preserved in Brazil (Figure 9).



**Figura 9.** Land occupation and use in Brazil. Source: Embrapa Satellite Monitoring, with data from IBGE, CNA, MMA, FUNAI, DNIT, ANA, MPOG.

**68. Describe up to 10 major policies, programmes and enabling frameworks in your country that embed the use of biodiversity for food and agriculture, including its different components, into disaster management and response.**

- **National Plan for the Prevention of Natural Disasters:** It aims to ensure the safety of populations living in areas susceptible to natural disasters and to preserve the environment. The plan works on four fronts: prevention, mapping, monitoring and response. Prevention includes the works of the Growth Acceleration Program (PAC) aimed at reducing the risk of natural disasters, including structural works to prevent floods and landslides such as drainage and containment of slopes. This axis also includes actions to combat the effects of drought such as the construction of dams, water mains and urban water supply systems in nine states in the Northeast and in the semi-arid region of Minas Gerais. The mapping involves the identification of risk areas for landslides and floods, supporting the development of geotechnical charts of urban aptitude, which will allow the establishment of urban planning guidelines for the design of new lots.

- **Reference Centers for Recovery of Degraded Areas (CRADs):** In order to promote the recovery of degraded areas, it was created Reference Centers for Recovery of Degraded Areas (CRADs). The objectives of the CRADs are linked to the development of recovery models for degraded areas in demonstration areas, to the definition and documentation of procedures to facilitate the replication of rehabilitation actions for degraded areas, and the promotion of training courses for human resources training (collection of seed, production of seedlings, planting, silvicultural treatments). Currently there are seven CRADs in operation, all in the São Francisco River Basin, in the Northeast Region.
- **Rural Environmental Registry:** National electronic public registry, mandatory for all rural properties, with the purpose of integrating the environmental information of the properties and rural properties related to the Permanent Preservation Areas - APP, of restricted use, Legal Reserve, remnants of forests and other forms of native vegetation, and consolidated areas, composing a database for control, monitoring, environmental and economic planning, and combating deforestation. The registration in the CAR is the first step to obtain the environmental regularity of the property, and includes: data of the owner, rural owner or directly responsible for the rural property; data on documents proving ownership and possession; and georeferenced information on the perimeter of the property, areas of social interest and areas of public utility, with information on the location of remnants of native vegetation, Permanent Preservation Areas, Restricted Use areas, consolidated areas and Legal Reserves.

**69. Describe up to 10 major policies, programmes and enabling frameworks in your country that embed the use of biodiversity for food and agriculture, including its different components, into climate change adaptation and mitigation strategies and plans (NAPAs, NAPs, NAMAs, etc.<sup>20</sup>).**

- **National Plan for Agroecology and Organic Production:** Implementation of sustainable food production and distribution systems with emphasis on the promotion of agroecological systems, preservation and enhancement of agrobiodiversity, creation of seed banks, productive diversification, and recovery and preservation of soils and water sources.
- **ABC Program (Low Carbon Agriculture Program):** Actions to be taken to adopt the sustainable production technologies selected to meet the commitments to reduce greenhouse gas emissions.
- **National Policy on Climate Change:** instituted by Law No. 12,187, of 2009. Based on legislation, it was defined strategies and proposes policies related to the monitoring and implementation of sectoral mitigation and adaptation plans. It also promotes technical and scientific cooperation with entities related to the subject so that the country reaches

---

<sup>20</sup> NAPAs - National adaptation programmes of action (NAPAs) provide a process for Least Developed Countries (LDCs) to identify priority activities that respond to their urgent and immediate needs to adapt to climate change – those for which further delay would increase vulnerability and/or costs at a later stage. NAPs – the national adaptation plan (NAP) process is a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to address those needs. NAMAs- Nationally Appropriate Mitigation Actions - a set of policies and actions that countries undertake as part of a commitment to reduce greenhouse gas emissions.

the voluntary commitments of reduction of emissions of greenhouse gases.

- **National Program for Strengthening Family Agriculture (PRONAF):** it has specific lines of credit for the financing of environmental conservation activities and the sustainable use of biodiversity, such as:
  - Pronaf Agroecology: Line for the financing of investments in agroecological or organic production systems, including costs related to the implementation and maintenance of the enterprise.
  - Pronaf Eco: Line for the financing of investments in techniques that minimize the impact of the rural activity on the environment, as well as allow the farmer better conviviality with the biome in which his property is inserted.
  - Pronaf Forest: Financing investments in projects for agroforestry systems; ecologically sustainable extractive exploitation, forest management plan, restoration and maintenance of permanent preservation areas and legal reserve and recovery of degraded areas.
  - Pronaf Semi-arid: Line for the financing of investments in projects with the semi-arid region, focused on the sustainability of agroecosystems, prioritizing water infrastructure and the implantation, expansion, recovery or modernization of other infrastructures, including those related to agricultural production and services projects and non-farming, according to the reality of the farming families of the semi-arid region.

**70. What arrangements are in place or foreseen in your country that help to ensure that the conservation of biodiversity for food and agriculture is taken into account in national planning and policy development of sectors other than agriculture (e.g. NBSAPs or infrastructure development such as transport or energy)?**

- **National Program for the Production and Use of Biodiesel:** program that aims at the sustainable implementation, production and use of biodiesel, with a focus on social inclusion and regional development, through the generation of employment and income. The main guidelines of the program are: to implement a sustainable program, promoting social inclusion; ensure competitive prices, quality and supply; produce biodiesel from different oil sources, strengthening the regional potentialities for the production of raw material. The program has promoted studies and research on the viability of the use of native species of Brazilian flora in the production of biodiesel, such as the macaúba (*Acrocomia aculeata*) and the caiaué (*Elaeis oleifera*).
- **Water Producer Program:** program that focuses on stimulating the policy of payment for environmental services focused on water protection in Brazil. It consists of remunerating the rural producer with values proportional to the environmental services provided, which benefit the society that lives in a certain river basin, besides offering technical assistance for the environmental recovery of the property. In 2017 resources should be applied to actions that include the adaptation of rural roads, agricultural terracing, forest remnant fencing, seedling planting of native species in each region, dam building (for rainwater harvesting and infiltration and for retention of sediments) and rural sanitation (with installation of septic tanks or similar structures).

**71. Has your country identified any obstacles to developing and implementing legislation that would protect associated biodiversity? List and describe initiatives in Table 25.**

**Table 6.** Obstacles to developing and implementing legislation that would protect associated biodiversity identified in the country.

Component of associated biodiversity	Obstacles to legislation for protection of associated biodiversity

*[Insert rows as needed]*

Provide a concise description of the obstacles to legislation reported in Table 25 and specify a course of action proposed to address this, where possible. Where possible provide examples of best practices or lessons learned.

*Policies, programmes and enabling frameworks governing exchange, access and benefits*

**72. Has your country taken measures with the aim of ensuring that access to its genetic resources shall be subject to its prior informed consent (PIC) and that benefits arising from their utilization shall be shared in a fair and equitable manner? If yes, identify for which resources and for which uses (e.g. to conduct research and development on the genetic and/or biochemical composition of the genetic resource) prior informed consent has to be obtained and benefits have to be shared. Indicate in Table 26 for the different categories (and possibly uses) of associated biodiversity, if prior informed consent has to be obtained and benefits have to be shared (Y: yes, N: no).**

**Table 7.** Policies and programmes governing the access to its genetic resources of associated biodiversity established in the country.

Component of associated biodiversity	Intended use (e.g. any use, research and development, commercial use)	PIC and benefit-sharing required (Y/N)

*[Insert rows as needed]*

The new legal framework of Brazilian genetic heritage and associated traditional knowledge management (Law No. 13,123/2015 and Decree No. 8772/2016) reduces the financial and regulatory costs of Brazilian biodiversity research activities and technological development.

This new regulation contemplates several improvements in the government's management agenda. Management was facilitated by the creation of two electronic systems designed to oversee and trace activities resulting from access.

The National Management System of Genetic Heritage and Associated Traditional Knowledge - SisGen, is the interface between the administrated entities, users, providers and the Board of Genetic Heritage Management, thus fulfilling the obligations contained in Law No. 13,123. SisGen is the recipient of all the registries, authorizations, notifications of finished products or reproductive materials, and generates the respective receipts and certificates.

The other system is the traceability system of the activities that result from access to genetic resources or associated traditional knowledge. It is one of the tools created by the legal

framework that increased control over the traceability of accesses, remittances and dispatches, and brought improvements in the monitoring of benefit sharing. Such a system will have the collaboration of various public bodies that regulate different productive sectors, until reaching the sector of product registration for commercial exploitation. This legal norm also assigns government agencies the function of "checkpoints" to guarantee compliance with the law.

Through the implementation of these systems it will be possible to maintain and manage a greater amount of information on the use of genetic resources and associated traditional knowledge. Besides this, once connected to other databases and information systems from federal public administration, modern high efficiency instruments can be implemented that have the capacity to verify information on the activities resulting from access to genetic resources or associated traditional knowledge, as well as those that render economic return.

The law assures the participation of representatives from these groups in the Genetic Heritage Management Council - CGen, the national ABS authority, and the Steering Committee of the National Benefit Sharing Fund - also created by law.

Law No. 13,123/2015 also creates the National Program of Benefit-Sharing - PNRB which will be implemented by the National Benefit Sharing Fund - FNRB to apply resources in various initiatives such as the implementation of Sustainable Development Plans of Traditional Peoples and Communities, which will stimulate and strengthen the practices of peoples and communities that are relevant for biodiversity conservation.

It also promotes the integration of biodiversity conservation policies to strategies directed at poverty reduction and public health, as it fosters the responsible use of biodiversity for technological development and innovation in the area of biotechnology.

Another point of interest of the biodiversity-based productive chains is benefit sharing at a single point of the production chain. The law determines that the benefits arising from the commercialization finished product should be shared by the last manufacturer in the productive chain, or by the producer of the reproductive material (in case of agricultural activities). The Brazilian biodiversity-based production chains are very fragmented and have a large number of intermediate links that deal with the initial processing of raw materials. The above mentioned provision intends to exempt the cooperatives and micro businesses from unnecessary demands without sacrificing the traceability of the product, while at the same time directing the focus of the benefit sharing on the product with the most added value on the productive chain.

Brazilian law complies with provisions from international treaties, and foresees benefit sharing in monetary and non-monetary terms.

From the perspective of indigenous peoples, traditional communities and traditional farmers, Law No. 13,123/2015 guarantees the protection of their knowledge; the right to participate in national decision-making processes on matters related to the conservation and sustainable use of their traditional knowledge; and the free exchange and dissemination of genetic heritage and associated traditional knowledge practiced amongst them for their own benefit, based on their customs and traditions.

**73. Has your country taken measures with the aim of ensuring that the prior informed consent or approval and involvement of indigenous and local communities is obtained for access to genetic resources and that benefits arising from the utilization of genetic resources that are held by indigenous and local communities, are shared in a fair and equitable way with the communities concerned, based on mutually agreed terms? If yes,**

**provide a description of the measures and where possible, examples of best practices or lessons learned.**

Despite significant advances in the political organization and representation of indigenous peoples and traditional communities vis-à-vis government and society in general, it is still a challenge to find representative voices for the great diversity of these groups in order to achieve the effective inclusion of their demands in public policies. The Law 13,123/15 reformulated the Genetic Heritage Management Council (CGen) that now includes representatives from National Council for the Sustainable Development of Traditional Peoples and Communities (CNPCT), from Indigenous People National Council (CNPI), and from National Council for Sustainable Rural Development (Condraf), those representations were an important step, although other equally complex challenges remain, such as building reliable processes and sufficient capacity to meet the commitment of informed consultation, informed consent and fair and equitable sharing of benefits.

To meet this challenge, it was developed by *Grupo de Trabalho Amazonico - GTA*, an civil society network of Amazonian local organizations, a methodology for the participatory elaboration of Community Protocols. These protocols, specific to each community, define the conditions and terms of access to traditional knowledge or genetic resources and benefit sharing. The traditional communities of the Bailique Archipelago in the state of Amapá, for example, have participated on the development of this methodology, which can be replicated to other traditional people and communities. The purpose of this initiative is to facilitate the dialogue among local populations and any external agent on biodiversity conservation, the sustainable use of natural resources and the sharing of benefits. Thus, the development of Community Protocols prepares the community to engage in fairer access contracts by strengthening local capacity to deal with the issue and by establishing conditions and terms that are more equitable. This prior definition, in turn, also facilitates access procedures for interested companies, reducing initial costs, since the training for informed consent has already been established, and streamlines the process of obtaining validated contracts for access to knowledge and / or traditional resources and benefit sharing.

In 2001, Brazil published the Provisional Measure (MP) on Access and Benefit-Sharing at n°. 2,186-16/2001 and has since then endeavored to improve national legal instruments to regulate the provisions of the biodiversity conservation in relation to access to biodiversity resources associated traditional knowledge, and the benefits resulting from its use. Significant advances have been made in recent years, especially with the entry into force of Law 13.123 of May 20, 2015, which regulated access to genetic heritage, protection and access to associated traditional knowledge and the sharing of conservation benefits and sustainable use of biodiversity.

The MP n°. 2,186-16/2001 was an important milestone in the fight against biopiracy in Brazil. However, this norm made rigid and bureaucratic requirements for access to genetic heritage and associated traditional knowledge, which provoked criticism from the user sector, considering the high transactional cost, and by traditional peoples and communities, who have always demanded greater participation in the decision-making process. With the entry into force of Law 13,123 of May 20, 2015, which replaces the Provisional Measure, several demands were made by the civil society sectors, including representation in the Genetic Heritage Management Council (CGen) of the business, indigenous peoples, traditional communities and traditional farmers. The new legislation allows the CGen to make the national system of access and benefit sharing a tool for the economic, social, cultural and environmental development of our country, promoting the conservation of biodiversity.

***Information management***

**74. List and describe any linkages between sector information systems on biodiversity for food and agriculture at national level. Where possible provide examples of best practices or lessons learned.**

With the aim of popularizing the practice of citizen science in the country, the Brazilian Biodiversity Information System (SiBBr) launched in 2017 the online platform of the Brazilian Network of Citizen Science in Biodiversity ([http://www.sibbr.gov.br / cienciacidada](http://www.sibbr.gov.br/cienciacidada)). In its first version, the tool presents information and access links for nine projects of different lines of research and continues to receive registrations of new initiatives. The Network aims to exchange Brazilian citizen science projects with joint communication tools and society engagement, and in a second step, the integration of data in the SiBBr database.

The online citizen science platform is the first step in integrating Brazilian projects into one place. It aims to strengthen the communication of initiatives that deal with biodiversity issues and facilitate the population's access to projects of interest, increasing the participation of people and working for the popularization of science in Brazil. The concept of citizen science is represented by a partnership between amateur researchers and scientists in data collection, in which the projects create a network of volunteers to assist in scientific research using methodologies developed by them or in collaboration with professional researchers. The "scientific citizens" are people who have chosen to dedicate themselves to science in their free time, assisting in the documentation of different research objects such as records of species occurrences, migration patterns, propagation of infectious diseases, among others. Citizen science has the potential to increase public participation in environmental management, interest in science, and environmental awareness.

**75. Has your country established national information systems on associated biodiversity? List in Table 27, along with a description of the components of associated biodiversity addressed, and a brief description of information included, use and applications of the information system.**

**Table 8.** National information systems on associated biodiversity in the Country.

National information system (List)	Components of associated biodiversity addressed (List)	Concise description of information systems
Phyosanitary Agrotoxic System (Agrofit)	Microorganisms, arthropods and pests, diseases, and weeds	Agrofit lists the target pests (microorganisms, arthropods and pests, diseases, and weeds) and the biological control organisms that are registered in the system ( <a href="http://agrofit.agricultura.gov.br/agrofit_cons/principal_agrofit_cons">http://agrofit.agricultura.gov.br/agrofit_cons/principal_agrofit_cons</a> ).
Information System on Brazilian Biodiversity (SiBBr)	Plant, animal and microrrganisms	Information on Brazilian biodiversity, biological collections, biodiversity and health, uses and conservation efforts. SiBBr will host the Biodiversity Nutrition Database ( <a href="http://www.sibbr.gov.br/areas/index.php?area=uso&amp;subarea=alimentacao-e-nutricao">http://www.sibbr.gov.br/areas/index.php?area=uso&amp;subarea=alimentacao-e-nutricao</a> ) and contains the tool "Species Sheet" ( <a href="https://ferramentas.sibbr.gov.br/ficha/bin/view/especie/">https://ferramentas.sibbr.gov.br/ficha/bin/view/especie/</a> ) with information on taxonomy, natural history, distribution, ecological importance and state of conservation of Brazilian species accompanied by records and images.
Portal Alelo	Plant, animal and microrrganisms	Portal for services and management of data and information on Genetic Resources in Brazil. Contains passport data, statistics, characterization and evaluation of materials kept in germplasm banks. ( <a href="http://alelobag.cenargen.embrapa.br/AleloConsultas/Conservacao/capacidade.do">http://alelobag.cenargen.embrapa.br/AleloConsultas/Conservacao/capacidade.do</a> ).

Portal of Biodiversity	Plant and animal	In order to provide information on Brazilian biodiversity ( <a href="https://portaldabiodiversidade.icmbio.gov.br/portal/">https://portaldabiodiversidade.icmbio.gov.br/portal/</a> ).
Sistema de Autorização e Informação em Biodiversidade (SISBIO)	Research with plants and animals of Brazilian biodiversity, and access to traditional knowledge associated with	Remote access system that allows researchers to request authorizations to collect biological material and to perform research in federal conservation units and caves ( <a href="http://www.icmbio.gov.br/sisbio/saiba-mais.html">http://www.icmbio.gov.br/sisbio/saiba-mais.html</a> )

[Insert rows as needed]

**76. Has your country established information systems intended to support maintenance of traditional knowledge on biodiversity for food and agriculture, including associated biodiversity? If yes, describe these and include information where available on socio-economic, policy and collective action aspects.**

- **SisGen** - National System for Management of Genetic Heritage and Traditional Associated Knowledge - is an electronic system created as an instrument to assist the Genetic Heritage Management Council - CGen - in the management of genetic heritage and associated traditional knowledge. It started its operations in November, 2017 (<http://www.mma.gov.br/patrimonio-genetico/conselho-de-gestao-do-patrimonio-genetico/sis-gen>). Among the planned activities, the system allows:
  - To register access to the genetic heritage or associated traditional knowledge;
  - To register sending a sample from genetic heritage to provide services abroad;
  - Referral of sample of genetic heritage;
  - Notify finished product or reproductive material;
  - Request permission to access the genetic heritage or associated traditional knowledge and to send abroad with the consent of the National Defense Council and the Navy Command;
  - To request accreditation of institutions that maintain *ex situ* collections that contain samples of genetic heritage;
  - Obtain vouchers of access records, shipping and notification records;
  - Obtain certificates from the administrative verification procedure; and
  - Request attestations of regularity of access.

*Stakeholder participation and ongoing activities that support maintenance of biodiversity for food and agriculture*

**77. List the most important stakeholder groups, including groups or associations of farmers, forest dwellers, fisher folk and pastoralists, NGOs or other civil society organizations active in the conservation of biodiversity for food and agriculture. Briefly summarize their scope, objectives and activities and any outcomes to date. Where possible provide examples of best practices or lessons learned.**

- **Seed Network of the Cerrado:** non-profit association, with the objective of defense, preservation, conservation, management, recovery, promotion of studies and research, and the dissemination of technical and scientific information related to the environment of the Cerrado, especially in Central Brazil (<http://www.rsc.org.br>).

- **Institute Society, Population and Nature:** It is an independent research and documentation center, non-profit, whose main objective is to contribute to the viability of sustainable development with greater social equity and environmental equilibrium (<http://www.ispn.org.br>).
- **Pro-UC Network:** Non-governmental organization, which works in partnership with other organizations and individuals, in the protection, strengthening, enhancement and expansion of all Nature Conservation Units in Brazil, especially those of Integral Protection (<http://redeproc.org.br>).
- **SOS Mata Atlantica Foundation:** Non-governmental organization that acts in the conservation of the Atlantic Forest and associated coastal and marine environments, seeking sustainable development and quality of human life ([www.sosma.org.br](http://www.sosma.org.br)).
- **Confederation of Agriculture and Livestock of Brazil:** Through the Biomas Project, developed in partnership with the Brazilian Agricultural Research Corporation (Embrapa), it studies and implements actions in the six Brazilian biomes to enable solutions with trees for protection, recovery and sustainable use of rural properties in the different biomes (<http://www.cnabrazil.org.br/servicos-para-produtor/projetos-programas/projeto-biomas>).
- **Pro-Nature Foundation (Funatura):** A non-profit organization that acts in the conservation and maintenance of biological diversity in Brazil, focusing on improving the quality of life of the population and contributing to the sustainable use of natural resources in all regions, especially in the Cerrado and Pantanal biomes (<http://www.funatura.org.br/>).

**78. Describe any incentives or benefits to support activities for the conservation and sustainable use of biodiversity for food and agriculture or associated biodiversity (such as payments, provision of inputs, subsidies or other forms of incentives/ benefits). Briefly describe how these have been applied, to what extent and the stakeholders involved (including provisions on gender balance if any). Indicate any lessons learned and planned development incentives.**

- **Bolsa Verde Program:** Its target audience is 16.2 million people living in extreme poverty who carry out activities for the conservation of natural resources in rural areas, priority conservation units for sustainable use and in resettlement projects for Agrarian Reform. By 2014 the program had reached 73,000 families. According to government estimates, there are 213,000 families living on 145 million hectares of priority areas targeted by the program. If the program were to reach all families, that would represent an investment of \$ 80 million per year, or just \$ 0.52 per hectare per year, which would be a low price to pay for conserving natural resources along with social and economic benefits. However, the operationalization of the program is still complex, and the location of the central coordination in Brasilia, far from the beneficiaries, increases the complexity of the operation. Decentralization of operations to the regions or states could contribute to the speed of program implementation and reduce the gap between the target population and program coordination.
- **Tax incentives for local governments (Ecological ICMS):** Municipalities that meet ecological criteria established by the state, such as the presence of conservation units and / or indigenous lands within their territories, solid waste management, sewage treatment

- systems, other criteria, may receive an additional share of the state tax collection on the circulation of goods and services. This incentive raises the budget of municipalities and gives opportunity for investment in education, health and solid waste management. However, adjustments are necessary for this money to be invested as it really needs more concrete results. As Ecological ICMS is not necessarily linked to environmental investments, municipal governments invest this resource according to their own criteria and not necessarily in environmental management or the creation of new conservation units.
- **Minimum Price Guarantee Policy for Socio-biodiversity Products (PGPM-Bio):** It supports the commercialization of non-timber forest products, with the payment of a direct subsidy, guaranteeing a minimum price for 15 native products, among which: açaí, andiroba, babaçu, baru, extractive rubber, extractive cacao, brazil nuts, carnauba, juçara, macaúba, mangaba, pequi, piaçava, pinhão and umbu. Created with the objective of attending to the traditional communities, generating income and opportunizing the conservation of the environment, and for this, it should be expanded. In 2015, the value of non-timber extraction in Brazil was approximately \$ 460 million, and the products that stood out were: açaí (\$ 147 million), native herb-mate (\$ 121 million), almonds (\$ 33 million), Brazil nut (\$ 32.9 million), piaçava fibers (\$ 31 million) and carnauba powder (\$ 60 million). Together, these products accounted for 91.4% of the total value of non-timber plant extractive production in Brazil.
  - **Food Acquisition Program:** Its objective is to collaborate with the fight against hunger and poverty in Brazil and, at the same time, to strengthen family farming. The program uses marketing mechanisms that favor the direct acquisition of products from family farmers or their organizations, stimulating the aggregation of value to production. The program serves family farmers, settled agrarian reform, indigenous communities and other traditional peoples and communities. In the year 2016, the federal government invested \$ 123 million in food purchases through this program, serving 76,847 families and moving approximately 134 thousand tons of food destined to the formation of strategic stocks and distribution to the population in situation of social vulnerability. The results have been important in promoting the sustainable use of biodiversity, contributing to the formalization of the commercialization of socio-biodiversity products, also promoting the rupture of economic exploitation and monopoly relations practiced by local buyers and middlemen.
  - **Seguro Defeso:** It is a modality of unemployment insurance with the socio-environmental objective of providing financial support to artisanal fishermen who are unable to work during the period of reproduction of native species, in order to protect marine, river and lake species from various regions of the country. has grown in the last five years and now serves 861 thousand families of artisanal fishermen, with an approximate investment of \$ 675 million per year. The main challenge is to adapt the policy to the new economic reality of the country to continue the pace of formalization of the activity and increasing the number of beneficiaries.
  - **Low Carbon Agriculture (ABC Plan):** Its purpose is to organize and plan the actions to be taken for the adoption of sustainable production technologies aimed at reducing GHG emissions by agricultural activities in Brazil. To date, the implementation of the actions has shown that most of the pasture recovery is concentrated in the cerrado regions of the Northeast, where the highest percentage of degraded pastures is located, but with a higher percentage of areas undergoing recovery, with 9.6 million hectares. The North Region,

where the Amazon biome is concentrated, would have about 570 thousand hectares of reclaimed pastures, a value considered small for the Region and where greater effort is needed. The Southeast and South regions had the highest levels of adoption of the resources destined for pasture recovery, being responsible for the recovery of 9.1 million hectares of pasture. However, the partial evaluation of the Plan (September 2017) indicates that the distribution of goals and resources is highly dependent on the policy implementation strategy. Without prioritization criteria, resources are more absorbed by the regions with greater aptitude and tradition in the operationalization of credit and in the adoption of technologies and, consequently, with better results than other regions. It is observed that the priority areas, from the point of view of pasture productivity, received less volume of resources and, consequently, resulted in a lower level of improvement in the use of the natural resource.

- **Renewable Energy and Environmental Sustainability Investment Facility (Pronaf Eco):** The National Program for Strengthening Family Agriculture (Pronaf) finances individual or collective projects that generate income for family farmers and settlers of agrarian reform. The program has several lines of credit that support the use and conservation of biodiversity, such as Pronaf Eco, which finances investments in techniques that minimize the impact of rural activity on the environment, allowing the farmer to better coexist with the biome in which his property is inserted.
- **Valuation of Protected Areas:** A study started in 2011 to evaluate and disseminate the role of conservation units in the provision of environmental goods and services that contribute to the economic and social development of the country. The current impact and economic potential of five environmental goods and services were evaluated: forest products, public use, carbon sequestration, water, and tax benefits. The study also evaluated the economic potential of two forest products (Brazil wood and Brazil nuts) in conservation units of the Amazon biome and estimated economic potential ranging from US \$ 700 million to US \$ 1.23 billion annually, as well as contributing to reduce demand illegal timber products.

**79. List up to 10 major projects (either in progress or completed in the last five years) that support the conservation and sustainable use of biodiversity for food and agriculture, associated biodiversity and/or wild foods. For each project listed describe the components of biodiversity, the production system and area covered, and the results, outcomes and lessons learned. Projects described in sector reports need not be described here.**

Project Mainstreaming Biodiversity Conservation and Sustainable Use into NTFP and AFS production practices in Multiple-Use Forest Landscapes of High Conservation Value (Projeto Bem Diverso)- The project's objective is to ensure that the biodiversity of Brazilian multiple-use forest landscapes of high conservation value is conserved through a strengthened sustainable use management framework for non-timber forest products (NTFP) and agro-forestry systems (AFS). It will support Brazil's goal of promoting the conservation and sustainable use of biodiversity while reducing poverty and increasing resilience in the rural areas, which are governmental objectives stated in public policies and programs. The project will conserve biodiversity in key forest landscapes - Amazon, Caatinga and Cerrado - all renowned for their outstanding global biodiversity significance but currently under threat from increasing land use pressures across production landscapes. It will address one of the key land use threats to these forests, which is forest degradation driven by small-scale farmers that employ traditional subsistence farming and extraction practices in and around forested areas throughout the landscape, including land clearing, over-exploitation of resources, and poor fire management.

This is causing increased encroachment on forest habitats both in areas under conservation and in locations that are strategic for connectivity across the landscape with the result of gradual loss of the global environmental values in these areas. It will seek to facilitate a shift from these unsustainable agricultural practices to an approach that conserves the biodiversity of multiple-use forest landscapes of high conservation value while meeting important social priorities and development goals. The project will therefore focus on the development of a strengthened sustainable use management framework for sustainable NTFP and AFS production. This will be achieved through two Outcomes: 1) Governance and capacity building framework for up-scaling best practices for BD sustainable management and production, and 2) Market and financial frameworks for up-scaling for NTFP and AFS production in high-conservation value forest landscapes. By removing current risks and uncertainties, the project will contribute to the upscaling of sustainable NTFP and AFS production while at the same time enhancing the rights and roles of communities in the sustainable management of BD and improving their livelihoods. Up-scaling and integration of AFS production will provide more environmentally friendly forms of land use in a landscape-level mosaic, increasing connectivity of forest fragments and helping to maintain ecosystem services.

**80. List in Table 28 up to 10 major landscape based initiatives to protect or recognize areas of land and water in your country of particular significance for biodiversity for food and agriculture.**

**Table 9.** Landscape based initiatives to protect or recognize areas of land and water in the country with particular significance for biodiversity for food and agriculture.

<b>Landscape based initiatives<sup>21</sup></b>	<b>Description of sites and their characteristics of relevance to biodiversity for food and agriculture</b>	<b>Extent (area)</b>
Protected Marine and Coastal Areas Project	The main objective is to support the creation and implementation of a representative and effective system of marine and coastal protected areas to reduce biodiversity loss. The idea is to increase the protected area of the marine biome to 5% by 2019	175 thousand km <sup>2</sup>
Areas Important to the Conservation of Birds Project	Global initiative to identify and protect a Brazilian network as well as worldwide critical areas for bird conservation	273 areas identified in Brazil (8.5 million ha in the Atlantic Forest and 7.3 million ha in Amazonia)
Program of Priority Areas of Amazonia	Federal government action with the objective of protecting areas of the Brazilian Amazon	60 million hectares
Ecological Corridors Project	Especially the biomes Amazon and Atlantic Forest. Its function is the protection of nature, reducing or preventing the fragmentation of existing forests, through the connection between different modalities of protected	NK

<sup>21</sup> For example, International Partnership for the Satoyama Initiative (IPSI) designated areas; Globally Important Agricultural Systems (GIAHS) designated areas; Identified buffer zones around UNESCO Man and Biosphere reserves; Indigenous and Community Conserved Areas; Indigenous and Community Conserved Areas; IUCN Category V (Protected Landscape/Seascape); High Nature Value grasslands, Ramsar Wetlands of International Importance, UNESCO World Heritage Sites (Natural, Mixed Natural Cultural), UNESCO World Heritage Forests, Conservation forests, etc.

	areas and other spaces with different uses of the soil	
Sustainable Landscapes of Amazonia - Brazil	It is part of the regional conservation program of the Amazon, involving Brazil, Colombia and Peru. Provide sustainability of protected area systems; Reduce threats to biodiversity; Recover degraded areas; Increase carbon stock; Develop good forest management practices; Strengthen policies and plans for conservation and recovery	NK
Wetland Conservation Project (Ramsar)	It is part of the Convention on Wetlands of International Importance (Ramsar Convention). It aims to promote the conservation and rational use of wetlands in the world, considering the ecological importance and social, economic, cultural, scientific and recreational value of such areas to the human communities that depend on them.	22 areas recognized in Brazil until 2017

[Insert rows as needed]

### *Collaboration between institutions and organizations*

**81. Describe existing linkages and collaboration between sectors in national programmes and policies governing conservation and sustainable use of biodiversity for food and agriculture. These may include overall strategies and plans developed by your country, committees or other national bodies which oversee or support collaboration, shared actions, facilities or resources and specific activities which involve inter-sector collaboration.**

- Brazilian Sociobiodiversity Native Food Species of Nutritional Value - Ordinance N° 163 (11 March 2016). Sixty-four of the BFN Project's prioritized species appear on the list. These are the species which the BFN Project in Brazil is focusing on to improve the evidence base for their nutritional value with a view to integrating into relevant national policies and programmes.
- These species will now be more attractive for family farmers not only to grow and conserve them, but also to use and commercialize, since they now have greater recognition by the federal institutions partners of the BFN Project, especially the Food Procurement Programme (PAA), the National School Feeding Programme (PNAE) and the Minimum Price Guarantee Policy on Biodiversity Products (PGPM-Bio).

**82. How are ministries working together to meet Aichi Targets<sup>22</sup> as they may apply to the conservation and sustainable use of biodiversity for food and agriculture in your country?**

The Federal Multiyear Plan (PPA), developed every four years by the federal government with the collaboration of all sectors, contains all the programs and activities in progress or planned for a given period of four years. In this plan it is possible to identify the national public policies that contribute to reverse the causes of the loss of biodiversity, aiming at the achievement of the Aichi Biodiversity Targets.

The Multi-Year Plan (2016-2019) included integrated actions among all Ministries and several federal agencies. The first PPA assessment (2016-2019) presents 19 direct indicators on the conservation and use of biodiversity. Some of them showed great advances compared to

<sup>22</sup> <http://www.cbd.int/sp/targets/>

2014; the number of Producers inserted in the Rural Environmental Register went from 53.56% to 100% in 2016; increases were observed in the percentages of vegetation coverage in Agrarian Reform Settlements and in Federal Conservation Units benefited by the Bolsa Verde Program; 2% of the wild fauna presented lower risk of extinction; 12.8% of the flora species have Plans of Action for recovery and conservation, were only 4% in 2014.

Some examples of existing initiatives and actions that contribute significantly to integrating biodiversity conservation into other sectors as well as to developing joint intersectoral initiatives would be: the Ecological-Economic Zoning that determines the best use of the soil; the Natural Capital Initiative of Brazil; the Action Plan for the Prevention and Control of Deforestation in the Amazon (PPCDAm) and the Plan of Action for the Prevention and Control of Deforestation and Burnings in the Cerrado (PPCerrado) for the monitoring and control of fires; among many others, including the use of public events to advance the biodiversity agenda.

Additionally, various efforts are being conducted by the Ministry of Environment, Ministry of Agriculture, Livestock and Supply and other government agencies and nongovernmental and private sector agencies to generate and disseminate knowledge about biodiversity and its value, such as the Initiative Natural Capital of Brazil, in order to contribute to the promotion and improvement of biodiversity integration in sectoral policies and programs, as well as to a better understanding of the importance and value of biodiversity and ecosystem services, and their conservation and sustainable use.

**83. What future actions have been planned to support your country’s efforts in addressing Aichi Targets as they may apply to the conservation and sustainable use of biodiversity for food and agriculture in your country?**

**84. Is your country involved in the implementation of regional and/or international initiatives targeting the conservation and sustainable use of associated biodiversity? List initiatives in Table 29.**

**Table 10.** Regional and/or international initiatives targeting the conservation and sustainable use of associated biodiversity.

<b>Initiatives</b>	<b>Scope (R: regional, I: international)</b>	<b>Description</b>	<b>References</b>
Amazon Sustainable Landscape Program (PSAM)	R	A program that involves Brazil, Colombia and Peru. Its main focus is the creation and consolidation of protected areas, the conservation of landscapes through the development of sustainable agricultural practices within and between protected areas, the strengthening of Policies for the monitoring and recovery of degraded areas and the exchange of knowledge among the countries involved.	<a href="https://www.thegef.org/project/amazon-sustainable-landscapes-program">https://www.thegef.org/project/amazon-sustainable-landscapes-program</a>

*[Insert rows as needed]*

### Capacity development

**85. What training and extension programmes, or elements of programmes, at all levels, exist that target the conservation and sustainable use of associated biodiversity?**

- National Register of Local, Traditional and Creole Cultivars, created to support the use, management and conservation of local, traditional and native cultivars, in the context of the democratization policies of access to seeds, preservation of agrobiodiversity and adoption of agroecological practices (<http://www.mda.gov.br/sitemda/cultivares-crioulas>).

**86. What higher education programmes exist that target the conservation and sustainable use of associated biodiversity genetic resources? List in Table 30 the institutions, as well as the programmes and enrolment, disaggregated by sex, if possible.**

**Table 11.** Higher education programmes specifically targeting the conservation and sustainable use of associated biodiversity genetic resources in the country.

Institution	Programme	Level	Enrolment		
			Total	Male	Female
Anhanguera University of São Paulo	Biodiversity	Graduation	NK	NK	NK
Foundation University of the State of Santa Catarina	Biodiversity	Graduation	20	NK	NK
Federal University of Latin American Integration	Ecology and biodiversity	Graduation	50	NK	NK
Federal University of Latin American Integration	Neotropical biodiversity	Postgraduate	NK	NK	NK
Faculty Entre Rios of Piauí	Biodiversity	Specialization	280	NK	NK
Faculty Center South of Paraná	Ecology and biodiversity	Specialization	12	NK	NK
Central Faculty of Cristalina	Environmental education and biodiversity	Specialization	18	NK	NK
Integrated School of Araguatins	Environmental management, biodiversity, and biology	Specialization	50	NK	NK
Integrated School of Ipiranga	Environmental management, biodiversity, and biology	Specialization	200	NK	NK
Faculty Promove of Janaúba	Environmental management, biodiversity, and sustainable development	Specialization	10	NK	NK
Federal University of Paraíba	Biodiversity	Post graduate	13	5	8
Federal University of São Paulo	Marine and coastal biodiversity and ecology	Post graduate	NK	NK	NK
Oswaldo Cruz Institute	Biodiversity and health	Post graduate	41	16	25
Federal University of Goiás	Plant biodiversity	Post graduate	13	7	6
Federal University of Rio de Janeiro	Biodiversity and evolutionary biology	Post graduate	NK	NK	NK
Federal University of Santa Maria	Animal biodiversity	Post graduate	NK	NK	NK

Rede Bionorte	Biodiversity and biotechnology of the Legal Amazon	Post graduate	84	28	56
Federal University of Espirito Santo	Tropical biodiversity	Post graduate	27	10	17
Federal University of Pará	Biodiversity and conservation	Post graduate	29	10	19
State University of Maranhão	Biodiversity, environment, and health	Post graduate	NK	NK	NK
State University of Bahia	Plant biodiversity	Post graduate	19	4	15
Federal University of Tocantins	Biodiversity, ecology, and conservation	Post graduate	NK	NK	NK
Federal University of Maranhão	Biodiversity and conservation	Post graduate	9	4	5
Federal University of Mato Grosso	Ecology and conservation of biodiversity	Post graduate	23	18	5
State University of Southwest of Bahia	Genetics, biodiversity and conservation	Post graduate	NK	NK	NK
State University of São Paulo	Ecology and biodiversity	Post graduate	58	25	33
Federal University of Grande Dourados	Entomology and biodiversity conservation	Post graduate	86	37	49
Federal University of Sergipe	Agriculture and biodiversity	Post graduate	58	24	34
Museu Paraense Emilio Goeldi	Biodiversity and evolution	Post graduate	13	4	9
Federal University of Bahia	Animal biodiversity	Post graduate	22	12	10
Institute of Botany of São Paulo	Plant biodiversity and environment	Post graduate	22	11	11
Federal University of Pernambuco	Biodiversity and conservation	Post graduate	20	11	9
University of São Paulo	Systematics, animal taxonomy and biodiversity	Post graduate	46	13	33
Federal University of Western Pará	Biodiversity	Post graduate	8	3	5
University of Montes Claros	Biodiversity and use of genetic resources	Post graduate	41	14	27
Botanical Garden Research Institute of Rio de Janeiro	Plant biodiversity	Post graduate	85	36	49
Botanical Garden Research Institute of Rio de Janeiro	Biodiversity in Conservation Units	Post graduate	91	44	47
Federal University of Mato Grosso do Sul	Post Graduate Program in Plant Biology	Post graduate	43	21	22
National Institute of Amazonian Research	Genetics, Conservation, and Evolutionary Biology	Post graduate	62	29	33
University of Brasilia	Graduate Program in Botany	Post graduate	19	5	14
Federal University of Rio de Janeiro	Plant biology	Post graduate	15	9	6
Federal University of Campinas	Plant biology	Post graduate	NK	NK	NK
Federal University of Feira de Santana	Botany	Post graduate	NK	NK	NK
Federal University of Santa Cruz	Botany	Post graduate	15	5	10
State University Paulista	Plant biology	Post graduate	NK	NK	NK

"Júlio de Mesquita Filho"					
State University Paulista "Júlio de Mesquita Filho"	Botany	Post graduate	41	9	32
Federal University of Minas Gerais	Plant biology	Post graduate	47	18	29
Federal University of Santa Catarina	Biology of fungi, algae, and plants	Post graduate	25	8	17
Federal University of Uberlândia	Plant biology	Post graduate	12	3	9
Federal University of Viçosa	Botany	Post graduate	53	27	26
Federal University of Paraná	Botany	Post graduate	27	12	15
Federal University of Rio de Janeiro	Biological Sciences	Post graduate	52	22	30
Federal University of Rio Grande do Sul	Botany	Post graduate	69	27	42
Federal Rural University of Amazônia	Biological Sciences	Post graduate	46	21	25
Federal Rural University of Pernambuco	Botany	Post graduate	62	27	35

Source: Ministry of Education (<http://emec.mec.gov.br>; <https://sucupira.capes.gov.br>). Considering only the courses in activity in 2017 and with graduates.

**Note:** Data marked with NK (no knowledge) does not necessarily mean absence of data, but only that information that is readily available was not found.

### *Knowledge generation and science for the management and sustainable use of biodiversity for food and agriculture*

**87. List up to 10 major institutions within your country directly involved in research on the conservation and sustainable use of associated biodiversity. Provide a concise description of the institutions, of their key research programmes and, where possible, provide the number of active researchers.**

- **Embrapa Genetic Resources and Biotechnology:** it has 306 employees working in the exchange and quarantine of plant germplasm, guaranteeing the continuity of the breeding programs of Embrapa, besides preventing the introduction and dispersion of agricultural pests. The material introduced and collected in the Country is classified and kept at -20 C, constituting the Long-Term Collection, known as Colbase, which currently has more than 100,000 accesses. The conservation actions are complemented by cryopreservation, in vitro conservation, in situ and on farm "in order to safeguard the genetic resources and the traditional knowledge contained therein. It operates in the following research and development areas: in situ and ex situ conservation; wild relatives and native plant species, characterization of plant genetic resources, conservation and characterization of animal genetic resources, biology of animal development and reproduction, plant development and reproduction, biotechnology, synthetic biology and bioinformatics, bioactive substances and nanomaterials, biological pest control, quarantine and plant health (<https://www.embrapa.br/recursos-geneticos-e-biotecnologia>).
- **Foundation Botanical Garden Institute of Rio de Janeiro:** Research in several areas of botany (taxonomy, anatomy, morphology, physiology, biogeography, phytogeography, ecology and conservation), as well as in history of science, phytopathology and other topics. It currently has 42 researchers, as well as a team of technologists, laboratory technicians and support staff. A large number of undergraduate, postgraduate and

postdoctoral fellows, usually linked to projects with extra resources, also work in scientific activities (<http://dipeq.jbrj.gov.br/>).

- **Museu Paraense Emilio Goeldi:** Institution of research linked to the Ministry of Science and Technology and Innovation. Located in the city of Belém, State of Pará, Amazon region, founded in 1866 and concentrating scientific studies of the natural and sociocultural systems of the Amazon, as well as the dissemination of knowledge and collections related to the region. It currently has 70 researchers, distributed in four major areas: Botany, Zoology, Earth Sciences and Ecology and Human Sciences (Anthropology, Archeology and Indigenous Linguistics). Scientific collections hold approximately 4.5 million items of scientific and historical importance. The collections make the Goeldi Museum one of the three largest institutions holding scientific collections in Brazil, and the biological collections consist for the most part of records of the biodiversity of the Amazon region (<http://www.museu-goeldi.br>).
- **National Institute of Amazonian Research:** Created in 1952, it carries out scientific studies of the physical environment and living conditions of the Amazon region to promote human well-being and regional socio-economic development. Currently, INPA is a world reference in Tropical Biology and has 210 researchers. Initially focused on research, surveys and inventories of fauna and flora, today seeks to expand in a sustainable way the use of the natural resources of the Amazon. Develops research with focus on Environmental Dynamics; Society, Environment and Health; Technology and Innovation and Biodiversity (<http://portal.inpa.gov.br>).
- **Botanica Institute of São Paulo:** It is an institution of scientific research in the area of botany, of the Environment Department of the State of São Paulo. In addition to its headquarters, Biological Reserve and Botanic Garden, located within the State Park of the Fontes do Ipiranga, in the capital of the State of São Paulo, the Água Funda neighborhood has two other Conservation Units, representing the main biomes of the State: Atlantic Forest (Alto da Serra Biological Reserve of Paranapiacaba) and Cerrado (Biological Reserve and Experimental Station of Mogi Guaçu). He works in the research with focus on anatomy, briology, recovery of degraded areas, ecology, ficology, physiology and biochemistry, mycology, palynology and other related areas. It has two important collections: The Collection of Algae, Cyanobacteria, and Fungus Cultures; and the herbarium A. de Saint-Hilaire. Currently the Institute has some of the most renowned scientists in plant research in Brasilia, especially in taxonomy, developing works in partnership with the other institutes listed here (<http://www3.ambiente.sp.gov.br/institutodebotanica>).
- **Chico Mendes Institute for Biodiversity Conservation:** A municipality linked to the Ministry of the Environment and part of the National Environmental System (Sisnama). It is responsible for carrying out the actions of the National System of Conservation Units, and may propose, implement, manage, protect, supervise and monitor the UCs established by the Union. It is also responsible for promoting and executing biodiversity research, protection, preservation and conservation programs and exercise the power of environmental police for the protection of federal Conservation Units. It is the responsibility of the Institute to monitor the public use and economic exploitation of natural resources in Conservation Units where this is permitted, obeying the legal and environmental sustainability requirements. In the research area, it contributes to the systematic generation and dissemination of information and knowledge related to the management of Conservation Units, the conservation of biodiversity and the use of fauna,

fisheries and forestry resources; in addition to disseminating methodologies and technologies for environmental management and protection and integrated management of ecosystems and species of natural and genetic heritage of ecological representativeness at regional and national scale (<http://www.icmbio.gov.br>).

- **National Institute of Space Research:** Among other activities, it develops research and activities in the fields of Meteorological Sciences, Meteorology by Satellites, Weather Forecast and Climatology. It maintains close cooperation with the Ministry of the Environment and Chico Mendes Institute in research and teaching, especially in the areas of meteorology and remote sensing. Providing environmental monitoring data for the various biomes, as well as information on deforestation, natural disasters and geological data that allow strategic decisions (<http://www.inpe.br>).
- **Agronomic Institute of Campinas:** Research Institute of the Secretariat of Agriculture and Supply of the State of São Paulo, founded in 1887, and focuses on the areas of food, raw materials for industry, cooperating for food security and competitiveness of products in domestic and foreign markets. It has 161 researchers and 12 Research Centers distributed in the state of São Paulo. Among its activities is the Center for Plant Genetic Resources, which brings together reference laboratories to provide molecular diagnostic services, aggregation of value in plants for aromatic and medicinal use and creation of integrated research network to enable viability under competitive bases of plants with vocation for biodiesel. The Center develops research on sustainability, such as better use of water and soil nutrients, as well as phytoremediation technologies and genetic materials with tolerance to cold and heat. In its structure it also houses several collections of plant germplasm and a botanical garden (<http://www.iac.sp.gov.br>).

## **Gaps and priorities**

**88. With respect to information management, national policies, programmes and enabling frameworks that support or influence the conservation and sustainable use of biodiversity for food and agriculture and the provision of ecosystem services, and govern exchange, access and benefits:**

- a) **What are the major gaps in information and knowledge?**
- b) **What are the main capacity or resources limitations?**
- c) **What are the main policy and institutional constraints?**
- d) **What actions are required and what would be the priorities?**

**89. With respect to stakeholder participation and ongoing activities that support maintenance of biodiversity for food and agriculture and collaboration between institutions and organizations:**

- a) **What are the major gaps in information and knowledge?**
- b) **What are the main capacity or resources limitations?**
- c) **What are the main policy and institutional constraints?**
- d) **What actions are required and what would be the priorities?**

**90. With respect to capacity development:**

- a) **What are the major gaps in information and knowledge?**
- b) **What are the main capacity or resources limitations?**
- c) **What are the main policy and institutional constraints?**

**d) What actions are required and what would be the priorities?**

**91. With respect to knowledge generation and science for the management and sustainable use of biodiversity for food and agriculture:**

- a) What are the major gaps in information and knowledge?**
- b) What are the main capacity or resources limitations?**
- c) What are the main policy and institutional constraints?**
- d) What actions are required and what would be the priorities?**

## **CHAPTER 6: Future agendas for conservation and sustainable use of biodiversity for food and agriculture**

### *Proposed structure of the chapter and information to be included in the Country Reports*

This chapter provides an opportunity to describe plans and priorities to secure and improve the conservation and sustainable use of biodiversity for food and agriculture. Particular attention should be given to future opportunities to enhance the contribution of biodiversity for food and agriculture to food security and nutrition, as well as the elimination of rural poverty. Planned actions and initiatives should be listed that intend to support the following:

- Strengthening the contribution of biodiversity for food and agriculture to secure the multiple benefits of agriculture, including food security and nutrition, rural development, sustainable intensification, and the enhanced sustainability and resilience of production systems;
- Improving recognition and involvement of farmers, pastoralists, fishers and forest dwellers, addressing gender equality, and supporting the roles and contributions of women;
- Contributing to the UN Strategic Plan for Biodiversity and to achieving the Aichi Targets<sup>23</sup> and linking to other related processes undertaken through the Convention on Biological Diversity.

Additionally, Chapter 6 allows an assessment of future needs with respect to policies and legal arrangements, economic frameworks, knowledge creation, capacity development and collaboration.

This part of the Country Report should build on the results presented in earlier Chapters and provide an integrated overview with, where possible, clear priorities for national, regional or global actions. This chapter is structured to benefit countries through an overall synthesis of information provided elsewhere in the report. Countries that previously presented or are currently preparing a Country Report on Forest, Aquatic, Animal or Plant Genetic Resources, may wish to take full advantage of their different sectoral reports to identify an overall perspective.

### *Enhancing the contribution of biodiversity for food and agriculture*

---

<sup>23</sup> Especially Targets 6, 7, 13.

This section provides an opportunity for countries to highlight their plans and priorities, and to describe current constraints to achieving them on enhancing the contribution of biodiversity for food and agriculture to human wellbeing, environmental health and sustainable production. Include any information that might be useful in informing future policies to help strengthen the contribution of biodiversity for food and agriculture to the broader sustainability and development objectives listed below.

**92. Describe planned actions and future priorities to improve the conservation and sustainable use of biodiversity for food and agriculture with specific reference to enhancing its contribution to:**

- a) improving food security and nutrition;
- b) improving rural livelihoods;
- c) improving productivity;
- d) supporting ecosystem function and the provision of ecosystem services;
- e) improving the sustainability and resilience of production systems;
- f) supporting sustainable intensification.

Refer to the future needs and priorities identified in previous Chapters. The different topics may be dealt with jointly or individually as appropriate to country plans and approaches. Replies should include country perspectives on:

- Ways and means of improving the capacity and operations of the institutions within your country concerned with or affected by the maintenance and use of biodiversity for food and agriculture and particularly of associated biodiversity, including universities, government programmes, NGOs, breeders, private sector entities, organizations and social movements of small-scale producers. Actions to improve collaboration between stakeholders should be included.
- Ways and means of supporting the development of new policies or the implementation of the current policies that support the integrated conservation and sustainable use of biodiversity for food and agriculture, and that also specifically target associated biodiversity.
- The major information and knowledge gaps that remain to be addressed and options that exist to address them.

Countries should indicate the ways in which planned actions will contribute to the UN Strategic Plan for Biodiversity and to achieving the Aichi Targets<sup>24</sup> as well as to how they link to other related processes undertaken through the Convention on Biological Diversity.

***Strengthening the conservation and management of associated biodiversity and wild foods***

This section provides an opportunity for countries to highlight their plans and priorities, and to describe current constraints to achieving them on the conservation and management of associated biodiversity and of wild foods.

---

<sup>24</sup> In particular Targets 6, 7, 13.

**93. Describe planned actions and future priorities to support conservation and management of the components of associated biodiversity and wild foods including the development of monitoring programmes and of information systems or databases.**

Replies should cover country perspectives on:

- **Ways and means of improving the capacity and operations of the institutions within your country concerned with or affected by the maintenance and use of biodiversity for food and agriculture and particularly of associated biodiversity, including universities, government programmes, NGOs, breeders, private sector entities, organizations and social movements of small-scale producers. Actions to improve collaboration between stakeholders should be included;**
- **Ways and means of supporting the development of new policies or the implementation of the current policies that support the integrated conservation and sustainable use of biodiversity for food and agriculture, and that also specifically target associated biodiversity;**
- **The major information and knowledge gaps that remain to be addressed and options that exist to address them.**

**94. Describe planned actions and future priorities with respect to implementing ecosystem approaches for the various components of biodiversity for food and agriculture.**

#### *Improving stakeholder involvement and awareness*

This section provides an opportunity for countries to highlight their plans and priorities, and to describe current constraints to achieving them with respect to stakeholder involvement in the conservation and sustainable use of biodiversity for food and agriculture with specific reference to the recognition and involvement of farmers, pastoralists, fishers and forest dwellers, addressing gender equality, and supporting the roles and contributions of women.

**95. Describe planned actions and future priorities to improve stakeholder awareness, involvement and collaboration in the conservation and sustainable use of biodiversity for food and agriculture. Include a description of the major challenges that will need to be overcome.**

- The area needing the most attention is production and marketing (supply) of wild foods. Priority should be given to marketing opportunities that could be explored by promoting social entrepreneurial at the grassroots level, at the private sector level or by strengthening links with institutional markets.

**96. Describe planned actions and future priorities to support the role of farmers, pastoralists, fisher folk, forest dwellers, and other rural men and women dependent on local ecosystems in the conservation and use of biodiversity for food and agriculture. Replies should include information on recognizing and enhancing the role of indigenous peoples. Include a description of the major challenges that will need to be overcome.**

- Formulation and implementation of training programs on ABS as well as Community Protocols and for multipliers;
- Strengthen activities of production chains with access to genetic resources and associated traditional knowledge and capacity building in ABS;
- Women's practices and knowledge should be recognized and valued.

**97. Describe planned actions and future priorities to improve recognition of the contribution of women to the conservation and use of the different components of biodiversity for food and agriculture, including associated biodiversity. Include a description of the major challenges that will need to be overcome.**

## **ANNEX 1: Recommended scope of the Country Report**

### **Biodiversity for food and agriculture**

Biodiversity for food and agriculture includes 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 agriculture products. Production systems, as defined for the purposes of this report, include the livestock, crop, fisheries and aquaculture and forest sectors. The diversity found in and around production systems has been managed or influenced by farmers, pastoralists, forest dwellers and fisherfolk over many hundreds of generations and reflects the diversity of both human activities and natural processes.

The present Guidelines for the SoWBFA mainly focus on those areas not covered by completed or on-going Country Reports on Animal, Forest, Plant and Aquatic Genetic Resources, e.g. the biological diversity associated with different supporting and regulating ecosystem services within production systems or of importance to them, referred to hereinafter as associated biodiversity, and wild resources used for food.

### **Associated biodiversity**

For the scope of this report, 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*:

- 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;
- 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;
- 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;
- 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.

Note that domesticated species may also provide ecosystem services other than provisioning ones and affect crop, animal, fish and forest production in different ways. However since these species are already addressed in other State of the World Reports, countries may choose whether or not they want to include them in their Country Reports for the SoWBFA.

## **Integrated analysis of biodiversity for food and agriculture**

The scope of the Report builds upon the contribution of individual sector reports by providing an integrative analysis of interactions, including synergies, interlinkages and trade-offs, between genetic resources of the different sectors. This is achieved through the identification of production systems within the country (Annex 2), and particular focus upon ecosystem perspectives in relation to biodiversity for food and agriculture. Questions addressing overall biodiversity for food and agriculture target information that would build upon what may be available in previous or ongoing country reports.

## ANNEX 2: Production systems

**Table 1.** Climatic zones definitions

Climatic zone	Definition
Tropics	All months with monthly mean temperature, corrected to sea level, above 18°C.
Subtropics	One or more months with monthly mean temperatures, corrected to sea level, below 18°C but above 5 °C.
Temperate	At least one month with monthly mean temperatures, corrected to sea level, below 5 °C and four or more months above 10 °C.
Boreal	At least one month with monthly mean temperatures, corrected to sea level, below 5 °C and more than one but less than four months above 10 °C.

**Table 2.** Production systems descriptions

Name of production system	Climatic zone	Description
Livestock grassland-based systems	Tropics	Systems in which the animals obtain a large proportion of their forage intake by grazing natural or sown pastures, includes: <ul style="list-style-type: none"> <li>Ranching: grassland-based systems in which livestock is kept on privately owned rangeland</li> <li>Pastoralist: grassland-based systems in which the livestock keepers move with their herds or flocks in an opportunistic way on communal land to find feed and water for their animals (either from or not from a fixed home base)</li> </ul>
	Subtropics	
	Temperate	
	Boreal and /or highlands <sup>25</sup>	
Livestock landless systems	Tropics	Systems in which livestock production is separated from the land where the feed given to the animals is produced.
	Subtropics	
	Temperate	
	Boreal and /or highlands	
		•
Naturally regenerated forests	Tropics	Includes: <ul style="list-style-type: none"> <li>Primary: Forests of native species, where there are no clearly visible indications of human activities and the ecological processes are not directly disturbed by humans</li> <li>modified natural: Forests of naturally regenerated native species where there are clearly visible indications of significant human activities</li> <li>semi-natural (assisted natural regeneration): Silvicultural practices in natural forest by intensive management (weeding, fertilizing, thinning, selective logging)</li> </ul>
	Subtropics	
	Temperate	
	Boreal	
	Boreal and /or highlands	
Planted forests	Tropics	Includes : <ul style="list-style-type: none"> <li>semi-natural (planted component) : Forests of native species, established through planting or seeding, intensively managed</li> </ul>
	Subtropics	

<sup>25</sup> High elevation montane environments where climate differs significantly from surrounding lower elevation areas, including alpine and sub-alpine zones, tropical highlands, dryland mountains, etc.

	Temperate	<ul style="list-style-type: none"> <li>Plantations (productive) : Forests of introduced and/or native species established through planting or seeding mainly for production of wood or non-wood goods</li> <li>Plantations (protective) : Forests of introduced and/or native species, established through planting or seeding mainly for provision of services</li> </ul>
	Boreal	
	Boreal and /or highlands	
Self-recruiting capture fisheries	Tropics	Includes capture fisheries in marine, coastal and inland areas that can involve <ul style="list-style-type: none"> <li>Natural ecosystems</li> <li>Modified ecosystems e.g. reservoirs and rice paddies;</li> </ul>
	Subtropics	
	Temperate	
	Boreal	
Culture-based fisheries	Tropics	Fisheries on resources, the recruitment of which originates or is supplemented from cultured stocks (i.e., populations chosen for culture and not stocks in the same sense as that term is used for capture fisheries) raising total production beyond the level sustainable through natural processes.
	Subtropics	
	Temperate	
	Boreal and /or highlands	
Fed aquaculture	Tropics	The farming of aquatic organisms including fish, mollusks, crustaceans, aquatic plants, crocodiles, alligators, turtles and amphibians. Farming implies some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators etc. Farming also implies individual or corporate ownership of the stock being cultivated; i.e., the population chosen for culture and not a stock in the same sense as that term is used for capture fisheries. Fed aquaculture production utilizes or has the potential to utilize aquafeeds of any type in contrast with the farming of filter-feeding invertebrates and aquatic plants that relies exclusively on natural productivity. Also defined as “farming of aquatic organisms utilizing aquafeeds in contrast to that deriving nutrition directly from nature”.
	Subtropics	
	Temperate	
	Boreal and /or highlands	
Non-Fed aquaculture	Tropics	The farming of aquatic organisms including fish, mollusks, crustaceans, aquatic plants that do not need supplemental feeding. Farming implies some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators etc. Farming also implies individual or corporate ownership of the stock being cultivated; i.e., the population chosen for culture and not a stock in the same sense as that term is used for capture fisheries. In non-fed aquaculture systems culture is predominately dependent on the natural environment for food, e.g. aquatic plants and mollusks.
	Subtropics	
	Temperate	
	Boreal and /or highlands	
Irrigated crops (rice)	Tropics	Irrigated rice refers to areas where rice is cultivated purposely provided with water, including land irrigated by controlled flooding.
	Subtropics	
	Temperate	
	Boreal and /or highlands	
Irrigated crops (other)	Tropics	Irrigated crops other than rice refers to agricultural areas purposely provided with water, including land irrigated by controlled flooding.
	Subtropics	
	Temperate	
	Boreal and /or highlands	
Rainfed crops	Tropics	Agricultural practice relying exclusively on rainfall as its source of

	Subtropics	water.
	Temperate	
	Boreal and /or highlands	
Mixed production systems (livestock, crop, forest and /or aquatic and fisheries mixed)	Tropics	<p>Production systems with multiple components. They include:</p> <ul style="list-style-type: none"> <li>• Crop-livestock: mixed systems in which livestock production is integrated with crop production.</li> <li>• Agro-pastoralist: livestock-oriented systems that involve some crop production in addition to keeping grazing livestock on rangelands; they may involve migration with the livestock away from the cropland for part of the year; in some areas, agropastoral systems emerged from pastoral systems</li> <li>• Agroforestry-livestock: mixed system in which livestock production is integrated with the production of trees and shrubs<sup>38</sup></li> <li>• Integrated aquaculture: mixed systems in which aquaculture is integrated with crop and livestock production. May involve ponds on farms, flooded fields, enrichment of ponds with organic waste, etc.</li> <li>• Other combinations</li> </ul>

## ANNEX 3: Drivers of change

**Table 1.** Drivers of change and descriptions.

<b>Drivers</b>	<b>Description, Subcategories and Examples</b>
Changes in land and water use and management	A change in the use, management and practices around land and water (e.g., deforestation; fragmentation; modification of water regimes; forest degradation; land conversion for agriculture; ecosystem restoration; the role of women and men in land and water use and management, etc.)
Pollution and external inputs	The mismanaged, excessive or inappropriate use of external inputs (e.g., over application of fertilizer and pesticides; excessive use of antibiotics or hormones; nutrient loading, including from use of imported feed; ocean acidification, CO <sub>2</sub> fertilization; chemical and particulate pollutants, etc.
Over-exploitation and overharvesting	Unsustainable extraction practices (e.g., overfishing; overhunting; overgrazing; logging and extractive activities exceeding replacement rates or affecting species of uncertain and at-risk conservation status, etc.)
Climate change	The impacts and effects of progressive climate change (e.g., alterations in precipitation regimes; temperature changes; loss of water supply; increased variability; sea level rise; shifts in flowering time or seasonality, etc.)
Natural disasters	Climate shocks, extreme weather events and other natural disasters that threaten agricultural production and resilience of production systems (e.g., hurricanes, earthquakes, floods, fires).
Pests, diseases, alien invasive species	New and emerging threats from pests, diseases and invasive species affecting biodiversity for food and agriculture (e.g., shifting ranges; introductions; increased suitability; loss of predator, etc.)
Markets, trade and the private sector	<b>Trade</b> - Changing terms of trade, globalization of markets, commercialization of products, retailing, the separate capacities of women and men to commercialize products, etc. <b>Markets and consumption</b> - Demand driven changes in production or practices including the tastes, values or ethics of consumers that may impact directly or indirectly biodiversity for food and agriculture, product quantity or quality <b>Private sector</b> - The changing role and influence of private sector and corporate interests
Policies	<b>Policies</b> - Global, regional, national, and subnational legislation and regulations (e.g., conservation regulations, participation and compliance with International treaties and conventions); <b>Economic and policy interventions</b> - Interventions that impact biodiversity for food and agriculture directly or indirectly (e.g., taxes, subsidies, charges for resource use, payments for ecosystem services) <b>Intellectual Property Rights (IPR), Access and Benefit Sharing (ABS)</b> - Direct or indirect impacts of IPR and ABS policy and regulations on biodiversity for food and agriculture.
Population growth and urbanization	<b>Population</b> - Changes in population metrics (e.g., growth, fertility, composition, mortality, migration, health and disease, including different affects on men and women.) <b>Urbanization</b> - (e.g., shifts in proportion of urban and rural; change in urbanization trends, including different effects on men and women)
Changing economic, socio-political, and cultural factors	<b>Economic development</b> - A change in economic circumstances of countries, industries, households (e.g., change in GDP and economic growth; structural change of economy; income diversification, and the different economic circumstances of men and women.) <b>Changing socio-political, cultural or religious factors</b> - Variation in the forces influencing decision-making of men and women, e.g., public participation, shifts in the influence of the state vs. private sector, changes in levels of education and knowledge, shifts in the beliefs, values and norms held by a group of people.

	<b>Participatory actions</b> – the role of collective action toward conservation and use of biodiversity by stakeholders
Advancements and innovations in science and technology	The development and diffusion of scientific knowledge and technologies, (e.g., advances in breeding; improvements in mobile extension; tools for monitoring; biotechnology applications, access of men and women to information).

## ANNEX 4: Ecosystem services

The SoWBFA Guidelines focus primarily on regulating and supporting ecosystem services, described below. Provisioning services relating to biodiversity for food and agriculture are the focus of sectoral State of the World Reports, and are addressed in these guidelines only in relation to associated biodiversity and wild foods, which often fall outside of traditional sectoral reporting. Countries may choose to address additional ecosystem services, including cultural services, for the completion of national reports, particularly where they are directly relevant to the objectives of the SoWBFA Report<sup>26</sup>.

**Table 1.** Regulating and supporting ecosystem services.

Category	Ecosystem services	Description	Relevant ecosystem functions
Regulating services	Pollination	Role ecosystems play in transferring pollen from male to female flower parts	Agricultural productivity; production of food and goods.
	Pest and disease regulation	Influence ecosystems have on the prevalence of crop and livestock pests and diseases	Biological control; the maintenance and feedback mechanisms preventing outbreaks of pests and diseases, including invasive species.
	Water purification and waste treatment	Role ecosystems play in the filtration and decomposition of organic wastes and pollutants in water; assimilation and detoxification of compounds through soil and subsoil processes	Filtering function performed by vegetation cover, soil and aquatic biota.
	Natural hazard regulation	Capacity for ecosystems to ameliorate and reduce the damage caused by natural disasters	Vegetative structure can alter potentially catastrophic effects of storms, floods and droughts through its storage capacity and surface resistance; coral reefs buffer waves and protect adjacent coastlines from storm damage. The services provided by this function relate to providing safety of human life and human constructions.
Supporting services	Nutrient cycling	Flow of nutrients (e.g., nitrogen, sulfur, phosphorus, carbon) through ecosystems	Maintenance of fertility; regulation of excess nutrients; climate regulation; regulation of biotic communities
	Soil formation and protection	Degradation of ecosystems, such as decomposition of organisms or weathering of substrate, to form soil	Maintenance of crop productivity on cultivated lands and the integrity and functioning of natural ecosystems.
	Water cycling	Flow of water through ecosystems in its solid, liquid, or gaseous forms	Regulation of hydrological flows at the earth surface. Maintenance of natural irrigation and drainage, buffering of extremes in discharge of rivers, regulation of channel flow, and provision of a medium for

<sup>26</sup> Including those described in the Millennium Ecosystem Assessment, or subsequent adaptations by the TEEB or other sources.

			transportation.
	Habitat provisioning	Role of ecosystems in creating and maintaining habitats for a wide variety of organisms	Providing diverse and suitable habitats for species; nursery function for migratory species and as breeding areas.
	Production of oxygen/ Gas regulation	The creation of atmospheric oxygen through photosynthesis	Gas regulation functions include the maintenance of clean, breathable air, and the prevention of diseases (e.g. skin cancer, asthma) May include regulation of the CO <sub>2</sub> /O <sub>2</sub> balance, maintaining ozone-layer (O <sub>3</sub> ), and regulation of SO <sub>x</sub> levels.

## ANNEX 5: Management practices supporting the use and conservation of biodiversity for food and agriculture

**Table 1.** Management practices supporting the use and conservation of biodiversity for food and agriculture.

<b>Management practices supporting the use and conservation of biodiversity for food and agriculture</b>	<b>Description/ examples of management practices</b>
Integrated Plant Nutrient Management (IPNM)	Soil, nutrient, water, crop, and vegetation management practices undertaken with the aim of improving and sustaining soil fertility and land productivity and reducing environmental degradation, often tailored to a particular cropping and farming system. May include the use of farmyard manures, natural and mineral fertilizers, soil amendments, crop residues and farm wastes, agroforestry and tillage practices, green manures, cover crops, legumes, intercropping, crop rotations, fallows, irrigation, drainage, plus a variety of other agronomic, vegetative and structural measures designed to conserve both water and soil.
Integrated Pest Management (IPM)	Pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment by encouraging natural pest control mechanisms that include: crop rotation; inter-cropping; seedbed sanitation, sowing dates and densities, under-sowing, conservation tillage, pruning and direct sowing; where appropriate, use of pest resistant/tolerant cultivars, push-pull strategies and standard/certified seed and planting material; balanced soil fertility and water management, making optimum use of organic matter; prevent spreading of harmful organisms by field sanitation and hygiene measures; protection and enhancement of important beneficial organisms.
Pollination management	Practices that accomplish or enhance pollination of a crop, to improve yield or quality, by understanding of the particular crop's pollination needs, and by knowledgeable management of pollenizers, pollinators, and pollination conditions. Pollinator-friendly practices include minimizing the use of agrochemicals, integrated pest management and mixed cropping to include pollinator friendly crops, preserving wild habitats, maintaining flower-rich field margins, buffer zones and permanent hedgerows to ensure habitat and forage, cultivating shade trees, managing for bee nest sites, and establishing landscape configurations that favor pollination services.
Landscape management	Practices that support the maintenance of biodiversity friendly farming systems, or the diversity of landscape mosaics within and surrounding production systems over particular geographic areas. Examples include riparian corridors, hedges, margins, woodland patches, clearings in forests, ponds or other biodiversity friendly features characteristic of the production environment that may be the result of national or regional policies such as the EU set aside schemes.
Sustainable soil management practices	Management of soil biodiversity to enhance agricultural production by both direct and indirect means, including alteration of the abundance or activity of specific groups of organisms through inoculation and/or direct manipulation of soil biota. Indirect interventions may include manipulation of the factors that control biotic activity (habitat structure, microclimate, nutrients and energy resources) rather than the organisms themselves such as the maintenance of soil cover with organic mulch including crop residues, green manure/cover crops including legumes, and

	compost to increase soil organic matter, irrigation and liming, as well as cropping system design and management.
Conservation agriculture	Conservation Agriculture (CA) aims to achieve sustainable and profitable agriculture and improve livelihoods of farmers through the application of the three CA principles: no or minimal soil disturbance through direct seeding into untilled soils, maintenance of permanent soil mulch cover, and crop diversification through rotations, associations and sequences.
Water management practices, water harvesting	Water harvesting and management through rain water retention or modification of the landscape (e.g., bunds, zais, terracing) for the restoration and improvement of degraded lands, and to allow cultivation of additional crops with higher water requirements, and improving water productivity of crops.
Agroforestry	Agroforestry is a collective name for land-use systems where woody perennials (trees, shrubs, palms, etc.) are integrated in the farming system.
Organic agriculture	Organic agriculture is a production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system.
Low external input agriculture	Production activity that uses synthetic fertilizers or pesticides below rates commonly recommended for intensive industrial tillage agriculture. It does not mean elimination of these materials. Yields are maintained through greater emphasis on agronomic practices, IPM, and utilization of on-farm resources (especially labor) and management.
Home gardens	An integrated system which comprises different components in a small area around the homestead, including staple crops, vegetables, fruits, medicinal plants, livestock and fish both for home consumption or use and for income. May include the family house, a living/playing area, a kitchen garden, a mixed garden, a fish pond, stores, an animal house, etc.
Areas designated by virtue of production features and approaches	These include areas recognized nationally or internationally by virtue of their landscape and agricultural features. In addition to Satoyama, GIAHS, national parks (IUCN categories), they also include areas recognized for specific agricultural products (e.g. DOP, IGP or Slow Food).
Ecosystem approach in capture fisheries	Approach promoting the diversity of the whole ecosystem in order to support the target species. Considerations include sustainable harvesting of the retained species (target and by-product species); managing the direct effects of fishing (especially on non-retained by-catch and habitat); and managing the indirect effects of the fishery on ecosystem structure and processes.
Conservation hatcheries	Hatcheries and production systems that optimize natural levels and organization of genetic diversity over production. Often for rebuilding depleted populations of commercially important species, (e.g. Atlantic and Pacific salmon).
Reduced-impact logging	A series of practices to improve logging practices such as vine removal, directional felling, limiting skid trails, logging roads and stumping grounds, restrictions on the size and number of trees felled, and post felling removal of waterway blockages, to reduce the residual damage, biodiversity loss and excess CO <sub>2</sub> emissions associated with conventional logging practices.

## ANNEX 6: Diversity based interventions

**Table 1.** Diversity based practices and interventions

Diversity based practices	Description/ examples of interventions
Diversification	The introduction of new varieties, species, and groups of organisms (e.g., livestock, crops, trees, fish) into a production system or managed environment without replacement or abandonment of other groups, or the maintenance of already-existing diversity in the case of traditionally diverse production systems. May include introductions for restoration or IPM objectives, including fish introduced to control reproduction.
Base broadening	Increasing the amount of genetic diversity used to produce new varieties or breeds used in agricultural production.
Domestication	The development of new crop, aquatic, forest and animal species through deliberate breeding programmes or the continued selection and improvement of existing species from their wild progenitors. These activities may be carried out by national breeding programmes or by farmers and communities themselves.
Maintenance or conservation of landscape complexity	Maintenance or management of components of a landscape mosaic including hedges, waterways, road margins, corridors, windbreaks, living fences, native grasses wild patches of vegetation in the farming landscape, etc.
Restoration practices	Restoring functionality and productive capacity to ecosystems, forests, landscapes, waterways, grasslands and rangelands in order to provide food, fuel, and fiber, improve livelihoods, store carbon, improve adaptive capacity, conserve biodiversity, prevent erosion and improve water provisioning and quality.
Management of micro-organisms	The intentional incorporation, management or maintenance of microbes, fungi and other micro-organisms into a production system or organisms; e.g., inoculation of plants and seeds with arbuscular mycorrhizal fungi, the addition of probiotics in aquaculture and livestock, etc.
Polyculture/Aquaponics	Integrated multi-trophic aquaculture, utilization of different trophic and spatial niches of an aquaculture system in order to obtain maximum fish production per unit area, utilizing natural resource availability.
Swidden and shifting cultivation agriculture	Rotation of plots from intensive cultivation to extended fallow periods for the replenishment of soil fertility.
Enriched forests	Selective logging and enrichment planting to increase the abundance of useful species for food, medicine and timber, often a feature of traditional management practices.

### References

- Agrofit. **Sistema de agrotóxicos fitossanitários**. Ministério da Agricultura, pecuária e Abastecimento. [http://agrofit.agricultura.gov.br/agrofit\\_cons/principal\\_agrofit\\_cons](http://agrofit.agricultura.gov.br/agrofit_cons/principal_agrofit_cons). (accessed 25.08.17).
- Alves, S.B.; Lopes, R.B. 2008. **Controle Microbiano de Pragas na América Latina: avanços e desafios**. FEALQ, Piracicaba, SP, Brazil.
- Bettiol, W., 2011. **Biopesticide use and research in Brazil**. *Outlooks Pest Manag.* 2, 280–284.
- Bettiol, W. et al., 2012. **Produtos comerciais à base de agentes de biocontrole de doenças de plantas**. Documentos 88, Jaguariúna, SP. Embrapa Meio Ambiente, 155 p.
- Brasil: **5º Relatório Nacional para a Convenção Sobre Diversidade Biológica**. Ministério do Meio Ambiente. Secretaria de Biodiversidade e Florestas; Coordenador Carlos Alberto de Mattos Scaramuzza. Brasília: MMA, 2016. (<http://www.mma.gov.br/informma/item/10772-quinto-relat%C3%B3rio>).
- Brasil. Ministério do Meio Ambiente. **Estratégia e Plano de Ação Nacionais para a Biodiversidade**. 2016-2020. [http://www.mma.gov.br/imagens/arquivo/80049/EPANB/EPANB\\_08-09-17.pdf](http://www.mma.gov.br/imagens/arquivo/80049/EPANB/EPANB_08-09-17.pdf)

- Brasil. Ministério do Meio Ambiente. **Portaria n. 443, of 17 dezembro de 2014.** Lista oficial da espécies da flora ameaçadas de extinção. ([http://cncflora.jbrj.gov.br/portal/static/pdf/portaria\\_mma\\_443\\_2014.pdf](http://cncflora.jbrj.gov.br/portal/static/pdf/portaria_mma_443_2014.pdf)).
- Brasil. Ministério da Agricultura, Pecuária e Abastecimento. **Hortaliças não-convencionais: (tradicionais).** Ministério da Agricultura, Pecuária e Abastecimento. Secretaria de Desenvolvimento Agropecuário e Cooperativismo. – Brasília: MAPA/ACS, 2010.
- Carrillo, D., Amalin, D., Hosein, F., Roda, A., Duncan, R.E., Pena, J.E. 2012. Host plant range of *Raoiella indica* (Acari: Tenuipalpidae) in areas of invasion of the New World. **Experimental and Applied Acarology**, 57, 271–289.
- Castilho, R.C., Moraes, G. J., Silva, E.S., Freire, R.A.P., Eira, C. 2009. The predatory mite *Stratiolaelaps scimitus* as a control agent of the fungus gnat *Bradysia matogrossensis* in commercial production of the mushroom *Agaricus bisporus*. **International Journal of Acarology**, 55: 181-185.
- Cocco, A., Hoy, M.A. 2009. Feeding, reproduction, and development of the red palm mite (Acari: Tenuipalpidae) on selected palms and banana cultivars in quarantine. **Florida Entomologist**, 92, 276–291.
- Conab - Companhia Nacional de Abastecimento. **Boletim da Sociobiodiversidade**, v.1, n.1, 2017 (<http://www.conab.gov.br/detalhe.php?c=45163&t=2#this>)
- Conab - Companhia Nacional de Abastecimento. **Acompanhamento da safra brasileira de grãos.** Vol. 4 safra 2016/17. jun. 2017. [http://www.conab.gov.br/OlalaCMS/uploads/arquivos/17\\_06\\_08\\_09\\_02\\_48\\_boletim\\_graos\\_junho\\_2017.pdf](http://www.conab.gov.br/OlalaCMS/uploads/arquivos/17_06_08_09_02_48_boletim_graos_junho_2017.pdf).
- Doetzer, Al.K., Foerster, L.A. 2007. Desenvolvimento, longevidade e reprodução de *Trissolcus basalis* (Wollaston) e *Telenomus podisi* Ashmed (Hymenoptera: Scelionidae). **Neotropical Entomology**, 36(2):233-242.
- Dorighello, D.V.; Bettiol, W.; Borlina, M.N.; Leite, R.M.V.B.C. 2015. Controlling Asian soybean rust (*Phakopsora pachyrhizi*) with *Bacillus* spp. and coffee oil. **Crop Protection**, 67:59-65.
- Embrapa. **Práticas tecnológicas adotadas pelos produtores de dendezeiro híbrido interespecífico no Nordeste Paraense.** Belém, PA: Embrapa Amazônia Oriental, 2017. (Embrapa Amazônia Oriental, ISSN 1517-2201, 430).
- FAO. 2017. **World production.** <http://faostat.fao.org/site/339/default.aspx>.
- Faria, M.R., Wraight, S.P., 2007. Mycoinsecticides and mycoacaricides: A comprehensive list with worldwide coverage and international classification of formulation types. **Biol. Control**, 43, 237–256.
- Flechtman, C.H.W., Etienne, J. 2004. The red palm mite, *Raoiella indica* Hirst, a threat to palms in the Americas (Acari: Prostigmata: Tenuipalpidae). **Systematic and Applied Acarology**, 9, 109-110.
- Freire, R.A.P., Moraes, G. J., Silva, E.S., Vaz, A.C.; Castilho, R.C. 2007. Biological control of *Bradysia matogrossensis* (Diptera: Sciaridae) in mushroom cultivation with predatory mites. **Experimental and Applied Acarology**, 42: 87-93.
- Freitas, C.M.; Silva, D.R.X.; Sena, A.R.M.; Silva, E.L.; Sales, L.B.F.; Carvalho, M.L.; Mazoto, M.L.; Barcellos, C.; Costa, A.M.; Oliveira, M.L.C.; Corvalán, C. Desastres naturais e saúde: uma análise da situação do Brasil. **Ciência & Saúde Coletiva**, 19(9), 3645-3656, 2014.
- Goble, T., Almeida, J., Conlong, D., 2017. Microbial Control of Sugarcane Insect Pests. In: Lacey L.A. (Ed). **Microbial Control of Insect and Mite Pests: From Theory to Practice.** Elsevier Academic Press, London, p.299-312.
- Gómez-Moya, C.A., Lima, T.P.S., Morais, E.G.F., Gondim Jr., M.G.C. 2017. Hosts of *Raoiella indica* Hirst (Acari: Tenuipalpidae) native to the Brazilian amazon. **Journal of Agricultural Science**, 9, 86-93.
- Gondim Jr., M.G.C., Castro, T.M.M.G., Marsaro, A.L., Navia, D., Melo, J.W.S., Demite, P.R., Moraes, G.J. 2012. Can the red palm mite threaten the Amazon vegetation? **Systematics and Biodiversity**, 10, 527-535.
- Guerra, M.P.; Rocha, F.S.; Nodari, R.O. Biodiversidade, recursos genéticos vegetais e segurança alimentar em cenário de ameaças e mudanças. In: Veiga, R.F.A.; Queiróz, M.A. (Ed.). **Recursos fitogenéticos: a base da agricultura sustentável no Brasil.** Viçosa: Ed. UFV, 2015. p.39-52.
- Hanna R., Yaninek J.S., Toko M., Onzo A., Gnanvossou D., Ojo D, Zannou L., Paraiso G. 1998. Current status of cassava green mite *Mononychellus tanajoa* Bondar (Acari: Tetranychidae) biological control in Africa. **Proceedings of the 7th Triennial Symposium of the International Society for tropical root crops.** Africa branch (ISTRAC-AB), Cotonou, Benin, 11-17.

- Hata, F.T., Silva, J.E.P., Ventura, M.U., Pasini, A., Roggia, S. 2017. First Report of *Raoiella indica* (Hirst) (Acari: Tenuipalpidae) in Southern Brazil. **Neotropical Entomology**. doi:10.1007/s13744-016-0468-9.
- IBGE – Anuário Estatístico do Brasil 2016 (<https://biblioteca.ibge.gov.br/biblioteca-catalogo?id=720&view=detalhes>)
- ICMBio – Instituto Chico Mendes de Conservação da Biodiversidade. **Livro Vermelho da Fauna Brasileira Ameaçada de Extinção**. 2016. ([http://www.icmbio.gov.br/portal/images/stories/comunicacao/publicacoes/publicacoes-diversas/dcom\\_sumario\\_executivo\\_livro\\_vermelho\\_ed\\_2016.pdf](http://www.icmbio.gov.br/portal/images/stories/comunicacao/publicacoes/publicacoes-diversas/dcom_sumario_executivo_livro_vermelho_ed_2016.pdf)).
- Instituto de Economia Agrícola. Defensivos Agrícolas: em 2014, faturamento do segmento foi o destaque. <http://www.iea.sp.gov.br/out/verTexto.php?codTexto=13679>
- Kirsch, H.M.; Schneider, S. Vulnerabilidade social às mudanças climáticas em contextos rurais. **Revista Brasileira de Ciências Sociais**, 31(91), 2016.
- Koch, K.A., Potter, B., Ragsdale, D.W., 2010. Non-target impacts of soybean rust fungicides on the fungal entomopathogens of soybean aphids. **J. Invertebr. Pathol.** 103, 156–164.
- Lemes, P; Loyola, R; Mudanças climáticas e prioridades para conservação da biodiversidade. **Revista de Biologia Neotropical**, 47-57, 2014.
- Li, Z., Alves, S.B., Roberts, D., Fan, M., Delalibera, I., Tang, J., Lopes, R.B., Faria, M., Rangel, D.E.N., 2010. Biological control of insects in Brazil and China: history, current programs and reasons for their successes using entomopathogenic fungi. **Biocontrol Sci. Technol.**, 20, 117–136.
- Lima, M.R., Rodriguez, H., Gonzalez, A.I., Gonzalez, M. 2011. Management strategy of *Raoiella indica* Hirst (Acari: Tenuipalpidae) in Cuba. In: Moraes, G.J., Proctor, H. (Eds.), **Acarology XIII: Proceedings of the International Congress. Zoosymposia 6**, 152–159.
- Lopes, R.B., Mesquita, A.L.M., Tigano, M.S., Souza, D.A., Martins, I., Faria, M., 2013a. Diversity of indigenous *Beauveria* and *Metarhizium* spp. in a commercial banana field and their virulence toward *Cosmopolites sordidus* (Coleoptera: Curculionidae). **Fungal Ecol.** 6, 356–364.
- Lopes, R.B., Souza, D.A., Oliveira, C., Faria, M., 2013b. Genetic diversity and pathogenicity of *Metarhizium* spp. associated with the white grub *Phyllophaga capillata* (Blanchard) (Coleoptera: Melolonthidae) in a soybean field. **Neotr. Entomol.** 42, 436–438.
- Lopes, R.B., Faria, M., Souza, D.A., Bloch, C., Silva, L.P., Humber, R.A., 2014. MALDI-TOF mass spectrometry applied to identifying species of insect-pathogenic fungi from the *Metarhizium anisopliae* complex. **Mycologia**, 106, 865–878.
- Magnusson, W.E. et al. A linha de véu: a biodiversidade brasileira desconhecida. **Parc. Estrat.**, 21(42), 45-60, 2016.
- Michereff-Filho, M., Faria, M., Wraight, S.P., Silva, K.F.A.S., 2009. Micoinseticidas e micoacaricidas no Brasil: como estamos após quatro décadas? **Arq. Inst. Biol.** 76, 769–779.
- Mineiro, J.L.C., Moraes, G.J. 2001. Gamasida (Arachnida: Acari) Edáficos de Piracicaba. Estado de São Paulo. **Neotropical Entomology**, 30, 379–386.
- Monteiro, L.B. 2002. Criação de ácaros fitófagos e predadores: um caso de produção de *Neoseiulus californicus* em produtores de maçã. In: Parra, J.R.P., Botelho, P. S.M., Correa-Ferreira, B.S.; Bento, J.M.S. (Org.). **Controle biológico no Brasil: parasitóides e predadores**. São Paulo: Manole. p.351-365.
- Monteiro, L.B., 1994. Manejo integrado de *Panonychus ulmi* em macieira. Primeiras experiências com a introdução de *Neoseiulus californicus*. **Revista Brasileira de Fruticultura** 16, 46-53.
- Monteiro, L.B., Belli, L., Souza, A., Werner, A.L., 2002. Efeito do manejo de plantas daninhas sobre *Neoseiulus californicus* (Acari: Phytoseiidae) em pomar de macieira. **Revista Brasileira de Fruticultura** 24, 680-682.
- Moraes, G.J., Alencar, J.A., Wenzel Neto, F., Mergulhao, S.M.R. 1990. Explorations for natural enemies of the cassava green mite in Brazil. In: Howeler, R.H. (Ed.), **Proceedings of the Eight Symposium of the International Society of Tropical Root Crops**. Bangkok, Thailand, pp. 351–353.
- Moreira, G.F., Moraes, G.J. 2015. The potential of free-living laelapid mites (Mesostigmata: Laelapidae) as biological control agents. In: Carrillo, D., Moraes, G.J., Peña, J.E. (Eds). **Prospects for biological control of plant feeding mites and other harmful organisms**. New York: Springer. pp. 77–102.
- Moreira, R.R.; Nesi, C.N.; De Mio, L.M. 2014. *Bacillus* spp. and *Pseudomonas putida* as inhibitors of the *Colletotrichum acutatum* group and potential to control Glomerela leaf spot. **Biological Control**, 72:30-37.

- Moscardi, F.; Morales, L.; Santos, B. 2002. The successful use of AgMNPV for the control of the velvetbean caterpillar, *Anticarsia gemmatalis*, in soybean in Brazil. In: **XXXV Annual Meeting of the Society for Invertebrate Pathology, Proceedings**. Brazil, Foz de Iguassu, p. 86-91.
- Moscardi F.; Sosa-Gómez, D.R. 2000. Microbial Control of Insect Pests of Soybeans. In **Field manual of techniques in invertebrate pathology: Application and Evaluation of Pathogens for Control of Insects and other Invertebrate Pests**. Lacey, L; Kaya, H. (eds.), Dordrecht Hardbound: Kluwer Academic Publishers, p. 447-466.
- Navia, D., Marsaro Jr, A.L., Gondim Jr, M.G.C., Mendonça, R.S., Pereira, P.R.V.S. 2013. Recent mite invasions in South America. In: Peña, J. **Potential invasive pests of agricultural crops**. CAB International. cap 15. p. 251- 287.
- Navia, D., Marsaro Jr., A.L., Gondim Jr., M.G.C., Mendonça, R.S., Pereira, P.R.V.S. 2013. Recent mite invasions in South America. In: Peña, J. **Potential invasive pests of agricultural crops**. CAB International. cap 15. p. 251- 287.
- Navia, D., Marsaro, A.L.J., da Silva, F.R., Gondim, M.G.C. Jr, de Moraes, G.J. 2011. First report of the red palm mite, *Raoiella indica* Hirst (Acari: Tenuipalpidae), in Brazil. **Neotropical Entomology**, 40, 409–411.
- Navia, D., Morais, E.G.F., Mendonça, R.S., Gondim Jr., M.G.C. 2015. Ácaro vermelho-das-palmeiras, *Raoiella indica* Hirst. In: Vilela, E.F., Zucchi, R.A. (Eds.). **Pragas introduzidas no Brasil: Insetos e ácaros**. Piracicaba, SP: ESALQ/USP. p.418-452.
- Okassa, M., Kreiter, S., Guichou, S. & Tixier, M.-S. 2011. Molecular and morphological boundaries of the predatory mite *Neoseiulus californicus* (McGregor) (Acari: Phytoseiidae). **Biological Journal of the Linnean Society**, 104, 393–406.
- Okassa, M., Tixier, M.-S., Kreiter, S. 2010. Morphological and molecular diagnostics of *Phytoseiulus persimilis* and *Phytoseiulus macropilis* (Acari: Phytoseiidae). **Experimental & Applied Acarology**, 52, 291–303.
- Oliveira, H., Fadini, M.A.M., Venzon, M., Rezende, D., Pallini, A. 2009. Evaluation of the predatory mite *Phytoseiulus macropilis* (Acari: Phytoseiidae) as a biological control agent of the two-spotted spider mite on strawberry plants under greenhouse conditions. **Experimental and Applied Acarology**, 47, 275-283.
- Oliveira, D.C., Prado, E.P., Moraes, G.J., Morais, E.G.F., Chagas, E.A., Gondim Jr., M.G.C., Navia, D. 2016. First report of *Raoiella indica* (Acari: Tenuipalpidae) in southeastern Brazil. **Florida Entomologist**, 99, 123-125.
- Parra, J.R.; Alves, G.R.; Diniz, A.J.F.; Vieira, J.M. 2016. *Tamarixia radiata* (Hymenoptera: Eulophidae) x *Diaphorina citri* (Hemiptera: Liviidae): Mass Rearing and Potential use of the Parasitoid in Brazil. **Journal of Integrated Pest Management** 7:1-11.
- Parra, J.R.P.; Zucchi, R.A. 2004. *Trichogramma* in Brazil: feasibility of use after twenty years of research. **Neotropical Entomology**, 33: 271-284.
- Parra, J.R.P.; Costa, V.A.; Pinto, A.S., 2011. **Insetos parasitoides**. *Ciência e Ambiente* 43: 19-36.
- Parra, J.R.P., 2014. Biological Control in Brazil: An overview. **Sci. Agric.**, 71(5), 345–355.
- Perini, C.R.; Arnemann, J.A.; Melo, A.A.; Pes, M.P.; Valmorbidia, I.; Beche, M.; Guedes, J.V.C. 2016. How to control *Helicoverpa armigera* on soybean in Brazil? What we have learned since its detection. **African Journal of Agricultural Research**, 11:1426-1432.
- Peña, J.E., Carrillo, D., Rodrigues, J.C.V., Roda, A. 2010. El ácaro rojo de las palmas, *Raoiella indica* (Acari: Tenuipalpidae), una plaga potencial para América Latina. In: Sánchez Gálvez, M.C., Sandoval-Islas, J.S., Estrada-Venegas, E.G.E. (Eds.) **Primer Simposio Internacional de Acarología en México–Memorias**. Chapingo: Universidad Autónoma de Chapingo. p. 48-57.
- Pires, C.S.S.; Pereira, F.M.; Lopes, M.T.R.; Nocelli, R.C.F.; Malaspina, O.; Pettis, J.S.E Teixeira, E.W. Enfraquecimento e perda de colônias de abelhas no Brasil: há casos de CCD. **Pesq. Agropec. Bras.**, 51(5), 422-442, 2016.
- Poletti, M., Konno, R.H., Sato, M.E. and Omoto, C., 2006. Controle Biológico aplicado do ácaro rajado em cultivo protegido: viabilidade no emprego dos ácaros predadores. In: Pinto, A.S., Nava, D.E., Rossi, M.M., Malerbo-Souza, D.T. (orgs.) **Controle biológico de pragas: na prática**. Piracicaba: FEALQ, pp. 193-203.
- Poletti, M., Omoto, C. 2012. Susceptibility to deltamethrin in the predatory mites *Neoseiulus californicus* and *Phytoseiulus macropilis* (Acari: Phytoseiidae) populations in protected ornamental crops in Brazil. **Experimental and Applied Acarology**, 58, 385-393.

- Rezende, J.M., Zanardo, A.B.R., Lopes, M.D., Delalibera I., Rehner, S.A., 2015. Phylogenetic diversity of Brazilian *Metarhizium* associated with sugarcane agriculture. **Biocontrol**, 60, 495–505.
- Roda, A., Nachman, G., Hosein, F., Rodrigues, J.C.V., Peña, J.E. 2012. Spatial distributions of the red palm mite, *Raoiella indica* (Acari: Tenuipalpidae) on coconut and their implications for development of efficient sampling plants. **Experimental and Applied Acarology**, 57, 291–308.
- Rodrigues, J.C.V., Antony, L.M.K. 2011. First report of *Raoiella indica* (Acari: Tenuipalpidae) in the Amazonas State, Brazil. **Florida Entomologist**, 94, 1073-1074.
- Rocha, L.F.N., Inglis, P.W., Humber, R.A., Kipnis, A., Luz, C., 2013. Occurrence of *Metarhizium* spp. in Central Brazilian soils. **J. Basic. Microbiol.** 53, 251–259.
- Sanches, M.A. 2000. Parasitism of eggs of *Gonipterus scutellatus* Gyllenhal, 1833 and *G. gibberus* Boisduval, 1835 (Coleoptera, Curculionidae) by the mymarid *Anaphes nitens* (Girault, 1928) (Hymenoptera, Mymaridae) in Colombo, PR, Brazil. **Arq. Instituto Biológico**, 67(1), 77-82.
- Santiago-Haase, S., Sciocco-Cap, A., Romanowski, V., 2015. Baculovirus Insecticides in Latin America: Historical Overview, Current Status and Future Perspectives. **Viruses**, 7, 2230-2267.
- Sato, M.E., M.E., Silva, M.Z., Souza-Filho, M.F, Matioli, A.L., Raga, A. 2007. Management of *Tetranychus urticae* (Acari: Tetranychidae) in strawberry fields with *Neoseiulus californicus* (Acari: Phytoseiidae) and acaricides. **Experimental and Applied Acarology**, 42, 107-120.
- Sato, M.E., Silva, M.Z., Gonçalves, L.R., Souza-Filho, M.F, Raga, A. 2002. Toxicidade diferencial de agroquímicos a *Neoseiulus californicus* (McGregor) (Acari: Phytoseiidae) e *Tetranychus urticae* Koch (Acari: Tetranychidae) em morangueiro. **Neotropical Entomology**, 31, 449-456.
- Sato, M.E., Silva, M.Z., Souza-Filho, M.F, Raga, A. 2002. Manejo de *Tetranychus urticae* Koch (Acari: Tetranychidae) em morangueiro utilizando ácaros predadores (Phytoseiidae) e propargite. **Arquivos do Instituto Biológico**, 69, 261-264.
- Schiesari L, Waichman A, Brock T, Adams C, Grillitsch B. 2013 Pesticide use and biodiversity conservation in the Amazonian agricultural frontier. *Phil Trans R Soc B* 368: 20120378. <http://dx.doi.org/10.1098/rstb.2012.0378>
- Sosa-Gómez, D.R., López-Lastra, C.C, Humber, R.A., 2010. An overview of arthropod-associated fungi from Argentina and Brazil. **Mycopathologia**, 170, 61–76.
- Sosa-Gómez, D.R., 2017. Microbial Control of Soybean Pest Insects and Mites. In: Lacey L.A. (Ed). **Microbial Control of Insect and Mite Pests: From Theory to Practice**. Elsevier Academic Press, London, p.199-208.
- Sosa-Gómez, D.R., Delpin, K.E., Moscardi, F., Nozaki, M.H., 2003. The impact of fungicides on *Nomuraea rileyi* (Farlow) Samson epizootics and on populations of *Anticarsia gemmatalis* Hubner (Lepidoptera: Noctuidae), on soybean. **Neotrop. Entomol.** 32, 287–291.
- Sturza, V.S.; Poncio, S; Santos, A.B., Lopes-da-Silva, M. 2012. Infestation and natural parasitismo of aphids in single and mixed pastures of black oats and ryegrass. **Neotropical Entomology**, 56(3): 363-367.
- Urban, M.C.G. Bocedi, A. P. Hendry, J.-B. Mihoub, G. Peer, A. Singer, J. R. Bridle, L. G. Crozier, L. De Meester, W. Godsoe, A. Gonzalez, J. J. Hellmann, R. D. Holt, A. Huth, K. Johst, C. B. Krug, P. W. Leadley, S. C. F. Palmer, J. H. Pantel, A. Schmitz, P. A. Zollner, and J. M. J. Travis. 2016. **Improving the forecast for biodiversity under climate change**. *Science* 353:aad8466
- Van Lenteren, J.C., Bolckmans, K., Köhl, J., Ravensberg, W.J., Urbaneja, A., 2017. Biological control using invertebrates and microorganisms: plenty of new opportunities. **BioControl**. DOI 10.1007/s10526-017-9801-4.
- Viana, B.F. **Plano de manejo para polinização de macieiras da variedade Eva: conservação e manejo de polinizadores para a agricultura sustentável, através de uma abordagem ecossistêmica**. Rio de Janeiro, 2015. Disponível em <http://www.mma.gov.br/publicacoes/biodiversidade/category/57polinizadores?download=1224:plano-de-manejo-para-poliniza%C3%A7%C3%A3o-de-macieiras-da-variedade-eva>
- Watanabe, M. A., Moraes, G. J., Nicolella, G. 1994. Controle biológico do ácaro rajado com ácaros predadores fitoseídeos (Acari: Tetranychidae, Phytoseiidae) em culturas de pepino e morango. **Scientia Agricola**, 51, 75-81.
- Yaninek, J. S., Hanna, R. 2003. Green cassava mite in Africa – a unique example of successful biological control of a mite pest on a continental scale. In: Neuenschwander, P., Borgemeister, C., Langewald, J. (Eds.). **Biological control in IPM systems in Africa**. Wallingford: CABI Publishing. pp. 61-75.