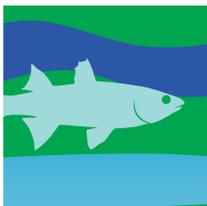
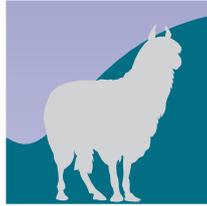


COUNTRY REPORTS



THE STATE OF **SWEDEN'S**
BIODIVERSITY FOR FOOD AND
AGRICULTURE

This country report has been prepared by the national authorities as a contribution to the FAO publication, *The State of the World's Biodiversity for Food and Agriculture*. The report is being made available by the Food and Agriculture Organization of the United Nations (FAO) as requested by the Commission on Genetic Resources for Food and Agriculture. The information in this report has not been verified by FAO, and the content of this document is entirely the responsibility of the authors, and does not necessarily represent the views of FAO, or its Members. The designations employed and the presentation of material do not imply the expression of any opinion whatsoever on the part of FAO concerning legal or development status of any country, territory, city or area or of its authorities or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed by FAO in preference to others of a similar nature that are not mentioned.



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والزراعة للأمم
المتحدة

联合国
粮食及
农业组织

Food and
Agriculture
Organization
of the
United Nations

Organisation des
Nations Unies
pour
l'alimentation
et l'agriculture

Продовольственная и
сельскохозяйственная
организация
Объединенных
Наций

Organización
de las
Naciones Unidas
para la
Alimentación y la
Agricultura

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

November 30, 2013

COMMISSION ON
GENETIC RESOURCES
FOR FOOD AND
AGRICULTURE



Country: Sweden

National Focal Point: Ministry for Rural Affairs, Mikaela Ståhl

INSTRUCTIONS FOR DYNAMIC GUIDELINES

How do I complete the dynamic guidelines?

1. You will require Adobe Reader to open the dynamic guidelines. Adobe Reader can be downloaded free of charge from: <http://get.adobe.com/uk/reader/otherversions/>. Use Adobe Reader Version 10 or higher.
2. Open the dynamic guidelines and save it (save as -> pdf) on your hard drive.
3. Please rename it <name of your country>.pdf.
4. You may forward the dynamic guidelines to stakeholders you would like to involve or inform by e-mail. You may also print and/or save the dynamic guidelines.
5. It is advisable to prepare textual responses (including any formatting such as bullet points) first in a separate document and then to copy and paste them into the form. Please use font Arial 10. Acronyms and abbreviations should be avoided if possible. If included, they must be introduced (i.e. written out in full) the first time they are used. Note that the text boxes are expandable. Once text has been entered, the box will automatically enlarge to make its content fully visible when you click outside its border.
6. When you have finished completing the dynamic guidelines, click the "Submit by Email" button on the last page and send the completed dynamic guidelines to SOW-BFA@fao.org. This should automatically attach the document to an email that you can then send. Otherwise, please attach the completed dynamic guidelines manually to an e-mail and send it to SOW-BFA@fao.org. A letter confirming official endorsement by relevant authorities should also be attached to the email.
7. You will receive a confirmation that the submission was successful.

Where can I get further assistance?

Should you have any questions regarding the dynamic guidelines, please address them by e-mail to SOW-BFA@fao.org.

How, by whom and by when must the completed dynamic guidelines be submitted?

Once officially endorsed by the relevant authorities, the completed dynamic guidelines should be submitted (click the "Submit by Email" button on the last page) by the National Focal Point. Completed dynamic guidelines should be sent **by December 31st, 2014**.

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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). CGRFA-14/13/Report, *Appendix I*, Table 1.

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 upon by the Commission. CGRFA-11/07/Report 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. CGRFA-14/13/Report, paragraph 14.

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. CGRFA-14/13/Report, paragraph 14.

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. CGRFA-14/13/Report, paragraph 15.

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.

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

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.

EXECUTIVE SUMMARY

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.

The report has been circulated and made available to relevant authorities and stakeholders which have provided the information included.

The importance of biodiversity and ecosystem services for food and agriculture is certainly acknowledged by Sweden. The country has adopted environmental quality objectives for agriculture and collaborates regionally since long on conservation and sustainable use of plant genetic resources. While the majority of the farmers utilize commercial varieties of plants as well as animals in their production, there is now a trend towards a market-driven niche production involving a greater diversity of crops, varieties and breeds.

In 1999 the Parliament adopted 15 national environmental quality objectives, and one more has been added since then. These objectives include the following:

- Biodiversity that has been created by long-term management is to be preserved.
- Small biotopes are to be preserved and also created in the plain districts.
- Nutrient leaching and use of chemical plant protection products shall be reduced in order to avoid health risks and to create good conditions for plant and animal life.

The objectives shall be reached through legislation, financial instruments, information, extension services, and training.

In March 2014, the Swedish government adopted a bill on biodiversity and ecosystem services, which presents the government's comprehensive strategy for biodiversity and ecosystem services. It concerns the Swedish environmental quality objectives and the generational goal as well as the Aichi targets and the targets of the EU strategy for biodiversity 2011-2020. The strategy contains the ten milestone targets on biodiversity, ecosystem services and sustainable land use that the government has adopted as well as measures to reach the environmental quality objectives and the generational goal and to contribute to reaching the Aichi targets and the EU targets.

A major positive driver affecting the extend and distribution of associated biodiversity in Sweden are national and EU Rural Development Policies, while a negative driver is the EU Common Agricultural Policy.

The Swedish Biodiversity Centre (CBM) is Sweden's national centre for promoting sustainable use of biodiversity. The centre's main function is to conduct, initiate and coordinate research on the preservation, sustainable use and restoration of biodiversity in Sweden. The Swedish Species Information Centre works with information on biodiversity in Sweden. The tasks include collecting, analysing and storing the most important information about endangered and disadvantaged plants, fungi and animals, assessing the degree and nature of the threat and compiling the so-called Red Lists.

In December 2005 the Swedish government decided to launch a national programme on local and traditional knowledge concerning the conservation and sustainable use of biological diversity, with the aim to safeguard relevant traditional knowledge, innovations and practices.

CHAPTER 1: Introduction to the Country and to the role of biodiversity for food and agriculture

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

The first objective of this Chapter is to present an overview that will help the reader appreciate the context for the Country Report by providing a general overview and summary of the features, demographics and major trends in overall biodiversity for food and agriculture in the country. Explicit attention should be given to associated biodiversity, ecosystem services and wild foods.

Countries that previously presented or are currently preparing a Country Report on Forest, Aquatic, Animal or Plant Genetic Resources, should be able to use some of the background information contained in these reports to prepare parts of their introductory section.

In this Chapter, countries will create a list of their different production systems that will be frequently referred to in subsequent chapters.

This chapter will seek information on the following topics:

- Basic information on the size and location of the country; its main physiographic and climatic features; human population;
- A synthesis of the current situation with respect to the current and potential contribution of biodiversity for food and agriculture to food security and nutrition, ecosystem health and sustainability of production systems, as supported by associated biodiversity and ecosystem services. Specific attention is also given to wild foods;
- Description of the different production systems within the country, as well as an overview of their importance to the national economy and rural livelihoods.

Preparation of the Country Report

1. Provide a description of the process that was followed in preparing the Country Report, preferably providing the names (with affiliations and addresses) of the participants, including all stakeholders consulted.

The report has been circulated and made available to relevant authorities such as the Ministry of Environment, The Swedish Environment Protection Agency, the Swedish Board of Agriculture, the Sami parliament, the Swedish Forest Agency, the Swedish University of Agricultural Sciences, the Swedish Agency for Marine and Water Management as well as the Ministry for Rural Affairs. These stakeholders have also provided information included in this report.

General overview of the country

2. In a few paragraphs, provide a synthetic overview of your country, including the size, location, main physiographic and climatic features. Include a section on human population, providing disaggregated data on women and men contribution and involvement in agriculture. Briefly discuss as well the overall nature and characteristics of the economy, including the contribution of the different sectors. You may wish to draw upon the country overviews provided in the first chapters of previous and ongoing Country Reports on Forest, Aquatic, Animal or Plant Genetic Resources.

Geography and climate

Sweden is located between 55-69° N latitude and 10-24° E longitude and, bordering Norway in the west and Finland in the northeast, has a landmass area of 450,000 km². Maximum length is 1,574 km and maximum width 499 km. In the south western parts of the country the climate is explicitly maritime (mean annual precipitation 600-1000 mm, occasionally up to 1800 mm), and less so in the south eastern parts (mean annual precipitation 400-700 mm) where early summer droughts are regular. The climate of the inner north and central parts is more continental, with regular snow cover and cold winters. Here average annual precipitation ranges between 600-900 mm. While mean temperatures in January range from -2/0 °C in the south to

-10/-16 °C in the north, July temperatures are more even (16/18 °C and 12/15 °C, respectively). Due to the influence of the Gulf Stream and the exceptionally light summer nights, the climate allows cultivation above the Arctic Circle (66°N). Along the western border with Norway, the central Scandinavian mountain range rises with some peaks more than 2,000 m above sea level. While the northern two thirds of the country are characterised by spruce and pine forests, the southern third represents a mixtures of arable land and broad-leaved deciduous forests.

Population

By the end of 2013, the Swedish population was approximately 9.6 million equal to an average density of 21 persons per km². However, the country is relatively urbanised with more than 25 % of the population concentrated to the five major cities, 85% of the total population lives in cities and less than 2% are farmers. Moreover, the northern 60 % of the country is only inhabited by 12 % of the total population. The population is dominated by Scandinavians. The indigenous ethnic group of Sami number approximately 20,000 in total. In recent years there has been considerable immigration into the country and Sweden receives approximately 40,000 immigrants annually. Approximately 40% of the farmers are women.

Agriculture

The Swedish agriculture and forestry is characterised by high technology input and not very labour intensive. It is very much dependent on modern machinery, electricity and fossil fuels, but not so much irrigation. Structural change in agriculture has in the last 50 years resulted in a sharp decline in the number of farms, and at the same time the farms have grown larger. Farmers have made large investments in machinery and become more and more specialised in areas like cereals, dairy or the rearing of pigs and bovine animals.

Agricultural land consists of 8% of the total land area, grasslands 7% and forest 53% (28.3 million hectares). Animal husbandry is the dominant line of production. Only in the central part of Sweden and in the southern county the cropping farms dominate. In the north there are mostly small farms.

Crop production

The conditions for crop production display great differences between the north and south of Sweden. About 60 % of the arable land is found on the fertile plains in the south. The crop production is strongly dominated by cereals and by leys, the former mainly being wheat. The proportion of leys increases towards the north of Sweden and makes up most of the area of arable land in the northern part. Oil seed production is mainly located on the plains in the middle and south of Sweden. Potatoes are grown throughout the entire country. Sugar beet are grown in the southern counties. The total crop production in 2012 is estimated to 5.1 million tonnes of cereals, 93 000 tonnes of peas and field beans, 322 000 tonnes of oilseed crops, 549 000 tonnes of table potatoes and 256 000 tonnes of potatoes for processing. The average yield varies in different parts of Sweden. For example for spring barley the average yield in the most southern county, is 6 360 kg/ha and in a county in the north part, 1 510 kg/ha.

Animal production

The dairy sector is playing a central role in Swedish agriculture. The number of dairy cows has, however, been decreasing over a long period of time. There were 1,5 million cattle in Sweden 2012 and 350 000 of those were dairy cattle.

The number of farms with livestock has decreased the last decades whereas those remaining have increased their number of animals. In 2012, there were dairy cows in 5 000 farms. There is an average of 70 dairy cows/herd. Roughly 1 300 pig farms with around 98 % of the fattening pigs found in herds with at least 100 animals. Cattle kept for purely beef production as well as sheep have increased the last years.

Egg production is dominated by few but large flocks. Over 95 % of the hens of laying breed are found in herds with at least 5 000 hens.

Approximately 3 million kgs of honey produced by 33 000 colonies of bees.

250 000 reindeer traditionally kept by approximately 997 sami villagers. Reindeer farming which is a part of the sami culture, is practiced on half of Swedens area. The reindeer is a nomadic animal and dependent on large areas for grazing. The animals movements follow the season and the pasture between mountain and the coast is utilised. Reindeer are sensitive to disturbances from other landuse as well as predators. Swedish land is open for exploitation by Swedish as well as foreign companies, which affects the biodiversity.

Horticulture

Carrots, lettuce and onions are the predominant crops on freeland, whereas cucumber and tomatoes are mostly grown in green houses. Apples are the most dominant fruit crop and straw berries the most dominant berry crop. In 2011, there were 1900 horticulture companies. Back yard cultivation for home or hobby production are not included. 76% of these practiced cultivation on free land, on a total area of 12 600 hectares.

Food from the wild

As long as the land is not cultivated, and as long as no damage is caused, most of Sweden's nature is free to explore. That means that picking of berries, mushrooms etc is for everyone. Hunting of game (moose, deer, hare, wild boars) is also free but subject to special regulations according to the hunting law. Fishing in lakes, rivers and seas may be subject to certain certificates and fees.

Fisheries

Sweden have a coast line of 11 500 km measured as main land from the border of Norway to the border of Finland. The marine ecosystem highly varies in species composition and biodiversity due to large-scale variation in abiotic factors between areas, continuously changing in a gradient from the Swedish west coast to the northern parts of the east coast. Nearly 100 000 fresh water lakes contribute to about 9 % of the total surface area, while rivers, streams and creeks makes out a total length of 192 000 km. Fishing for consumption take place in both marine- and freshwater systems mainly exploiting self-recruiting stocks. There are about 1400 licensed fishermen whereof 12 % are active in fresh water systems. Around 1 million people perform recreational fishing every year where relaxation and consumption of self-captured fish is some of the main objectives. Marine systems, the five largest lakes and to some extent rivers are nationally managed by the state. Fishing for commercial purposes requires a license while recreational fishing in those areas is free for resident people under the restriction of current regulation and legislation. Other lakes and rivers are normally managed by landowners from who permission to fish is required.

Role of biodiversity for food and agriculture

Countries that previously presented or are currently preparing a Country Report on Forest, Aquatic, Animal or Plant Genetic Resources, should be able to use some of the background information contained in these reports to prepare this part of their introductory section. Detailed information on associated biodiversity, ecosystem services and wild foods will be provided in chapters 2, 3, 4, and 5 of the Country Report, and thus, countries may wish to consider developing this section after completing the main body of the Country Report.

3. Provide a summary of the role of biodiversity for food and agriculture in improving food security and nutrition, the livelihoods of farmers, pastoralists, forest dwellers and fisher folk, ecosystem health and sustainability of production systems in your country. Specific attention should be given to associated biodiversity, ecosystem services and to wild foods. The summary should also draw attention to the *ex situ* and *in situ* conservation of biodiversity for food and agriculture, the most significant aspects of use to improve food security and nutrition in the country, major changes observed in the last 10 years and the main factors causing changes. Significant risks or dangers to the conservation and use of biodiversity for food and agriculture may also be highlighted.

The importance of biodiversity and ecosystem services for food and agriculture is certainly acknowledged by Sweden, in addition to the necessity of *in situ* as well as *ex situ* conservation of biodiversity. To this end, the country has adopted environmental quality objectives for agriculture and collaborates regionally since long on conservation and sustainable use of plant genetic resources. While the majority of the farmers utilize commercial varieties of plants as well as animals in their production, there is now a trend towards a market-driven niche production involving a greater diversity of crops, varieties and breeds. The ability to choose domestic organic produce is increasingly important to many consumers, to the extent that domestic production is now insufficient. An increasing trend is also hobby farming, an extensive production often based on organic production and utilization of old local breeds and varieties. However, the produce from such farms is only a fraction of the total output of food on the internal market. Wild foods such as forest berries and fungi traditionally play a very important role in domestic households, although not from the perspective of food security.

Due to fundamental structural changes of agriculture during the last 100 years the area of semi-natural pastures and meadows has decreased markedly and the management of remaining such ecosystems is often insufficient for preserving the values of these systems. These changes have also caused a severe loss of ecological functionality and diversity in the agricultural landscape. On 13 March 2014 the Swedish government adopted a bill on biodiversity and ecosystem services, which presents the government's comprehensive strategy for biodiversity and ecosystem services. It concerns the Swedish environmental quality objectives and the generational goal as well as the Aichi targets and the targets of the EU strategy for biodiversity 2011-2020. The strategy contains the ten milestone targets on biodiversity, ecosystem services and sustainable land use that the government has adopted as well as measures to reach the environmental quality objectives and the generational goal and to contribute to reaching the Aichi targets and the EU targets.

The value of the agricultural landscape and of agricultural land for production of both biology and food is to be protected. At the same time, biodiversity and cultural heritage values are to be preserved and strengthened. So it says under the heading A Varied Agricultural Land-scape, which is one of Sweden's environmental objectives. In 1999 the Parliament adopted 15 national environmental quality objectives, and one more has been added since then. These objectives describe the characteristics our natural and cultural environment must have in order for society to develop in an environmentally sustainable way.

Three of the objectives are of particular relevance to agriculture: A Varied Agricultural Landscape, Zero Eutrophication, and A Non-Toxic Environment.

These objectives include the following:

- Biodiversity that has been created by long-term management is to be preserved.
- Small biotopes are to be preserved and also created in the plain districts.

– Nutrient leaching and use of chemical plant protection products shall be reduced in order to avoid health risks and to create good conditions for plant and animal life.

The objectives shall be reached through legislation, financial instruments, information, extension services, and training.

Production systems in the country

IMPORTANT: Throughout these guidelines, questions on production systems will refer to the production systems identified in Table 1 as present in your country.

4. Indicate, for each of the production systems listed in Table 1 below, whether it is found in your country or not, regardless of its importance.

Table 1. Production systems present in the country.

Sector	Code	Production system names (Place pointer on the production system name for a detailed description)	Check if present in the country
Livestock	L1	Livestock grassland-based systems: Tropics	<input type="checkbox"/>
	L2	Livestock grassland-based systems: Subtropics	<input type="checkbox"/>
	L3	Livestock grassland-based systems: Temperate	<input type="checkbox"/>
	L4	Livestock grassland-based systems: Boreal and /or highlands	<input checked="" type="checkbox"/>
	L5	Livestock landless systems: Tropics	<input type="checkbox"/>
	L6	Livestock landless systems: Subtropics	<input type="checkbox"/>
	L7	Livestock landless systems: Temperate	<input type="checkbox"/>
	L8	Livestock landless systems: Boreal and /or highlands	<input checked="" type="checkbox"/>
Forest	F1	Naturally regenerated forests: Tropics	<input type="checkbox"/>
	F2	Naturally regenerated forests: Subtropics	<input type="checkbox"/>
	F3	Naturally regenerated forests: Temperate	<input type="checkbox"/>
	F4	Naturally regenerated forests: Boreal and /or highlands	<input checked="" type="checkbox"/>
	F5	Planted forests: Tropics	<input type="checkbox"/>
	F6	Planted forests: Subtropics	<input type="checkbox"/>
	F7	Planted forests: Temperate	<input type="checkbox"/>
	F8	Planted forests: Boreal and /or highlands	<input checked="" type="checkbox"/>
Aquaculture and Fisheries	A1	Self-recruiting capture fisheries: Tropics	<input type="checkbox"/>
	A2	Self-recruiting capture fisheries: Subtropics	<input type="checkbox"/>
	A3	Self-recruiting capture fisheries: Temperate	<input type="checkbox"/>
	A4	Self-recruiting capture fisheries: Boreal and /or highlands	<input checked="" type="checkbox"/>
	A5	Culture-based fisheries: Tropics	<input type="checkbox"/>
	A6	Culture-based fisheries: Subtropics	<input type="checkbox"/>
	A7	Culture-based fisheries: Temperate	<input type="checkbox"/>
	A8	Culture-based fisheries: Boreal and /or highlands	<input checked="" type="checkbox"/>
	A9	Fed aquaculture: Tropics	<input type="checkbox"/>
	A10	Fed aquaculture: Subtropics	<input type="checkbox"/>
	A11	Fed aquaculture: Temperate	<input type="checkbox"/>
	A12	Fed aquaculture: Boreal and /or highlands	<input checked="" type="checkbox"/>

	A13	Non-fed aquaculture: Tropics	<input type="checkbox"/>
	A14	Non-fed aquaculture: Subtropics	<input type="checkbox"/>
	A15	Non-fed aquaculture: Temperate	<input type="checkbox"/>
	A16	Non-fed aquaculture: Boreal and /or highlands	<input checked="" type="checkbox"/>
Crops	C1	Irrigated crops (rice) : Tropics	<input type="checkbox"/>
	C2	Irrigated crops (rice) : Subtropics	<input type="checkbox"/>
	C3	Irrigated crops (rice) : Temperate	<input type="checkbox"/>
	C4	Irrigated crops (rice) : Boreal and /or highlands	<input type="checkbox"/>
	C5	Irrigated crops (other) : Tropics	<input type="checkbox"/>
	C6	Irrigated crops (other) : Subtropics	<input type="checkbox"/>
	C7	Irrigated crops (other) : Temperate	<input type="checkbox"/>
	C8	Irrigated crops (other) : Boreal and /or highlands	<input checked="" type="checkbox"/>
	C9	Rainfed crops : Tropics	<input type="checkbox"/>
	C10	Rainfed crops : Subtropics	<input type="checkbox"/>
	C11	Rainfed crops : Temperate	<input type="checkbox"/>
	C12	Rainfed crops : Boreal and /or highlands	<input checked="" type="checkbox"/>
Mixed	M1	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Tropics	<input type="checkbox"/>
	M2	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Subtropics	<input type="checkbox"/>
	M3	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	<input type="checkbox"/>
	M4	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands	<input checked="" type="checkbox"/>
Others [please specify]	O1	Horticulture: Boreal and /or highlands	<input checked="" type="checkbox"/>
Others [please specify]	O2		<input type="checkbox"/>
Others [please specify]	O3		<input type="checkbox"/>
Others [please specify]	O4		<input type="checkbox"/>
Others [please specify]	O5		<input type="checkbox"/>

5. Provide in Table 2 a description for each production system. Countries may wish to use the following criteria, where information is available:

Environmental features and characteristics:

- a) additional information on climate (arid, semi-arid, humid, subhumid);
- b) features of the landscape mosaic.

Rural livelihoods and sustainable use:

- c) share of smallholders;
- d) proportion of the production system found in urban or peri-urban context;
- e) share of the population actively contributing to the production system disaggregated by gender, including number of employees if available;
- f) importance of the production system to the incomes, livelihoods and well-being of rural communities;
- g) levels of agricultural intensification and the reliance of synthetic inputs, modern varieties, fossil fuels, etc.

Table 2. Description or characterization of production systems within the country

Production system	Description
Livestock grassland-based systems: Boreal and /or highlands	<p>A majority livestock production is based on a system where the farmer has both animals as well as land for grazing and forage production. The system is highly mechanised and modern and highly dependent on electricity and fossil fuels.</p> <p>Reindeer farming is a part of the sami culture and uses the grazing land in the northern part of Sweden between the coast and the mountains, following the seasons. The reindeer practice means that the sami may use land and water for themselves and their animals. The right to farm reindeer can only be practiced by a sami that is a member of a sami village, which in turn is an economic and administrative association which by right of law shall lead the farming in a certain area. 50% of Swedens area is used for reindeer farming. Some areas may be used all year round and other areas only for winter grazing. Reindeer farming is an old tradition. Today it is mainly focused on meat production. The reindeer keepers are carriers of traditional knowledge and old heritage.</p>
Livestock landless systems: Boreal and /or highlands	This system is mainly valid for poultry production and intensive pig production.
Naturally regenerated forests: Boreal and /or highlands	<p>There is no division between naturally regenerated forest and planted forest in the statistics. In average the proportion of the annual re-generated area that is naturally re-generated amounts to approximately 25% during the last 25 years. Due to severe storms the proportion has decreased during the last decade.</p> <p>e) The Florestry and logging is a male dominated area where 9% of the labour force are women (2011).</p>
Planted forests: Boreal and /or highlands	In average the proportion of the annual re-generated area that is planted amounts to approximately 75% during the last 25 years. Due to severe storms the proportion has increased during the last decade.

Self-recruiting capture fisheries: Boreal and /or highlands	<p>Also fishing is a part of the sami culture and tradition, with the same premises as described above.</p> <p>According to the year of 2012, the commercial fishing fleet operating in marine systems consisted of about 1300 vessels. The fleet can be divided into different segments target different species in coastal areas as well as offshore areas, using both active and passive gears. The absolute majority of fish and invertebrates caught originate from self-recruiting species and stocks. Total volume landed by the fleet in 2012 was 137 000 tons of seafood, corresponding to a total value of about € 120 million. About 65 % of total landings are caught in the Baltic Sea outside the Swedish south and east coast while the remaining part is caught in Skagerrak, Kattegatt and North sea outside the Swedish west coast. Herring, sprat, cod, crayfish and prawn are the most valuable species according to landing value, corresponding to more than 85 % of the total value. While total landing volume has decreased continuously during the last decade, total value of landings has been fairly stable. Observed decrease in landings is partly explained by reduced international quotas that highly regulates catch of several marine species.</p> <p>87 % of total landings from the commercial fisheries in inland freshwater systems are located to the four largest lakes. This is a passive small scale fishery based on gears like gill nets, trap nets etc. Total landings in 2012 were 1491 tons corresponding to a total value of nearly € 11.5 million. Compared to landings from the marine system, this only makes out 1 % of total volume but more than 9 % of total landing value. Pike perch, north american signal crayfish, vendace, european eel and salmon nearly makes out 93 % of the total landing value. Landing volume has been stable during the last decade while total landing value has increased.</p> <p>Approximately 1 million resident people spend about 13 million fishing days on recreational fishing every year. Surveys have shown that relaxation, experience nature and the opportunity to consume self-captured fish is some of the main objectives. More than 90 % of all fishing days are carried out within a distance of 30 km from the dwelling-place, generally causing the highest use and exploitation rates in waters located close to conurbation. Recreational fishing takes place in both marine systems and fresh water systems and total landings are estimated to about 15 tons. Pike, perch, pike perch, mackerel and herring makes out the most popular species according to landing volume.</p>
Culture-based fisheries: Boreal and /or highlands	<p>There is a mixed, wild and reared stock fishery, target Atlantic salmon and European eel. Farmed salmon are released into rivers emptying in the Baltic Sea, the North Sea as well as in the two largest lakes. Main objectives are to protect the original genetic strain of each stock as well as to compensate the fishery for reduced livestock production, due to hydropower exploitation in spawning rivers. Annually, about 2 million reared salmon are released into the wild as smolt. Both commercial and recreational fishery exploit salmon corresponding to a total landing volume of about 544 tons in 2012. Roughly, about half of the total landing volume are estimated to originate from reared salmon. About 2.5 million quarantined glass eels are released annually along the coast line and in rivers. These eels are naturally produced into the wild but caught, transported and quarantined in farms before further release. Historically, eels were released to compensate the fishery for reduced production due to hydro power exploitation. Today releases are considered and used as a management measure to enhance the recovery of European eel, classified as an endangered species. About 310 tons of eel were landed in the commercial fishery during 2012, proportion of quarantined and released eels in landings are unknown.</p>
Fed aquaculture: Boreal and / or highlands	
Non-fed aquaculture: Boreal and /or highlands	
Irrigated crops (other) : Boreal and /or highlands	<p>Approximately 55 000 hectares are irrigated which is 2% of the arable land (figure from 2006). The major irrigated crop is potatoes.</p>

<p>Rainfed crops : Boreal and /or highlands</p>	<p>Cereal, legume, potato, sugarbeet, oilseed, "energyforest" are the main crops along with forage crops (45%) cultivated in Sweden. Of cereals, wheat and barley are the most dominant followed by rye. Wheat and barley are either cultivated as spring or winter variety.</p> <p>Agriculture The total arable land area (census of 2010) is around 3.1 mill hectares divided into 2.6 mill hectares of open fields and 0.5 mill hectares of grazing areas. The economic account for agricultural crop production in Sweden (EEA) was estimated in 2011 at almost 23 billion SEK. The total value of agricultural production, incl. services, was estimated at 48.5 billion SEK. The average saving from nitrogen fixation from forage legumes is some SEK 200 million a year. A benefit difficult to estimate is the recreational value of the open landscape, much appreciated in Sweden.</p> <p>The number of farms in Sweden range from 68,200 to 71,100, depending on classification. Overall, this is a decrease since more than 20 years. Of these 31 % are fully privately owned and 53 % leased. The mean size of a Swedish farm is currently 37.0 hectares (range 19.2-59.1 hectares), and slightly on the increase. The number of farms with animal production (dairy, pigs) is decreasing. The absolute majority of farms (91.6 %) focus on agricultural production and only a minor part on other crops such as vegetables, ornamentals, fruit trees and berries.</p> <p>Approximately 58,000 persons, or 1.3 % of the total labour force, are directly involved in agriculture. If subsidiary enterprises are included, this figures increase to c. 100,000 (2.2 %). Median age lies in the interval of 55-59 years with even older farmers being predominant on smaller farms. C. 23 % of the farmers are women.</p> <p>The main agricultural areas are situated in the southernmost province, Scania, and the fertile areas of the provinces of Västergötland and Östergötland in south-central Sweden. These areas are characterised either exclusively by crop production or in combination with animal husbandry. Agriculture in north central Sweden, along the Bothnian coast and in the north central inland regularly combine crop production, animal husbandry and forestry. Due to the influence of the Gulf Stream, vegetable and berry production is possible up to the Arctic Circle at 66°N. Being a member of the European Union since 1995, Sweden provides agricultural subsidies to the farming community both as direct production subsidies and as compensation for a range of environmental measures. In particular, farmland in marginal areas, the management of natural or semi-natural grasslands and meadows, threatened landraces of farm animals etc. depend upon such economic measures for their subsistence.</p> <p>Swedish agriculture is industrialised and depending upon major inputs such as fertilisers, agrochemicals, imported feedstuffs and fossil fuels. However, for some of these inputs major changes are in process not least due to extended implementation of IPM. Increased use of biofuels and biogas is slowly replacing fossil fuels despite technical, economic and practical challenges. During the last 20 years the use of artificial fertilisers and insecticides has decreased by 38 %, fungicides by 63 %, herbicides by 14 % and seed disinfectants by 81 %. Still, however, more than 1,400 tonnes of herbicides are being used annually which equals c. 85 % of all agrochemicals used in the country.</p> <p>Swedish farmers generally use modern crop cultivars. During most of the 20th century plant breeding was very strong in the country and cultivars of most crops were bred domestically. Upon the entry into the EU, Sweden adopted the common legislation for crop cultivars and many foreign cultivars are now grown. Domestic commercial breeding focuses exclusively on cereal crops, Brassica oil crops and forages. Limited publicly-funded breeding is being carried out in potato, apple and some berry crops. The diversity of vegetable cultivars has diminished considerably over the last 50 years, as has that of some important forage crops (e.g. red clover).</p>
<p>Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands</p>	

Horticulture: Boreal and /or highl	<p>Commercial cultivation of vegetables in Sweden is small but diverse, including a large number of species. The most important outdoor vegetables grown are carrot, lettuce, onion, white cabbage and parsnip. A major part of the production is directed towards the domestic market. Though the total area of outdoor crops is fairly stable around 12,700 hectares, the number of growers has steadily decreased and is now only a third of what it was 25 years ago. Fourteen taxa are cultivated on more than 100 hectares and are considered as major vegetable crops. Historically almost all varieties on the Swedish list were bred in the country, but during recent decades varieties developed within EU are also grown.</p> <p>Vegetable production under glass is focused on cucumber, tomato and various lettuce crops. The total area of glasshouse cultivation in 2012 was 1,22 million m². The combined area devoted to other crops is small by comparison (150,000 m²), the most important crops being herbs with 77,000 m² and strawberries with 45,900 m². Between 350 and 400 enterprises grow vegetable crops under glass.</p> <p>Large scale tree fruit growing is local with a stronghold in the south-eastern part of the country, particularly Scania. Commercial cultivation is dominated by apple, which represents more than 81 % of all fruit cultivation. The entire fruit producing area is 1,690 hectares and the total number of fruit enterprises is now 262, which is a more than 45 % decrease in cultivated area and a 53 % decrease in number of growers since the mid 1980's. This is reflection of Sweden now being open to the global fruit market. Other fruits grown include pear, plum, and cherry.</p> <p>Among the soft fruits, raspberries, blackcurrants and strawberries are grown commercially. The berry production is completely dominated by strawberries, which holds close to 80 % of the entire acreage or 2,130 hectares in total. Black currant occupies 11 % and raspberries 5 % of domestic soft berry production.</p> <p>Several indigenous species such as lingonberry (<i>Vaccinium vitis-idaea</i>) and arctic raspberry (<i>Rubus arcticus</i>) have historically been bred and cultivated, though current cultivation is negligible. The domestic annual harvest of lingonberry, bilberry (<i>Vaccinium myrtillus</i>) and cloudberry (<i>Rubus chamaemorus</i>) – c. 15,000 tonnes or only 2-4 % of the estimated production – is exclusively based upon wild berries. In recent years breeding and growing of sea buckthorn (<i>Hippophae rhamnoides</i>) has increased and may grow in importance as a horticultural crop.</p> <p>Other horticultural crops produced in Sweden include herbs, cut flowers, pot plants or ornamentals for outdoor planting or for further cultivation (cuttings, grafts). Particularly important plant groups include tulips as cut flowers, pelargoniums as pot plants and a range of herbs (dill, parsley, basil, rosemary, sage, etc.). As an example, in 2012 103 enterprises with more than 200 m² under glass were registered as producers of cut flowers and 332 as pot plant growers. While the total value of domestic commercial horticultural production in 2011 was estimated at 4,6 billion SEK, a very preliminary production value of Swedish home gardens was estimated at 3 billion SEK.</p>
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6. Provide a map of production systems in your country, marking the places and regions mentioned in the Country Report.

Add
Delete

7. For each production system found in your country (refer to Table 1), indicate in Table 3 the area under production (km², hectares, acres, other). If not applicable, indicate the estimated production quantity (major products aggregated) using the appropriate unit or measure (tonne, head, inventory, cubic metre, etc.) for the production system. If available, indicate the contribution of the production system to the agricultural sector economy in the country (%). Please use the most recent data available and indicate the year of reference for the data or estimates. Specify NK if not known or NA if not applicable.

Table 3. Area under production, production quantity and contribution to the agricultural sector economy of production systems in the country.

Production systems	Area		Production - quantity		Contribution to the agricultural sector economy	Reference year
	Value	Unit (enter)	Value	Unit (enter)	%	year

Livestock grassland-based systems: Boreal and /or highlands	50% of the land +		248296	head reindeer +	slaughter value 76 M SEK +	2013/2014
Livestock landless systems: Boreal and /or highlands						
Naturally regenerated forests: Boreal and /or highlands	15509 000	hectares				2010
Planted forests: Boreal and /or highlands	12564 000	hectares				2010
Self-recruiting capture fisheries: Boreal and /or highlands	NA		138506/130.5 mil +	Tonnes/Euro		2012
Culture-based fisheries: Boreal and /or highlands	NA		645/3.9 million	Tonnes/Euro		2012
Fed aquaculture: Boreal and /or highlands						
Non-fed aquaculture: Boreal and /or highlands						
Irrigated crops (other) : Boreal and /or highlands	24 700	hectares	1,48 billion	SEK	3,0	2012
Rainfed crops : Boreal and /or highlands	2.6 millions	hectares	16,8 billion	SEK	47.3	2012
Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands						
Horticulture: Boreal and /or highlands +	15 300	hectares	4,7 billion	SEK	9,6	2011

8. Comment on the effects on biodiversity for food and agriculture of production destined for exportation versus production for local and/or national consumption. Where information is available, indicate for each production system the proportion of production that is destined for export, the major commodities involved, the impact on the methods of production (e.g. adoption of specific production practices to meet export needs) and the implications for biodiversity.

In Sweden, there is no such division between agricultural production aimed for exportation and that destined for the domestic market. Swedish agriculture operates on a global market. All production is equal, as are the effects on the environment and ecosystem services.

CHAPTER 2: Drivers of change

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

This Chapter provides an assessment of the major drivers causing changes (drivers list and descriptions provided in Annex 3), either positive or negative, on the state of biodiversity for food and agriculture in the country, with specific attention to changes in the associated biodiversity in and around production systems, ecosystem services and wild foods. This Chapter also encourages countries to compare drivers between different production systems.

The Chapter will address the following topics related to drivers of change in biodiversity for food and agriculture:

- The effects of drivers and stressors over the past ten years on a) associated biodiversity, b) ecosystem services and c) wild foods;
- Impacts of drivers on the involvement of women in the maintenance and use of biodiversity for food and agriculture, the application and preservation of traditional knowledge, and rural poverty alleviation;
- Countermeasures addressing current and emerging drivers, best practices and lessons learned.

The Country Report should include information or reference to any specific studies that have been carried out in the last ten or so years that relate observed changes in the extent or distribution of associated biodiversity and wild foods in the country to different drivers.

IMPORTANT: Throughout these guidelines, questions on production systems will refer to the production systems identified in Table 1 as present in your country.

One of the main objectives of this report is to identify knowledge gaps and to provide baseline information for future assessments. Thus please indicate where information is unavailable.

Effects of drivers of change on associated biodiversity

9. What have been the most important drivers affecting the extent and distribution of associated biodiversity in the last 10 years in your country? In describing the drivers you may wish to indicate the production systems where associated biodiversity is most affected and identify drivers that are common to the various components of associated biodiversity listed. Indicate where possible the indicators used to measure changes, along with the sources of information.

Since many years Sweden has translated its agri-environmental policies (relevant ones include A Non-Toxic Environment and A Varied Agricultural Landscape) into environmental quality objectives and measures. One such measure involves encouraging farmers to switch from conventional to organic farming. The overall goal of 20 % organic agriculture is not yet met (2012: 15,7 %) but has more than doubled since 2005 (6,9 %). The common Rural Development Programme (RDP) of EU plays an important role in this respect. Similarly, through the RDP farmers are provided economic support to ensure that landscape elements such as small waters, pastures/meadows, ditches, stone walls etc., that are important from the point of view of biodiversity, are maintained. These subsidies have helped to slow down and, in some aspects, interrupt a previous loss of those important habitats. Still, however, important microhabitats are being lost due to abandonment of farmland and rationalisation. While the sales of artificial fertilisers have decreased by one third since 1985, the use of manure has increased resulting in a more or less stable use of nitrogen in Swedish agriculture. The same holds more or less true also for phosphorus and potassium. Leakage of plant nutrients has decreased by c. 10 % due to improved nutrient uptake but also as a result of increased areas of ley on behalf of cereal crops. The use of pesticides decreased during the 1990's mostly as a result of farm abandonment but is nowadays stable. Eighty percent of all pesticides sold in Sweden are herbicides, c. 8 % fungicides and only a minor part insecticides (c. 2,5 %).

To summarize: major positive drivers – national and EU Rural Development Policies, agreements within HELCOM; major negative drivers – EU Common Agricultural Policies

Source: Yearbook of agricultural statistics 2013, Official statistics of Sweden

10. Where associated biodiversity is believed to be affected by climate change, please provide additional information on the nature, severity and frequency of the climate threat and the production systems impacted.

There is, as yet, little evidence to suggest that Swedish agro-biodiversity is affected by climate change. However, for fish, endemic species, habitat and feeding specialists are thought to be more effected by climate changes. Also already vulnerable species whose existence is already threatened. Some fish species are likely to respond with altering their spatial distribution ranges. Some species use deeper areas or move to other areas when the water temperature rises. For example mackerel has moved further north, probably due to climate change. More variation in rainfall with more intense rainy seasons in turn causes an increased leakage of nutrients and turbidity, rising sea levels and thus reduced access to spawning areas including for fish.

Effects of drivers of change on biodiversity for food and agriculture

This section applies to all biodiversity for food and agriculture. Countries that previously presented or are currently preparing a Country Report on Forest, Aquatic, Animal or Plant Genetic Resources, may wish to use these reports as reference.

11. For each production system present in your country as indicated in Table 1, fill in the code and name of each production system in Table 4 (repeat Table for each production system). For each production system indicate which drivers have been influencing biodiversity for food and agriculture, disaggregated by sector, during the past 10 years (description of drivers can be found in Annex 3). Drivers may have a strongly positive (2), positive (1), negative (-1), and strongly negative effect (-2), or no effect at all (0) on biodiversity for food and agriculture. If the effect of the driver is unknown or not applicable, please indicate not known (NK) or not applicable (NA).

Table 4. Effect of drivers on sector biodiversity within production systems in the country, by animal (AnGR), plant (PGR), aquatic (AqGR) and forest (FGR) genetic resources.

Production systems	Drivers (Place pointer on the driver name for a detailed description)	Effect of drivers on sector biodiversity for food and agriculture (2, 1, 0,-1, -2, NK, NA)			
		PGR	FGR	AnGR	AqGR
Livestock grassland-based systems: Boreal and /or highlands	Changes in land and water use and management			0	
	Pollution and external inputs			0	
	Over-exploitation and overharvesting			NA	
	Climate change			NK	
	Natural disasters			0	
	Pests, diseases, alien invasive species			0	
	Markets, trade and the private sector			-1	
	Policies			-1	
	Population growth and urbanization			NA	
	Changing economic, socio-political, and cultural factors			0	
	Advancements and innovations in science and technology			1	
Other [please specify]:			0		
Livestock landless systems: Boreal and /or highlands	Changes in land and water use and management				
	Pollution and external inputs				

	Over-exploitation and overharvesting				
	Climate change				
	Natural disasters				
	Pests, diseases, alien invasive species				
	Markets, trade and the private sector				
	Policies				
	Population growth and urbanization				
	Changing economic, socio-political, and cultural factors				
	Advancements and innovations in science and technology				
	Other [<i>please specify</i>]:				
Naturally regenerated forests: Boreal and /or highlands	Changes in land and water use and management				
	Pollution and external inputs				
	Over-exploitation and overharvesting				
	Climate change				
	Natural disasters				
	Pests, diseases, alien invasive species				
	Markets, trade and the private sector				
	Policies				
	Population growth and urbanization				
	Changing economic, socio-political, and cultural factors				
	Advancements and innovations in science and technology				
	Other [<i>please specify</i>]:				
Planted forests: Boreal and /or highlands	Changes in land and water use and management				
	Pollution and external inputs				
	Over-exploitation and overharvesting				
	Climate change				
	Natural disasters				
	Pests, diseases, alien invasive species				
	Markets, trade and the private sector				
	Policies				
	Population growth and urbanization				
	Changing economic, socio-political, and cultural factors				

	Advancements and innovations in science and technology				
	Other [<i>please specify</i>]:				
Self-recruiting capture fisheries: Boreal and /or highlands	Changes in land and water use and management				0
	Pollution and external inputs				0 (-1)
	Over-exploitation and overharvesting				0
	Climate change				NK
	Natural disasters				0
	Pests, diseases, alien invasive species				-1
	Markets, trade and the private sector				0 (-1)
	Policies				0
	Population growth and urbanization				0
	Changing economic, socio-political, and cultural factors				0
	Advancements and innovations in science and technology				0
	Other [<i>please specify</i>]:				
Culture-based fisheries: Boreal and /or highlands	Changes in land and water use and management				0 /-1
	Pollution and external inputs				0/ -1
	Over-exploitation and overharvesting				0/ -1
	Climate change				NK/ -1
	Natural disasters				0
	Pests, diseases, alien invasive species				-1
	Markets, trade and the private sector				0/ -1/1
	Policies				0
	Population growth and urbanization				0/1
	Changing economic, socio-political, and cultural factors				0/1
	Advancements and innovations in science and technology				0/1
	Other [<i>please specify</i>]:				
Fed aquaculture: Boreal and / or highlands	Changes in land and water use and management				-1
	Pollution and external inputs				-1
	Over-exploitation and overharvesting				-2
	Climate change				-1
	Natural disasters				0

	Pests, diseases, alien invasive species				-1
	Markets, trade and the private sector				1
	Policies				1
	Population growth and urbanization				1
	Changing economic, socio-political, and cultural factors				1
	Advancements and innovations in science and technology				1
	Other [<i>please specify</i>]:				-2
Non-fed aquaculture: Boreal and /or highlands	Changes in land and water use and management				-1
	Pollution and external inputs				1
	Over-exploitation and overharvesting				0
	Climate change				0
	Natural disasters				0
	Pests, diseases, alien invasive species				0
	Markets, trade and the private sector				1
	Policies				1
	Population growth and urbanization				1
	Changing economic, socio-political, and cultural factors				1
	Advancements and innovations in science and technology				2
	Other [<i>please specify</i>]:eutrophication				
Irrigated crops (other) : Boreal and /or highlands	Changes in land and water use and management	0			
	Pollution and external inputs	-1			
	Over-exploitation and overharvesting	0			
	Climate change	0			
	Natural disasters	0			
	Pests, diseases, alien invasive species	0			
	Markets, trade and the private sector	-1/1			
	Policies	-1/1			
	Population growth and urbanization	0			
	Changing economic, socio-political, and cultural factors	-1/1			
	Advancements and innovations in science and technology	0			
	Other [<i>please specify</i>]:				
Rainfed crops : Boreal and /or highlands	Changes in land and water use and management	NK			

	Pollution and external inputs	-1			
	Over-exploitation and overharvesting	NA			
	Climate change	NK			
	Natural disasters	0			
	Pests, diseases, alien invasive species	0			
	Markets, trade and the private sector	0/1			
	Policies	-1/1			
	Population growth and urbanization	-1			
	Changing economic, socio-political, and cultural factors	NK			
	Advancements and innovations in science and technology	0			
	Other [<i>please specify</i>]:				
Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands	Changes in land and water use and management				0
	Pollution and external inputs				0/-1
	Over-exploitation and overharvesting				0
	Climate change				NK
	Natural disasters				0
	Pests, diseases, alien invasive species				-1
	Markets, trade and the private sector				0/-1
	Policies				0
	Population growth and urbanization				0
	Changing economic, socio-political, and cultural factors				0
	Advancements and innovations in science and technology				0
	Other [<i>please specify</i>]:				
Horticulture: Boreal and /or highlands	Changes in land and water use and management	NK			
	Pollution and external inputs	-1			
	Over-exploitation and overharvesting	0			
	Climate change	0			
	Natural disasters	0			
	Pests, diseases, alien invasive species	-1			
	Markets, trade and the private sector	-1			
	Policies	-1/1			
	Population growth and urbanization	-1			

	Changing economic, socio-political, and cultural factors	NK			
	Advancements and innovations in science and technology	0			
	Other [<i>please specify</i>]:				

Effects of drivers of change on associated biodiversity

12. What have been the main drivers affecting regulating and supporting ecosystem services in the country during the last 10 years? Describe, for each production system, the major driver(s) affecting ecosystem services and indicate the effect on ecosystem services as being strongly positive (2), positive (1), negative (-), strongly negative (-2), no effect (0), not known (NK), or not applicable (NA) in Table 5 (repeat table for each production system). Place pointer on the ecosystem service name for a detailed description.

Table 5. Major drivers and their effect on ecosystem services in production systems.

Production systems	Drivers	Effect of drivers on ecosystem services (2, 1, 0, -1, -2, NK, NA) (Place pointer on the ecosystem service name for a detailed description)								
		Pollination	Pest and disease regulation	Water purification and waste treatment	Natural hazard regulation	Nutrient cycling	Soil formation and protection	Water cycling	Habitat provisioning	Production of oxygen/ Gas regulation
Livestock grassland-based systems: Boreal and /or highlands	Changes in land and water use and management		0							
	Pollution and external inputs		0							
	Over-exploitation and overharvesting		0							
	Climate change		0							
	Natural disasters		0							
	Pests, diseases, alien invasive species		1							
	Markets, trade and the private sector		0							
	Policies		0							
	Population growth and urbanization		0							
	Changing economic, socio-political, and cultural factors		0							
	Advancements and innovations in science and technology		2							
Other [<i>please specify</i>]:		0								

Livestock landless systems: Boreal and /or highlands	Changes in land and water use and management																				
	Pollution and external inputs																				
	Over-exploitation and overharvesting																				
	Climate change																				
	Natural disasters																				
	Pests, diseases, alien invasive species																				
	Markets, trade and the private sector																				
	Policies																				
	Population growth and urbanization																				
	Changing economic, socio-political, and cultural factors																				
	Advancements and innovations in science and technology																				
Other [<i>please specify</i>]:																					
Naturally regenerated forests: Boreal and /or highlands	Changes in land and water use and management																				
	Pollution and external inputs																				
	Over-exploitation and overharvesting																				
	Climate change																				
	Natural disasters																				
	Pests, diseases, alien invasive species																				
	Markets, trade and the private sector																				
	Policies																				
	Population growth and urbanization																				
	Changing economic, socio-political, and cultural factors																				
	Advancements and innovations in science and technology																				
Other [<i>please specify</i>]:																					
Planted forests: Boreal and /or highlands	Changes in land and water use and management																				
	Pollution and external inputs																				
	Over-exploitation and overharvesting																				
	Climate change																				
	Natural disasters																				
	Pests, diseases, alien invasive species																				
	Markets, trade and the private sector																				

	Policies								
	Population growth and urbanization								
	Changing economic, socio-political, and cultural factors								
	Advancements and innovations in science and technology								
	Other [<i>please specify</i>]:								
Self-recruiting capture fisheries: Boreal and /or highlands	Changes in land and water use and management								0
	Pollution and external inputs								0
	Over-exploitation and overharvesting								0
	Climate change								NK
	Natural disasters								0
	Pests, diseases, alien invasive species								-1
	Markets, trade and the private sector								0
	Policies								0
	Population growth and urbanization								0
	Changing economic, socio-political, and cultural factors								0
	Advancements and innovations in science and technology								0
	Other [<i>please specify</i>]:								
Culture-based fisheries: Boreal and /or highlands	Changes in land and water use and management	NA	-1	NA	-1	NA	-1	-1	0/-1
	Pollution and external inputs	NA	-1	NA	-1	NA	0	-1	-1
	Over-exploitation and overharvesting	NA		NA	-1	NA	0		0
	Climate change	NA		NA		NA	0		NK
	Natural disasters	NA	-1	NA		NA	0		0
	Pests, diseases, alien invasive species	NA	-1	NA		NA	0		-1
	Markets, trade and the private sector	NA		NA		NA			0
	Policies	NA		NA		NA			0
	Population growth and urbanization	NA		NA		NA			0
	Changing economic, socio-political, and cultural factors	NA		NA		NA			0
	Advancements and innovations in science and technology	NA		NA		NA			0
	Other [<i>please specify</i>]:								
Fed aquaculture: Boreal and /or highlands	Changes in land and water use and management	NA	-1	NA	-1	NA	0	-1	-1
	Pollution and external inputs	NA	-1	NA	-2	NA	0	-1	-1

	Over-exploitation and overharvesting	NA			NA	-1	NA	0		
	Climate change	NA			NA		NA	0		
	Natural disasters	NA	NA		NA		NA	0		
	Pests, diseases, alien invasive species	NA	-1		NA		NA	0		
	Markets, trade and the private sector	NA			NA		NA			
	Policies	NA			NA		NA			
	Population growth and urbanization	NA			NA		NA			
	Changing economic, socio-political, and cultural factors	NA			NA		NA			
	Advancements and innovations in science and technology	NA			NA		NA			
	Other [<i>please specify</i>]:									
Non-fed aquaculture: Boreal and /or highlands	Changes in land and water use and management	NA		2	NA	2	NA	0	1	-1
	Pollution and external inputs	NA		2	NA	2	NA	0	0	0
	Over-exploitation and overharvesting	NA			NA		NA	0		
	Climate change	NA			NA		NA			
	Natural disasters	NA	0		NA		NA	0		
	Pests, diseases, alien invasive species	NA	-1		NA		NA	0		
	Markets, trade and the private sector	NA			NA		NA			
	Policies	NA			NA		NA			
	Population growth and urbanization	NA			NA		NA			
	Changing economic, socio-political, and cultural factors	NA			NA		NA			
	Advancements and innovations in science and technology	NA			NA		NA			
	Other [<i>please specify</i>]:									
Irrigated crops (other) : Boreal and /or highlands	Changes in land and water use and management	NA	NK	NK	NA	NK	NK	NK	NK	NK
	Pollution and external inputs	NA	NK	NK	NA	NK	NK	NK	NK	NK
	Over-exploitation and overharvesting	NA	NA	NA	NA	NK	NA	NK	0	NK
	Climate change	NA	NK	NA	NA	NK	NK	NK	NK	NK
	Natural disasters	NA	NA	NA	NA	NK	NK	NA	0	NK
	Pests, diseases, alien invasive species	NA	NK	NA	NA	NK	NA	NA	0	NK
	Markets, trade and the private sector	NA	NA	NK	NA	NK	NK	NK	NA	NA
	Policies	NA	NK	NK	NA	NK	NK	NK	NA	NA
	Population growth and urbanization	NA	NA	NA	NA	NK	NK	NK	NA	NA
	Changing economic, socio-political, and cultural factors	NA	NA	NA	NA	NK	NA	NK	NA	NA

	Advancements and innovations in science and technology	NA	NA	NA	NA	NK	NK	NK	NA	NA
	Other [<i>please specify</i>]:									
Rainfed crops : Boreal and /or highlands	Changes in land and water use and management	0	NK	NK	NK	1	NK	NK	1	N
	Pollution and external inputs	-	-1	NK	NK	NK	NK	NK	-1	NA
	Over-exploitation and overharvesting	0	0	0	0	NK	-1	0	-1	NA
	Climate change	NK	NK	NK	0	NK	NK	NK	NK	NK
	Natural disasters	0	0	0	0	0	0	0	0	0
	Pests, diseases, alien invasive species	-2	NK	NA	0	NA	0	0	0	NA
	Markets, trade and the private sector	NK	-1	0	NK	NK	NK	NK	-1	1
	Policies	NK	1	1	NK	1	NK	NK	-1/1	NK
	Population growth and urbanization	NK	0	NK	NK	NA	NK	NK	-1	NA
	Changing economic, socio-political, and cultural factors	0	1	NK	NK	NK	NK	NA	NK	NK
	Advancements and innovations in science and technology	0	1	1	NK	NK	NK	NK	-1/1	NK
	Other [<i>please specify</i>]:									
Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands	Changes in land and water use and management									0
	Pollution and external inputs									0/-1
	Over-exploitation and overharvesting									0
	Climate change									NK
	Natural disasters									0
	Pests, diseases, alien invasive species									-1
	Markets, trade and the private sector									0/-1
	Policies									0
	Population growth and urbanization									0
	Changing economic, socio-political, and cultural factors									0
	Advancements and innovations in science and technology									0
	Other [<i>please specify</i>]:									
Horticulture: Boreal and /o	Changes in land and water use and management	NK	-1/0	NK						
	Pollution and external inputs	NK	NK	NA	NA	NK	NK	NK	NK	NK
	Over-exploitation and overharvesting	0	0	NA	NA	NK	NK	NA	-1/0	NA
	Climate change	0	0	NA	NA	NA	NA	NA	NA	NA

Natural disasters	0	0	NA						
Pests, diseases, alien invasive species	-2	-1	NA						
Markets, trade and the private sector	NK	NK	NK	NA	NK	NA	NA	NK	NA
Policies	NK	NK	NK	NA	NK	NA	NK	NK	NK
Population growth and urbanization	NA	NA	NK	NK	NA	NA	NA	-1	NA
Changing economic, socio-political, and cultural factors	NK	NK	NK	NA	NK	NA	NA	NK	NK
Advancements and innovations in science and technology	NK	NK	NK	NA	NA	NK	NK	NA	NA
Other [<i>please specify</i>]:									

13. Briefly describe the main driver(s) affecting ecosystem services in each production system, as identified in Table 5. Include where possible a description of the components of associated biodiversity that are affected, the indicators used to measure change, and the source of information.

The study of marine ecosystem services and water is particularly important for Sweden, one of nine Baltic Sea countries. The Baltic Sea, the largest body of brackish water in the world, contains a mixture of saline seawater from the North Sea and freshwater from rainfall and rivers seeping from a catchment area four times larger than the sea itself (SEPA and SwAM, 2009). Connected to the Atlantic through the North Sea via the narrow and shallow Danish Straits, water exchange is very limited, particularly bottom waters. Biodiversity has historically been low as the few species that can live in brackish water are more sensitive to change than saltwater and freshwater species. Biodiversity is highest in the Skagerrak, somewhat lower in the Kattegat and substantially lower in the Baltic Sea, with the number of species rarely reaching a tenth of what is found in the Skagerrak (SEPA and SwAM, 2009). The Baltic Sea suffers from serious environmental problems that have an economic impact; many of Sweden's coastal and marine areas are badly affected by eutrophication, toxic substances, overfishing and exploitation. Almost one-third of all red-listed species in Sweden are associated with aquatic environments (SEPA and SwAM 2009).

Effects of drivers of change on wild foods

14. What were the main drivers affecting the availability, knowledge and diversity of wild foods during the last ten years in the country? In Table 6, indicate the major drivers affecting availability, knowledge and diversity of wild foods, and if the effects are strongly positive (2), positive (1), negative (-1), strongly negative (-2), no effect (0), not known (NK), or not applicable (NA).

Table 6. Drivers affecting availability, knowledge and diversity of wild foods.

Drivers (Place pointer on the driver name for a detailed description)	Effect of drivers (2, 1, 0,-1, -2, NK, NA)		
	Availability of wild foods	Knowledge of wild foods	Diversity of wild food
Changes in land and water use and management	0	0	0
Pollution and external inputs	-1	0	0
Over-exploitation and overharvesting	-2	0	0
Climate change	NK	0/NK	0/NK
Natural disasters	1	0	0
Pests, diseases, alien invasive species	-1	-1	0

Drivers	Effect of drivers (2, 1, 0,-1, -2, NK, NA)		
Markets, trade and the private sector	2	0	0
Policies	0	0	0
Population growth and urbanization	0	0/-1	0
Changing economic, socio-political, and cultural factors	0	0	0
Advancements and innovations in science and technology	0/NK	0/NK	0/NK
Other [<i>please specify</i>]:			

15. Briefly describe the main drivers affecting the availability, diversity and knowledge of wild foods in your country, as identified in Table 6. Include where possible indicators used to measure change, along with the source of information.

Prevention programs against diseases are undertaken by farmers organisations and ministry. Support schemes for maintained biodiversity and contingency plans for both diseases and other disasters.

A new market for export of one species of wild growing mushroom has been developed recently. The mushroom is found in some forest ecosystems in the northern part of the country and is exported to Japan where it is highly appreciated as a delicacy. Although that many species of wild growing mushrooms are harvested and consumed domestically, this particular species is not known as one of the most appreciated in the Swedish cuisine.

The most important wild foods in Sweden area game-meat from hunting and the picking of berries and mushrooms.

Game-meat: The abundance of important game-species has historically varied over time, an important driver is direction of the resource management objectives, i.e. the hunting. In the last 10 years we can identify an increase in abundance of some important species attributed to large storm-fellings of forest, creating an increase in forage.

Urbanization including forest owners no longer living on their forest holdings are reason for a decrease in knowledge of wild foods.

A wide range of human activities impact on marine and water ecosystem services. Sweden has identified four major environmental stresses impacting the Baltic Sea and the North-east Atlantic Ocean (Skagerrak, Kattegat and Öresund): inputs of nutrients and organic matter, input of hazardous substances, biological disturbance and physical disturbance (SwAM, 2012). Impact on the ecosystem services in the Baltic Sea and Skagerrak are so strong that even regulating services are under stress (SEPA and SwAM, 2009). Although some services are relatively unaffected by environmental threats (such as the provision of space and waterways), others are impacted by many threats at the same time (such as biodiversity, habitats, food provisioning and recreation). The main targeted commercial fish species are fully used in Swedish fisheries, i.e cod - but there are some potential for bigger – and consequently more profitable – cod stocks in both the Baltic Sea and Kattegat. This may be hindered by environmental degradation such as poor water quality and eutrophication and depend upon the influx of salt water from the North Sea basin, which is necessary for hatching of cod larvae in the Baltic Sea. Potentially all cod stocks in the area may be affected by climate changes.

Effects of drivers of change on traditional knowledge, gender and rural livelihoods

In answering questions 16 to 18, describe the major drivers that have had an impact in the last 10 years and include where possible indicators used to measure change, and sources of information.

16. Which drivers have had the most significant effect on the involvement of women in the maintenance and use of biodiversity for food and agriculture?

NOT KNOWN, or most likely no significant changes during the last 10 years. Traditionally, women have had a great responsibility in the harvesting of wild foods in Sweden. The proportional importance of wild foods in the domestic economy has decreased during the twentieth century. In rural livelihoods, however, fishing, hunting and harvesting of berries and mushrooms are still of significant economic importance. Women's participation in hunting activities has increased considerably over the last decades which most likely also could be seen during the last 10 years.

17. Which drivers have had the most significant effect on the maintenance and use of traditional knowledge relating to biodiversity for food and agriculture?

Sweden has initiated a national programme on traditional knowledge related to the conservation and sustainable use of biodiversity. The programme, NAPTEK, is running under the Swedish Biodiversity Centre at the Swedish University of Agricultural Sciences, and was initiated to enhance the national implementation of Article 8(j) and related provisions of the Convention on Biological Diversity. The programme is addressing a wide range of aspects of traditional knowledge where those relating to wild food is an important but limited fraction. One observation made, is an increased interest in traditional knowledge on wild food as a bases for entrepreneurship in the food sector. Traditional cooking, methods for preservation and refinement of ingredients, have provided business cases for a growing number of small scale enterprises. The main driver for this is an enhanced interest among the public in food quality, food security and outdoor activities.

18. Which drivers have had the most significant effect on the role of biodiversity for food and agriculture in improving food security and sustainability?

Countermeasures addressing current and emerging drivers of change, best practices and lessons learned

19. Referring to the information provided in this Chapter, identify countermeasures planned or in place to reduce adverse consequences of drivers on a) associated biodiversity, b) ecosystem services and c) wild foods. Provide any expected outcomes, lessons learned and best practices.

Prevention programs against diseases are undertaken by farmers organisations and ministry. Support schemes for maintained biodiversity and contingency plans for both diseases and other disasters.

CHAPTER 3: The state and trends of biodiversity for food and agriculture

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

The main objective of this Chapter is to describe the state of biodiversity for food and agriculture in the country, with an emphasis on associated biodiversity and wild foods, and to identify current trends. The Chapter should also indicate current gaps and future needs and priorities. Where possible, countries should identify interventions required to support maintenance of associated biodiversity and indicate whether action is required at local, national, regional or global levels.

This Chapter will seek information on the following topics:

- The state of diversity between and (where any information exists) within species with respect to associated biodiversity and wild foods;
- The importance of the different components of associated biodiversity in relation to ecosystem services;
- The main factors influencing the state of genetic diversity with an emphasis on threatened and endangered species and resources;
- The state of activities and of the development of monitoring and information systems on the state of biodiversity for food and agriculture;
- The state of any specific conservation actions that target associated biodiversity and wild foods;
- Major gaps in the information available and opportunities and priorities for improving knowledge of state and trends of biodiversity for food and agriculture.

Where possible, indicate whether the information systems are gender-sensitive, specifying to what extent the different types and levels of knowledge of women and men are taken into account.

IMPORTANT: Throughout these guidelines, questions on production systems will refer to the production systems identified in Table 1 as present in your country.

One of the main objectives of this report is to identify knowledge gaps and to provide baseline information for future assessments. Thus please indicate where information is unavailable.

Overall synthesized assessment of forest, aquatic, animal or plant genetic resources

Countries that previously presented or are currently preparing a Country Report on Forest, Aquatic, Animal or Plant Genetic Resources may have important information on genetic diversity in these various reports. Therefore, Countries may wish to take full advantage of their different sector reports to develop a comprehensive description and comparison of the state, trends, and state of conservation of forest, aquatic, animal or plant genetic resources. The following indications are designed to provide guidance on the topics that could be addressed.

20. Describe the overall 1) state, 2) trends and 3) state of conservation of diversity of forest, aquatic, animal or plant genetic resources in your country with respect to:

- a) common characteristics shared by all sectors;
- b) major differences between sectors;
- c) synergies or trade-offs in the state of diversity between sectors.

The responses should include relevant information on socio-economic, political and cultural dimensions as well as biological ones. Information on the significance of common characteristics, differences, synergies and trade-offs with respect to achieving food security and nutrition, sustainable production or the provision of ecosystem services should also be provided.

Work on Swedish plant, animal and forest genetic resources is being coordinated regionally at the Nordic level through the Nordic Genetic Resource Centre. PGR collections include plant varieties, advanced breeders' material, landraces/locally adapted material and populations collected in the wild. Accessions have been characterised and evaluated for important agricultural traits, but molecular characterisation is generally incomplete, even for commercially important crops. Knowledge of the genetic diversity of wild populations is lacking.

a) for animal and plant the state known and documented b) for animal and plant trends are known and followed c) for animal the conservation activities is existing

The knowledge about genetic diversity in forest trees in general is very low and has received far less attention than biodiversity on the species and ecosystem levels. Few scientific studies have analyzed the amount and structuring of genetic variation within and between natural populations, especially in minor forest species. Assessments of genetic erosion are even more uncommon. Loss of genetic variation, both in number of alleles and levels of heterozygosity, especially in major forestry species can nevertheless be expected. The reasons include fragmentation of landscapes, regeneration with bred forest reproductive material and forest damage. The main loss of genetic variation is expected when using only one or a few clones in forestry. Clonal forestry is however still relatively unusual in Sweden. Levels and rates of genetic erosion in *Picea abies* and *Pinus sylvestris* are unknown due to the absence of analysis on previous and present amounts of genetic diversity in forest stands of these species. This is also the case in *Ulmus* and *Fraxinus* which are severely threatened by forest damage, genetic diversity is presumably lost at a high rate within and across populations.

State and trends of associated biodiversity and ecosystem services

This section seeks information on the state of associated biodiversity in different production systems and in relation to the provision of ecosystem regulating and supporting services.

21. Have any changes been detected in your country for the different production systems over the last 10 years in components of associated biodiversity? If so, indicate if trends are strongly increasing (2), increasing (1), stable (0), decreasing (-1) or strongly decreasing (-2) in Table 7. If no information is available, indicate not known (NK). If not applicable, (NA).

Table 7. Trends in the state of components of associated biodiversity within production systems.

Production systems	Trends in last 10 years (2,1,0,-1,-2, NK, NA) (Place pointer on the component of associated diversity name for a description)			
	Micro-organisms	Invertebrates	Vertebrates	Plants
Livestock grassland-based systems: Boreal and /or highlands			-1	
Livestock landless systems: Boreal and /or highlands				
Naturally regenerated forests: Boreal and /or highlands				
Planted forests: Boreal and /or highlands				
Self-recruiting capture fisheries: Boreal and /or highlands	NK	NK	NK	NK
Culture-based fisheries: Boreal and /or highlands	NK	NK	NK	1
Fed aquaculture: Boreal and /or highlands	NK	NK	NK	1
Non-fed aquaculture: Boreal and /or highlands	NK	NK	NK	NK
Irrigated crops (other) : Boreal and /or highlands	NK	NK	NK	0
Rainfed crops : Boreal and /or highlands	NK	NK	-2/-1	-1
Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands				
Horticulture: Boreal and /or highlands	NK	NK	NK	NK

22. Briefly describe the changes or trends in diversity recorded in Table 7. Where possible provide information on: baseline levels (last 10 years, indicate if otherwise), measurements and indicators used, the extent of change, and the likely cause(s). Include references to the sources of information.

30 years of consecutive censuses of bird populations traditionally common in Swedish farmland have shown significant decreases for a number of well-known species such as lapwing (*Vanellus vanellus* L.), skylark (*Alauda arvensis* L.), linnet (*Carduelis cannabina* L.), (hortulan bunting (*Emberiza hortulana* L.) and others. An additional ten farmland bird species show similar negative population trends according to the EU Farmland Bird Index (FBI). Major causes for the decline include loss of important micro-habitats for nesting and feeding, closing of ditches and drainage of wetlands, and increased use of herbicides (effects on seeds) and insecticides (effects on invertebrate fauna). In addition, a trend for earlier harvest of leys has the effect that many nests and young are destroyed. Frequent use of herbicides also has had a strongly negative effect on several red-listed agricultural weed species that were previously more common in Swedish fields.

23. Have any changes been detected in your country for the different production systems over the last 10 years in regulating and supporting ecosystem services? If so, indicate if trends are strongly increasing (2), increasing (1), stable (0), decreasing (-1) or strongly decreasing (-2) in Table 8. If no information is available, indicate not known (NK). If not applicable, (NA).

Table 8. Trends in the state of regulating and supporting ecosystem services within production systems.

Production systems	Trends in last 10 years (2,1,0,-1,-2, NK, NA) (Place pointer on the ecosystem service name for a description)								
	Pollination	Pest and disease regulation	Water purification and waste treatment	Natural hazard regulation	Nutrient cycling	Soil formation and protection	Water cycling	Habitat provisioning	Production of oxygen/ Gas regulation
Livestock grassland-based systems: Boreal and /or highlands	-1								
Livestock landless systems: Boreal and /or highlands									
Naturally regenerated forests: Boreal and /or highlands									
Planted forests: Boreal and /or highlands									
Self-recruiting capture fisheries: Boreal and /or highlands	NA	1	NK	NK	NA	NK	NA	1	NA
Culture-based fisheries: Boreal and /or highlands	NA	NK	NK	NA	-1	NA	NK	NK	-1
Fed aquaculture: Boreal and /or highlands	NA	NK	NK	NA	-2	NA	NK	NK	-1
Non-fed aquaculture: Boreal and /or highlands	NA	0	NK	NA	2	NA	NK	1	-1
Irrigated crops (other) : Boreal and /or highlands	NA	0	NK	NK	NK	NK	NK	0	NK
Rainfed crops : Boreal and /or highlands	0	0	NK	NK	NK	NK	NK	-1	NK
Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands									
Horticulture: Boreal and /or highlands	0	0	NK	NK	NK	NK	NK	0	NK

24. Briefly describe the changes or trends in diversity recorded in Table 8. Where possible provide information on: baseline levels (last 10 years, indicate if otherwise), measurements and indicators used, the extent of change, and the likely cause(s). Include references to the sources of information.

Due to high winterlosses of honeybees there are locally less pollination services in the spring. The losses are in average 13% per year. Although the winter losses may be high some years, the number of colonies in average per year does not fluctuate much. The beekeepers split colonies and restock hives. (Source; Swedish Beekeepers Association.)

The prevalence of micro-habitats for nesting, breeding, over-wintering etc has gone down despite economic support through the Rural Development Programme.

25. Is there evidence that changes in biodiversity for food and agriculture have impacted ecosystem services in your country? Indicate if strongly increasing (2), increasing (1), stable (0), decreasing (-1) or strongly decreasing (-2) in Table 9 and provide a description of specific situations and documentation where available.

Table 9. Impact of changes in biodiversity for food and agriculture on ecosystem services.

Production systems	Changes	Impact of changes in biodiversity for food and agriculture on ecosystem services (2, 1, 0, -1, -2, NK, NA) (Place pointer on the ecosystem service name for a description)								
		Pollination	Pest and disease regulation	Water purification and waste treatment	Natural hazard regulation	Nutrient cycling	Soil formation and protection	Water cycling	Habitat provisioning	Production of oxygen/ Gas regulation
Livestock grassland-based systems: Boreal and /or highlands	Changes in animal genetic resources		-1							+1
	Changes in crop genetic resources									
	Changes in forest genetic resources									
	Changes in aquatic genetic resources	NA	NK	NK	NK	NK	NA	NK	NK	NA
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)									
Livestock landless systems: Boreal and /or highlands	Changes in animal genetic resources									
	Changes in crop genetic resources									
	Changes in forest genetic resources									
	Changes in aquatic genetic resources	NA	NK	NK	NK	NK	NA	NK	NK	NA
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)									

Naturally regenerated forests: Boreal and /or highlands	Changes in animal genetic resources									
	Changes in crop genetic resources									
	Changes in forest genetic resources									
	Changes in aquatic genetic resources	NA	NK	NK	NK	NK	NA	NK	NK	NA
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)									
Planted forests: Boreal and /or highlands	Changes in animal genetic resources									
	Changes in crop genetic resources									
	Changes in forest genetic resources									
	Changes in aquatic genetic resources									
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)									
Self-recruiting capture fisheries: Boreal and /or highlands	Changes in animal genetic resources									
	Changes in crop genetic resources									
	Changes in forest genetic resources									
	Changes in aquatic genetic resources	NA	NK	NK	NK	NK	NA	NK	NK	NA
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)									
Culture-based fisheries: Boreal and /or highlands	Changes in animal genetic resources	NA								
	Changes in crop genetic resources	NA								
	Changes in forest genetic resources	NA	NA	NA	NA	NA	NA	N	NA	NA
	Changes in aquatic genetic resources	NA	NK	NK	NA	NK	NA	NK	NK	NK

	Changes in micro-organism genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in invertebrates genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in vertebrates genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in plants genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
Fed aquaculture: Boreal and /or highlands	Changes in animal genetic resources	NA								
	Changes in crop genetic resources	NA								
	Changes in forest genetic resources	NA								
	Changes in aquatic genetic resources	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in micro-organism genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in invertebrates genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NK	NK	NK	NK
	Changes in vertebrates genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in plants genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
Non-fed aquaculture: Boreal and /or highlands	Changes in animal genetic resources	NA								
	Changes in crop genetic resources	NA								
	Changes in forest genetic resources	NA								
	Changes in aquatic genetic resources	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in micro-organism genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in invertebrates genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in vertebrates genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
	Changes in plants genetic resources (associated biodiversity)	NA	NK	NK	NA	NK	NA	NK	NK	NK
Irrigated crops (other) : Boreal and /or highlands	Changes in animal genetic resources									
	Changes in crop genetic resources	NA	0	NK	NK	NK	NK	NK	0	NK
	Changes in forest genetic resources									
	Changes in aquatic genetic resources									
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)	NA	NK	NK	NK	NK	NK	NK	0	NK

Rainfed crops : Boreal and /or highlands	Changes in animal genetic resources									
	Changes in crop genetic resources	0	0	NK	NK	NK	NK	NK	NA	NK
	Changes in forest genetic resources									
	Changes in aquatic genetic resources									
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)	0	0	NK	NK	NK	NK	NK	NA	NK
Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands	Changes in animal genetic resources									
	Changes in crop genetic resources									
	Changes in forest genetic resources									
	Changes in aquatic genetic resources	NA	NK	NK	NK	NK	NA	NK	NK	NA
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)									
Horticulture: Boreal and /o ⁺	Changes in animal genetic resources									
	Changes in crop genetic resources	0	NK	NK	NK	NK	NK	NK	NA	NK
	Changes in forest genetic resources									
	Changes in aquatic genetic resources									
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrates genetic resources (associated biodiversity)									
	Changes in vertebrates genetic resources (associated biodiversity)									
	Changes in plants genetic resources (associated biodiversity)	0	NK	NK	NK	NK	NK	NK	NA	NK

26. Briefly describe the impacts on ecosystem services recorded in Table 9. Where possible provide information on: baseline levels (last 10 years, indicate if otherwise), measurements and indicators used, the extent of change, and the likely cause(s). Include references to the sources of information.

Decreasing biodiversity within AnGR will reduce the resilience towards diseases.

27. List any associated biodiversity species or sub-species (if information is available) that are in some way actively managed in your country to help provide regulating or supporting ecosystem services in Table 10. Indicate in which production systems they occur and indicate if diversity information is available. Provide any available sources of information.

Table 10. Associated biodiversity species that are in some way actively managed in your country to help provide regulating or supporting ecosystem services.

Ecosystem service provided (Place pointer on the ecosystem service name for a detailed description)	Actively managed species (name) and sub-species (where available)	Production systems (code or name)	Availability of diversity information (Y/N)	Source of information
Pollination	Honey bee (<i>Apis mellifera</i> L.), <i>Bombus terrestris</i> (L.) and other spp.	Rainfed crops: boreal Horticulture: boreal	Y	Swedish board of agriculture
Pest and disease regulation				
Water purification and waste treatment				
Natural hazard regulation				
Nutrient cycling	Winter wheat, winter rye, winter barley, timothy, perennial ryegrass, red clover, etc.	Rainfed crops: boreal	Y	
Soil formation and protection				
Water cycling				
Habitat provisioning	Salmon, trout			
Production of oxygen/ Gas regulation				
Other [<i>please specify</i>]:Nectar crop	<i>Phacelia tanacetifolia</i> (Benth.)	Rainfed crops: boreal	Y	

28. Does your country have monitoring activities related to associated biodiversity? If yes, describe these. Where possible provide information on the components of associated biodiversity that are monitored and on the geographical coverage of the monitoring system (local, regional, national, global). Include references to the sources of information, if possible.

Honey bee, and to some extent bumble bee, populations are being monitored annually through the official statistics on honey production and annual loss of bee hives due to disease and/or winter kill. Data may be obtained from the Board of Agriculture or the National Bee-keepers' Association.

Species of associated biodiversity at risk of loss

In this section the objective is to identify species of associated biodiversity within the country that are at significant risk of loss, degradation or extinction.

29. List in Table 11 any components of associated biodiversity for which there is evidence of a significant threat of extinction or of the loss of a number of important populations in your country. Specify the degree of the threat according to the classification in use in your country or following the IUCN Red List Categories and Criteria. Include a description of the threat and list references or sources of information if available.

Table 11. Main threats to associated biodiversity identified as at risk.

Associated biodiversity species	Degree of threat	Main threat	References or sources of information if available
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Associated biodiversity species	Degree of threat	Main threat	References or sources of information if available
A number of spp.			Check Swedish Red Data List 2010 (http://www.slu.se/en/collaborative-centres-and-projects/artdatabanken/)
European eel	Critically endangered	overfishing, habitat losses	Regulation (EC) 1100/2007

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Conservation of associated biodiversity

This section collects information on the state of conservation of components of associated biodiversity providing ecosystem services within production systems in your country.

30. Does your country currently have any *ex situ* conservation or management activities or programmes for associated biodiversity for food and agriculture? These may include, for example, culture collections, collections of pollinators, etc. If so, list these in Table 12.

Table 12. *Ex situ* conservation or management activities or programmes for associated biodiversity for food and agriculture.

Components of associated biodiversity	Organisms, species and sub-species (where available) conserved	Size of collection	Conservation conditions	Objective(s)	Characterization and evaluation status
Plants	Crop wild relatives (CWRs)	NK	Medium-Long term (seed gene bank, botanic gardens)	Conservation	NK
Vertebrates	Salmon, trout, coregonids	various	Fish farm	conservation	

Add row

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31. Does your country currently have any *in situ* conservation and management activities or programmes in your country that support the maintenance of associated biodiversity? If so provide any available information on organisms and species managed or conserved, site name and location, production system(s) involved, conservation objective and specific actions that secure associated biodiversity or ecosystem services (if any).

Table 13. *In situ* conservation or management activities or programmes for associated biodiversity for food and agriculture.

Components of associated biodiversity	Organisms, species and sub-species (where available) conserved	Site name and location	Production system(s) involved (code or name)	Conservation objective(s)	Specific actions that secure associated biodiversity or ecosystem services
Vertebrates	Bee				Honungsprogrammet och stöd till föreningen Nordbi (landsbygdsprogrammet) Lokal biodling
Plants	Crop wild relatives (CWRs)	Several sites	Rainfed crops: boreal Horticulture: boreal	Conservation of genetic diversity	NK

Components of associated biodiversity	Organisms, species and sub-species (where available) conserved	Site name and location	Production system(s) involved (code or name)	Conservation objective(s)	Specific actions that secure associated biodiversity or ecosystem services
Vertebrates	Salmon				Local Stocks (Lake Vänern)
Add row					
Delete row					

32. What activities are undertaken in your country to maintain traditional knowledge of associated biodiversity? Has traditional knowledge of associated biodiversity been used to inform conservation and use decisions in your country? Please share best practices and lessons learned.

The Swedish Biodiversity Centre (CBM) is Sweden's national centre for promoting sustainable use of biodiversity. The centre's main function is to conduct, initiate and coordinate research on the preservation, sustainable use and restoration of biodiversity in Sweden. The Swedish Species Information Centre works with information on biodiversity in Sweden. The tasks include collecting, analysing and storing the most important information about endangered and disadvantaged plants, fungi and animals, assessing the degree and nature of the threat and compiling the so-called Red Lists. The Swedish Species Information Centre provides and disseminates information about the red-listed species, develops proposals for action and initiates research. The Swedish Species Information Centre at SLU is an important link between researchers, conservationists and the public. Most of the activities fall within SLU's environmental monitoring and assessment (EMA) that focuses on the needs of society as expressed in the Swedish Parliament's environmental quality objectives, international commitments and the overarching objective for long-term sustainable development. The research carried out by the Swedish Species Information Centre is as yet only on a limited scale.

The Swedish Species Information Centre is a centre for information about species and habitats in Sweden and a link between researchers, conservationists and the general public. The Swedish Species Information Centre works for a rich plant and animal life in Sweden and the World.

In December 2005 the Swedish government decided to launch a national programme on local and traditional knowledge concerning the conservation and sustainable use of biological diversity, with the aim to safeguard relevant traditional knowledge, innovations and practices.

Sweden is one of the few EU countries to have indigenous people, the Sami. In addition to the Sami, Sweden also has many tradition holders represented in small-scale use of the biological resources. Reindeer husbandry, small-scale farming, forestry, hunting, and artisanal fishery all depend on traditional knowledge. Artisanal fishermen are still dependent on knowledge of the seasonal behaviour of the fish, weather conditions and wind directions to make their catches. Fish, both fresh and smoked, is sold directly by the fishermen locally to tourists and summer guests. Farm dairies produce traditional cheese made from cows and goats that graze in forest that have been grazed for centuries. Traditional knowledge and local traditional products still play an important role in rural development even in a highly industrialized country like Sweden.

The purpose of the national programme is to:

- document traditional knowledge
- maintain and preserve local and traditional knowledge
- work as a link between tradition holders and national authorities
- initiate research concerning traditional knowledge

33. Provide any available information on gender dimensions with respect to the maintenance of and knowledge about associated biodiversity. These may include differences in the roles and insights of women and men with respect to maintaining particular resources, monitoring their state, overseeing their management at different stages of production or ecosystem management.

Not known

State and trends of wild resources used for food

34. Provide in Table 14 a list of wild food species known to be harvested, hunted, captured or gathered for food in your country, and that are not already included in a completed or ongoing Country Report on Forest, Aquatic, Animal or Plant Genetic Resources. Indicate in or around which production system the species is present and harvested, and the change in state of the species over the last 10 years (strongly increasing (2), increasing (1), stable (0), decreasing (-1), or strongly decreasing (-2), or not known (NK)). Indicate where differences within species have been identified and characterized.

Table 14. Wild species used for food in the country.

Species (local name)	Species (scientific name)	Production systems or other environments in which present and harvested	Change in state (2,1,0,-1,-2, NK)	Differences within species identified and characterized (Y/N)	Source of information
Elk/moose	<i>Alces alces</i>	wild game hunting	0		Swedish Hunters association
Wild boar	<i>Sus scrofa</i>	wild game hunting	2		
Deer	<i>Capreolus capreolus</i>	wild game hunting	0		
Kajp/skogslök, Sand leek	<i>Allium scorodoprasum</i> L.		0	N	
Ramslök, Wood garlic/Ramsons/Buckrams	<i>Allium ursinum</i> L.		0	N	
Kirskål, Goutweed/Bishop's weed	<i>Aegopodium podagraria</i> L.		0	Y	
Kvanne, Garden angelica	<i>Angelica archangelica</i> L.		0	Y	
Råglosta, Rye brome	<i>Bromus secalinus</i> L.		0	N	
Lungört, Good King Henry	<i>Chenopodium bonus-henricus</i> L.		0	Y	
Ängssyra, Common sorrel/Garden sorrel	<i>Rumex acetosa</i> L.		0	N	
Bilberry and Lingonberry	<i>Vaccinium myrtillus</i> L. and <i>vitis-idaea</i> L.	Naturally regenerated forests: boreal Planted forests: boreal	0	Y	
Blackberry, Raspberry, Cloudberry, Dewberry, Arctic bramble	<i>Rubus fruticosus</i> , <i>idaeus</i> , <i>chamaemorus</i> , <i>caesius</i> , <i>arcticus</i> (respectively)	Naturally regenerated forests: boreal Livestock grassland-based systems: boreal Mixed production systems	0	Y	
Black currant, Red currant, Gooseberry	<i>Ribes nigrum</i> , <i>rubrum</i> , <i>grossularia</i> (respectively)	Naturally regenerated forests: boreal Livestock grassland-based systems: boreal Mixed production systems	0	Y	
Common strawberry, hautbois and wild strawberry	<i>Fragaria vesca</i> , <i>moschata</i> and <i>viridis</i> (respectivel	Naturally regenerated forests: boreal Livestock grassland-based systems: boreal Mixed production systems	0	Y	

Species (local name)	Species (scientific name)	Production systems or other environments in which present and harvested	Change in state (2,1,0,-1,-2, NK)	Differences within species identified and characterized (Y/N)	Source of information
Cod	Gadhus Morhua	Self recruiting capture fisheries	-1	Y	ICES
Herring	Clupea harangus	Self recruiting capture fisheries	1	Y	ICES
Sprat	Sprattus sprattus	Self recruiting capture fisheries	0	Y	ICES
Crayfish	Nephrops norvegicus	Self recruiting capture fisheries	0	N	ICES
Prawn	Pandalus borealis	Self recruiting capture fisheries	-1	N	ICES
Pikeperch	Sander lucioperca	Self recruiting capture fisheries	1	Y	SLU
Signal crayfish	Pacifastacus leniusculus	Self recruiting capture fisheries	1	Y	SLU

Add row

Delete row

Wild food resources at risk

In this section the objective is to identify uncultivated and wild species used for food within the country that are at significant risk of loss.

35. List in Table 15 any wild food species for which there is evidence of a significant threat of extinction or of the loss of a number of important populations in your country. Specify the degree of threat according to the classification in use in your country or following the IUCN Red List Categories And Criteria. Include a description of the threat and list references or sources of information if available.

Table 15. Main threats to wild food species identified as at risk.

Wild food species (scientific name)	Degree of threat	Main threat	References or sources of information if available
Bromus racemosus L.	EN	Lack of traditional haymaking, too heavy grazing	http://www.artfakta.se/artfaktablad/Bromus_Racemosus_177.pdf
European eel (Anguilla anguilla)	Critically endangered	Overfishing, habitat loss etc	Regulation (EC) 1100/2007
Noble crayfish (Astacus astacus)	Endangered	Disease, invasive species	IUCN

Add row

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Provide information, where available, as to how the loss of wild food species affects the livelihoods of those that depend on them and on the general impact of their loss on food security and nutrition. Include references to the sources of information, if possible.

Not known

Conservation of wild resources used for food

36. Are any *ex situ* conservation or management activities or programmes established in your country for wild food species? These may include, for example, culture collections, collections of insects, fungi, etc. If so, list these in Table 16.

Table 16. *Ex situ* conservation or management activities or programmes for wild food species.

Wild food species conserved (scientific name)	Size of collection (number of accessions and quantities)	Conservation conditions	Objective(s)	Characterization and evaluation status
Several crop wild relatives (CWRs)	See http://www.nordgen.org/index.php/skand/content/view/full/344	Medium and long-term	Complementary to <i>in situ</i> conservation	NK
Also see table 12				
Add row				
Delete row				

37. Are any *in situ* conservation and management activities or programmes established in your country that supports maintenance of wild food species? If so list these in Table 17 provide the following information for each activity or program: site name and location, production system(s) involved, conservation objective and specific actions that secure wild food species (if any).

Table 17. *In situ* conservation or management activities or programmes for wild food species.

Wild food species conserved (scientific name)	Site name and location	Size and environment	Conservation objective(s)	Actions taken
Also see table 13				
Add row				
Delete row				

38. What activities are undertaken in your country to maintain traditional knowledge of wild food species (indicate if the extent to which these have already been described in sector reports)? How can traditional knowledge of wild food species be accessed and used to inform conservation and use decisions?

Swedish ethno-botanical information was compiled and published in 2007 as one of three book volumes on ethno-biology. No continuous up-dating or implementation of traditional knowledge relating to wild food species is, however, taking place.

39. Provide any available information on gender dimensions with respect to the maintenance of and knowledge about wild food species. These may include differences in the roles and insights of women and men with respect to harvesting particular resources, monitoring their state, overseeing their ecosystem management.

NOT KNOWN

Natural or human-made disasters and biodiversity for food and agriculture

This section collects information on natural or human-made disasters and their impact on and response from biodiversity for food and agriculture as a whole.

40. **Has your country experienced any natural or human-made disaster(s) that has had a significant effect on biodiversity for food and agriculture and/or on ecosystem services in the past 10 years? List in Table 18 those for which any information exists on their effect on biodiversity for food and agriculture and/or ecosystem services. Indicate the effect on different components or services as significant increase (2), increase (1), no change (0), some loss (-1), significant loss (-2), or not known (NK).**

Table 18. Natural or human-made disasters that has had a significant effect on biodiversity for food and agriculture in the past 10 years in the country.

Disaster description	Production system(s) affected (code or name)	Effect on overall biodiversity for food and agriculture (2, 1, 0, -1, -2, NK)	Effect on ecosystem services (2, 1, 0, -1, -2, NK)
Crayfish plague	lakes, ponds	-1	-1
Add row			
Delete row			

41. Briefly summarize any available information, including the year of the disaster, a description of the effects of the disaster on the different components of biodiversity for food and agriculture and/or on the effects on ecosystem services, and references to the supporting documentation.

42. **Provide any available evidence from your country that changes in biodiversity for food and agriculture caused by natural or human-made disasters have had an effect on livelihoods, food security and nutrition.**

43. **Provide any available evidence that the enhanced use of biodiversity for food and agriculture has contributed to improving livelihoods, food security and nutrition in the context of a natural or human-made disasters. Describe and provide source of information.**

Invasive alien species and biodiversity for food and agriculture

44. **Are there invasive alien species identified in your country that have had a significant effect on biodiversity for food and agriculture in the past 10 years? List in Table 19 those for which any information exists on their effect on biodiversity for food and agriculture and/or ecosystem services. Indicate the effect on different components or services as strong increase (2), increase (1), no effect (0), some loss (-1), significant loss (-2), or not known (NK).**

Table 19. Invasive alien species that have had a significant effect on biodiversity for food and agriculture in the past 10 years.

Invasive alien species (scientific name)	Production system(s) affected (code or name)	Effect on components of biodiversity for food and agriculture (2,1,0,-1,-2, NK)	Effect on ecosystem services (2,1,0,-1,-2, NK)
Varroa mite (Varroa spp.)	Rainfed crops: boreal Horticulture: boreal	-2	-1
Spanish slug (Arion vulgaris Moquin-Tandon)	Rainfed crops: boreal Horticulture: boreal	-1	0

Invasive alien species (scientific name)	Production system(s) affected (code or name)	Effect on components of biodiversity for food and agriculture (2,1,0,-1,-2, NK)	Effect on ecosystem services (2,1,0,-1,-2, NK)
Signal crayfish	lakes, ponds	-1	-1
Pacific oyster	marine waters, lagoons	NK	NK

Add row
Delete row

45. Briefly summarize any available information related to the invasive alien species listed in Table 19, including a description of the effects of the invasive alien species on the different components of biodiversity for food and agriculture and/or on the effects on ecosystem services, and references to the supporting documentation.

The socio-economic effects of varroa infestation of Swedish honey bee production have been reported by the Board of Agriculture (Report 2009:24 concerning Colony Collapse Disorder; http://www2.jordbruksverket.se/webdav/files/SJV/trycksaker/Pdf_rapporter/ra09_24.pdf).

Alien species are without doubt an important and integrated part of Swedish aquatic environment and fisheries management owing to historical decisions. However, alien species can also be a cause of concern and in worst cases create serious problems. Certain species simply thrive too well in their new environment and can proliferate enormously and thereby affect indigenous biodiversity or cause socio-economic problems. The introduction of the signal crayfish is an obvious example causing the decline of the Noble crayfish. In general the problem with alien species is greatest in tropical and warm temperate areas. Sweden with its northern location is relatively free from invasive alien species and diseases. As the temperature rises, the risk increases significantly. Many species that are considered problematic in Central Europe are currently only present in small and harmless numbers in Sweden. However, as the climate becomes more favourable the risk of spreading increases and from being an exciting, rather exotic species it can cause real problems. Furthermore, there is a risk that species that have yet to become established at these latitudes are given the opportunity to proliferate.

46. Has biodiversity for food and agriculture contributed to managing the spread and proliferation or controlling established invasive alien species in your country? If yes, provide information on the invasive alien species involved, the components of biodiversity for food and agriculture and any indication on how the components of biodiversity contributed to managing the spread and proliferation or controlling established invasive alien species in your country. Provide references to the supporting documentation.

NOT KNOWN

Similarities, differences and interactions

47. Comment on those aspects with respect to the state, trends and conservation of associated biodiversity or wild food biodiversity in relation to the state, trends and conservation of sector genetic resources. It would be helpful to provide your observations under the following headings:

- a. main similarities between associated biodiversity, wild food diversity and the different sectors;
- b. major differences between associated biodiversity, wild food diversity and the different sectors;
- c. synergies or trade-offs between associated biodiversity, wild food diversity and the different sectors.

The responses should include relevant information on socio-economic, political and cultural dimensions as well as biological ones. Information on the significance of common characteristics, differences, synergies and trade-offs with respect to achieving food security and nutrition, sustainable production or the provision of ecosystem services should also be provided.

a. main similarities between associated biodiversity, wild food diversity and the different sectors;
Some wild food plant species belong to well-known crop genera (Allium, Bromus). Otherwise, no main similarities with respect to the state, trends and conservation.

b. major differences between associated biodiversity, wild food diversity and the different sectors;
- most genera of associated plant diversity or wild food plant diversity do not overlap with genera of cultivated crops
- farmers can receive economic support from the Rural Development Programme for a range of diversity measures, including (1) establishing "diversity fallows" during a maximum of 5 years (free establishment and growth of associated plant biodiversity,

i.e. wild plant species) and (2) maintaining red-listed weed species in extensively managed crops. This is not the case for wild food plants.

- while wild food plants is in focus for medium to long-term conservation ex situ at the Nordic Genetic Resource Centre, associated plant biodiversity is normally not (source: <http://www.nordgen.org/index.php/skand/content/view/full/344>)
- no active in situ conservation implemented for associated or wild food plant diversity as compared to certain crop wild relatives
- c. synergies or trade-offs between associated biodiversity, wild food diversity and the different sectors;
- not previously used wild species (e.g. *Lepidium campestre*, *Barbarea vulgaris*) are being researched and domesticated for oil production and prevention of nutrient losses.

Gaps and priorities

48. With respect to the state, trends and conservation of associated biodiversity and ecosystem services:

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

a. Lack of knowledge regarding effects of associated plant biodiversity on major ecosystem services, primarily water purification and waste treatment, nutrient cycling, soil formation and protection, water cycling and production of oxygen/gas regulation

b. Very high competition for research funding (i.e. overall insufficient funding). Fisheries - genetic monitoring, harvesting strategies, effects of climate change, large changes and shifts in aquatic ecosystems. Complex ecological relationships in marine waters. Effects of eutrophication.

c. Relatively low priority of research for sustainable agricultural development incl. agro-ecosystem services

d. An integrated systems approach to sustainable agriculture, incl. gas, water and nutrient management and cycling, soil fertility and integrated pest management

49. With respect to the state, trends and conservation of wild resources used for food:

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

a. Lack of knowledge regarding possible effects of (underutilised) wild food plant biodiversity on their contribution to food security or any other tentative role for sustainable agriculture

b. Very high competition for research funding (i.e. overall insufficient funding)

c. Relatively low priority of research for sustainable agricultural development incl. agro-ecosystem services

d. A long-term approach to research and evaluate the role of (underutilised) wild food plant biodiversity and their contribution to food security or any other tentative role for sustainable agriculture

50. With respect to the impact and response to natural or human-made disasters and biodiversity for food and agriculture:

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

a. Lack of knowledge regarding the role and opportunities for associated or wild food plant biodiversity to help mitigate the anticipated effects of climate change

b. Very high competition for research funding (i.e. overall insufficient funding)

c. Relatively high level of political awareness of on-going climate change, but both low understanding and acknowledgement of the global inter-dependence of plant genetic diversity and sustainable agriculture as a means to mitigate climate change. Taken together, this leads to low priority of research for sustainable agricultural development incl. agro-ecosystem services.

d. Acknowledgement of the fact that sustainable agriculture has a role to play in mitigating climate change; a long-term approach to research and evaluate the role of plant diversity and its contribution to food security or any other tentative role for

51. **With respect to the impact of invasive alien species on 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?**

- a. Identification of tentative invasive species of greatest priority given the on-going climate change
- b. The need for continuous monitoring as well as regular up-dating of known information resources by responsible authorities (e.g. www.nobanis.org and similar information platforms)
- c. Not identified
- d. (1) A review of current policy guidelines, (2) a verification that their implementation is in place and operative and (3) a continuous update of those invasive organisms/taxa that are expected to inflict the most severe effects on plant biodiversity - or associated biodiversity - for food and agriculture.

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.

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.

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.

52. For each of the production systems present in your country 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.

In the 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 20. Management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture.

Production systems	Management practices (Place pointer on the management practice name for a description)	Percent of production area or quantity under the practice (%)	Change in production area or quantity under the practice (2,1,0,-1,-2, NK, NA)	Effect on biodiversity for food and agriculture (2,1,0,-1,-2, NK, NA)
Livestock grassland-based systems: Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)			
	Integrated Pest Management (IPM)			
	Pollination management			
	Landscape management			
	Sustainable soil management practices			
	Conservation agriculture			
	Water management practices, water harvesting			
	Agroforestry			
	Organic agriculture	17	1	1
	Low external input agriculture			
	Home gardens			
	Areas designated by virtue of production features and approaches			
	Ecosystem approach to capture fisheries			
	Conservation hatcheries			
	Reduced-impact logging			
Other [<i>please specify</i>]:				
Livestock landless systems: Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)			
	Integrated Pest Management (IPM)			
	Pollination management			
	Landscape management			
	Sustainable soil management practices			
	Conservation agriculture			
	Water management practices, water harvesting			
	Agroforestry			
	Organic agriculture			

	Low external input agriculture			
	Home gardens			
	Areas designated by virtue of production features and approaches			
	Ecosystem approach to capture fisheries			
	Conservation hatcheries			
	Reduced-impact logging			
	Other [<i>please specify</i>]:			
Naturally regenerated forests: Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)			
	Integrated Pest Management (IPM)			
	Pollination management			
	Landscape management			
	Sustainable soil management practices			
	Conservation agriculture			
	Water management practices, water harvesting			
	Agroforestry			
	Organic agriculture			
	Low external input agriculture			
	Home gardens			
	Areas designated by virtue of production features and approaches			
	Ecosystem approach to capture fisheries			
	Conservation hatcheries			
	Reduced-impact logging			
Other [<i>please specify</i>]:				
Planted forests: Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)			
	Integrated Pest Management (IPM)			
	Pollination management			
	Landscape management			
	Sustainable soil management practices			
	Conservation agriculture			
	Water management practices, water harvesting			
	Agroforestry			
	Organic agriculture			
	Low external input agriculture			

	Home gardens			
	Areas designated by virtue of production features and approaches			
	Ecosystem approach to capture fisheries			
	Conservation hatcheries			
	Reduced-impact logging			
	Other [<i>please specify</i>]:			
Self-recruiting capture fisheries: Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)			
	Integrated Pest Management (IPM)			
	Pollination management			
	Landscape management			
	Sustainable soil management practices			
	Conservation agriculture			
	Water management practices, water harvesting			
	Agroforestry			
	Organic agriculture			
	Low external input agriculture			
	Home gardens			
	Areas designated by virtue of production features and approaches			
	Ecosystem approach to capture fisheries			
	Conservation hatcheries			
	Reduced-impact logging			
Other [<i>please specify</i>]:				
Culture-based fisheries: Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)			
	Integrated Pest Management (IPM)			
	Pollination management			
	Landscape management			
	Sustainable soil management practices			
	Conservation agriculture			
	Water management practices, water harvesting			
	Agroforestry			
	Organic agriculture			
	Low external input agriculture			
	Home gardens			

	Areas designated by virtue of production features and approaches			
	Ecosystem approach to capture fisheries			
	Conservation hatcheries			
	Reduced-impact logging			
	Other [<i>please specify</i>]:			
Fed aquaculture: Boreal and / or highlands	Integrated Plant Nutrient Management (IPNM)			
	Integrated Pest Management (IPM)			
	Pollination management			
	Landscape management			
	Sustainable soil management practices			
	Conservation agriculture			
	Water management practices, water harvesting			
	Agroforestry			
	Organic agriculture			
	Low external input agriculture			
	Home gardens			
	Areas designated by virtue of production features and approaches			
	Ecosystem approach to capture fisheries			
	Conservation hatcheries			
	Reduced-impact logging			
Other [<i>please specify</i>]:				
Non-fed aquaculture: Boreal and / or highlands	Integrated Plant Nutrient Management (IPNM)			
	Integrated Pest Management (IPM)			
	Pollination management			
	Landscape management			
	Sustainable soil management practices			
	Conservation agriculture			
	Water management practices, water harvesting			
	Agroforestry			
	Organic agriculture			
	Low external input agriculture			
	Home gardens			
	Areas designated by virtue of production features and approaches			

	Ecosystem approach to capture fisheries			
	Conservation hatcheries			
	Reduced-impact logging			
	Other <i>[please specify]</i> :			
Irrigated crops (other) : Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)	??	2	NK
	Integrated Pest Management (IPM)	100%	1	NK
	Pollination management	0	0	NK
	Landscape management	NA	0	NA
	Sustainable soil management practices	NA	0	NA
	Conservation agriculture	NA	0	NA
	Water management practices, water harvesting	NA	0	NA
	Agroforestry	NA	0	NA
	Organic agriculture	810 HECTARES	-1	NK
	Low external input agriculture	NA	0	NA
	Home gardens	NA	0	NA
	Areas designated by virtue of production features and approaches	NA	0	NA
	Ecosystem approach to capture fisheries	NA	0	NA
	Conservation hatcheries	NA	0	NA
	Reduced-impact logging	NA	0	NA
	Other <i>[please specify]</i> :			
Rainfed crops : Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)	??	2	NK
	Integrated Pest Management (IPM)	100%	1	NK
	Pollination management	12500HA	1	NK
	Landscape management	??	1	NK
	Sustainable soil management practices	NK	0	NK
	Conservation agriculture	NA	0	NA
	Water management practices, water harvesting	NA	0	NA
	Agroforestry	NA	0	NA
	Organic agriculture	16,5%	2	1
	Low external input agriculture	NA	0	NA
	Home gardens	NA	0	NA
	Areas designated by virtue of production features and approaches	NK	0	NK
	Ecosystem approach to capture fisheries	NA	0	NA

	Conservation hatcheries	NA	0	NA
	Reduced-impact logging	NA	0	NA
	Other <i>[please specify]</i> :			
Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)	??	2	NK
	Integrated Pest Management (IPM)	100%	1	NK
	Pollination management	NK	1	NK
	Landscape management	??	1	NK
	Sustainable soil management practices	NK	0	NK
	Conservation agriculture	NA	0	NA
	Water management practices, water harvesting	NA	0	NA
	Agroforestry	NA	0	NA
	Organic agriculture	??	1	NK
	Low external input agriculture	NA	0	NA
	Home gardens	NA	0	NA
	Areas designated by virtue of production features and approaches	NK	0	NK
	Ecosystem approach to capture fisheries	NA	0	NA
	Conservation hatcheries	80 % salmon	0	0
	Reduced-impact logging	NA	0	NA
	Other <i>[please specify]</i> :			
	Horticulture: Boreal and /or highlands	Integrated Plant Nutrient Management (IPNM)	NK	1
Integrated Pest Management (IPM)		100%	1	NK
Pollination management		100%	1	NK
Landscape management		NK	1	NK
Sustainable soil management practices		NK	0	NK
Conservation agriculture		NK	0	NK
Water management practices, water harvesting		NK	0	NK
Agroforestry		NA	0	NA
Organic agriculture		960HECTARES	2	NK
Low external input agriculture		NA	0	NA
Home gardens		NA	0	NA
Areas designated by virtue of production features and approaches		NA	0	NA
Ecosystem approach to capture fisheries		NA	0	NA
Conservation hatcheries		NA	0	NA

	Reduced-impact logging	NA	0	NA
	Other [<i>please specify</i>]:			

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 indicate in Table 21 the extent of use of diversity based practices that involve the use of biodiversity for food and agriculture.

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 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 21. Diversity based practices that involve the enhanced use of biodiversity for food and agriculture.

Production systems	Diversity based practices (Place pointer on the diversity based practice name for a description)	Percent of production area or quantity under the practice (%)	Change in production area or quantity under the practice (2,1,0,-1,-2, NK, NA)	Effect on biodiversity for food and agriculture (2,1,0,-1,-2, NK, NA)
Livestock grassland-based systems: Boreal and /or highlands	Diversification			
	Base broadening			
	Domestication	NA	NA	NA
	Maintenance or conservation of landscape complexity			
	Restoration practices			
	Management of microorganisms			
	Polyculture/Aquaponics			
	Swidden and shifting cultivation agriculture	NA	NA	NA
	Enriched forests			
	Other [<i>please specify</i>]:			
Livestock landless systems: Boreal and /or highlands	Diversification			
	Base broadening			
	Domestication			
	Maintenance or conservation of landscape complexity			

	Restoration practices			
	Management of microorganisms			
	Polyculture/Aquaponics			
	Swidden and shifting cultivation agriculture			
	Enriched forests			
	Other [<i>please specify</i>]:			
Naturally regenerated forests: Boreal and /or highlands	Diversification			
	Base broadening			
	Domestication			
	Maintenance or conservation of landscape complexity			
	Restoration practices			
	Management of microorganisms			
	Polyculture/Aquaponics			
	Swidden and shifting cultivation agriculture			
	Enriched forests			
	Other [<i>please specify</i>]:			
Planted forests: Boreal and /or highlands	Diversification			
	Base broadening			
	Domestication			
	Maintenance or conservation of landscape complexity			
	Restoration practices			
	Management of microorganisms			
	Polyculture/Aquaponics			
	Swidden and shifting cultivation agriculture			
	Enriched forests			
	Other [<i>please specify</i>]:			
Self-recruiting capture fisheries: Boreal and /or highlands	Diversification			
	Base broadening			
	Domestication			
	Maintenance or conservation of landscape complexity			
	Restoration practices	NK	+2	+1
	Management of microorganisms			

	Polyculture/Aquaponics			
	Swidden and shifting cultivation agriculture			
	Enriched forests			
	Other [<i>please specify</i>]:			
Culture-based fisheries: Boreal and /or highlands	Diversification			
	Base broadening	80% salmon	0	0
	Domestication			
	Maintenance or conservation of landscape complexity			
	Restoration practices			
	Management of microorganisms			
	Polyculture/Aquaponics			
	Swidden and shifting cultivation agriculture			
	Enriched forests			
	Other [<i>please specify</i>]:			
Fed aquaculture: Boreal and /or highlands	Diversification			
	Base broadening			
	Domestication			
	Maintenance or conservation of landscape complexity			
	Restoration practices			
	Management of microorganisms			
	Polyculture/Aquaponics			
	Swidden and shifting cultivation agriculture			
	Enriched forests			
	Other [<i>please specify</i>]:			
Non-fed aquaculture: Boreal and /or highlands	Diversification			
	Base broadening			
	Domestication			
	Maintenance or conservation of landscape complexity			
	Restoration practices			
	Management of microorganisms			
	Polyculture/Aquaponics			
	Swidden and shifting cultivation agriculture			
	Enriched forests			

	Other <i>[please specify]</i> :			
Irrigated crops (other) : Boreal and /or highlands	Diversification	NK	0	NA
	Base broadening	50 000 HA	1	NK
	Domestication	NA	0	NA
	Maintenance or conservation of landscape complexity	NK	0	NK
	Restoration practices	NA	0	NA
	Management of microorganisms	NA	0	NA
	Polyculture/Aquaponics	NA	0	NA
	Swidden and shifting cultivation agriculture	NA	0	NA
	Enriched forests	NA	0	NA
	Other <i>[please specify]</i> :			
Rainfed crops : Boreal and /or highlands	Diversification	NA	0	NA
	Base broadening	2.6 MILLION HA	1	NK
	Domestication	NA	0	NA
	Maintenance or conservation of landscape complexity	NK	1	NK
	Restoration practices	NA	0	NA
	Management of microorganisms	NA	0	NA
	Polyculture/Aquaponics	NA	0	NA
	Swidden and shifting cultivation agriculture	NA	0	NA
	Enriched forests	NA	0	NA
	Other <i>[please specify]</i> :			
Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands	Diversification	NA	0	NA
	Base broadening	80 % salmon	0	0
	Domestication	NA	0	NA
	Maintenance or conservation of landscape complexity	NK	1	NK
	Restoration practices	NA	0	NA
	Management of microorganisms	NA	0	NA
	Polyculture/Aquaponics	NA	0	NA
	Swidden and shifting cultivation agriculture	NA	0	NA
	Enriched forests	NA	0	NA
	Other <i>[please specify]</i> :			
Horticulture: Boreal and /or highlands	Diversification	100 HECTARES	-1	NK

	Base broadening	12600 HA	0	NK
	Domestication	NA	0	NA
	Maintenance or conservation of landscape complexity	NA	0	NA
	Restoration practices	NA	0	NA
	Management of microorganisms	NA	0	NA
	Polyculture/Aquaponics	NA	0	NA
	Swidden and shifting cultivation agriculture	NA	0	NA
	Enriched forests	NA	0	NA
	Other [<i>please specify</i>]:			

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 fisherfolk involved, state and outcome with respect to components of biodiversity for food and agriculture.**

Approx. 2 million individuals of salmon and 0,5 million trout are released owing to hydropower reasons for compensation of habitat losses and migration routes. Recommendations for river-specific stocks and associated programs for protection of genetic diversity - number of spawners, sampling over seasons etc.

- Introduction and breeding of new fruit and berry species (Chaenomeles, Aronia, Hippophaë, Amelanchier, ...)
- Domestication and breeding of field cress (*Lepidium campestre* L.)
- Joint Nordic Public-Private Partnership on Pre-breeding (barley, ryegrass, apple)

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 22. 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	Y	Aerial desposit of N, leakage of P into coastal waters	
Over-use of chemical control mechanisms (e.g. disease control agents, pesticides, herbicides, veterinary drugs, etc.)	Y	C. 85 % of biocides used are herbicides, but pesticides (e.g. neonicotinoids) cause problems. However, leakage to ground water is reduced by 90 % since 1990.	
Inappropriate water management	N		

Practices leading to soil and water degradation	Y	Industrial' agriculture, heavy machines causing soil compaction, absence of low-tillage in some areas	
Over-grazing	Y		
Uncontrolled forest clearing	Y	Insufficient monitoring routines	
Fishing in protected areas	N		
Overharvesting	Y	Marine fish: dispatch of small-size fish and high trawling efficiency	
Other [please specify]: Physical impacts on habitats and habitat losses		Dams, dehydration, regulation, channelling	
Other [please specify]: Abandonement of farmland	Y	Particularly in Northern Sweden	
Other [please specify]: Lack of grazing animals	Y	Particularly semi-natural grasslands in south and central parts of Sweden	
Other [please specify]: Loss of landscape elements (i.e. heterogeneity)	Y	Loss of small (micro) but essential habitats in many parts of the country has led to ecosystem impoverishment	

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

Low profitability of agriculture in sparsely populated rural areas, need for economic return on (costly) investments within 'industrialized' agriculture.

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

MSFD (Marine Strategy Framework Directive), WFD (Water Framework Directive), CFP (Common Fisheries Policy), Habitats directive and LIFE-fund.
- Economic support to farmers through the EU Rural Development Programme
- National policies on environmental quality goals
- Implementation of common European policies on fishery and biodiversity

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.

Table 23. 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	Extent of problem (2,1)	Effect on food security and nutrition	Effect on livelihood	Reference
NA					

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

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;
- b) food security and nutrition;
- c) rural livelihoods;
- d) ecosystem services;
- e) sustainability;
- f) resilience;
- g) sustainable intensification.

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.

a d e g: Principles of IPM in both agriculture and horticulture (incl. glasshouse production) - National approach - All crop growers
a d e f g: The undertaking 'Focus on Nutrients' (http://www.greppa.nu/om-greppa/om-projektet/in-english.html#.U8jPxvI_uA0) - National approach - Farmers
d e f: A range of measures through the EU Rural Development Programme to safeguard, and improve, landscape heterogeneity (restoration and/or establishment of field edges/stone walls/groves/small waters/open ditches/'beetle banks', management of semi-natural grasslands, sowing of pollen and nectar sources, etc.) - National approach - Farmers
Restoration practices for secure populations size and genetic diversity in streamfish stocks. Knowledge about genetic diversity Mapping and monitoring of genetic diversity are to be initiated by 2015 is a milestone target within the Environmental objectives system.

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).

Provide explanations and additional information as regards the gender differences in the patterns of use, management and consumption of wild food, including data disaggregated by sex.

Collecting of wild berries and mushrooms is very popular in Sweden but not essential from a food security perspective. Wild lingonberry and blueberry (bilberry) are harvested commercially (10 - 20 000 tonnes/yr). Use of other wild plants is negligible and mainly for traditional reasons. No gender differences, but persons aged 55-80 are most active.
About 1 million resident people in an age between 18 and 75 years perform recreational fishing every year. Nearly 60 % specify consumption of self-captured fish as the main reason, total landings of self-captured fish from recreational fishing are estimated to about 15000 tons.

The adoption of ecosystem approaches

60. Describe in Table 24 the extent to which you consider that ecosystem approaches 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 (0), not applicable (NA). You may also want to describe landscape approaches that have been adopted in your country.

Table 24. Adoption of and importance assigned to ecosystem approaches in production systems in the Country.

Production system	Ecosystem approach adopted (name)	Importance assigned to the ecosystem approach (2,1,0,NA)	Importance assigned to the ecosystem approach (2,1,0,NA)
Wild recruit fisheries	Ecosystem approaches such as physical effects, by-catches, socio-economic effects in all fisheries regulation	1	1
All	National environmental objectives that relate to biodiversity for food and agriculture (Reduced Climate Impact, A Non-Toxic Environment, Zero Eutrophication, Flourishing Lakes and Streams, A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos, Thriving Wetlands, Sustainable Forests, A Varied Agricultural Landscape, A Magnificent Mountain Landscape, A Rich Diversity of Plant and Animal Life)	2	2
<input type="button" value="Add row"/>			
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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

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?
- 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?

a. Knowledge gaps in genetical structure and spatial distribution and occurrence of meta-stocks in fisheries management. Limited fisheries sector, small enterprises. Pilot studies on ecosystembased fisheries started in controllable limited systems such as inland lakes.

Reference is given to the Fifth National Report to the Convention on Biological Diversity (Sweden)

63. **With respect to the sustainable use of biodiversity for food and agriculture:**
- What are the major gaps in information and knowledge?**
 - What are the main capacity or resources limitations?**
 - What are the main policy and institutional constraints?**
 - What actions are required and what would be the priorities?**

See above.

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

Special conservation programs running for threatened species (noble crayfish, asp). Management plans for salmon, trout and eel.

Reference is given to the Fifth National Report to the Convention on Biological Diversity (Sweden)

65. **With respect to the adoption of ecosystem approaches:**
- What are the major gaps in information and knowledge?**
 - What are the main capacity or resources limitations?**
 - What are the main policy and institutional constraints?**
 - What actions are required and what would be the priorities?**

Aquatic systems are complex systems with food-web interactions, trophic quascads, spatial dimensions and effects and impact factors not fully known.

Reference is given to the Fifth National Report to the Convention on Biological Diversity (Sweden)

CHAPTER 5: The state of interventions on conservation and use of biodiversity for food and agriculture

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, programmes 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;**
- b. **Support the conservation and sustainable use of associated biodiversity;**
- c. **Address food security and nutrition with explicit reference to biodiversity for food and agriculture, associated biodiversity and/or wild foods;**
- d. **Address the maintenance of ecosystem services with explicit reference to biodiversity for food and, associated biodiversity and/or wild foods;**
- e. **Improve resilience and sustainability of production systems with explicit reference to biodiversity for food and agriculture, associated biodiversity and/or wild foods;**
- 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.**

Within the environmental objective 'A Varied Agricultural Landscape': The Programme for Diversity of Cultivated Plants (that also, in part, addresses the issue of crop wild relatives), serving as the national programme for plant genetic resources. A national programme for animal genetic resources has also been developed but never launched due to resource limitations. Also, refer to the system of Environmental objectives

67. **List up to 10 major policies, programmes and enabling frameworks in your country that enhance the application of an ecosystem approach or a landscape approach 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.**

The Programme for Diversity of Cultivated Plants:

- (a) a nationwide programme established 2000 and still running, involving government agencies, universities, botanic gardens, growers' and farmers' associations, NGOs, the Nordic Genetic Resources Centre, the commercial breeding sector, etc.
 - (b) Irrigated crops (other) : Boreal and /or highlands; Rainfed crops (other) : Boreal and /or highlands; Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands; Horticulture: Boreal and /or highlands;
 - (c) traditionally modern and adapted crops and varieties: there is renewed interest in niche production that includes redundant (heritage) varieties and land races
 - (d) different parties have different entry points, collaboration is not an automatic process, coordination is necessary
 - (e) higher number of conserved plant accessions at gene bank; increased interest in diversification of cropping systems;
 - (f) as gender is not an issue with respect to plant genetic resources, it has never been explicitly addressed
- Also, Refer to the system of Environmental objectives

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.

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.**

Adaptive management of fisheries applied within the fisheries regulation when short response needed.

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.).

The Swedish NAP for agriculture (<http://www.climateadaptation.eu/sweden/agriculture-and-horticulture/>) does not mention the role that PGRFA can play.

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)?

Environmental acts, fisheries acts, marine spatial planning, Planning and building acts, sectors policies for central authorities.

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 25. 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

Add row

Delete row

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.

Table 26. 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)

Add row

Delete row

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.

Naptek - A national programme on local and traditional knowledge concerning the conservation and sustainable use of biological diversity.

Traditional knowledge and article 8(j): the Swedish approach

In December 2005 the Swedish government decided to launch a national programme on local and traditional knowledge concerning the conservation and sustainable use of biological diversity. This was a direct result of the ongoing discussions concerning art. 8(j) in the Convention on biological diversity (CBD). The national programme will in its first phase run for six years with the aim to safeguard relevant traditional knowledge, innovations and practices according to art. 8(j).

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.

The Swedish Species Information Centre works with biodiversity, serving as the focal point for information on threatened species and biodiversity in Sweden. Other databases on measures and fish stocks are in place and WISS (Water Information System Sweden) is a database that has been developed by the Competent Authorities of the Swedish Water Districts, the County Administrative Boards and the Swedish Agency for Marine and Water Management. WISS is managed today by the County Administrative Board of Kalmar.

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 27. National information systems on associated biodiversity in the Country.

National information system (List)	Components of associated biodiversity addressed (List)	Concise description of information systems
Sightings of species	<p>Sightings of species</p> <p>The Species Gateway Opens is the principle reporting system used to find information about where and when sightings of specific species were made and is by far the largest system in Sweden.</p> <p>For environmental monitoring of protected molluscs the Clam Gateway exists.</p> <p>Information about Red-Listed species</p> <p>For red-listed species in Sweden it is possible to search for information about the characteristics, status, distribution, ecology, threats and actions. Information can be found in the species data sheets through the search engine Artfakta.</p>	
Swedish LifeWatch	All relevant organism groups	http://www.svenskalifewatch.se/en/

Add row

Delete row

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.

Naptek - A national programme on local and traditional knowledge concerning the conservation and sustainable use of biological diversity.

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.

Advisory group for recreational fisheries, Coastfishers organisation, Association for fishery owners, Swedish Fishermen Organisation, WWF, Swedish Society for Nature Conservation (SSNC)

Also see answer (a) in Q67. Partners are active from the point of view of their respective interests (breeding, research, cultivation, conservation, etc.).

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.

The Swedish Agency for Marine and Water Management, SwAM, is a government agency that supports actions by financial allocation to get flourishing seas, lakes and streams for the benefit and enjoyment of all.
Also see e.g. answers in Q47, Q56 and Q58.

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.

Vindel River LIFE - Restoration of tributaries of the Vindel river combined with monitoring and evaluation of ecological responses of species and habitats
Projektkod: LIFE08 NAT/S/000266
Total budget: 2,675,513.00 €
ReMiBar - Remediation of migratory barriers in Nordic/fennoscandian watercourses
Projektkod: LIFE10 NAT/S/000045
Total budget: 8,169,141.00 €
UC4LIFE - The thick shelled river mussel (Unio crassus) brings Life+ back to rivers
Projektkod: LIFE10 NAT/S/000046
Total budget: 4,927,119.00 €

also Reference is given to the Fifth National Report to the Convention on Biological Diversity (Sweden)

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

Landscape based initiatives	Description of sites and their characteristics of relevance to biodiversity for food and agriculture	Extent (area)
-----------------------------	--	---------------

Landscape based initiatives	Description of sites and their characteristics of relevance to biodiversity for food and agriculture	Extent (area)
Marin spatial planning		Coastal and marine waters
Green infrastructure		Territorial
	Reference is given to the Fifth National Report to the Convention on Biological Diversity (Sweden), chapter 2.3.2	

Add row
Delete row

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.

Advisory group for recreational fisheries, Coastfishers organisation, Association for fishery owners, Swedish Fishermen Organisation, WWF, Swedish Society for Nature Conservation (SSNC).
Some linkage between PGR and FGR sectors: mainly information exchange. No linkages between PGR and other GR sectors.

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

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 29. Regional and/or international initiatives targeting the conservation and sustainable use of associated biodiversity.

Initiatives	Scope (R: regional, I: international)	Description	References
HELCOM	I		
OSPAR	I		
BONN	I		
CITES	I		
BERN	I		
CBD	I		
RAMSAR	I		
CMS	I		

Initiatives	Scope (R: regional, I: international)	Description	References
European Cooperative Programme on Plant Genetic Resources (ECPGR)	R	Conservation, characterization, evaluation and documentation of PGRFA; policy development regarding in situ and on farm conservation	http://eurisco.ecpgr.org http://aegis.cgiar.org
PrepActGR	R	The aim of this preparatory action is to deliver inputs on how to improve communication, knowledge exchange and networking among all the actors potentially interested in activities related to the conservation of genetic resources in agriculture. Finally, the preparatory action aims to find ways towards a sustainable and economically viable use of these resources.	http://www.geneticresources.eu

Add row

Delete row

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?

NK

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

Institution	Programme	Level	Enrolment (total)	Enrolment (male)	Enrolment (female)
UNIVERSITIES					

Add row

Delete row

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.

1. Nordic Genetic Resource Centre; regional genebank for ex situ conservation of seeds of cultivated crops (primarily) and crop wild relatives; no research
2. Swedish University of Agricultural Sciences (Swedish Biodiversity Centre, Swedish Species Information Centre, Ecology, ...); ...
3. Uppsala University - several departments within the Section of Biology; ...
4. Lund University, Dept. of Biology; ...
5. University of Gothenburg, Biological & Environmental Sciences; ...
6. Stockholm University - several departments within the Section of Biology; ..

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

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?

(a) Many actors, little common knowledge (or perhaps even interest?) of each other, no coordination across genetic resources/ biodiversity domains

(b) Availability of funding

(c) A general understanding at the policy level of conservation and sustainable u

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?

(a)-(d) Similar responses as in Q89. A general problem is fragmentation, lack of coordination, many actors unaware of each other, possibly competition. A political naivety in believing that strong guidance and assigned responsibility is not necessary. Thi

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?

(a)-(d) Similar responses as in Q89. A general problem is fragmentation, lack of coordination, many actors unaware of each other, possibly competition. Competition in itself is not necessarily negative as it spurs people to think and work creatively, but

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 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

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 In particular Targets 6, 7, 13. as well as to how they link to other related processes undertaken through the Convention on Biological Diversity.

PGRFA: activities continue within the revised framework of the national Programme for Diversity of Cultivated Plants for the period 2016-2020. Programme partners likely to remain the same, or possibly expand. Activity areas include: conservation, use, research and development, education and information, policy development, governance, and international collaboration. Activities are also foreseen within the new Rural Development Programme, possibly within the context of crop diversification and niche production. It is expected that a clearer division of responsibilities should be done, not least with respect to (in situ) conservation of crop wild relatives and wild food plants. One major research objective will be to establish multi-year research programmes/projects on 'cultivated diversity' and 'multi-functional and diversified cropping systems'.

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.

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.**

Environmental objectives, Marine spatial planning, WFD, MSFD, CFP (Bioprop., Miljömålsberedningens betänkande, flera regeringsuppdrag, several governmental initiatives).
 PGRFA: As mentioned in Q92, one major objective of the revised national programme is to clarify the roles for in situ conservation of crop wild relatives. This should lead to the development of monitoring programmes of genetic resources conserved in situ, as well as possible the identification and establishment of genetic reserves. Such an approach implies the development and implementation of appropriate information systems by relevant partners.

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

SEE ABOVE

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.

SEE ABOVE

PGRFA: the platform for interaction is in place since many years - the challenge is to make stakeholders reflect upon 'what's in it for me' and realize that they have much to learn and profit from unconditioned (read: non-dogmatic) collaboration

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.

Naptek - A national programme on local and traditional knowledge concerning the conservation and sustainable use of biological diversity. Sweden is one of the few EU countries to have indigenous people, the Saami. In addition to the Saami, Sweden also has many tradition holders represented in small-scale use of the biological resources. Reindeer husbandry, small-scale farming, forestry, hunting, and artisanal fishery all depend on traditional knowledge. Artisanal fishermen are still dependent on knowledge of the seasonal behaviour of the fish, weather conditions and wind directions to make their catches. Fish, both fresh and smoked, is sold directly by the fishermen locally to tourists and summer guests. Farm dairies produce traditional cheese made from cows and goats that graze in forest that have been grazed for centuries. Traditional knowledge and local traditional products still play an important role in rural development even in a highly industrialized country like Sweden.

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.

Not applicable for Sweden.

Submit by email

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*:

- 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;
- 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;
- 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;
- 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"> Ranching: grassland-based systems in which livestock is kept on privately owned rangeland 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)
	Subtropics	
	Temperate	
	Boreal and /or highlands ¹	
Livestock landless systems	Tropics	Systems in which livestock production is separated from the land where the feed given to the animals is produced.

¹ High elevation montane environments where climate differs significantly from surrounding lower elevation areas, including alpine and sub-alpine zones, tropical highlands, dryland mountains, etc.

	Subtropics	
	Temperate	
	Boreal and /or highlands	
Naturally regenerated forests	Tropics	Includes: <ul style="list-style-type: none"> 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 modified natural: Forests of naturally regenerated native species where there are clearly visible indications of significant human activities semi-natural (assisted natural regeneration): Silvicultural practices in natural forest by intensive management (weeding, fertilizing, thinning, selective logging)
	Subtropics	
	Temperate	
	Boreal	
	Boreal and /or highlands	
Planted forests	Tropics	Includes : <ul style="list-style-type: none"> semi-natural (planted component) : Forests of native species, established through planting or seeding, intensively managed Plantations (productive) : Forests of introduced and/or native species established through planting or seeding mainly for production of wood or non-wood goods Plantations (protective) : Forests of introduced and/or native species, established through planting or seeding mainly for provision of services
	Subtropics	
	Temperate	
	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"> Natural ecosystems Modified ecosystems e.g. reservoirs and rice paddies;
	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 water.
	Subtropics	
	Temperate	
	Boreal and /or highlands	
Mixed production systems (livestock, crop, forest and /or aquatic and fisheries mixed)	Tropics	Production systems with multiple components. They include: <ul style="list-style-type: none"> • Crop-livestock: mixed systems in which livestock production is integrated with crop production. • 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 • Agroforestry-livestock: mixed system in which livestock production is integrated with the production of trees and shrubs²⁶ • 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. • Other combinations
	Subtropics	
	Temperate	
	Boreal and /or highlands	

ANNEX 3: Drivers of change

Table 1. Drivers of change and descriptions.

Drivers	Description, Subcategories and Examples
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 ₂ 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	<p>Trade- Changing terms of trade, globalization of markets, commercialization of products, retailing, the separate capacities of women and men to commercialize products, etc.</p> <p>Markets and consumption - 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</p> <p>Private sector - The changing role and influence of private sector and corporate interests</p>
Policies	<p>Policies - Global, regional, national, and subnational legislation and regulations (e.g., conservation regulations, participation and compliance with International treaties and conventions);</p> <p>Economic and policy interventions - Interventions that impact biodiversity for food and agriculture directly or indirectly (e.g., taxes, subsidies, charges for resource use, payments for ecosystem services)</p> <p>Intellectual Property Rights (IPR), Access and Benefit Sharing (ABS) - Direct or indirect impacts of IPR and ABS policy and regulations on biodiversity for food and agriculture.</p>
Population growth and urbanization	<p>Population - Changes in population metrics (e.g., growth, fertility, composition, mortality, migration, health and disease, including different effects on men and women.)</p> <p>Urbanization- (e.g., shifts in proportion of urban and rural; change in urbanization trends, including different effects on men and women)</p>
Changing economic, socio-political, and cultural factors	<p>Economic development - 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.)</p> <p>Changing socio-political, cultural or religious factors - 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.</p> <p>Participatory actions – the role of collective action toward conservation and use of biodiversity by stakeholders</p>
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 Report².

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 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 ₂ /O ₂ balance, maintaining ozone-layer (O ₃), and regulation of SOx 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.

Management practices supporting the use and conservation of biodiversity for food and agriculture	Description/ examples of management practices
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

² Including those described in the Millennium Ecosystem Assessment, or subsequent adaptations by the TEEB or other sources.

	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 ₂ 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.