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Country Report Germany

The State of the World's Biodiversity for Food and Agriculture

28.10.2015

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

TABLE OF CONTENT

List of abbreviations and acronyms

AbL	German Small Farmers' Association
ADT	German Animal Breeders Federation
AECM	Agri-environment-climate measures
AEM	Agri-environment measures
AGRDEU	Database for aquatic genetic resources
AnGR	Animal genetic resources
AqGR	Aquatic genetic resources
ATB	Leibniz Institute for Agricultural Engineering Potsdam-Bornim
BArtSchV	Federal Species Protection Ordinance
Basis-DLM	Basis Digital Landscape Model
BBSR	Federal Institute for Research on Building, Urban Affairs and Spatial Development
BDP	Federal Association of German Plant Breeders
BDRG	German Association of Poultry Breeders
BEKO	Advisory and Co-ordinating Committee for Agricultural and Horticultural Crops of the BMEL
BfN	Federal Agency for Nature Conservation
BGBl.	Federal Law Gazette
BLAG-FGR	Federal-Länder working group Forest Genetic Resources and Forest Seed Legislation
BLE	Federal Office for Agriculture and Food
BMBF	Federal Ministry of Education and Research
BMEL	Federal Ministry of Food and Agriculture, since 2014
BMELV	Federal Ministry of Food, Agriculture and Consumer Protection, until 2013
BMJ	Federal Ministry of Justice
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, until 2013
BMUB	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, since 2014
BMZ	Federal Ministry for Economic Cooperation and Development
BNatSchG	Federal Nature Conservation Act
BÖLN	Federal Organic Farming Scheme and other forms of sustainable agriculture
BÖLW	German Organic Food Industry Federation
BUND	Friends of the Earth Germany
BWaldG	Forest Preservation and Forestry Promotion Act
BZE	The National Forest Soil Inventory
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CGRFA	Commission on Genetic Resources for Food and Agriculture
CWR	Crop wild relatives

DAFV	German Recreational Fishing Association
DBV	German Farmers' Association
DFA	German Research Centre for Food Chemistry
DFV	German Fishing Association
DGfZ	German Society for Animal Production
DIB	German Beekeepers Association
DIL	German Institute of Food Technologies
DJV	German Hunting Association
DLV	German Agricultural Publishing House
DSMZ	German Collection of Micro-organisms and Cell Cultures
DVL	German Association for Landcare
EAFRD	European Agricultural Fund for Rural Development
ECPGR	European Cooperative Programme for Plant Genetic Resources
EFA	Ecological Focal Areas
EFI	European Forest Institute
e.g.	For example
EEZ	Exclusive economic zone
ELF	Food, Agriculture and Forest
EPGRIS	European Plant Genetic Resources Information Infrastructure
EU	European Union
EURISCO	European Search Catalogue for plant genetic resources
EVA	National Evaluation Programme for Plant Genetic Resources
FAO	Food and Agriculture Organisation of the United Nations
FBN	Leibniz Institute for farm animal biology
FFH	Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora)
FGR	Forest genetic resource
FGRDEU	National Database for Forest Genetic Resources in Germany
FNR	Agency for Renewable Resources
GAK	Joint Task for the Improvement of Agricultural Structures and Coastal Protection
GBIF	Global Biodiversity Information Facility
GBIS	Genebank Information System of IPK Gatersleben
GCDT	Global Crop Diversity Trust
GEH	Society for the Conservation of Old and Endangered Livestock Breeds
GENRES	Information System on Genetic Resources
GFP	Common Fisheries Policy
GFU	Global Facilitation Unit for Underutilized Species

ha	hectares
HNV	high nature value
IACS	Integrated Administration and Control System
IAMO	Leibniz Institute of Agricultural Development in Transition Economies
IBV	Information and Coordination Centre for Biological Diversity of the Federal Office for Agriculture and Food
ICZ	Integrated Coastal Zone
ICZM	Integrated Coastal Zone Management
IGZ	Leibniz Institute of Vegetable and Ornamental Crops, Großbeeren
IKZM	Integrated development of coastal zones and islands
IMA	Inter-ministerial working group
IPCC	Intergovernmental Panel on Climate Change
IPEN	International Plant Exchange Network
IPK	Leibniz Institute of Plant Genetics and Crop Plant Research
IPGRI	International Plant Genetic Resources Institute, now Bioversity International
IPPC	International Plant Protection Convention
IRZ	Institute for Grapevine Breeding Geilweilerhof of the Federal Centre for Breeding Research on Cultivated Plants (BAZ) (since 1 January 2008 Institute for Grapevine Breeding Geilweilerhof of the Julius Kühn Institute)
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for Conservation of Nature and Natural Resources
JKI-ZO	Institute for Breeding Research on Fruit Crops of the Julius Kühn Institute (JKI)
KULAP	Programme for agricultural landscape
Länder	Federal states of the Federal Republic of Germany
LTZ	Agricultural Technology Centre Augustenberg
MAB	Man and the Biosphere Programme of UNESCO
MCPD	Multi-Crop Passport Descriptors
MGR	Genetic resources of microorganisms and invertebrates
MLS	Multilateral System of the ITPGRFA
MSRL	European Marine Strategy Framework Directive
MSY	Maximum Sustainable Yield
NABU	German Nature and Biodiversity Conservation Union
NAMA	Nationally Appropriate Mitigation Action
NAP	National Adaptation Plan

NAPA	National Adaptation Programmes of Action
NBS	National Biodiversity Strategy
NGO	Non-Governmental Organisation
NRW	North Rhine-Westphalia
OJ	Official Journal
PGR	Plant genetic resources
PGRDEU	German National Inventory of Plant Genetic Resources
PGRFA	Plant Genetic Resources for Food and Agriculture
SAVE	Safeguard for Agricultural Varieties in Europe
SDW	German Association for the Protection of Forests and Woodlands
SMTA	Standard Material Transfer Agreement of the ITPGRFA
SysTax	Botanical Garden Information System
TEEB	The Economics of Ecosystems and Biodiversity
TGRDEU	German National Inventory of Animal Genetic Resources
TI	Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries
UAA	Utilised Agricultural Area
UBA	Federal Environment Agency
UNCLOS	United Nations Conference on the Law of the Sea
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UPOV	International Union for the Protection of New Varieties of Plants
VAAM	Association for General and Applied Microbiology
VEN	German Association for the Conservation of Crop Diversity
VERN	Association for the Conservation and Recultivation of Crop Diversity in Brandenburg
WEL	Wild plants for food and agriculture
WHG	Federal Water Act
WIEWS	World Information and Early Warning System of FAO
WSSD	World Summit on Sustainable Development
WRRL	Water Framework Directive
ZADI	Former German Centre for Documentation and Information in Agriculture (today cf. IBV)
ZALF	Leibniz Centre for Agricultural Landscape Research
ZDRK	Central Association of German Rabbit Breeders
ZEFOD	Inventory of Biological Research Collections in Germany
ZVG	German Central Horticultural Association

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 it 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).[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.[2] 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.[3]

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

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

[2] CGRFA-11/07/Report

[3] CGRFA-14/13/Report, paragraph 14.

sectoral assessments. It also suggested that priority be given to key supplementary information not available in existing sources.[4]

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.[5]

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

[4] CGRFA-14/13/Report, paragraph 14.

[5] CGRFA-14/13/Report, paragraph 15.

products. A detailed description of the scope of the Country Report is provided in Annex 1. Production systems, as defined for the purposes of this report, include the livestock, crop, fisheries and aquaculture, and forest sectors (description provided in Annex 2).

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

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

Structure of the Country Report

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

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

Chapter 1: Introduction
Chapter 2: Drivers of change
Chapter 3: The state and trends of biodiversity for food and agriculture
Chapter 4: The state of use of biodiversity for food and agriculture
Chapter 5: The state of interventions in the conservation and use of biodiversity for food and agriculture
Chapter 6: Future agendas for conservation and sustainable use of biodiversity for food and agriculture

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

IV. TIMELINE AND PROCESS

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

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

- Each participating country should appoint a National Focal Point for the coordination of the preparation of the Country Report who will also act as focal point to FAO. National Focal Points should be communicated to Ms Linda Collette, Secretary, Commission on Genetic Resources for Food and Agriculture (cgrfa@fao.org), by November 30, 2013**.**
- Countries are encouraged to establish a national committee to oversee the preparation of the Country Report. Given the cross-sectoral nature of the Country Report, the national committee should consist of as many representative stakeholders as practical (representing government, research and civil society) including from different sectors (fisheries and aquaculture, forest, livestock and plants) and those able to support analysis of associated biodiversity. It is recommended that the national committee also include a gender specialist along with someone who can contribute to economic issues, with a natural resource management, environmental economics, or other relevant background. It is recommended that within the 13 months countries are given for the preparation of the Country Report, the national committee meets frequently to review progress and consults widely with key stakeholders.
- The national committee may find it useful to establish cross-sectoral and inter-departmental/inter-ministerial working groups to compile data and information for specific sections of the Country Report, or to write specific chapters of the Country Report.
- The National Focal Point should coordinate the preparation of the first draft of the Country Report, which should be reviewed by the national committee. The National Focal Point should facilitate a consultative process for broader stakeholder review, including stakeholders from various ministries, departments, NGOs, research institutions, and stakeholders with experiential knowledge, such as farmers, pastoralists, forest dwellers and fisher folk, etc.
- Following the stakeholder review, the National Focal Point should coordinate the finalization of the Country Report, submit it to the government for official endorsement and transmit it to FAO in one of the Organization's official languages (Arabic, Chinese, English, French, Russian and Spanish) by 31 December 2014. The Country Report will be an official government report.
- If countries are unable to submit final Country Reports by the set deadline, preliminary reports of findings should be provided to FAO to contribute to the identification of global priorities for inclusion in the SoWBFA Report.

The FAO contact for the preparation of Country Reports is:
Secretariat
Commission on Genetic Resources for Food and Agriculture
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00153 Rome, Italy
Fax: +39 0657055246
Email: SOW-BFA@fao.org

V. DETAILED METHODOLOGY AND GUIDANCE BY CHAPTER

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

Questions are organized and formulated in relation to the production systems that are present in your country. Thus it is very important to fill in Detailed descriptions for each production system listed in Annex 2.

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.

This report is Germany's contribution to the first FAO report on "The State of the World's Biodiversity for Food and Agriculture". This report is an important milestone in the multi-year work programme of work of the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA). The German report on "The State of the World's Biodiversity for Food and Agriculture" draws on existing sectoral reports on the state of the world's plant, animal and forestry genetic resources. A report on the state of the world's aquatic genetic resources is being prepared in parallel. The state-of-the-world reports are based on the national reports of the Member States.

"Biodiversity for food and agriculture", also known as agrobiodiversity, encompasses all cultivated and domesticated species together with their varieties, breeds and populations including the related wild species. They are also called genetic resources for food and agriculture. The other important component in agrobiodiversity is biodiversity which encompasses the living organisms in agroecosystems that provide ecological services, e.g. for pollination, soil fertility or plant protection. This part of biodiversity is called "associated biodiversity".

Whereas the work of CGRFA has mainly been focused up to now on genetic resources for agriculture and food, the main thrust of this state-of-the world report is associated biodiversity, ecosystem services and the wild species used.

The 97 questions in the report "The State of the World's Biodiversity for Food and Agriculture" are raised in the context of agricultural, forestry and fisheries use. They also touch on the impact of climate change, human-made disasters and gender equality. Most of the questions refer to the main drivers of change, conservation and development status and the situation regarding current and planned measures.

Certain topics in the report "The State of the World's Biodiversity for Food and Agriculture" play a subordinate or no role at all in Germany when it comes to the threat to and the development of agrobiodiversity, like, for instance, human-made disasters or the use of wild species for food security. In contrast, other topics like the real and potential effects of climate change, invasive alien species, research, consumer education or European and national policies have a major impact on the development of agrobiodiversity in Germany.

Based on the Guidelines seven relevant production systems were identified for Germany:

1) livestock grassland based systems, 2) livestock landless systems, 3) naturally regenerated forests, 4) self-recruiting capture fisheries, 5) fed aquaculture, 6) non-fed aquaculture and

7) rainfed crops. A temperate climate was assumed as the climate zone for Germany as a whole.

The importance and the value of biodiversity, including genetic resources for food and agriculture, have been increasingly recognised in recent decades. Hence, numerous activities were initiated to combat biodiversity loss in Germany and in conjunction with development cooperation on the international level, too.

Germany has developed an agrobiodiversity strategy for the conservation and sustainable use of biodiversity for food, agriculture, forestry and fisheries as well as national programmes for the individual sectors of genetic resources which are conducted and further developed with the participation of the stakeholders concerned. A programme for micro-organisms and invertebrates has been launched.

In addition, since the mid-1990s agri-environment-climate measures for the protection and sustainable use of agrobiodiversity, in particular associated biodiversity, have been promoted within the framework of the Federal Government/Länder Joint Task for the Improvement of Agricultural Structures and Coastal Protection and through the Länder's own support schemes.

Numerous other programmes, strategies and measures like the strategy for sustainable development, the protein crop strategy, the National action plan on sustainable use of plant protection products or the Fertiliser Application Ordinance support the measures for the conservation of agrobiodiversity in Germany. Furthermore, the National Policy Strategy on Bioeconomy also contributes to the conservation of biodiversity in agricultural, forestry and fisheries use.

Germany is very actively involved in the European cooperative programmes for plant genetic resources, animal genetic resources and forest genetic resources. The work of these programmes is extremely important in terms of the conservation and sustainable use of agrobiodiversity in the region of Europe and, beyond this, as a contribution in a global context to international collaboration within FAO.

As a contracting state to CBD and ITPGRFA, Germany supports multilateral approaches and also cooperates bilaterally with more than 50 countries on questions of biodiversity. Over the last 20 years the Federal Republic has markedly increased its funding for the conservation and sustainable use of biodiversity. In this context, it likewise promotes initiatives and programmes that contribute globally to the conservation of natural environment and to the sustainable use of agrobiodiversity.

The data situation with regard to the species inventory is generally good in Germany. In conjunction with the National Biodiversity Strategy initial indicators have been defined for the status of biodiversity. Target values have been set for habitats shaped by agriculture and forestry, too. However, there are no indicators to comprehensively measure and evaluate the conditions and trends of individual components of associated biodiversity on the national level. Hence, no statements can be made in Germany about the impact of changes to various components of associated biodiversity on different production systems. At the present time, there is no nationally agreed and coordinated process for the assessment of ecosystem services. Statements on possible changes or developments in regulating and supporting ecosystem services are, therefore, only possible to a limited degree or in a

general manner. Further steps for the development and implementation of the monitoring of agrobiodiversity and ecosystem services are needed in Germany.

Nevertheless, it is in fact agriculture that established the base of biodiversity we see today in open spaces in Germany as it created the habitats for the many species that are not forest dwellers. The high level of technological progress in cultivation, harvesting and further processing techniques lead to a steady intensification of crop husbandry and vegetable growing and thus to higher crop yields. However, intensified land use is also seen, to regionally varying degrees, as a major cause of the decline of species variety in agroecosystems in Germany.

There has been a steady growth in arable land farmed in line with ecological standards in Germany. Nonetheless, the population of many birds, which breed on fields, meadows and pastures, has continued to fall overall in recent years.

The EU's Common Agricultural Policy along with its reforms has a major impact on the development of arable land. Important reforms for the conservation of biodiversity were introduced with the decoupling of direct payments from production and tying to cross-compliance in 2003, the "health check" with the acceleration of Agenda 2000 measures in 2009, the introduction of greening with mandatory crop diversification, the conservation of permanent grassland and the introduction of ecological focus areas in 2015.

In recent years various measures have led to a drop in substance inputs from agriculture in water bodies. However, they continue to be one of the main reasons why only 10% of Germany water bodies had good ecological status in 2009. Amendments to the Fertiliser Application Ordinance and falling nitrogen surpluses from agriculture are steps in the right direction.

The latest results of the third National Forest Inventory confirm: Germany's forest area is stable. More timber is re-growing than is used. Despite intensive use forest stocks have grown. The percentage of deciduous trees has risen compared with coniferous trees. This is more in harmony with natural forest cover and constitutes a forestry policy objective. Forests have become more diverse and natural in structure. There is more deadwood – an important basis for biodiversity

There are still threats today from fragmentation, habitat losses as a result of changes in location, browsing by game, air pollutant inputs and a particular challenge - the effects of climate change. The latter requires the use of the entire genetic potential of native populations and, where appropriate, the targeted expansion of the genetic spectrum by imported tree species and provenances that are less sensitive to future climate changes in order to establish adapted forests that are as adaptable as possible. In addition, forest and sustainable forestry have to meet the increasing demands made on their protection and recreational functions and the growing demand for wood.

Important measures for the next few years are the ongoing reduction or the elimination in the risks outlined above to biodiversity, improved integration of the value of nature (including ecosystem services, ecosystem damage) in private and public decisions, the communication of the value of biodiversity and an increase in individual willingness to protect biodiversity.

Furthermore, the networking of the main stakeholders should be supported. The effectiveness, accuracy and efficiency of existing support instruments should be reviewed and, if necessary, improved.

A review of the impact on biodiversity of measures adopted in the Common Agricultural Policy in 2014 and any ensuing adjustments are necessary steps on the European level to conserve agricultural biodiversity.

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, in an annex.

Dr. Thomas Meier, Division 522 in the Federal Ministry of Food and Agriculture (BMEL), is the National Focal Point. The Information and Coordination Centre for Biological Diversity (IBV) of the Federal Office for Agriculture and Food (BLE) coordinates the preparation of the National Report on behalf of BMEL. The questions were answered in a comprehensive consultation process within the federal government and with the relevant stakeholders.

General overview of the country

2. In a few paragraphs, provide a synthetic overview of your country
including the size, location, and main physiographic and climatic features. Include a section on human population, providing disaggregated data on women and men's 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.

The Federal Republic of Germany (referred to hereinafter as "Germany") is situated in central Europe and covers an area of some 357,169 km² (Statistisches Bundesamt, 2014b). Germany is divided, in geographical terms, into seven large-area landscapes (Figure 1). The North German Plain extends from the islands in the North Sea and marshes over the Old and Young Drift region to the lowland bays. It encompasses glacial flat landscapes interspersed with rivers, moraines, lakes and moors. On the southern edge there are loess hill landscapes, whose geological bedrock is largely covered with fertile loess soil. Heading south you reach the western and eastern ridges of the low mountain range which were formed from sediments from the Tertiary, the Cretaceous and the Jurassic Periods. The Mesozoic escarpments were forged from the rift valleys, which are up to 5 kilometres deep, on the Upper Rhine. This is where the crystalline bedrock was elevated. From here the area covered with sediments slopes down to the south-east.

The foothills of the Alps are located south of the Danube. They consist of thick sediments from the Tertiary Period and Mesozoic Era. A narrow strip of the northern limestone Alps (German Alps) forms the southern German border (Gauer und Aldinger, 2005). The height above sea level increases from the north-west to the south-east. The North-West German Plain is only a few meters above sea level. Some areas are below sea level and must be protected with dykes. The low mountain ranges reach heights of 600 m up to just under 1,500 m. The German Alps rise up to just under 3,000 m. This is also the location of Germany's highest mountain, the Zugspitze (2,962 m above sea level). Germany's longest rivers are the Rhine (865 km in Germany), the Weser (744 km in Germany), the Elbe (727 km in Germany) and the Danube (647 km in Germany).

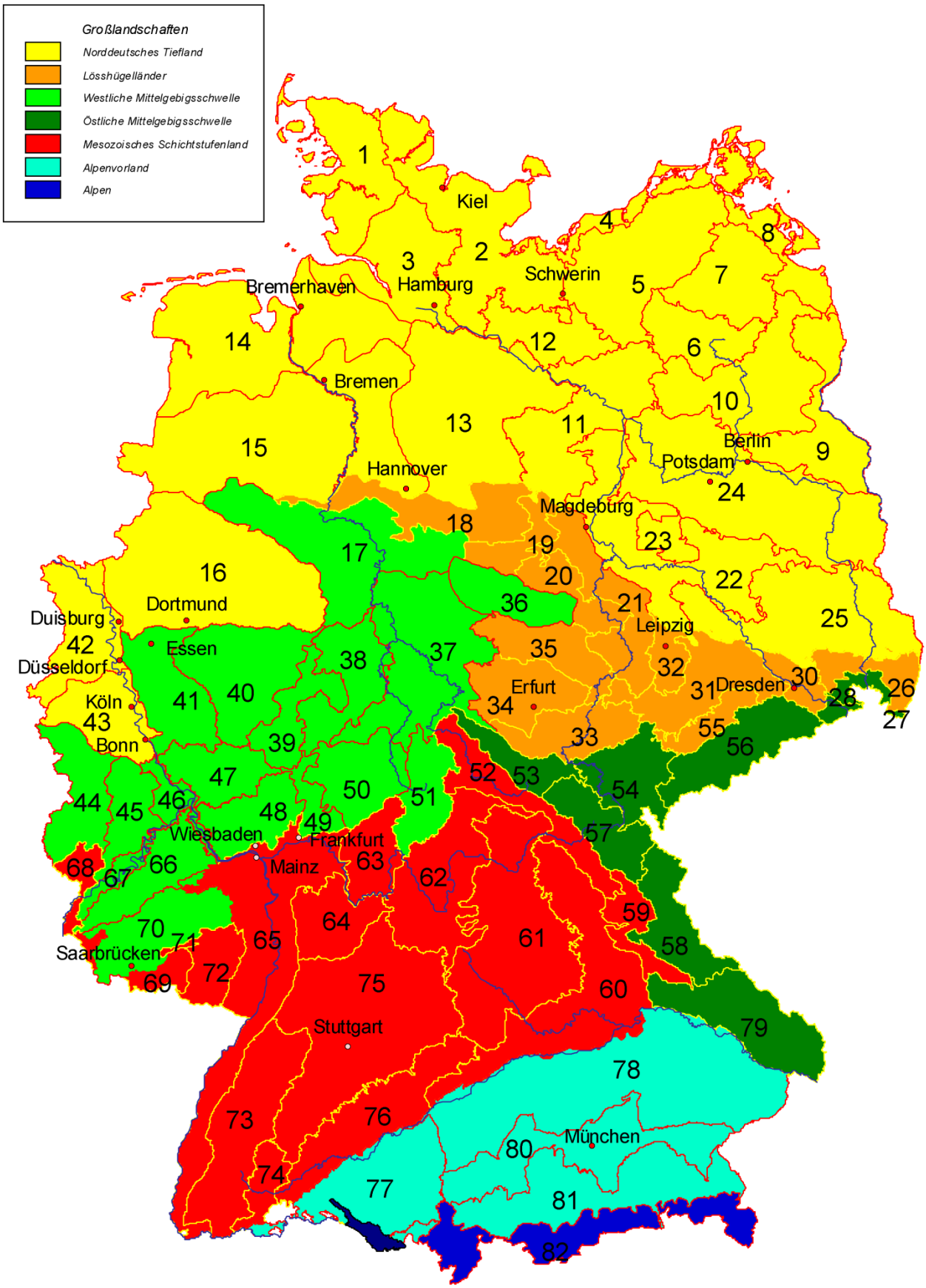


Figure 1: Large-area landscapes (Gauer und Aldinger 2005)

Germany's climate is determined by its location in a temperate zone with frequently changing weather. Precipitations in all seasons are characteristic. From the north-west to the east and south-east there is a progressive and gradual transition from a more oceanic to a more continental climate. The daily fluctuations and the seasonal differences in temperature are not subject to any extremes (exception mountain areas). The average annual temperature is +7 up to +9°C and the annual precipitation levels are on average 600 - 800 l/m² in the west, 500 - 600 l/m² in the east, in some cases well below 450 l/m² too. In windward areas in the northern Alps and in the upper reaches of low mountain ranges the precipitation levels increase markedly and average temperatures fall. In the upper reaches of the low mountain ranges and in the Alps there are frequently longer periods of snow (BLE 2015, gone to press).

Around 80.5 million people live in Germany; this corresponds to a population density of 225 inhabitants per square kilometre. 82% of the population lives in urban communities. Settlement and traffic areas make up 14% of the ground surface (Statistisches Bundesamt, 2014b). More than 60% of the area is taken up by rural communities but only 18% of the population lives there (Bundesinstitut für Bau-, Stadt- und Raumforschung BBSR, 2010). In rural areas the landscapes are characterised by arable land, grassland and forests (BLE, 2015). 11.4 million hectares are forests; more than half of the ground surface is used for agriculture (BMEL, 2014b, Table 424). 285,000 farms manage the agricultural land spanning 16.7 million hectares. Of them 11.9 million hectares are arable land and wheat is grown on more than a quarter of that area. 4.6 million hectares are permanent grassland and 0.2 million hectares are used for permanent crops like fruit and wine. Whereas agricultural land is steadily dwindling, its share of land used to cultivate renewable resources increased to 13% in 2014. 6.4% of the area is worked according to organic farming methods. 6,600 farms produce vegetables on arable land encompassing some 112,000 hectares. In total around 1.1 million tonnes of beef, 5.5 million tonnes of pork and 1.5 million tonnes of poultry meat are produced every year from commercial slaughter. Germany produced 31.3 million tonnes of milk in 2013. This amounts to 20% of the milk produced in the EU-28. In 2013 53.2 million m^3 timber were felled in Germany's forests and just under 26,000 tonnes of aquaculture products were manufactured in more than 6,000 farms (Statistisches Bundesamt, 2014b). Hunting management is done almost nationwide. There are around 50.000 hunting districts, providing annually 24.000 tons of game (Deutscher Jagdverband 2015).

In 2013 the gross domestic product amounted to 2,737 billion euro (0.4% more than the previous year, Statistisches Bundesamt, 2014b). Almost 70% of value added was generated by the services sectors; manufacturing (not including the construction industry) only had a share of just under 26%. Despite its small share of under 1% in gross value added, agricultural production is still an important economic sector. In addition to the contribution it makes to supplying the population with food, it also supplies feedstocks for further processing in various sectors and renewable energies. In some rural areas it continues to play a significant role in safeguarding job opportunities. In 2012/2013 the degree of self-sufficiency almost hit 92% - not including foreign feed 81% (BMEL, 2014b, Table 206).

In terms of agro-food exports, Germany was in third place in a global comparison (WTO) chalking up US$ 85 billion in 2013.

Men and women are equally open when it comes to training and employment in agriculture. However, women's income is still lower than men's.

So far the parity-based composition of agricultural bodies has not been achieved particularly in agricultural self-administration and in the senior management tiers of public authorities.

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.

See answer to the "Executive Summary" (to follow)

Maintaining agrobiodiversity

In Germany, an agrobiodiversity strategy and national programmes for the individual sectors of genetic resources have been developed for the conservation and sustainable use of biodiversity for food, agriculture, forestry and fisheries. They are conducted and further developed with the participation of the stakeholders concerned. In addition, since the mid-1990s agri-environment-climate measures (AECMs) for the protection and sustainable use of agrobiodiversity, in particular associated biodiversity, have been promoted within the framework of the Federal Government/Länder Joint Task for the Improvement of Agricultural Structures and Coastal Protection and through the Länder support schemes.

Germany is very actively involved in the existing European Cooperative Programmes for Plant Genetic Resources (ECPGR), the European Regional Focal Point for Animal Genetic Resources (ERFP) and the European Forest Genetic Resources Programme (EUFORGEN). The work in these programmes is extremely important in terms of the conservation and sustainable use of agrobiodiversity in the region of Europe and, beyond this, as a contribution in a global context to international collaboration within FAO.

In the field of the *ex situ* conservation of **plant genetic resources** for food and agriculture, more than 100 facilities like gene banks, botanic gardens and collectors' conservation networks have joined forces in conservation networks and are active in Germany. The *in situ* conservation of CWR species is done by area conservation in nature reserves. The first steps have been taken to establish genetic conservation areas for CWR species which initially focus on priority species like wild vines, wild apples, wild pears, wild turnips and wild celery (*Apium*) and on species-rich types of ecosystem like important grassland areas.

The *in situ* conservation of **animal genetic resources** is mainly ensured by agricultural enterprises, ark farms, open-air museums and hobby breeders. In this context breeders associations in particular play an important role in active breeding work and in collecting individual animal data in order to estimate the threat to a breed. Work is under way to establish a national cryoreserve for the purposes of ex-situ-conservation.

State institutions are responsible in Germany for the conservation of **forest genetic resources**. The work is coordinated by a Federal Government/Länder Working Group "Forest Genetic Resources and Legislation on Forest Reproductive Material" (BLAG-FGR). Based on a four-year action plan BLAG-FGR implements, by way of coordinated collaboration, the projects envisaged in the National Programme. A few main areas of work are listed by way of example.

- Recording and evaluation of existing forest genetic resources.
- *In situ* measures (natural regeneration, conservation of tree stands and individual trees, seeds and forest planting);
- *Ex situ* measures (evacuation, gene conservation, seed orchards, gene banks),
- Conservation in conjunction with use (regeneration, tree stand maintenance, wood harvesting)
- Elaboration of joint research priorities.

The aim of this work on forest genetic resources is to continue to maintain biodiversity and diversity of tree and shrub species, to sustainably use forest genetic resources, to re-establish viable populations of endangered tree and shrub species, and to make a contribution to preserving and re-establishing diverse forest ecosystems.

Despite stepped-up efforts in recent years some **stocks of useful fish** in the North and Baltic Seas are still not within safe biological limits. As a consequence of the fundamental reform of the Common Fisheries Policy that came into force on of 1 January 2014, a further improvement in the stock situation is, however, to be expected. The reform constitutes a change in direction in European fisheries policy. Sustainability is now the most important principle in the fisheries sector. In future, far stiffer measures will ensure that fish stocks are replenished. Given the over-exploitation of the seas, European fisheries policy is committed to modern methods of fisheries management. By 2015 as many stocks as possible, and all others by no later than 2020, are to be managed according to the principle of maximum sustainable yield (MSY) and the multi-annual management plans are to be extended to all commercially used fish stocks. This principle will ensure the sustainable use of stocks and provide the basis for an economically viable fishing sector (BMEL, http://www.bmel.de/DE/Wald-Fischerei/05_Fischerei/EU-Fischerei/_Texte/Reform-Gemeinsame-Fischereipolitik.html). The European Marine Strategy Framework Directive is very important, too. It is based on the ecosystem approach and aims to protect aquatic species and the habitats to be found there, and to prevent a decline in marine biodiversity. In fresh water 70 percent of fish species are classified as at risk and 6 percent as already extinct (BMELV, 2005). With the implementation of the European Water Framework Directive, improvements to the ecological condition of water bodies are being driven forward in Germany. In some cases replenishment projects are up and running for extinct or endangered fish species in Germany like, for instance, the European salmon, the European and Baltic sturgeon, shad or whitefish. Future efforts will focus on the sustainable use of commercial species and the use of aquatic biodiversity for aquaculture.

At the present time, a National Programme for the Conservation and Sustainable Use of Genetic Resources of Micro-organisms and Invertebrates is being elaborated. The need for action is being

identified in the areas of pollinators, human consumption, animal nutrition, animal health, renewable resources, functional soil biodiversity, plant health and plant breeding.

Production systems in the country

IMPORTANT: Throughout these guidelines, questions on production systems will refer to the production systems identified in Table 1. Detailed descriptions for each production system listed in Annex 2.

Table as present in your country. When referring to them in your answers, please provide the production system code and/or the full name.

4. Indicate, for each of the production systems listed in Table 1 below, whether it is found in your country or not (Y: yes, N: no), regardless of its importance.
Detailed descriptions for each production system listed in Annex 2.

Table 1. Production systems present in Germany.

Sector	Code	Production system names	Present (Y/N)
Livestock	L1	Livestock grassland-based systems: Tropics[6]	No
	L2	Livestock grassland-based systems: Subtropics[7]	No
	L3	Livestock grassland-based systems: Temperate[8]	Yes
	L4	Livestock grassland-based systems: Boreal and /or highlands[9]	(Yes)*1 not taken into account for D
	L5	Livestock landless systems: Tropics	No
	L6	Livestock landless systems: Subtropics	No
	L7	Livestock landless systems: Temperate	Yes
	L8	Livestock landless systems: Boreal and /or highlands	No*2
Forests	F1	Naturally regenerated forests: Tropics	No
	F2	Naturally regenerated forests: Subtropics	No
	F3	Naturally regenerated forests: Temperate	Yes
	F4	Naturally regenerated forests: Boreal and /or highlands	No*3
	F5	Planted forests: Tropics	No
	F6	Planted forests: Subtropics	No
	F7	Planted forests: Temperate	No 4
	F8	Planted forests: Boreal and /or highlands	No
Aquaculture and Fisheries	A1	Self-recruiting capture fisheries: Tropics	No
	A2	Self-recruiting capture fisheries: Subtropics	No
	A3	Self-recruiting capture fisheries: Temperate	Yes
	A4	Self-recruiting capture fisheries: Boreal and /or highlands	No*5
	A5	Culture-based fisheries: Tropics	No
	A6	Culture-based fisheries: Subtropics	No
	A7	Culture-based fisheries: Temperate	No*5

[6] Tropics: All months with monthly mean temperature, corrected to sea level, above 18°C.
[7] Subtropics: One or more months with monthly mean temperatures, corrected to sea level, below 18°C but above 5 °C.
[8] Temperate: At least one month with monthly mean temperatures, corrected to sea level, below 5 °C and four or more months above 10 °C.
[9] Boreal and/or highlands: 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.

	A8	Culture-based fisheries: Boreal and /or highlands	No
	A9	Fed aquaculture: Tropics	No
	A10	Fed aquaculture: Subtropics	No
	A11	Fed aquaculture: Temperate	Yes
	A12	Fed aquaculture: Boreal and /or highlands	No
	A13	Non-fed aquaculture: Tropics	No
	A14	Non-fed aquaculture: Subtropics	No
	A15	Non-fed aquaculture: Temperate	Yes
	A16	Non-fed aquaculture: Boreal and /or highlands	No
Crops	C1	Irrigated crops (rice) : Tropics	No
	C2	Irrigated crops (rice) : Subtropics	No
	C3	Irrigated crops (rice) : Temperate	No
	C4	Irrigated crops (rice) : Boreal and /or highlands	No
	C5	Irrigated crops (other) : Tropics	No
	C6	Irrigated crops (other) : Subtropics	No
	C7	Irrigated crops (other) : Temperate	No*[6]
	C8	Irrigated crops (other) : Boreal and /or highlands	No
	C9	Rainfed crops : Tropics	No
	C10	Rainfed crops : Subtropics	No
	C11	Rainfed crops : Temperate	Yes
	C12	Rainfed crops : Boreal and /or highlands	No
Mixed[10]	M1	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Tropics	No
	M2	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Subtropics	No
	M3	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	No
	M4	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands	No
Others	O1	Others [*please specify*]	No

**[1] The sub-alpine zone starts at between 1,500 m and 2,000 m (Schaefer, 2003). From an altitude of 1,500 m and higher around 14,230 hectares have been mapped as grassland on the basis of DLM 2013 and from 2,000 m upwards a further 880 hectares. This means that less than 0.3% and 0.02% of this grassland potential is being exploited by this production system. The actual area being used is smaller (more precise assessments could be undertaken by the Johann Heinrich von Thünen Institute using integrated administration and control system data).*

**[2] Landless livestock farming in the highlands is not relevant according to the Johann Heinrich von Thünen Institute.*

**[3] Forests with natural regeneration in the highlands are not relevant in terms of area in Germany. According to the National Forest Inventory 2012 (BWI) only 2% of forest area is located at altitudes above 1,000 m.*

**[4] Short-rotation plantations and fruit-growing areas are not included in forest areas in Germany but are deemed to be arable land (as defined in Article 2 Federal Forest Act dated 2 May 1975 (Federal Law Gazette I p. 1037).*

(Federal Law Gazette I p. 1050) has been amended.). Public forests in Germany and many private forest enterprises use above all natural regeneration to renew forest stands. The entire forest area is, therefore, assigned to the column forests with natural regeneration. A nationwide classification of planted and naturally regenerated forest stands is not possible in Germany.

10 Note: in the various questions of the questionnaire, you may wish to provide data disaggregated by components for mixed production systems.

*[*5] Germany has culture-based fisheries but only on a marginal scale, for instance in Lake Constance and on the Baltic Sea. For the questions addressed in this report they are not, however, relevant. Hence, this production system is not included in the overall consideration in the report for Germany.*

*[*6] There are irrigated crops in Germany (372,749 ha), which were recorded for the first time in 2010. The scale and frequency of irrigation have not, however, been recorded. They vary depending on the annual level and pattern of rainfall. For the questions addressed in this report the demarcation of this production system is, however, irrelevant and is not examined separately. In 2005 there were 3,699 hectares of greenhouse area in Germany.*

5. List in Table 1 the production systems that have been identified as occurring in your country in Table 1

indicating the codes and/or the names of the production systems as provided.

Provide 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[11];
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 reliance upon synthetic inputs, modern varieties, fossil fuels, etc.

Table 1. Production systems present in Germany.

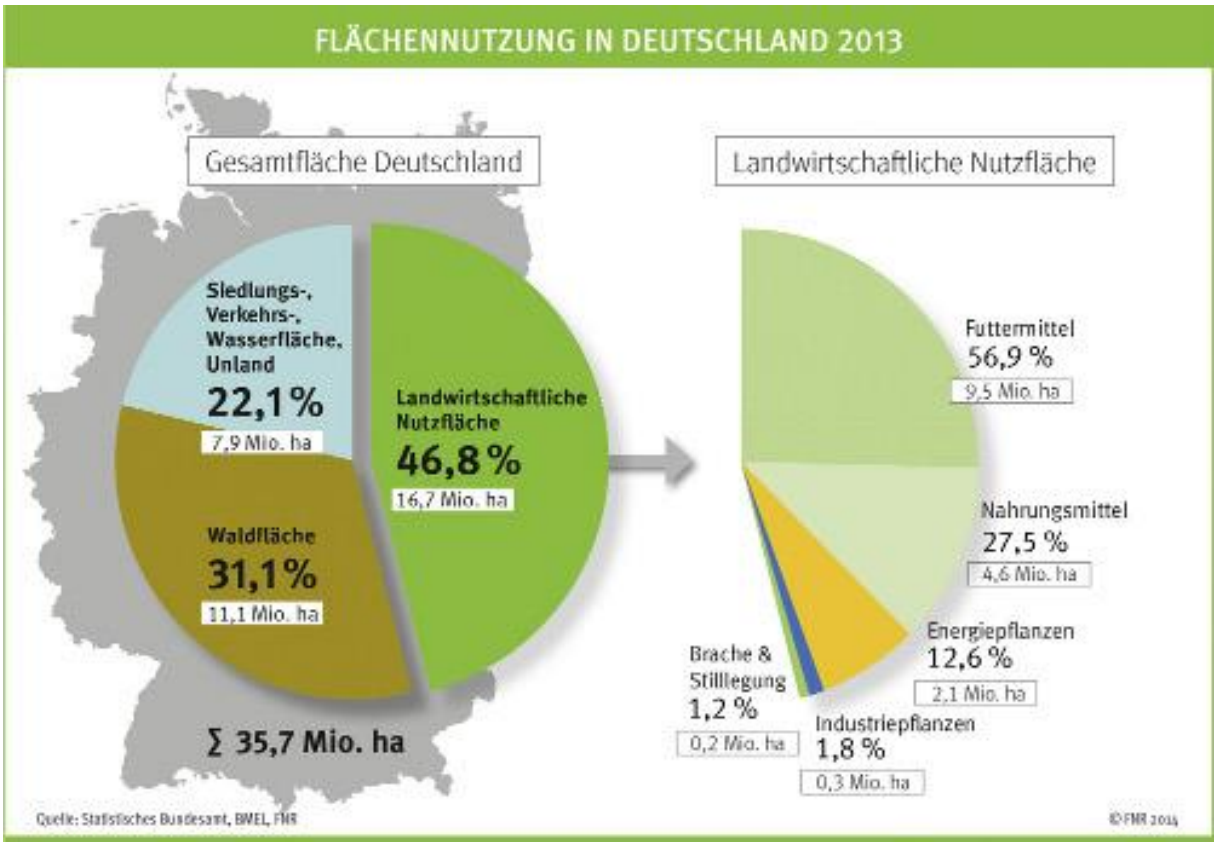
Code of production system	Name of production system	Description
L 3[*1]	Grassland-based livestock husbandry: temperate zone	Drystock farms (grazing stock farms) particularly those specialising in milk production, cattle breeding/fattening, sheep and horses, mixed livestock production farms oriented towards grazing stock
L 7[*1]	Landless livestock farming: temperate zone	Farms particularly producing pigs and poultry
F 3	Forests with natural regeneration, temperate zone	corresponds to the entire forest area in Germany
A 3	Capture fisheries based on naturally self-reproducing stocks: temperate zone	Capture fisheries in rivers and lakes are included here.
A 11	Fed aquaculture: temperate zone	Main share of aquaculture in Germany
A 15	Unfed aquaculture: temperate zone	Shellfish culture industry

[11] Smallholder definitions are numerous and vary according to countries. Please refer to http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE_Reports/HLPE-Report-6_Investing_in_smallholder_agriculture.pdf, pp. 23-24.

C 11	Rain-fed crops: temperate zone	They include: Field crops Fruit Vegetables Ornamental plants Nurseries Wine-growing Short-rotation plantations

**1: Production system L7 Landless livestock farming, temperate zone: the area details in Table 3 are based on the assumption that pig and poultry farming in Germany is mainly landless and not grassland-based. In contrast, cattle farming, sheep farming and horse keeping is mainly grassland-based. But this doesn't mean that their feed is solely based on grassland growth.*

6. Provide a map of production systems in your country, marking the places and regions mentioned in the Country Report.



(Source: FNR, 2014)

Explanations: Land use in Germany

Left: Total area of Germany

46,8 % = agricultural land, 31,1% = forests, 22,1% = settlements, rivers, lakes, roads

Right: Agricultural land

56,9 % = feed production, 27,5% = food production, 12,6% = energy plants, 1,8% = industrial plants, 1,2 % = fallow & set-aside land

7. For each production system found in your country (refer to Detailed descriptions for each production system listed in Annex 2.

Table

Indicate in Table 2 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 2. Area under production, production quantity and contribution to the agricultural sector economy for production systems in the country.

Code of production system	Name of production system	Area (indicate unit)	Production – quantity (indicate unit)	Contribution to the agricultural sector economy (%)	Reference year
L 3	Grassland-based livestock husbandry: temperate zone	4,621,000 ha	Coarse feed harvest: 28,493,000 t (calculated as dry matter)[1] Meat production (cattle, sheep, goats): 1,195,000 t[2] Milk production: 31,324,000 t *1		2013
L 7	Landless livestock farming: temperate zone	NA	Meat production: Pig: 5,011,000 t Poultry: 1,709,000 t Egg production: 847,000 t		2013
F 3	Forests with natural regeneration, temperate zone	10,888,000 ha	53,208 m^3 wood		2012 (area) 2013 (production quantity)
A 3	Capture fisheries based on naturally self-reproducing stocks: temperate zone	EEZ area North Sea: 28,539 km^2 EEZ area North Sea 4,452 km^2 fisheries area inland fishing: (ha) 524,840 ha *3			2012
A 11	Fed aquaculture: temperate zone	6,119 farms (A11 and A15 together, A15 with a very low share)	20,481 t (without A15)		2013
A 15	Unfed aquaculture: temperate zone	Shellfish culture industry	5,035 t		2013
C 11	Rain-fed crops: temperate zone	12,079,000 ha *4	114,197,000 t gross soil production (in cereal units)*4		2013 (area), 2012/2013 (harvesting)

**1 (BMEL, 2014b), *2 (Statistisches Bundesamt, 2014b), *3 (Brämik, 2013, Jahresbericht Binnenfischerei) (This probably also includes pond areas - no further details are given); *4 this is based on the area and gross soil production of the total agricultural land minus permanent grassland, BMEL, 2014b (Source: Table 86 in the Statistisches Jahrbuch ELF 2014)*

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.

The legal foundations for agricultural production apply equally to export and import goods.

In 2013 Germany exported 4.2 billion tonnes of meat and meat products, 5.7 billion tonnes of dairy products and 14.3 billion tonnes of cereals and cereal products. Fish and fish products, live animals, potatoes and potato products as well as fruit, vegetables, spices and feed were exported as well but on a comparatively lower scale (Statistisches Bundesamt, 2014b).

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. Detailed descriptions for each production system listed in Annex 2.

Table as present in your country. When referring to them in your answers, please provide the production system code and/or the full name.

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[12] affecting the extent and distribution of associated biodiversity[13] 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.

The main causes of species diversity loss are, to regionally varying degrees, intensive farming, landscape fragmentation and urban sprawl, soil sealing and large-scale pollutant inputs (e.g. acidifying substances or Anutrients). The loss of near-natural areas and village structures due to building and soil sealing has a negative impact on human settlements. Threats to coastal habitats include disturbance from increased recreational use and from construction (BMUB, 2014b).

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 are no safe statements that climate change has had a measurable impact on associated biodiversity in Germany. The climate change indicator "Duration of the vegetative period" in the National Biodiversity Strategy outlines the changes in the duration of the vegetative period. The shifts in the annual start date of phenological spring and winter are still illustrated on the basis of selected developmental stages of two native wild plant species. This presentation is supplemented by time series of mean temperatures in the three months which precede the start of phenological spring and winter respectively.

Between 1951 and 2012 a clear prolongation is visible in the duration of the vegetative period of around 15 days to 234 days in the most recent records (linear trend). This is the consequence of the premature start to spring combined with a late start to winter. At the present time there is no comprehensive assessment of associated biodiversity in individual production systems in Germany (BMUB, 2014b).

A prolongation of the vegetative period can lead, for instance, to higher ecosystem productivity. This, in turn, can influence the relationships between various species. Systematic nationwide studies on the impact of a prolonged vegetative period on biodiversity are not available at the present time (UBA, 2015, p. 91).

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.

[12] Description of drivers can be found in Annex 3.

[13] Description of associated biodiversity can be found in Annex 1.

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**[14]	**Effect of drivers on sector biodiversity for food and agriculture** (2, 1, 0,-1, -2, NK, NA)			
		PGR	FGR	AnGR	AqGR
	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 [*please specify*]				

It is not possible to give a trend estimate for the entire list of contributory factors for all production systems. The main contributory factors are, therefore, presented in text form for each production system.

Production system F3 Forests with natural regeneration, temperate zones

Germany's woodland has virtually remained unchanged over the last ten years. In 2013, just under 70% of the forest area had been certified under PEFC and slightly more than 5% of the forest area had been certified under FSC (BMUB, 2014b). More timber is re-growing than used. In spite of intensive use, forest stocks rose to 3.7 billion cubic metres. The percentage of deciduous trees has risen compared with coniferous trees. This is more in harmony with natural forest cover and constitutes a policy objective. Forests have become more diverse and natural in structure. There is more deadwood – an important basis for biodiversity The good condition of forests is the result of both the silvicultural activities of many forest owners and foresters and of a forest policy geared to

[14] Description of drivers can be found in Annex 3.

balance and sustainability (BMEL, 2014a). Pollution-induced forest damage was an important topic in environmental and forest policy in Germany from 1980 up to around 2005. A very considerable reduction in the total emission of noxious sulphur dioxide is discussed as a major contributory factor to the restoration of forest trees. However, it has not led to a general improvement in crown condition. Climate changes and introduced pests are taking on increasing importance as contributory factors (see also question 18).

Production system L3 Grassland-based livestock husbandry: temperate zone

From 2003 to 2012 the absolute loss of permanent grassland in Germany was around 5%. Under the Common Agricultural Policy (CAP) the Länder were not allowed to exceed a threshold of maximum 5% grassland loss. Because of EU statutory provisions individual Länder were obliged to enact a corresponding ordinance for the protection of permanent grassland.

With regard to the qualitative development of permanent grassland in relation to biodiversity, the results of the national FFH reports (BfN, 2014) show that species-rich grassland is in an inadequate to poor condition. Over the last 10 years the share of intensive meadows and hay meadows with high yields has increased further compared with biodiverse extensive grassland areas with lower yield for agricultural use.

The mapping results for the HNV (high nature value) farmland indicator from 2013 indicate an 11.8% share of HNV farmland areas in total agricultural area. Overall, the indicator worsened by 1.3 percentage points compared with 2009. Particularly high losses can be observed, *inter alia*, for extensively used grassland (BMUB, 2014b).

The flock situation of many bird species is critical in agricultural landscapes. The flocks of birds that brood on fields, meadows and pastures are continuing to dwindle - on varying regional levels - because of intensive agricultural use. Over the last ten years up to 2011 this is clearly demonstrated by the very negative trend (BMUB, 2014b) in terms of NBS indicator biodiversity and landscape quality. It is, at present, still unclear whether the agri-environmental and nature conservation measures taken will, in the medium to long-term, result in a reversal of the negative trend in farmland.

Production system L7 Landless livestock farming, temperate zone

In the National Strategy for sustainable development (Bundesregierung, 2002) the federal government laid down the reduction of nitrogen surpluses from agricultural production in the annual total balance to 80 kg/ha of arable land by 2010 as a concrete target in 2002. From 1991 to 2011, the annual nitrogen surplus decreased from 130 kg/ha to 101 kg/ha (moving triennial average). Analyses of farm data show that in particular farms with a high density of livestock have large surpluses. There is a statistically significant trend towards the target of 80 kg/ha and year between 2001 and 2011. However, the current value is still far higher than the target that was already supposed to have been reached in 2010 (BMUB, 2014b).

Technical improvements are a major contributory factor thanks to extended storage capacities and improved application methods or innovative techniques for the separation of harmful effects when spreading nitrogen-containing residues from animal husbandry on adjacent areas.

Production system A3 Capture fisheries based on naturally self-reproducing stocks, on sea fisheries

Sea fisheries

The Common Agricultural Policy is the most important factor that influences stocks of usable sea species for Germany. It underwent a major reform as a result of the new EU Basic Regulation that came into force on 1 January 2014. Sustainability is now the most important principle in the fisheries sector. In future, significantly stiffer measures will ensure that fish stocks are replenished. Given the over-exploitation of the seas, European fisheries policy is committed to modern methods of fisheries management. By 2015 as many stocks as possible, and all others by no later than 2020, are to be managed according to the principle of maximum sustainable yield (MSY) and the multi-annual management plans are to be extended to all commercially used fish stocks. This principle will ensure the sustainable use of stocks and provide the basis for an economically viable fishing sector (BMELV, 2010b). Innovations in information technology and remote sensing help to monitor compliance with fisheries requirements. It is these very techniques that will make it possible to monitor compliance with management plans. Innovations in fisheries technology can help to reduce by-catches and disruptions to the benthos.

Germany has made a political commitment to protecting the oceans and ratified the United Nations Convention on the Law of the Sea (UNCLOS). What is important in connection with the protection of marine organisms is Germany's commitment to introduce marine protected areas.

Nutrient inputs also pose a serious ecological problem for the Baltic Sea as an inland sea. They cause excessive growth of phytoplankton. Dying plankton, in turn, results in a lack of light and oxygen which adversely affects the lives of seaweed, bladder wrack and animals on the sea bed. While nutrient inputs in the Baltic Sea have fallen since the 1980s, the inland sea continues to be regarded as severely eutrophicated. (UBA, 2014).

Inland fisheries (fish-farming operations and line fishing) (Brämik, 2013). Around 670 full-time and part-time farms currently manage around 220,000 hectares of lakes, valley reservoirs and rivers. This corresponds to roughly one-quarter of water bodies in Germany. The number of farms has been falling in recent years. The reasons given for the decreasing number of farms are the framework conditions both for capture which have been steadily worsening for a long time and, outside tourist centres, for the marketing of fish from lakes and running water bodies too. By far the largest share of areas managed by commercial fishermen is also used for line fishing. The fisheries management of inland waters encompasses non-commercial line fishing, too. This branch of inland fishing is becoming increasingly popular in Germany. Damage to fish populations from the discharge of noxious substances has markedly diminished as a contributory factor compared with previous decades. In contrast, the situation in terms of the structural impairment, particularly of flowing water bodies, and the resulting harm to the fish species community is worsening. The use of hydro-electric power was frequently linked with disastrous consequences for fish stocks. Invasive species play a major role as they crowd out native species (e.g. round goby).

Production system A11 Fed aquaculture

Around 8,800 tonnes of fish were harvested from warm water ponds. Food carp (around 5,700 tonnes) account for the largest share of this total volume. The profitable management of warm water ponds with food carp as the main fish species is becoming increasingly difficult for instance because of losses caused by the Koi herpes virus disease and the dwindling interest of consumers in carp as an edible fish. That's why the production of minor fish species like the pike-perch or also the

common sturgeon is taking on increasing importance. According to estimates from the Länder the carp pond industry in Germany has been facing unfavourable framework conditions for quite some time now. Besides damage in particular from cormorants and infections with the Koi herpes virus, the dwindling interest in carp as an edible fish is another contributory factor.

In the EU it is possible to establish protected designations of genetic origin for edible fish. In Bavaria the "Aischgrund carp" and the "Franken carp" and in Schleswig-Holstein the "Holstein carp" have been registered.

The production of fish in flow-through cold water plants is the backbone of German aquaculture with the highest production volumes and very modest but steady growth. In 2013 2,833 farms operated cold water plants with continuous fresh water flow-through according to the aquaculture statistics. Rainbow trout was the main fish species produced in a total of around 2,600 farms. In 2013 15,143 tonnes of fish were produced in cold-water plants, including 9,600 tonnes of edible trout. For some years now there has been a trend towards the increased manufacturing and processing of primary products prior to sale.

Cold-water plants may clash with the implementation of the EU Water Framework Directive for the safeguarding or achievement of the good ecological status of flowing water. Guidelines for the year-round passability of dam plants by fish come up against specifications of the Fish Disease Prevention Ordinance for achieving disease-free status of fish farming by sufficient water flow-through.

In recent years fish production in warm water recirculation systems (1,679 t) has steadily increased but is still far behind the previously mentioned types of aquaculture. Besides the eel mainly African and European catfish, carp and common sturgeon were bred. The main obstacle to the further expansion of this sector is seen less in the biotechnological or economic imponderables and far more in the current problems arising from licensing law.

At the present time, net cage systems for fish production in German inland and coastal waters are of no importance. (Brämik, 2013).

Production system A15 Unfed aquaculture

In 2011 shellfish accounted for 53.1% (21,000 tonnes) of aquaculture products manufactured in Germany (Statistisches Bundesamt, 2014a). In order to ensure sustainable shellfish breeding and fishing in harmony with the goals of the Wadden Sea National Park, shellfish production has been based since 1997 in the National Park on the "Programme for the management of shellfish resources in the Schleswig-Holstein Wadden Sea". This also includes avoiding the import of stocked shellfish from far-away regions that carry the risk of introducing invasive species and parasites. Examples of problematic species for native German fauna that have already been introduced are the Pacific oyster or the American jackknife clam.

Production system C11 Rain-fed crops, temperate zone

Improved seeds and ongoing technological progress in the fields of cultivation, harvesting and processing methods have also facilitated the steady intensification of crop husbandry and vegetable production in Germany in recent years. In crop husbandry there is an ongoing trend towards wheat as the most important crop species and a steady increase in maize production. Barley and rye are steadily losing cultivation shares and rape is still the most important crop species (Statistisches Bundesamt, 2014b).

Economic considerations are the main driver behind farm managers' choices of crops and they are shaped by the demand behaviour of commerce and consumers.

Agri-environment-climate measures (AECMs) in the Second CAP Pillar with the goals of crop cycle diversification and mandatory crop diversification as part of greening under the First CAP Pillar are important instruments in maintaining agricultural biodiversity.

Important trends over the last 10 years were an increase in organic arable land and a growth in silage maize cultivation for biogas production. Major factors that influence the organisation of arable farming are the CAP with its reforms, in 2003 the mid-term review with the decoupling of direct payments from production and tying to cross compliance, in 2009 the health check with the acceleration of the Agenda 2000 measures, and in 2015 the introduction of greening with mandatory crop diversification, the conservation of permanent grassland and the introduction of ecological focus areas (EFAs).

There is another danger from pests from other continents. As a rule, native plants in Europe do not have sufficient genetic resistance to non-native pests which often don't have any natural enemies here either. As measures in the field of plant health and on both the national and international level may be of relevance for commerce, international standards are particularly important here. In the field of plant health this is ensured through the international standardised procedures of the International Plant Protection Convention (IPPC).

Effects of drivers of change on ecosystem services

12. What have been the main drivers (descriptions in Annex 3) affecting regulating and supporting ecosystem services (descriptions in Annex 4) in the country during the last 10 years?

Describe, for each production system identified in Table 1, 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).

There is, at present, no nationally agreed and coordinated assessment of ecosystem services in Germany. It is therefore not possible to describe the main factors that have influenced ecosystem services over the past decade in a differentiated manner according to production systems. While initial indicators for the status of biodiversity have been defined and target values have been set in Germany (BMU, 2010), indicators are lacking in order to comprehensively measure and assess conditions and trends of components of the associated biodiversity at national level. Statements on the impact of the changes in different components of associated biodiversity on the provision of regulating and supporting ecosystem services are therefore only possible on the basis of individual studies, in some cases only as initial estimates.

It can be assumed that the main influencing factors that impact species diversity are also mainly relevant for the impact on ecosystem services (cf. question 9).

The main causes of species diversity loss are, to regionally varying degrees, intensive farming, landscape dissection and urban sprawl, soil sealing and large-scale pollutant inputs (e.g. acidifying substances or nutrients). In human settlements, negative impacts are brought about by the loss of near-natural areas and village structures due to building and soil sealing. Threats to coastal habitats include disturbance from increased recreational use and from construction (BMUB, 2014b,).

See also our answer to question 9 and 22.

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

Production systems	**Drivers**[15]	**Effect of drivers on ecosystem services**[16] (2, 1, 0,-1, -2, NK, NA)								
		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
L 3 L 7 F 3 A 3 A 11 A 15 C 11	Changes in land and water use and management	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Pollution and external inputs	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Over-exploitation and overharvesting	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Climate change	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Natural disasters	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Pests, diseases, alien invasive species	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Markets, trade and the private sector	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Policies	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Population growth and urbanization	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Changing economic, socio-political, and cultural factors	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Advancements and innovations in science and technology	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Other [*please specify*]	NK	NK	NK	NK	NK	NK	NK	NK	NK

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.

See answer to question 12.

[15] Description of drivers can be found in Annex 3.

[16] Description of ecosystem services can be found in Annex 4.

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).

The wild species mainly used for food in Germany are:

- wild plants for food such as wild vegetables and wild herbs
- wild fruit
- huntable game species under the Federal Hunting Act
- edible mushrooms
- honey bee

There are no indications that the availability of wild species has changed to an appreciable extent in the past decade. Many wild species also form part of associated biodiversity. Thus, the availability and diversity of wild species is exposed to the same influencing factors as associated biodiversity: see table 4 and question 9.

General remarks on wild species for food
Wild species in Germany are only to a limited extent used for food and, as a rule, are not of vital importance in ensuring food security for the German population.

2,800 species of wild plants in Germany's native flora are very important as wild relatives of crops or potentially as usable wild species for food and agriculture.

Even though wild species, on the whole, only make a minor contribution to food, wild species can, in part, make an important contribution to food. This is particularly true of huntable wild game, wild fruit and mushrooms. In 2012/2013, the use of huntable wild game accounted for a total value of approx. EUR 219 million, thus also being of considerable economic importance (German Hunting Association, 2014).

In recent decades, the use of wild game for food purposes has also declined because urbanisation has progressed further, with the products being provided on the market in a simple and cost-efficient manner and in a controlled quality. In addition, the negative side effects or health risks of the direct use of wild game for food purposes (harmful ingredients such as e.g. woodruff, radioactive elements in fungi, fox tapeworm) have increasingly gained public attention.

Legal situation for the use of wild species:
The use of wild species is subject to different legal rules. Section 44 of the Federal Nature Conservation Act (BNatSchG) of 29 July 2009 (Federal Law Gazette I, p. 2542) prohibits the taking from the wild (ban on access), the possession (ban on possession) and the commercial use (ban on marketing) of animals and plants of specially protected and specific other animal and plant species. The German Federal Hunting Law and the Regulation for Game Conservation in Germany regulate the conservation and sustainable use of game species.

The Federal Ordinance on the Conservation of Wild Species of Fauna and Flora (Federal Ordinance on the Conservation of Species) of 16 February 2005 (Federal Law Gazette I p. 258, 896), last amended

by Article 10 of the Act of 21 January 2013 [Federal Law Gazette I p. 95) – BArtSchV] lays down rules for the exceptions in Section 2: the "flower bouquet rule" applies to the gathering of forest fruit and forest plants". Plants and fruits may be gathered from forests for personal use only to the extent of one bouquet of flowers/herbs or one basket of berries/mushrooms. The Länder laid down rules for this in their Land forest acts.

Knowledge of wild species in the population has decreased because use is on the decline (see reply to question 14), the knowledge holders are increasingly part of the older generation and, as a result of urbanisation, many people no longer have contact with nature and the flora and fauna therein. Nevertheless, most of the knowledge is available for everybody or can be researched in numerous publications in Germany. Numerous organisations inform the public about wild species.

As a result of the diversification of income sources in rural areas and the establishment of niche markets, know-how on wild species can, in part, also be acquired via practical use. There is an increasing interest in game as food, because it is an high-quality product and it is produced sustainably and humanely. With this, it meets the current trends in conscious nutrition.

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

Drivers[17]	**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			
Pollution and external inputs			
Over-exploitation and overharvesting			
Climate change			
Natural disasters			
Pests, diseases, alien invasive species			
Changing markets			
Policies			
Population growth and urbanization			
Changing economic, socio-political, and cultural factors			
Advancements and innovations in science and technology			
Other [*please specify*]			

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.

See answer to question 14.

[17] Description of drivers can be found in Annex 3.

Effects of drivers of change on traditional knowledge, gender and rural livelihoods
In answering questions 0 to 0, 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?

No information is available as to if and to what extent the influencing factors listed in the answer to question 13 have a gender-specific effect.

Experience to date shows that rural women's associations are instrumental in improving the environment for training in biodiversity conservation and biodiversity-events , in particular through the conservation of cottage gardens. The marketing of regional products plays a prominent role in the conservation of old varieties.

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

Germany is a knowledge and information society that generates new knowledge at a high speed. Traditional knowledge is thus losing in importance. At the same time, many different services rendered by biodiversity for food and agriculture, the use of which requires traditional knowledge, are being replaced by technological processes. For this reason, traditional knowledge has steadily lost importance in agricultural practice.

The decoupling of agricultural primary production from actual consumption, the industrial production and processing of food and the continuing trend towards convenience products reinforce the loss of traditional knowledge.

There are many activities in Germany intended for the collection and written recording of current and traditional knowledge so that it can be assumed that hardly any traditional knowledge gets lost.

However, skills that cannot be documented in written records can get lost. These can only be preserved if they are exercised in practice. Thus, traditional ways of living and working are being preserved via Chambers of Handicrafts and open-air museums. Many different organisations and initiatives such as SlowFood, ark farms and others also devoted themselves to this field of work.

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

Germany has exercised a type of farming for many decades that preserves the main services rendered by biodiversity for food and agriculture. These services are being supplemented by technological processes in specific areas (fertilisation, plant protection, soil tillage). As a result, the role played by biodiversity for food and agriculture is partly less visible or is regarded as a matter of course and as guaranteed. The increasing intensification of agricultural production has also caused a restriction of the ecosystem services rendered by biodiversity for food and agriculture (e.g. pollination, see also answer to question 12), which could jeopardise food security and the sustainability of agriculture in the long run. In recent decades, these effects have been recognised and examined. They are increasingly better understood today. Nowadays, German agricultural policy

is designed to preserve and promote sustainability in the agricultural sector. Examples include both the development and spread of sustainable farming systems, integrated crop production or organic farming. With a view to climate change and the increase in global trade, the prevention of the introduction and spread of harmful organisms is becoming increasingly important. Thus, phytosanitary rules (see question 44) make a major contribution towards the conservation of biodiversity for food and agriculture. The current BMEL protein crop strategy could also result in an increase in the cultivation of native protein crops, thus helping to promote environmentally sound and resource-saving farming. In addition, biodiversity in Germany, including biodiversity for food and agriculture, is being preserved for nature conservation, ethical and cultural reasons.

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.

Question 55 in Chapter 5 sets out, and explains in greater detail, the key strategies, programmes and framework conditions for the protection and sustainable use of biodiversity for food and agriculture.

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. Detailed descriptions for each production system listed in Annex 2.

Table as present in your country. When referring to them in your answers, please provide the production system code and/or the full name.

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.

The national sectoral reports on the FAO Reports on the State of the World´s Genetic Resources provide detailed information on the status, trends and conservation condition of plant, animal and forest genetic resources in Germany. The respective summaries are listed below. For aquatic genetic resources, country reports in response to the first report on the state of the world's resources are currently being drawn up. Without anticipating Germany's country report, information is provided on aquatic genetic resources.

FGR:

Forests cover around 11.4 million hectares in Germany or 32% of the national territory. Of the 70 tree species occurring in German forests, spruce, pine, beech and oak cover most of the forest area. Current forest management is based on the principles of sustainable and multifunctional forestry,

that generally fulfils production, protection and recreational functions at the same time. Many *in situ* conservation measures for forest genetic resources have also been integrated into forest management practices.

The forest area initially stabilised after the large waves of forest clearance in the Middle Ages and has been increasing again since the 19th century. Forest genetic resources in Germany are therefore no longer threatened by losses of forest cover. Over-harvesting and clear-cutting are largely a thing of the past. Yet, past influences are still having an impact today. Continuous management over centuries has changed forests significantly compared with the vegetation that would have grown naturally. Still relevant today is the danger from fragmentation, habitat losses as a result of changes in location, browsing by game, air pollutant inputs and, as a particular challenge, climate change. The latter requires the exploitation of the entire genetic potential of native populations and, as appropriate, the targeted expansion of the genetic spectrum by introduced tree species and provenances that are less sensitive to future climate changes in order to establish adapted forests or forests that are as adaptable as possible. In addition, forests must satisfy the increasing demands made on their protection and recreational functions and the rising demand for wood.

In Germany, operations for the conservation of forest genetic resources focus on *in situ* measures. With regard to the main tree species, this is mainly done as part of sustainable forest management through tending and natural regeneration on the spot and through sowing and planting site-adapted reproductive material. This is supplemented by the targeted designation of gene conservation objects and *ex situ* measures (e.g. seed storage, seed plantations). Rare tree and shrub species mostly require a targeted recording and genetic characterisation of their occurrences in order to decide on conservation measures, for instance in the form of conservation plantations.

In Germany, *in situ* conservation stands are currently (as per 2010) designated for approx. 170 tree and shrub species on an area of around 7,079 ha. Common beech, the native oak species English and sessile oak, common spruce, Scots pine and Russian elm predominate in terms of area.

Ex situ stands of tree and shrub species cover (as per 2010) a total area of around 1,254 ha, with the main proportion of the land being taken up by Douglas fir, common spruce, common beech and common yew. There are, at present, seed plantations for tree and shrub species on a total area of almost 800 ha. The storage of seed and pollen constitutes a further *ex situ* measure. The nine Länder centres for seed storage and one Federal Government centre currently store seeds of 84 species.

At present, 25,963 seed crop stands have, under the Act on Forest Reproductive Material, been approved for the provision of forestry with reproductive material, with by far the greatest proportion being accounted for by the category "selected". Around 1,600 forestry seed and forestry plant enterprises are engaged in the production and marketing of forest reproductive material. In doing so, they are subject to the strict rules of the Act on Forest Reproductive Material that lays down rules both for the commercial production, marketing and import and export of forest reproductive material. In conjunction with the Federal Government/Länder forest acts and nature conservation legislation, they form the key legal framework for the conservation and sustainable use of forest genetic resources in Germany.

As early as in the 1980s, the Federal Government/Länder Working Group "Forest Genetic Resources and Legislation on Forest Reproductive Material" (BLAG-FGR) presented an initial "Concept for the Conservation of Forest Genetic Resources in the Federal Republic of Germany". After a thorough review in 2000, the concept is available as the National Programme in an updated new edition issued in 2010. The nine Länder institutions represented in BLAG-FGR, the Johann Heinrich von Thünen-

Institute (TI) and universities and polytechnic colleges are engaged in research on forest genetic resources. The Federal Government promotes research with support schemes.

Knowledge of tree and shrubs genetics and the importance of forest genetic resources is imparted both in higher education at universities and polytechnics and in the vocational training of forest experts and related professions. A special feature in Germany is the interaction between training companies and vocational schools in the dual system of vocational training.

Alongside public administrations, many non-governmental organisations are also involved in public relations work, raising public awareness of the importance of forests and the need for their conservation. Germany took the International Year of Forests proclaimed by the United Nations as an opportunity to launch a national campaign coordinated by the Federal Ministry of Food, Agriculture and Consumer Protection that involved over 100 organisations staging their own events.

Germany collaborates in different regional and international networks, programmes and projects for the conservation and sustainable use of forest genetic resources and is a State Party to a number of international agreements such as e.g. the CBD.

AnGR:

Advancements in biotechnology with artificial insemination (AI) and embryo transfer (ET), and in animal breeding with data processing, index selection, commercial cross- and hybrid-breeding have led to a rapid improvement of the commercially significant characteristics milk, meat and egg production in intensively managed breeding populations of cattle, pigs and poultry.

At the same time, many of the less productive breeds have lost their importance. As a consequence, their population size continues to decrease and they become endangered. The loss of these endangered landraces comes along not only with the risk that important alleles disappear, but also that stringent selection and global use of ever fewer sires lead to an increase in inbreeding within high-output populations. This in turn means ongoing reduction and potential loss of genetic diversity and of alleles that currently are not thought useful in achieving breeding objectives. It is feared that the use of molecular biotechnology, especially with genomic selection, will accelerate this trend. However these technologies bear also the possibility to characterize and monitor this kind of alleles.

This trend is intensified by the concentration of demand, which forces producers to offer the expanding consumer industry uniform products of strictly defined quality at falling prices. The products and thus the producers and their farm animals can only stand their ground if they open specialized markets where the particular characteristics of local products with a higher unit price are appreciated accordingly. This requires not only self-production, but also direct marketing. Thus, the traditional breeding structures of farmers, i.e. breeding associations, are put at risk by globally active breeding companies, which now become the rule for hybrid poultry and pig breeding.

The trend outlined in contemporary industrial societies leads unintentionally to more farm animal breeds being at risk of extinction. The potentially irreversible loss of alleles associated with extinction reduces genetic diversity. For this reason, the conservation of endangered breeds “as the genetic resources of the future” has become a social liability. The use of limited public funds and fundraising from private sponsors for this task requires that, on the one hand, the social importance of the local breeds is pointed out irrespective of their present day market value and that, on the other hand, cost-effective, sustainable and reliable conservation methods are developed and recommended.

Priorities and strategic directions for future actions are identified in of the National Programme on the Conservation and Sustainable Use of Animal Genetic Resources:

- long term in situ and ex situ conservation of the diversity of animal genetic resources in scientifically sound and cost-effective breeding programmes;
- enhancing attractiveness of animal genetic resources for sustainable animal production systems by means of description, evaluation, documentation and breeding tests;
- contributing to the conservation and use of agricultural grassland ecosystems and supporting the utilization of animal genetic resources in nature and landscape protection areas;
- supporting all actions concerning the conservation of animal genetic resources and establishing a transparent system of competence and responsibilities between the Federal Government and the Länder, NGOs and private sponsors;
- promoting co-operation at national, European and international level and exploiting the resulting synergies.

PGR:

Plant genetic resources form the vital basis for feeding a growing world population in times of climate change and limited availability of fertile soils. In Germany alone, several hundred crop species have and still are being grown (without the species grown for ornamental purposes). Over the centuries, thousands of varieties have emerged among the species of particular importance for food purposes and the species heavily modified by breeding that have their own characteristic features.

Yet, breeding objectives are changing. For example, the further development of organic farming, in part, requires other breeding aims than conventional farming. This can result in genetic properties that had previously no longer been in demand being reintroduced into breeding programmes.

A key reservoir for innovations in breeding research are therefore collections of genetic material such as gene banks, research and connoisseur collections. It is therefore a key task of society to preserve biological material in these collections in the long term and to provide the best possible support for its use.

In order to meet some challenges that arise in breeding it may even be necessary to draw on the extended gene pool of the wild species related to crops. Therefore, the conservation of wild crop relatives and their valorisation for breeding is also important. Collecting missions to the centres of diversity of wild crop relatives may expand the available diversity for national users, especially if few or no valuable genetic traits of key agronomic features exist in the gene bank stocks.

New and innovative approaches in breeding research (phenotyping, genotyping, sequencing of DNA, etc.), technology and documentation and information technology are constantly increasing the opportunities of modern plant breeding. In spite of that, the selection of cross-breeding partners, the availability of genetically diverse material for the subsequent selection process and pre-breeding form the basis for the constant further development of our crops. The competitiveness and sustainability of German farming is based on a constantly renewed varietal diversity that is made available by breeding establishments. Farmers and horticulturists thus have access to seed of varieties with enhanced properties, notably the quality and resistance to abiotic and biotic factors.

Even though some species have been able to recover because of targeted conservation activities, as a whole the diversity of species being used, and partly also the genetic diversity within the species, are sharply in decline. The decline has coincided with an intensification of agriculture, which is characterised by regional differences, and the abandonment of low-yielding sites.

The National Programme on the conservation and sustainable use of plant genetic resources of agricultural and horticultural crops explains the various aspects related to the conservation and sustainable use of plant genetic resources, whilst defining a need for action for improved conservation and increased use of plant genetic resources.

The Federal Ministry of Food and Agriculture (BMEL) has charged the Advisory and Co-ordinating Committee for Agricultural and Horticultural Crops (BEKO) with assisting the implementation of the National Programme on Plant Genetic Resources. BEKO provides expert assistance for the areas listed below and enables progress to be made by initiating and implementing projects.

- Conservation of crop diversity in collections (*ex situ*)

A well-developed gene bank landscape has been established in Germany that, alongside the internationally renowned and certified central federal ex-situ gene bank of agricultural and horticultural crops at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), also includes other more specific gene banks for vines, fruit, ornamental plants, wild plants and tobacco. German gene banks have either already implemented the internationally agreed gene bank standards by the Commission on Genetic Resources for Food and Agriculture in an exemplary fashion or started to do so at least. The long-term security of the plant specimens stored in most establishments is thus ensured.

In spite of this relatively positive situation, it must not be forgotten that the funding of conservation work is not ensured in all cases. The closing down of collections, unforeseeable events (e.g. accidents, errors, disasters) or phytosanitary problems can cause the loss of valuable genetic resources. The long-term use of varietally pure, healthy and viable plant material is therefore a costly task that requires appropriate resources.

- Conservation of wild species related to our crops in natural habitats (*in situ*)

In recent years, the interest in wild crop relatives (also referred to as wild plants for food and agriculture - WEL - in Germany) has continuously grown since the crossing of distantly related genes also became possible with the help of biotechnological methods. However, it is often difficult to gain access to the plant samples of these wild plants because they have, to date, been under-represented in gene banks and given that the centres of origin of the species modified by breeding in Germany are mostly outside of national borders, e.g. in the fertile crescent of the Middle East.

Yet, in Germany, too, there are communities of wild plants related to our crops, e.g. European wild vine, wild celeries and different types of wild fruit and grassland, that are of interest to breeders. In recent years, more and more plant material of important WEL species has been secured in gene banks, with a gene bank being specifically established for the collection of native WEL species. Particularly in the case of WEL species, the conservation of natural habitats is of major importance because the plants show a high intra-specific variability on these sites that can only be preserved through natural processes of reproduction and that cannot be mapped in pure *ex situ* storage.

- Conservation of old varieties in agricultural or horticultural cultivation (on-farm or in-garden)

Many of our crops have already been used for hundreds of years and undergo constant evolution. The permanent selection of individuals for further use generates a regionally-adapted large diversity of land races. As a result of the globalisation of markets and the concentration processes in the agricultural and food industries, many crop species and varieties have vanished from widespread cultivation in Germany as well. Therefore, the National Biodiversity Strategy and the sectoral Agro-biodiversity Strategy, inter alia, set the objective of the conservation and sustainable use of the distinctive regional genetic diversity of crop varieties.

The 1980s saw greater public awareness of the value of crop diversity, with societies being established that dedicated themselves to the conservation of crop diversity. To date, these societies and initiatives have recultivated and also used a major part of the crop diversity that exists as genetic resources in gene banks in Germany. Thus, healthy plant material of rare and old varieties could be preserved over a wide area and, in part, be further developed through selection. In individual cases, old varieties could thus again be successfully marketed.

In line with the slogan "conservation through utilisation", there are numerous approaches to keep the diversity of plant genetic resources available via use, whether through the growing of old varieties and the attempt at re-marketing, through use in breeding programmes or by broad-based screenings in basic research. The chief concern here is to continue the projects and initiatives that are already under way. For example, positive results have been achieved by the EVA II project for the evaluation and characterisation of wheat and barley, the German plant phenotyping network (DPPN) for automated high-throughput phenotyping or the formation of composite cross populations for barley. These projects have helped to valorise genetic diversity in gene banks and other research collections by linking the resources with information about their properties, thus promoting their use in breeding programmes.

Besides using plant genetic resources in research and breeding, it is also possible to recultivate them and put them to direct use. To this end, it is necessary to provide a sufficient quantity and quality of seed and planting material of old varieties and to be able to offer the material ideally with precise instructions for cultivation. Alongside the voluntary work performed by conservation initiatives, so-called centres of expertise can help spread suitable old varieties and foster a possible marketing. However, a prerequisite for this is that the statutory framework allows such a marketing and takes account of the more difficult growing conditions and reduced profits from the marketing of such products.

In recent years, numerous information systems have emerged in Germany that provide information about plant genetic resources, whether about stocks in gene banks, botanical gardens or conservation initiatives, biological and specialised nature conservation information, breeding properties and much more besides.

Nevertheless, not all information was sufficiently accessible, in particular from the key field of characterisation and evaluation data that matters for breeding research. A valorisation of plant genetic resources in gene banks can best be achieved by a link to information about value-enhancing traits. There are international efforts in this regard, e.g. through the initiative DivSeek that just got under way and that involves Germany. The results from stepped-up efforts in plant phenotyping should also be reflected in modern information systems.

AqGR

Aquatic genetic resources comprise all water-dwelling genetic resources that are of current or potential value for the productivity and sustainability in capture fisheries and aquaculture. However, merely bony fishes, crustaceans and mussels are of commercial importance in German fisheries and aquaculture.

The structure of fisheries in Germany heavily depends on the different habitats of aquatic genetic resources. The natural habitats can be subdivided into the marine sector with coastal and deep-sea fisheries and the limnic sector with lake and river fishing as well as pole-and-line fishing (recreational fisheries). In Germany, aquaculture is mainly carried out in inland waters. Pole-and-line fishing or recreational fishing can be conducted in inland waters and in the ocean.

German sea fisheries (coastal and deep-sea fisheries), which is embedded in the common fisheries policy of the EU, holds about 5 % of the catch quota of species subject to quota within the EU. In 2013, the total annual landings of German sea fisheries at home and abroad accounted for 209,644 t. In the order of their quantitative shares in German domestic landings in 2013, the main target species among sea fish were Atlantic horse mackerel, herring, sprat, blue whiting, mackerel, saithe and codling/cod. Alongside the North and Baltic Seas, the fishing grounds of the fleet also encompass the waters in the North-East, North-West and Middle East Atlantic. In addition, a larger number of part-time fishermen and anglers with or without vessels also exploit the resources in the German coastal waters.

Freshwater fisheries uses both wild stocks of lakes, dams and rivers, and stocks in aquaculture that are, affected by breeding. While professional lake and river fishing has sharply decreased in Germany during the last century, pole-and-line fishing, with currently more than 1.6 million anglers, is becoming increasingly more important also economically speaking. Thus, around 215,000 lakes, dams and river are currently being managed by approx. 750 full-time or part-time fishing enterprises. Added to this are fishing rights for non-commercial purposes in an unknown number and on an unknown scale. Both in terms of stretches of water used for fishing and in terms of the number of fishery enterprises, river and lake fisheries focuses on the Länder of Brandenburg, Bavaria, Mecklenburg Western Pomerania, Baden-Württemberg and Schleswig-Holstein that are rich in lakes. The catch levels reported in 2012 add up to just over 3,000 t.

Today the vast majority of the fishing yield of freshwater fisheries no longer comes from the lake and river fisheries but from aquaculture. According to the Federal Statistical Office (Statistisches Bundesamt 2013), a total of 26,591 t aquatic organisms had been produced in German aquaculture for the food sector in 2012. In terms of production volume, fish accounted for around 74% of production and molluscs for 26%. Even if mollusc production is only confined to the two species of common mussel and Pacific oyster, these two species have a quite high share in the total output of German aquaculture. The species of rainbow trout and carps are very dominant in German aquaculture fish production.

In the sea fisheries sector, the increase in human activities in the marine sector such as offshore wind parks, sand and gravel extraction, gas and petroleum pipelines are seen as problematic for the conservation and sustainable use of aquatic genetic resources because they deprive fisheries of key fishing grounds and the aquatic genetic resources of their habitats. The reformed Common Fisheries Policy (CFP) will make a further substantial contribution to enhanced sustainability in marine fisheries, notably by implementing the discard ban, regionalisation of management, extensive implementation of long-term management plans, time-and area-related catching restrictions,

legislation governing fishing gear etc. The ecosystem approach is being implemented in fisheries management under the CFP and the European Marine Strategy Framework Directive.

In recent years, the framework conditions for the use of aquatic genetic resources in commercial fisheries in German lakes and rivers have become more complicated and problematic due to the competition with other interests in water use. Apart from the persistent cormorant problem, nature conservation rules and restrictions make fisheries more difficult. Conflicts arise specifically in connection with management plans in FFH areas where restrictions on water use for fishing purposes are called for. There are also conflicts arising from the intensive water use by other areas of interest such as shipping, recreational activities/tourism, energy generation through hydro-electric power and abstraction of coolant (Brämik, 2013).

The implementation of Art. 34 of the EU Basic Regulation on Fisheries (Reg (EU) 1380/2013) constitutes a new development. The new EU Basic Regulation on the Common Fisheries Policy (CFP) now, for the first time, also includes aquaculture, thus giving it a significantly higher profile than hitherto. Inter alia, the EU calls upon the Member States to draw up their own "national strategy plans" to develop this sector and present them to the European Commission. The aim of this strategy plan is basically threefold, with the plan being structured accordingly:

1. the detailed appraisal and presentation of the current situation in German aquaculture, including a concrete identification of the chief obstacles to development,
2. formulation of fundamental and universal strategic long-term objectives and the derivation of concrete sectoral growth objectives for a medium-term period for German aquaculture (strategic planning section), and
3. formulation of measures needed to achieve the strategic targets.

In this connection, the quantitative growth targets defined in the National Strategy Plan for Aquaculture that are to be achieved by 2020 in relation to the respective production branches are of particular interest for the production trends in the coming decade. Growth targets for carp pond farming are aimed at stabilising the current production levels. Particular emphasis is put on the conservation of ecosystem services provided by carp pond farming for nature conservation. The plan envisages substantial increases in production for the other aquaculture sectors. The setting of the targets is chiefly based both on the growth forecasts of key economic operators and on an assessment by experts from the fisheries administrations of the Länder.

a) common characteristics shared by all sectors

All sectors are closely linked to the productive and functional capacities of the ecosystem. The conservation of biodiversity for food and agriculture generally depends on the sustainable use of the genetic resources concerned.

In the case of plant and animal genetic resources, a tendency towards the further mechanisation of production and cultivation and towards a homogenisation of the genetics used has become evident. The latter is backed up by the increased opportunities for a selection of high-yielding genetics. It seems that the concentration on specific types of farm animals or crops has not progressed further in recent years.

b) major differences between sectors;

As far as aquatic genetic resources area concerned, capture fisheries still draws on wild natural resources for food production to a large extent. For many commercial fish species, German coastal

and high-sea waters experienced a stabilisation or recovery of stocks as a result of a consistently implemented build-up of stocks and management plans. German breeding lines of aquaculture species (carps) are, *inter alia*, threatened by displacement by more cost-efficient stocking material from abroad.

The conservation measures that have so far been taken in the field of aquatic genetic resources prevented the extinction of native breeds of the main species used over the past decade. Improvements are sought in cryopreservation and the targeted pairing within endangered breeds in order to limit inbreeding growth (indicator genetic resources, indicator report 2014).

Long rotation periods in forestry of 60-120 years necessitate a forward-looking forest management. In Germany, the use of seed and planting material of enclosed regions for trees for production is therefore prescribed by law. Here, strategies for adjustment to climate change are particularly important. In contrast to crop plantations in agriculture and horticulture, German forests mainly consist of populations that are only slightly influenced by man. Moreover, the protective, productive and recreational functions are being fulfilled on the same area.

c) synergies or trade-offs in the state of diversity between sectors

Synergies arise from the basic research into the causes and drivers of the loss of genetic resources and the formulation of overarching programmes.

Cross-cutting advisory bodies (scientific advisory boards, institutes) are also capable of addressing the subject in an integral manner. Synergies can also arise in the development of communication measures aimed at the public. As the central German body, the Information and Coordination Centre for Biological Diversity (IBV) at the Federal Office for Agriculture and Food (BLE) supports the efforts undertaken by the Federal Ministry of Food and Agriculture (BMEL) for the protection of biodiversity in agricultural areas. In doing so, synergies between the sectors are being harnessed in a targeted manner in the drafting of programmes and structures.

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 regulating and supporting ecosystem services. Annex 1 provides a description of the components of associated biodiversity and Annex 4 a description of the ecosystem 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).

See answer to question 22.

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

Production system	**Trends in last 10 years (2,1,0,-1,-2, NK, NA)**			
Code or name	Micro-organisms	Invertebrates	Vertebrates	Plants

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.

See answers to questions 9, 13 and 28.

There are different monitoring programmes in place in Germany, that are not specifically targeted at associated biodiversity, however, While initial indicators for the status of biodiversity have been defined and target values have been set in Germany (BMU, 2010), indicators are lacking in order to comprehensively measure and assess conditions and trends of components of the associated biodiversity at national level. Statements on the impact of changes to different components of associated biodiversity on different production systems are therefore not possible. 7 of the 19 indicators of the National Strategy for Biodiversity analyse components of biodiversity and thus only indirectly the associated biodiversity.

The indicator **"species diversity and landscape quality"** maps the changes in chosen bird species populations in the main landscape and habitat types in Germany (farmland, forests, settlements, inland waters, coasts and sea and the Alps). It is regarded as a key indicator of the sustainability of land uses and shows a sustained negative trend in the past decade. The indicator **"endangered species"** sets out the threats to species in Germany on the basis of assessments of chosen Red Lists (Binot et al., 1998, BfN, 2009, Binot-Hafke et al., 2011), that, however, cover merely 11% of the species occurring in Germany. An indicator value of 23% as against 21% in 1998 suggests a continuing state of danger for the species under examination. It is not possible to generalise the indicator values to the entire species diversity in Germany and their vulnerability. The indicator "**conservation status of FFH (flora-fauna-habitat) habitats and FFH species"** provides a summary statement on the conservation status of habitats under the FFH Directive in Germany. The 46% indicator value in 2013 vis-à-vis 48 % in 2007 underlines the need for action for the improvement of the conservation status of FFH habitats in Germany. The indicator **"invasive species"** sums up the number of invasive species that could jeopardise ecosystems, habitats or species in Germany. The indicator value of 11 invasive species in 2012 that, so far, only occur within small areas has not changed vis-à-vis 2010. Since 2010, no small-scale invasive species of the first sub-indicator became so widespread in Germany as to be regarded as covering large areas now.

The indicator **"territorial protection"** reviews progress on the designation of strictly protected areas as a measure of site protection. A positive trend can be observed here: The area devoted to strictly protected sites has risen from 3.2 % to 4.3 % from 2000 to 2012.

The indicator "**ecological water status"** provides information on the ecological condition of rivers, brooks, lakes, transitional and coastal waters. In 2009, only 10% of water bodies achieved a good or very good ecological status. Flowing waters (9% in a good or very good ecological condition) make up the largest part of water bodies in Germany. The outcome for lakes was more positive. Here, 39 % achieved a good or very good ecological condition. Coastal and especially transitional waters fared worse. They missed the target of good ecological condition in virtually all water bodies.

The indicator "**status of floodplains**" gives information on the condition of floodplains as a habitat for flora and fauna. The indicator level amounted to 19 % in 2009 which suggests that the large floodplains in Germany are, as a whole, adversely affected (BMUB, 2014b). The Red Lists describe the hazardous situation of animals, plants and fungi and, with their check lists, constitute an inventory of species diversity in Germany. Roughly every ten years, they are published for Germany as a whole

under the aegis of the Federal Agency for Nature Conservation. The Red Lists are scientific expert opinions setting out the risk status for a specific reference area. They assess the danger on the basis of the stock size and stock development.

Which species and varieties count among associated biodiversity in Germany has not been determined so far. Neither is a survey being conducted relative to the production system. Therefore, no statement can be made about the impact on individual production systems at this point in time.

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).

See answers to question 24 and to questions 9 and 13

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)**									
Code or name	Pollination	Pest and disease regulation	Water purification and waste treatment	Natural hazard regulation	Nutrient cycling	Soil formation and protection	Water cycling	Provisioning of habitat	Production of oxygen/ Gas regulation	Others: [*please specify*]

24. Briefly describe the <u>changes</u> or trends in <u>diversity</u> 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.

See answers to questions 9, 11 and 13.

There is, at present, no nationally agreed and coordinated assessment of ecosystem services in place in Germany. Statements on possible changes or trends in regulating and supporting ecosystem services in the past decade, differentiated according to production systems, are therefore only possible to a limited extent.

Production system L3 Livestock grassland-based systems: temperate zone;
Production system L7 Landless livestock farming, temperate zone;
Production system C11 Rainfed crops, temperate zone

The indicator "nitrogen surplus in agriculture" can be used for the supporting ecosystem function "Nutrient cycling". It does not, however, distinguish between production systems. From 1991 to 2011, the nitrogen surplus decreased from 130 kg/ha and year to 101 kg/ha and year (moving triennial average). This level is still well over the intended target level for 2010 of 80 kg/ha and year

(BMUB, 2014b). The indicator "species diversity and landscape quality" can be used for the supporting ecosystem service "provisioning of habitat" and "pollination" (see also question 9). Ploughing up of grassland and energy crop cultivation can have an impact on landscape quality and species diversity. It is, at present, still open whether the agri-environmental and nature conservation measures taken will, in the medium to long-term, result in a reversal of the negative trend on farmland (BMUB, 2014b).

Production system F3 Forests with natural regeneration, temperate zone

Germany's forest area has virtually remained unchanged in the past decade. In 2013, just under 70% of the forest area had been certified under PEFC and slightly more than 5% of the forest area had been certified under FSC (BMUB, 2014b). More timber is re-growing than exploited. In spite of an intense use, forest stocks rose to 3.7 billion cubic metres. The percentage of deciduous trees has risen as compared to coniferous trees, which is more in harmony with natural forest cover and constitutes a policy objective. Forests have become more diverse and natural in structure. There is more deadwood in forests – an important foundation for biodiversity (BMEL, 2014a).

Production system A3 capture fisheries, production system A11 aquaculture with feeding; production system A 15 aquaculture without feeding

For the supporting ecosystem service "provisioning of habitat" in the case of water bodies, the indicator "ecological water status" can provide information: According to the assessment criteria of the Water Framework Directive, it turns out that only 10% of water bodies achieved a good or very good ecological status in 2009. This overall result largely reflects the assessment of flowing water bodies (9% in a good or very good ecological condition) in Germany since these account for most of the water bodies. The outcome for lakes was more positive. Here, 39% achieved a good or very good ecological condition. Coastal and especially transitional waters fared worse. They missed the target of good ecological condition in virtually all water bodies. As regards flowing water bodies, the most frequent reasons for a classification under a moderate, unsatisfactory or poor status are changes in hydromorphology (e.g. through construction, straightening of watercourses and regular maintenance), the lack of passability and high nutrient inputs from farming. These adverse effects are reflected in massive changes in the biocoenoses. The nutrient load represented the key cause for lakes, transitional and coastal waters (BMUB, 2014b). Moreover, considerable inputs come from defective sewer systems or also from sewage treatment plants. Nutrient inputs also pose a serious ecological problem for the Baltic Sea as an inland sea, causing excessive growth of phytoplankton. Dying plankton, in turn, results in a lack of light and oxygen which adversely affects the lives of seaweed, bladder wrack and animals on the sea bed. While nutrient inputs in the Baltic Sea have dropped since the 1980s, the inland sea continues to be regarded as severely eutrophicated. (UBA, 2014).

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 and provide a description of specific situations and documentation where available (repeat table for each production system).

See answer to question 26.

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)								
Code or name		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
	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)									

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.

Generally, great importance is being attached to biodiversity for food and agriculture for the provision of ecosystem services (BMELV, 2007). A comprehensive and substantiated evidence base of the impact of changes in biodiversity for food and agriculture on the provision of ecosystem services is not available in Germany.

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.

The active management of honey bees in Germany is not (only) aimed at rendering ecosystem services but also due to the honey yield. Honey bees and pollinators in breeding enterprises are being actively managed for horticulture and vegetable growing (greenhouse system).

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	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 bees (Apis mellifera) Bumble bees (Bombus terrestris) Wild bees: Osmia bicornis (red mason bee) Osmia cornuta (hornfaced bee) Flies: Lucilia caesar (toadfly) Lucilia sericata (blowfly) Eristalis tenax (dronefly) Sphaerophoria scripta/rueppelii (long hoverfly) Episyrphus balteatus (marmalade hoverfly)	C11, (specifically fruit cultivation and vegetable cultivation under glass and polytunnels)	Yes, honey bee No, bumble bees, wild bees and flies in breeding centres	German Beekeepers' Association, German Professional Beekeepers' Association, Working Group of the Institutes for Bee Research
Pest and disease regulation	Beneficials The regulation of game also serves the prevention of game epidemics, like swine fever, scabies, and fox tapeworm.	C11	No	www.**jki**.bund.de/fileadmin/dam_uploads/_../**NuetzlingeGarten**.pdf §§ 23 + 24 of German Federal Hunting Law, veterinary authorities of the Länder
Water purification and waste treatment				
Natural hazard regulation				

Nutrient cycling				
Soil formation and protection	Soil-conserving management preserves and promotes overall soil biodiversity.	C11	Yes, regarding individual groups of soil organisms	Van Capelle et al. 2012
Water recycling				
Habitat provisioning	As appropriate, wild bee hotel, dry walls, is not actively managed however Soil-conserving management promotes the overall habitat function of soils and thus soil biodiversity.	C11	Yes, regarding individual groups of soil organisms	Van Capelle et al. 2012
Production of oxygen/ Gas regulation				

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.

There are diverse monitoring measures in place in Germany, they either directly address associated biodiversity or indirectly. The following excerpt shows the nationwide monitoring activities that are classified in line with associated biodiversity listed in Annex 1 to the guidelines:

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;
Soil permanent observations: The status of Germany's soils is monitored on almost 800 soil permanent observation plots comprising arable land, grassland, forestry and special uses (e.g. settlements, viticulture). The monitoring programme aims at recording the current soil status, monitoring changes therein in the long run and mapping emerging trends. Long term soil monitoring is incumbent on the Länder (UBA, 2013). The National Forest Soil Inventory (BZE) examines the status and changes in forest soils, vegetation, crown condition and forest nutrition at around 2000 forest sample points in Germany. While the Länder gather the data, the Thünen Institute (TI) coordinates the survey, assists the Länder through accompanying scientific research and evaluates the data. Native flora and fauna are being assessed in the Red List of endangered animals in Germany with regard to the danger they are exposed to. In 2011, the second part of the Red List of endangered animals, plants and fungi in Germany, volume 6: fungi (part 2) - lichen and myxomycetes (Ludwig und Matzke-Hajek, 2011) was published.
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;
As part of butterfly monitoring in Germany, volunteers conduct weekly walks along set routes (transects), recording all diurnal butterflies year after year. The population data thus obtained documents the development of butterflies at local, regional and national levels and can be compared

with those from other European countries where observations have, in part, been conducted for many decades (www.tagfaltermonitoring.de).

Native flora and fauna are being assessed in the Red List of endangered animals in Germany with regard to the danger they are exposed to. The first volume of the Red List of invertebrates was published in 2009 (BfN, 2009).
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;
The game information system of the German Länder (WILD Wildtierinformationssystem der Länder Deutschlands) documents stocks and distribution of selected wild species, like fox, partridge or raccoon. Thus it ensures the conservation and sustainable use of wild species populations. Data is recorded by (local) hunting communities.
Bird indicator: In order to provide a summary assessment of the status of nature and landscapes under the influence of diverse uses throughout Germany, an indicator has been developed that is based on the population trends of selected bird species that represent the main types of landscape and habitat in Germany. The size of the populations (according to the number of territories or breeding pairs) reflects the suitability of the landscape as a habitat for the selected bird species. (BMUB, 2014b, p. 9).
In 2009, the Red Lists for vertebrates (without marine fish) were published.

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.
In 2013, volume 2 of the Red List for marine organisms (Becker et al., 2013) was published.

Floristic mapping: Under the name of floristic mapping, a stock evaluation and mapping of vascular plants (ferns and flowering plants) is under way in Germany (BfN, 2008). Biotope mapping (conclusions for plant species are drawn from a typical species inventory of classified biotope types) (FFH monitoring, cf question 22). In addition, different surveys are conducted in connection with performance reviews of agri-environmental measures in the Länder, that, in part, also encompass associated biodiversity. Under the forest soil condition survey, vegetation surveys were also carried out at sample points.
Using a national sample grid, the HNV-Farmland Indicator identifies the percentage of agricultural production area in Germany that is deemed rich in biodiversity for food and agriculture. In 2013, HNV-farmland accounted for a 11.8% share in agricultural land (BfN, 2015c).

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[18]. Include a description of the threat and list references or sources of information if available.

[18] IUCN (International Union for Conservation of Nature) (2012). IUCN Red List Categories And Criteria, Version 3.1 Second edition http://jr.iucnredlist.org/documents/redlist_cats_crit_en.pdf

There is no classification of species and varieties under the categories of "biodiversity" or "associated biodiversity" in Germany.

Hazardous situation of wild animals in Germany: In the Red List of endangered animals in Germany of 1998, over 16,0000 of ca. 48,000 native animal species had been assessed with respect to the threat they are exposed to (Binot et al., 1998). According to the current risk classification under the Red Lists, a total of 207 species and subspecies (taxa) of vertebrates (without fish and Cyclostomata in the sea) had been listed in the various risk categories of the Red List (including extremely rare and extinct and missing species). With 43%, this is just under half of all vertebrates evaluated. Almost 28% (128 taxa) are currently critically endangered, 7% (37 species) already extinct and missing. With over 60% critically endangered taxa, reptiles (13 taxa) are the vertebrate group most at risk. The other vertebrate groups that are more rich in species all show under 40% of critically endangered taxa. In spite of the still high share of endangered species, some success has, in specific cases, also been achieved for nature conservation. Thus, the currently positive stock developments for otters, wolf and beaver document that the species conservation measures implemented by official and honorary nature conservationists are having a positive effect. The outcome of nationwide bird monitoring also indicates for different endangered bird species that they have benefited from specific protection measures at their nesting sites, e.g. black stork, crane, harrier or great bustard. In contrast, the stock situation of numerous ground-breeding bird species of the agricultural landscape such as skylark, lapwing or meadow pipit is still unfavourable (BfN, 2012). The current Red List draws attention to some otherwise neglected species groups that fulfil important functions in ecosystems, however: for example, the wild bees, hoverflies, butterflies and wasps that are important for the pollination of wild plants or also other hymenopterans such as ants that have a strong impact on the substance and energy flows of ecosystems. The share of red list species in most groups examined here exceeds 40%. Long-legged, dagger and robber flies (Empidoidea), of which some species are also of economic interest to humans as antagonists to bark beetles or of insect groups causing damage to agriculture, account for the largest share at 68.6%. With 52.2% of native species, wild bees as well account for an above-average share of red list species.
The indicator "endangered species" that is recorded under the Biodiversity Strategy summarises the risk to species in the nationwide Red Lists in a simple index. The classification of species under the Red List categories constitutes the data basis. In order to protect species diversity, a reduction of the risk to all currently critically endangered species by one step is sought until 2020. This would result in a target level of 15% for the groups under review. For 2013, the indicator level that has provisionally only been calculated for 37 groups accounts for 23%. Great efforts in nature conservation are needed in order to achieve the 15% target level by 2020. The following Red Lists have since been published in Germany:
Red List of endangered animals, plants and fungi in Germany, Volume 6 Fungi (Part 2) – Lichens and myxomyceta, (Ludwig und Matzke-Hajek, 2011)

Red List of endangered animals, plants and fungi in Germany, Volume 3 Invertebrates (Part 1), (Binot-Hafke et al., 2011)

Red List of endangered animals, plants and fungi in Germany, Volume 2: marine organisms (Becker et al., 2013)

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

Associated biodiversity species	Degree of threat	Main threat (indicate)	References or sources of information if available

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.

There is no classification of species and varieties under the categories "biodiversity" and "associated biodiversity" in the ex situ conservation of biodiversity in Germany. Nevertheless, associated biodiversity forms part of the priority collections for biodiversity. The share of associated biodiversity can therefore not be quantified. Table 12 sets out key ex situ collections in Germany, by way of example.

More detailed information on the collections in Germany is being made available via the Global Biodiversity Information Facility (GBIF). Germany is involved in this international initiative and, in this context, provides collection, research, supporting and observation data from Germany (www.gbif.de).

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
Micro-organisms Leibnitz Institute DSMZ*[1]	Archaea, bacteria, yeasts, fungi and plant viruses	The microbiological collection contains 20,000 cultures from 6,900 species and 1,400 genera from bacterial and fungal strains and 600 plant viruses.			
Invertebrates SDEI*[2]	3 million Specimens of 190,000 species (worldwide), including types of 22,000 species	Special scientific collection with 3 million insect preparations	Research collection and no ex situ conservation collection	Supporting function for biodiversity monitoring and nature conservation planning	

Vertebrates Zoological gardens and animal parks			Combination between ex situ and in situ conservation	Combination between ex situ and in situ conservation, public relations work	
Plants Working group on conservation crops	600 endangered native plant species	600 species in over 3,000 accessions	Conservation cultures at different levels 1: Standard crop 2: Culture with generative propagation 3: Culture with generative propagation and genetic control	Conservation cultures are aimed at preventing the local, regional or global extinction of the respective species.	

*[*1] Leibnitz-Institut DSMZ -Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH (www.dsmz.de)*
*[*2] Senckenberg Deutsches Entomologisches Institut Müncheberg http://www.senckenberg.de/root/index.php?page_id=5242*
[3] German zoos and animal parks are involved in national and international conservation projects (e.g.amphibian programme, European mink) http://www.deutsche-tierparkgesellschaft.de/artenschutz and http://www.zoodirektoren.de/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=52&Itemid=210 abgerufen am 9.02.2015
[4] (www.ex-situ-erhaltung.de/botanische-gaerten/, 2015) http://www.ex-situ-erhaltung.de/botanische-gaerten/ abgerufen am 3.2.2015

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).

See answer to question 80 with information on protected areas in Germany

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
Micro-organisms					
Invertebrates					
Vertebrates					
Plants					

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.

See answer to question 17.

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.

See answer to question 16.

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.

See answer to question 14.

The Federal Hunting Act (as of 29 September 1976, Federal Law Gazette I p. 2849) specifies game species, whereas not all game species are used for food. It includes rules for hunting as a framework for Germany as a whole. The Länder hunting laws specify this from the respective regional angle. The Annex 7 contains a list of species that come under the Federal Hunting Act.

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

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[19]. Include a description of the threat and list references or sources of information if available.

See answer to question 29. There is no classification of species or varieties in the categories "biodiversity" or "associated biodiversity" in Germany.

[19] IUCN (International Union for Conservation of Nature) (2012). IUCN Red List Categories And Criteria, Version 3.1 Second edition http://jr.iucnredlist.org/documents/redlist_cats_crit_en.pdf

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

Wild food species (scientific name)	Degree of threat	Main threat (indicate)	References or sources of information if available

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.

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.

See answer to questions 30, 80.

The largest ex situ collection in Germany is the Federal Centre's ex situ gene bank at the Institute for Plant Genetics and Crop Plant Research (IPK). This collection contains approximately 18,000 accessions for around 3,000 wild species.

In Germany ex situ conservation is currently being established for wild plants for food and agriculture with the WEL gene bank in order to ensure the long-term conservation of these important plant genetic resources. At the present time 3,020 accessions for 300 plant species are conserved (see Infobox WEL gene bank).

In its Working Group on Conservation Crops, the Association of Botanic Gardens, a network of more than 90 botanic gardens in Germany, coordinates the activities of numerous botanic gardens and other stakeholders (institutions, associations, private individuals) in Germany for the conservation of native wild plants as crops (ex situ), as a form of insurance against the extinction of wildlife populations. At the present time, more than 3,000 conservation crops of around 600 endangered native plant species are listed.

In order to re-establish extinct populations, plants from conservation crops are returned to nature and substitute populations for disappeared or disappearing species are established at new sites. One essential prerequisite for successful reintroduction is the quality of the habitat. Only when the designated biotope meets a species' minimum requirements is there some chance of success (www.ex-situ-erhaltung.de/botanische-gaerten.de).

Wild fruit species

Wild fruit species are contained to a certain degree in the ex situ forestry collections of the federal Länder.

Wild game species

Wild game species are to be found to a certain degree in zoos and domestic animal parks. No up-to-date figures about the species and stocks to be found there are available. The targeted ex situ conservation of wild game species is not, however, linked to this. For some extremely endangered wild species, like for the European bison (Bison bonasus), ex-situ conservation activitites exist.

Micro-organisms and invertebrates

The Leibniz Institute's National Collection of Micro-organisms and Cell Cultures is Germany's largest collection of Archaea, bacteria, yeast, fungi and plant viruses. It contains samples of bacteria, fungi and viruses which are relevant for medicinal and industrial applications and, in some cases, for the agri-food industry. In the field of activity of the Federal Ministry of Food and Agriculture (BMEL) working collections of micro-organisms and invertebrates are maintained for research purposes. It can be assumed that there are also extensive collections in the private sector. No overview is available at the present time of the total number of collections as there are no central databases (www.genres.de).

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**
Wild species in the IPK Gatersleben	5,389 accessions	Gene bank standard	Long-term conservation	
Ex situ gene bank for wild species for food and agriculture (WEL gene bank)	300 species 3,020 accessions		long-term conservation, supply of seeds	
Wild fruit				
Invertebrates		no details	working collections dead collections	no details

Information box: Gene bank wild plants for food and agriculture

Gene bank wild plants for food and agriculture

The "Gene Bank Wild Plants for Food and Agriculture" (WEL) is a network that was established in 2009. It aims to safeguard wild plant genetic resources in Germany and to guarantee the availability of seeds. The Botanic Gardens in Osnabrück, Berlin, Karlsruhe and Regensburg and the Pädagogische Hochschule Karlsruhe participate in this network.

Seeds from native wild plants of relevance for food and agriculture are collected throughout Germany. 170 wild species are collected in different natural areas to ensure as great as possible genetic diversity within species. Around 30-40 wild plant species, that occur exclusively or at least largely in a specific region, are collected by the individual network partners to achieve plant genetic diversity on the interspecies level. The seeds are processed "regionally" in the four botanic gardens that participate in the network (purification, drying, germination tests, dispatch) and stored there at deep-freeze temperatures.

Tasks and objectives:

- Seed collections and conservation measures with special consideration of native crop wild relatives, of species with a direct or potential benefit for humans and of wild species/populations, the stocks of which are endangered.
- Evaluation, nationwide inventory, documentation and provision of propagative material and the related freely available data
- Tapping into network synergies through collaboration and mutual support on all questions of variety conservation and collection management
- Mutual support and collaboration on training courses, education, public relations and projects

In 2014 (status July 2014) the gene bank contained 3,022 accessions. Data on the collections are available on the Internet (http://pgrdeu.genres.de/exsitu/sdb) as part of the national inventory of plant genetic resources. The supply of seeds is, in principle, possible and is done by way of a SMTA. Further information: http://www.genbank-wel.uni-osnabrueck.de/ (in German only)

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).

See answers to questions 31 and 54.

As part of the general efforts to conserve biodiversity (nature conservation) wild species for food and agriculture are also protected without them being directly centre stage of protection goals.

The Fauna-Flora-Habitat Directive (FFH Directive) and the European Bird Protection Directive are the basis for the EU-wide network of protected areas Natura 2000 which is of particular importance for the protection and conservation of biodiversity. Natura 2000 mainly serves to conserve and develop habitats and species that merit special protection. With 26,000 sites across Europe and 18% of the EU's total surface area it is the world's largest network of protected areas. Natura 2000 areas are the backbone of Germany's network of protected areas. The notification of areas in Germany was completed in October 2009. There are almost 5,300 areas covering around 15.4% of federal territory and approximately 45% of German seas. The granting of protection for the notified Natura 2000 areas is well advanced. Many of the areas are, for instance, protected by Länder statutory orders or are designated nature conservation areas.

In the German exclusive economic zone (EEZ, 12-200 nautical miles) in the North and Baltic Seas, the federal government is responsible for the Natura 2000 areas. Germany had already notified eight FFHs and two bird sanctuaries to the European Commission in May 2004. The bird sanctuaries were designated as nature conservation areas in September 2005. The FFH areas were recognised as areas of Community importance by the EU at the end of 2007. The nature conservation area ordinances are currently being drawn up (BMUB, 2014a, p. 61). According to Articles 1 and 37 of the Federal Nature Conservation Act of 29 July 2009 (Federal Law Gazette 1 p. 2542), viable populations of wild animals and plants, inter alia, are to be conserved in Germany. There is a special responsibility for the conservation of species that are to be found exclusively or predominantly on federal territory because the global maintenance situation of these species depends on national stocks. There is a call for action above all for species that are already endangered. Germany has added the funding priority "Species for which Germany has a special responsibility" to the Federal Biodiversity Programme. This means that 40 selected species for which it bears responsibility can receive specific support. The measures in this funding priority are also intended to conserve and renaturalise their habitats in order to ensure long-term viable populations of these species. So far six projects have already been

approved in this funding priority (BMUB, 2014a, p. 59). The list is contained in the Annex 7. The higher the natural genetic diversity within species, the greater the chances of those species being able to adjust to changing environmental conditions and survive. Hence, this genetic diversity within species plays a decisive role particularly against the backdrop of climate change that is already happening now. Diversity within species is also of prime importance for maintaining potential uses in pharmaceutics, agriculture or in plant breeding. The genetic diversity of crop plants and agricultural livestock, which is reflected in the diversity of the animal species and plant varieties used, is the basis for securing future use options and adjustment opportunities to changing framework conditions and consumer wishes. This means that diversity within species is also of fundamental importance when it comes to tackling global challenges like food security or climate change. A substantial contribution to conserving genetic resources was already made in 2008 with the introduction of funding for the "Conservation of genetic resources in agriculture" in the Joint Task for the Improvement of Agricultural Structures and Coastal Protection.

Furthermore, Germany channels 2 million euro available every year into pilot and demonstration projects to support the development and implementation of innovative exemplary concepts, and to overcome deficits in the conservation and use of genetic resources. A further 1.5 million euro a year is made available by Germany for inventorying, surveys and the like in the field of biodiversity. The objective is the recording, inventorying and documentation of genetic resources, the monitoring of stock development and the establishment of other information bases. This helps to support, inter alia, the setting up and strengthening of conservation infrastructures and networks. (BMUB, 2014a, p. 63). The conservation and development of biodiversity in agricultural landscapes is a primary task of agri-environmental schemes. Agri-environment-climate measures (AECMs) promote the conservation of certain agroecosystems and extensive farming techniques (extensive permanent grassland, hedgerow planting, field periphery programmes, the promotion of the integration of natural open farmland structures and many other things). This has a positive impact on the conservation of biodiversity, including wild species for food and agriculture. In recent years (2009-2012) both subsidised areas and the funds made available have increased. In future, funding must be geared more towards protection and the sustainable use of biodiversity (see question 54 and BMUB, 2014, p. 55 ff and BMU, 2013, . Furthermore, organic farming with its positive impact on the above-mentioned objective is important. All federal Länder have promoted the switch to organic farming and the conservation of this form of farm management.

A forward strategy to strengthen organic farming is currently being developed in Germany with a view to enhancing the offering of organic foods. Against this backdrop attention will focus, inter alia, on how sustainable agricultural production methods like organic farming can be embedded in existing, overarching agricultural and resource policy strategies. This also encompasses activities in conjunction with the DAFA (German Agricultural Research Alliance) process "Future of the organic farming system" that elaborates more particularly the need for and orientation of research priorities.

Furthermore, efforts are being made in Germany to cultivate more protein crops. To this end, a protein crop strategy was developed which pursues, in addition to the goals of resource protection and improved soil fertility (e.g. through carbon sequestration in the soil), the goal of improving species diversity in agricultural landscapes.

Germany has plans for a Network of Genetic Conservation Areas for the targeted in situ conservation of important related wild species of crops to be coordinated by the Information and Coordination Centre for Biological Diversity (IBV). The first protection zone is to be a protection zone for wild wine (Vitis vinifera) on the Rhine island Ketsch in southern Germany.

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
Vitis vinifera L. subsp. sylvestris (C.C.Gmel.) hegi	Establishment of a genetic protection zone on the Rhine island Ketsch in southern Germany	A population with 82 individuals	Long-term maintenance of the population, promotion of use by characterisation and evaluation	
Wild fruit	"Conservation of diversity within species of native wild fruit species in Saxony" http://www.wildobstsachsen.de/index.php?id=22		Recording of genetic diversity; production of native seeds;	
Wild animals	Numerous projects of the German Wild Animal Foundation for the protection of native wild animal species as well as of the local hunting communities	Various species	Conservation and protection of selected wild animal species and their habitats	Research, public relations, conservation efforts
Wild animals	Wild animal information system of the German Länder (WILD) http://www.jagdverband.de/sites/default/files/5114_WILD_2013_RZ-lr.pdf	Nationwide recording of wild animal species	selected wild animal species and their habitats	

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?

See answers to questions 17 and 37.

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.

See answer to question 16.

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).

In recent years numerous extreme weather events (see Table 18) led to substantial, mainly local and regional harvesting losses. There are no safe statements about a loss of biodiversity for food and agriculture caused by natural or man-made disasters at the present time. No information is available about studies on the concrete effects of these disasters on ecosystem services. Disease outbreaks constitute a risk for genetic resources because stocks have to be culled in the direct vicinity of the outbreak in line with the safety provisions in animal health law for specific diseases. This leads to the risk that endangered farm animal breeds, that only have very small conservation stocks left, will be almost eradicated.

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)
Heatwave in 2003: Damage estimated at US$ 13 billion (BfG, 2006), harvesting losses of 1 billion euro	Yield losses on grassland areas, maize and cereal fields (L3, C11) Fish mortality in rivers and lakes, e.g. grayling and shellfish mortalities of a common basket shell in the Rhine, eel mortalities in Lake Constance-Untersee and in individual sections of the Rhine (caused by high water temperatures (A 3)	NK	NK
"Kyrill" storm January 2007	Storm damage in forests (F3)	NK	NK
Winter storm "Xynthia" beginning of March 2010	Storm damage in forests (F3)	NK	NK
Flood June 2013: 12 billion euro damage in Germany	severe harvest losses in grassland areas and maize, potato fields (L3, C11) resulting in: heavy metal contamination of the soil	NK	NK
HPAI outbreaks in 2006, 2007 and 2014	commercial poultry production, culling of stocks, quarantine and other biosafety measures reduced farms' success. Breed poultry farmers, mandatory closed stalls and other biosafety measures applied a brake to the voluntary commitment of hobby poultry breeders to conserve, inter alia, endangered poultry breeds, too.	NK	NK

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 natural or human-made disasters.

Describe and provide source of information.

Questions 41-43: See answer to question 40.

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).

As a consequence of traffic and goods flows and climate change, species arrive in Germany which can pose a threat to naturally occurring species and habitats. Besides these negative effects from the angle of nature conservation, invasive species can have additional negative economic effects (e.g. for forestry and agriculture) or a negative impact on human health (e.g. giant hogweed as a cause of skin burns).

Classifications for the scale of the damaging effects of species on biodiversity in agriculture and food and on ecosystem services are the subject of studies. Lists of invasive species are being prepared using risk assessments and scientific findings on both the European and national level.

As part of the implementation of the National Biodiversity Strategy, an "invasive species" indicator has already been developed. It adds up the number of invasive species spreading across Germany in all groups of species examined. At the present time, data are available on two species groups (10 vascular plant species, 1 fish species). The recording of other species groups will widen the database which means that the indicator values will probably be adjusted retrospectively. Since 2010, no small-scale invasive species have become so widespread in Germany that it is now to be regarded as covering large areas. However, no invasive species could be removed from the list of invasive species thanks to successful fight. Overall, the indicator values from 2012 are the same as for 2010. In the National Biodiversity Strategy the federal government has proposed several measures that could reduce the impairment of biodiversity by invasive species. Special emphasis must be given to prevention in order to counteract the threat to ecosystems, biotopes or species from invasive species. If invasive species reach Germany, their introduction or further spread must be prevented by early detection and immediate action (BMUB, 2014b, pp. 28-30).

The EU Regulation adopted in September 2014 on the prevention and management of the introduction and spread of invasive alien species aims to encourage further progress in the control of invasive species (Regulation (EU) No 1143/2014 of the European Parliament and the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species). Under this Regulation a list of invasive alien species of EU-wide importance is currently being drawn up. This is to serve as the basis for the laying down of measures for future handling (prevention, early detection, rapid response, control).

Furthermore, invasive alien species that damage plants are also recorded in plant protection law and, on the international stage, in the International Plant Protection Convention (IPPC). On the national level the Plant Protection Act and the Plant Inspection Ordinance set out the competences of the institutions involved and the measures to be taken to prevent the introduction and spread of invasive alien species of this kind. At the present time, the review of Directive 2000/2009/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community is currently being negotiated on the EU level. The goal is to establish a system that enables rapid and efficient action in order to successfully counteract the threat of the introduction and spread of organisms harmful to plants in the EU. On the EU level suitable measures are available in the field of phytosanitary regulations and these need to be further detailed. Furthermore, the EPPO (European and Mediterranean Plant Protection Organisation) already introduced activities and measures for them many years ago. It develops, inter alia, strategies to combat introduction and spread, and lists relevant alien species.

Studies on the impact of invasive species on various production systems and ecosystem services are in the teething stages and still currently focus on developing methods. Examples:

EFSA PLH Panel (EFSA Plant Health Panel), 2014. Scientific Opinion on the environmental risk assessment of the apple snail for the EU. EFSA Journal 2014;12(4):3641, 97 pp. doi:10.2903/j.efsa.2014.3641

EFSA Panel on Plant Health (PLH); Guidance on the environmental risk assessment of plant pests. EFSA Journal 2011; 9(12):2460. [121 pp.] doi:10.2903/j.efsa.2011.2460. Available online: www.efsa.europa.eu/efsajournal

Gilioli, G.; Schrader, G.; Baker R.H.A.; Ceglarska, E.; Kertész, V.K.; Lövei, G.; Navajas, M.; Rossi, V.; Tramontini, S.; van Lenteren, J.C. (2014): Environmental risk assessment for plant pests: A procedure to evaluate their impacts on ecosystem services. Science of the Total Environment, 468-469, 475-486

Schrader, G.; Kehlenbeck, H.; Unger, J.G. (2014): FGGA expert panel contribution "Effects of invasive species, that are harmful to plants, on food security and corresponding measures of crisis management and safeguarding the sustainability of plant production" Journal für Kulturpflanzen, 66, 4, 149

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)**

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.

See answer to question 44.

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.

No information is available on this.

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.

This question cannot be answered with a reasonable amount of effort; it is far too multi-faceted.

Gaps and priorities

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

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?

Germany has a good overview of the status of biodiversity in general (see answer to question 28) but knowledge about short- and long-term trends can still be improved (monitoring). A process to evaluate ecosystem services has just begun in Germany (UFZ, 2014) in order to raise the level of knowledge about the value of ecosystem services. The biggest challenges are seen in the lack of monitoring activities of associated biodiversity and ecosystem services, the decline in knowledge about taxonomy and the systematics of wild animals and species, and the dwindling interest of universities/students in training.

Statements on the impact of the changes in different components of associated biodiversity on the provision of regulating and supporting ecosystem services have only been based up to now on individual studies (question 13).

The effects of the measures taken to implement the existing legal provisions, strategies and programmes on associated biodiversity are not all known. What is mainly missing is a uniform federal evaluation of important components of associated biodiversity. There is a need for the further systematic pursuit of the national strategy for agrobiodiversity.

One important step is the preparation of a National Programme for the Conservation and Sustainable Use of the Genetic Resources of Micro-organisms and Invertebrates for nutrition and agriculture that is currently being elaborated by BMEL. Besides the issues of importance in Germany, the Programme is oriented towards the subject areas of the Food and Agriculture Organization (FAO).

The subject areas will be:

Pollinators

Human nutrition

Functional soil biodiversity

Renewable resources

Plant health

Plant breeding

Animal nutrition

Animal health

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

Wild species in Germany are only used to a limited extent for food. As a rule they are not essential in ensuring food security for the German population. There is not deemed to be any need for further information or policies at the present time (see also the answer to question 14). This is different to wild game with annually 24.000 tons of game meat used for food. However, there are some resentments in the general public, so that public awareness rising is needed.

50. With respect to the impact and response to natural or human-made disasters and 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?

Extreme weather conditions like drought, flooding, hail, heat, frost or storms can inflict substantial damage on German agriculture and forestry in the space of just a few hours or weeks. Secured knowledge about the loss of biodiversity for food and agriculture through natural or man-made disasters are not currently available. Whereas the long-term and global effects of climate change are the subject of extensive research, there are scarcely any robust research findings for extreme

weather conditions that vary considerably from region to region and are triggered by climate change. In order to obtain valid information on the impact of these extreme weather conditions that vary considerably from region to region and are triggered by climate change, BMEL has launched further research projects including "Agriculture-related extreme weather conditions and opportunities for risk management systems" (www.agrarrelevante-extremwetterlagen.de). The consistent further pursuit of the German Strategy for Adaptation to Climate Change is what is needed.

Disease outbreaks constitute a risk for genetic resources because stocks have to be culled in the direct vicinity of the outbreak in line with the safety provisions laid down in animal health law for specific diseases. This can also have an effect on stocks of very endangered breeds.

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?

See answers to questions 44-46

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[20].

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 (indicated in Table 1) indicate in Table 20 the extent of use of management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture.

A full description of the production practices listed is given in Annex 5 and the table below should be completed separately for each production system. In each table indicate the percent of total production area or quantity under the practice (where known), changes that have occurred over the last 10 years in the production area or quantity under the practice (significant increase (2), some increase (1), no change (0), some decrease (-1), significant decrease (-2), not known (NK), not applicable (NA)), and any identified change in biodiversity for food and agriculture associated with the practice (strongly increasing (2) increasing (1), stable (0) decreasing (-1), strongly decreasing (-2), not known (NK), not applicable (NA)).

Details on changes and on possible effects were only provided for individual management practices. As a rule no figures are available on changes in the interrelated circumstances of individual management practices with regard to demarcated production systems according to the definition given here.

Table 20.1 Management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture

Production system **L3 Livestock grassland-based systems: Temperate**			
Management practices[21]	**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)**
Integrated Plant Nutrient Management (IPNM)	100 %	0	1
Integrated Pest Management (IPM)	NK	0	1

[20] http://www.cbd.int/ecosystem/principles.shtml

[21] Detailed descriptions of management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture can be found in Annex 5.

Pollination management	0		
Landscape management	NK		
Sustainable soil management practices	NK		
Conservation agriculture	NA		
Water management practices, water harvesting	NK	- 1	2
Agroforestry	NA		
Organic agriculture	12.1 %	1	1
Low external input agriculture	1.1 %*	0	2
Home gardens	NA		
Areas designated by virtue of production features and approaches	14.2 %**		
Ecosystem approach to capture fisheries	NA		
Conservation hatcheries	NA		
Reduced-impact logging	NA		
Others (describe)	45.5 %*	0	1

[*Note that percentages may not equal 100% since different practices are often undertaken in the same part of the production system.*]

** TI, 2013*

*** Source: HighNatureValue-Grünland 2009, aus BfN, 2012*

Table 20.2 Management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture

Production system **L7 Livestock landless systems: Temperate**			
Management practices	**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)**
Integrated Plant Nutrient Management (IPNM)	NA		
Integrated Pest Management (IPM)	NA		
Pollination management	NA		
Landscape management	NA		
Sustainable soil management practices	NA		
Conservation agriculture	NA		
Water management practices,water harvesting	NA		
Agroforestry	NA		
Organic agriculture	2 %*	1	1
Low external input agriculture	NA		
Home gardens	NA		
Areas designated by virtue of production features and approaches	NA		
Ecosystem approach to capture fisheries	NA		
Conservation hatcheries	NA		
Reduced-impact logging	NA		
Others (describe)			

[*Note that percentages may not equal 100% since different practices are often undertaken in the same part of the production system.*]

** Statistisches Bundesamt, 2011*

Table 20.3 Management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture

Production system **C11 Rainfed crops : Temperate**			
Management practices	**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)**
Integrated Plant Nutrient Management (IPNM)	100 %	0	1
Integrated Pest Management (IPM)	100 %	0	1
Pollination management	NK		
Landscape management	0.03 %*[1]	0	1
Sustainable soil management practices	6.2% (AEM - ploughless tillage/ mulch seeding/direct seeding: 737656 ha)*[2]		
Conservation agriculture	NK	0	1
Water management practices, water harvesting	NA		
Agroforestry	0.03 %*[3]		
Organic agriculture	6.2 %	1	1
Low external input agriculture	0.07*		
Home gardens	0.0 %, 3,000 ha*[4]		
Areas designated by virtue of production features and approaches	5.3 %*[5]		
Ecosystem approach to capture fisheries	NA		
Conservation hatcheries	NA		
Reduced-impact logging	NA		
Others (describe)	46.9 %*[6]	0	1

[*Note that percentages may not equal 100% since different practices are often undertaken in the same part of the production system.*]

**[1] TI, 2014*

**[2] BMELV, 2011b*

**[3] BMELV, 2013b, Table 424, short-rotation plantations,*

**[4] BMELV, 2013b, Table 85 garden plots,*

**[5] BMELV, 2013b, Table 94 biosphere reserves,*

**[6]TI, 2013*

Table 20.4 Management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture

Production system **A3 Self-recruiting capture fisheries: Temperate**			
Management practices	**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)**
Integrated Plant Nutrient Management (IPNM)	NA		
Integrated Pest Management (IPM)	NA		
Pollination management	NA		
Landscape management	NA		
Sustainable soil management practices	NA		
Conservation agriculture	NA		
Water management practices, water harvesting	NA		
Agroforestry	NA		
Organic agriculture	NA		
Low external input agriculture	NA		
Home gardens	NA		
Areas designated by virtue of production features and approaches	NA		
Ecosystem approach to capture fisheries	CFP: By 2015 as many as possible and by 2020 all stocks are to be managed in line with MSY (100% inland fisheries)*	1	1
Conservation hatcheries	NK	1	1
Reduced-impact logging	NA		
Others (describe)			

[*Note that percentages may not equal 100% since different practices are often undertaken in the same part of the production system.*]

** In the sea fisheries sector some commercially harvested fish stocks in the North and Baltic Seas are still outside safe biological limits. The Länder fisheries laws are the statutory basis for fisheries management of inland waters. In the fisheries legislation of the Länder the principle of the sustainable use of fisheries' resources has the highest priority. The main decisive factor for fish stocks is the good ecological status of aquatic habitats. Efforts to improve this are part of the implementation of the Water Framework Directive. According to the 2014 Indicator Report only 10% of water bodies are in a good ecological condition.*

Table 20.5 Management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture

Production system **A11 Fed aquaculture, A 15 Unfed aquaculture**			
Management practices[22]	**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)**
Integrated Plant Nutrient Management (IPNM)	NK	1	1
Integrated Pest Management (IPM)	NK	- 1	0
Pollination management	NA		
Landscape management	NK		
Sustainable soil management practices	NA		
Conservation agriculture	NA		
Water management practices, water harvesting	NA		
Agroforestry	NA		
Organic agriculture	< 1 %	0	1
Low external input agriculture	NA		
Home gardens	NA		
Areas designated by virtue of production features and approaches	NK	1	2
Ecosystem approach to capture fisheries	NA		
Conservation hatcheries	NA		
Reduced-impact logging	NA		
Others (describe)	0.76 %*	0	1

[*Note that percentages may not equal 100% since different practices are often undertaken in the same part of the production system.*]

** TI, 2013*

[22] Detailed descriptions of management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture can be found in Annex 5.

Table 20.6 Management practices that are considered to favor the maintenance and use of biodiversity for food and agriculture

Production system **F3 Forests with natural regeneration, temperate zone**			
Management practices	**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)**
Integrated Plant Nutrient Management (IPNM)	0.36 %*	1	1
Integrated Pest Management (IPM)	NK		
Pollination management	NK		
Landscape management	NK		
Sustainable soil management practices	NA		
Conservation agriculture	NA		
Water management practices, water harvesting	NA		
Agroforestry	NK		
Organic agriculture	NA		
Low external input agriculture	NA		
Home gardens	NA		
Areas designated by virtue of production features and approaches	3 %	1	NK
Ecosystem approach to capture fisheries	NA		
Conservation hatcheries	NA		
Reduced-impact logging	95 %*	0	2
Others (describe)			

[*Note that percentages may not equal 100% since different practices are often undertaken in the same part of the production system.*]

**www.waldkalkung.com/fuer-alle/waldstruktur-in-deutschland/*

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

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

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

A definition of the diversity based practices listed is provided in Annex 6. The table below should be completed separately for each production system. In each table indicate the percent of total production area or quantity under the practice (where known), changes in the production area or quantity under the practice that have occurred over the last 10 years (strongly increasing (2), increasing (1), stable (0) decreasing (-1), strongly decreasing (-2), not known (NK)) and any identified change in biodiversity for food and agriculture associated with the diversity based practice (strongly increasing (2) increasing (1), stable (0) decreasing (-1), strongly decreasing (-2), not known (NK)).

See answer to question 52.

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

Production system …… [*insert code or name*]			
Diversity based practices [23]	**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)**
Diversification			
Base broadening			
Domestication			
Maintenance or conservation of landscape complexity			
Restoration practices			
Management of micro-organisms			
Polyculture/Aquaponics			
Swidden and shifting cultivation agriculture			
Enriched forests			
Others [*please specify*]			

[*Note that percentages may not equal 100% since different practices are often undertaken in the same part of the production system.*]

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

54. List and briefly describe any specific programmes or projects that have been undertaken in the country to support any of the practices listed in Table 20 and Table 21.

Provide information where available on what types of activities were supported, areas and numbers of farmers, pastoralists, forest dwellers and fisher folk involved, state and outcome with respect to components of biodiversity for food and agriculture.

The main programmes and strategies for the implementation of the management practices indicated in Tables 20 and 21 are described in the answers to questions 56, 66 and 80.

Furthermore, agri-environmental measures (from 2014 agri-environment-climate measures - AECMs) are financed by the European Union within the framework of the Second Pillar of the Common Agricultural Policy (CAP) from funds of the European Agricultural Fund for Rural Development (EAFRD). Corresponding measures are conducted in Germany partially within the framework of the Joint Task for the Improvement of Agricultural Structures and Coastal Protection with national cofunding by the federal government and Länder, partially within the Länder's own support programmes and only with cofunding by the Land or EU. The requirements to be met by AECMs must go beyond the relevant mandatory basic requirements for farm management according to Title VI Chapter 1 of Regulation (EU) No 1306/2013, the cross compliance provisions, the relevant minimum requirements for the use of pesticides and fertilisers or the relevant mandatory requirements in national legislation and from 2015 beyond what is known as greening in Regulation (EU) No 1307/2013 of the European Parliament and the Council (direct payments regulation). Payments for these support measures are laid down for the additional outlay linked to the special requirements for these management methods and for loss of income. According to EU legal provisions duplicate

[23] Detailed descriptions of diversity based interventions can be found in Annex 6.

funding is not possible. To ensure that the Länder have sufficient financial scope when it comes to recourse to measures under the Joint Task for the Improvement of Agricultural Structures and Coastal Protection (cofunding with federal resources), payments within this Joint Task can be raised or lowered by up to 30%.

Besides the agri-environment-climate measures (AECMs) the EAFRD Regulation offers further funding options for the cofinancing of measures for the conservation and improvement of biodiversity. They include, for example, compensatory payments under Natura 2000, measures in the fields of the support for non-productive investment or for the conservation and improvement of rural heritage. Under this Joint Task financing is provided for measures to conserve genetic resources or to conserve locally endangered animal breeds and regionally adjusted traditional crop species and varieties, threatened with genetic erosion. In addition, a few Länder have solely nationally funded measures in this area within the subsidies of agri-environment-climate measures (AECMs).

A demarcation of funds used explicitly for biodiversity is very difficult or only possible, in some cases, for the additional EAFRD funding options. Often the measures pursue several goals and are geared to the conservation of biodiversity and environmental protection (e.g. soil protection) and climate stewardship.

The Länder rural development programmes implemented with this funding are already or are about to be notified by the European Commission. They can be implemented from the time of notification with effect from 2015. For 2014 the support schemes from the prior period could be extended as an interim solution in line with EU statutory requirements. Several Länder took advantage of this. According to the EAFRD Regulation at least 30% of the total EAFRD funds for each development programme must be used to stem climate change, for adjustments to its impact and for environmental issues. These funds should help, inter alia, to finance agri-environment-climate measures (AECMs), organic and low-input sustainable agriculture by farmers in areas with a natural handicap or who are at a disadvantage for other reasons, to support Natura 2000 areas and for climate- and environmentally relevant investments.

The national implementation of the Common Agricultural Policy plays an important role for preserving or increasing biodiversity in agricultural landscapes. Further measures were added in 2014 to the framework plan of the Joint Task for the Improvement of Agricultural Structures and Coastal Protection that aim to conserve biodiversity. They seek, for instance, to promote the integration and maintenance of natural open farmland structures like hedgerow planting, boundary hedges. Furthermore, the payments for the AECMS of the Joint Task were adjusted to the changing price-cost relationships on the market and increased. In future, funding must be geared more towards the protection and the sustainable use of biodiversity (BMUB, 2014b).

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.

See also answer to question 14.

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	J	Plant biodiversity is negatively impacted by high nitrogen use particularly in grassland areas.	Kleijn et al. 2009; Klimek et al. 2007
Over-use of chemical control mechanisms (e.g. disease control agents, pesticides, herbicides, veterinary drugs, etc.)	J	A high level of herbicide use has a negative impact on the weed plant flora of conventionally farmed arable land.	Geiger et al. 2010
Inappropriate water management	N	Drainage ditches influence the water balance of low-lying areas and, by extension, components of associated biodiversity as well. Drainage followed by extensive use can enhance biodiversity. In contrast, intensive use of grassland or arable land leads to a loss.	Dierßen und Dierßen 2008
Practices leading to soil and water degradation	J	Soil degradation in the shape of soil damage compaction caused by the use of heavy agricultural machinery.	Beylich et al. 2010; Turbé et al. 2010; Van Capelle et al. 2012; Brunotte et al. 2013 Gardi et al. 2013
	J	Drainage of moorland leads to increased mineralisation of organic matter. Temporarily bare soil and missing structural elements lead to soil depletion caused by wind and water erosion.	Dierßen und Dierßen 2008
Over-grazing	N		
Uncontrolled forest clearing	N		
Fishing in protected areas	N		
Overharvesting	N		
Others [*please specify*]			

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

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

Measures to avoid non-sustainable farming methods are defined firstly in regulatory legislation (laws, ordinances) and secondly in legislation on support (e.g. voluntary agri-environmental measures). Then there are the direct payments and greening specified in the Common Agricultural Policy which also call for an environmental standard that goes further than regulatory law.

Nitrates Directive/Fertiliser Application Ordinance: sets out good practice for the use of fertilisers, soil improvers, culture substrates and plant fortifiers on agricultural land.

Plant Protection Act: aims to forestall or prevent risks that may arise particularly for human and animal health and for the balance of nature from the use of pesticides or other plant protection measures.

Federal Immission Control Act: aims to protect man, animals, plants, soil, water, the atmosphere, cultural assets and physical assets from harmful environment effects and stop them occurring.

Environmental impact assessment: aims to ensure that the environmental impact of certain public and private projects and certain plans and programmes for effective precautionary action in the field of environmental protection is identified, described and evaluated in a timely manner on the basis of uniform principles in environmental reviews.

Cross compliance: A CAP instrument that defines the basic requirements to be met by farm management (environment, human, animal and plant health and animal welfare), good agricultural and ecological status and permanent grassland conservation.

Greening: One part of the CAP consists of the three components: crop diversification, permanent grassland conservation and ecological focus areas (EFAs) (currently 5% of the farm area).

Agri-environment and climate measures (AECMs): are voluntary measures from the Second CAP Pillar which promote the particularly environmentally-friendly and resource-conserving management of agricultural land.

Agricultural investment promotion programme: supports competitive, particularly environmentally sound and especially animal welfare-oriented agriculture by funding investment in consumer durables, inter alia, to conserve biodiversity.

Protected areas: The protected area categories that are valid in Germany are based on the Federal Nature Conservation Act (BNatSchG) of 29 July 2009 (Federal Law Gazette I p. 2542). A distinction can be made between the different protected areas in terms of their size, protection purpose and protection goals (landscape, nature, water) and the resulting restrictions on use (Nature reserves (Article 23 Federal Nature Conservation Act [BNatSchG]), national parks (§ 24 BNatSchG), national natural monuments (§ 24 BNatSchG), biosphere reserves (§ 25 BNatSchG), landscape reserves (§ 26 BNatSchG), nature parks (§ 27 BNatSchG), especially protected types of biotopes (§ 30 BNatSchG), water protection areas (§ 52 Federal Water Act of 31 July 2009 (Federal Law Gazette I p. 2585)).

The German Federal Hunting Law, together with the Hunting Laws of the Länder guarantee sustainable hunting (cf. such as section 1, sentence 2 German Federal Hunting Law and the provisions for shootingplan, section 21 German Federal Hunting Law).

In German legislation the impact mitigation rule is the main instrument for enforcing nature conservation in 'normal landscapes', i.e. outside designated protected areas. There is a general ban on the deterioration of nature and landscapes. Impact mitigation sets out to avoid and minimise the negative effects of intervention in nature and landscapes (impairments). Furthermore, non-avoidable intervention is to be balanced by nature conservation measures. The detailed rules are defined in nature conservation laws (e.g. landscape upkeep laws) and the Länder compensation ordinances.

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

Indicate the production systems affected together with any information on the extent of problem (significant lack (2), some lack (1)), describe the effects on livelihood, food security and nutrition, and

the components of biodiversity for food and agriculture that are limited. The list of components of biodiversity for food and agriculture given in Annex 1 should be used where possible.

Food security is not hampered in Germany by a lack of biodiversity for food and agriculture. See also the answer to question 18.

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[24]	Extent of problem (2,1)	Effect on food security and nutrition	Effect on livelihood	Reference

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) productivity;

Not relevant in Germany.

b) food security and nutrition;

Not relevant in Germany.

[24] Please refer to list in Annex 1.

c) rural livelihoods;

In individual cases, the income situation of agricultural enterprises could be improved by tourism, landscape stewardship and the use and marketing of traditional, typical regional products of species and varieties.

d) ecosystem services;

In some cases neglected breeds are used in biotope maintenance. The situation of pollinators can be promoted by diverse crop cultivation.

e) sustainability;

Permanent grassland can be conserved by site-adapted use. The diversification of crop rotations contributes to increasing ecosystem services.

f) resilience;

Biodiversity for food and agriculture can help to improve stock stability and limit the mass propagation of pests. Use of Biodiversity for food and agriculture, in particular with regard to beneficial species and crop rotations, plays an important role in organic farming and other sustainable production systems.

g) sustainable intensification.

Sustainable intensification is mainly promoted through the use of genetic resources in breeding in order to create high-performance and resistant varieties, breeds and strains.

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.

The use of wild species for food only plays a minor role in Germany. No statistical data are available on the proportion of people who regularly use wild species. See also the answer to question 18.

The adoption of ecosystem approaches

60. Describe in Table 24 the extent to which you consider that ecosystem approaches[25] 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[26] that have been adopted in your country.

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

[26] A "landscape approach" means taking both a geographical and socio-economic approach to managing the land, water and forest resources that form the foundation – the natural capital – for meeting our goals of food security and inclusive green growth. By taking into account the inter-actions between these core elements of

The ecosystem approach is part of the strategies and programmes mentioned in the answers to questions 66 and 67. It is, therefore, taken into account when integrating these strategies and programmes into the production systems of relevance in Germany.

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

Production systems Code or name	Ecosystem approach adopted (name)	Extent of adoption (2,1,0,NA)	Importance assigned to the ecosystem approach (2,1,0,NA)

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.

The ecosystem and landscape approach is the basis for German and European policy for the diversity for food and agriculture. The most important measures and conclusions are described in the answers to questions 66 and 67.

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:

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

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:

65. With respect to the adoption of ecosystem approaches:

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?

The information and knowledge base regarding the use of management methods or activities that use to or promote biodiversity for food and agriculture is relatively good in Germany. The effects of the measures taken to implement the existing legal provisions, strategies and programmes on biodiversity for food and agriculture are being monitored. What is missing is a uniform federal evaluation of important components of biodiversity for food and agriculture. There is a need for

natural capital and the ecosystem services they produce, rather than considering them in isolation from one another, we are better able to maximize productivity, improve livelihoods, and reduce negative environmental impacts.

systematic implementation of the national strategy for agrobiodiversity (BMELV, 2007) and of the necessary measures, particularly monitoring of biodiversity for food and agriculture, elaborated in the respective specialist programmes.

The integration of the ecosystem approach into national policies and then into economic decisions is an ongoing process in Germany. The "Natural asset Germany" project, which continues the international TEEB initiative on the national level, is designed to also provide major stimulus for agriculture and food. The goal is to identify options for action on how to better integrate the value of nature (including ecosystem services, ecosystem damage) into private and public decisions (UFZ, 2014).

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[27], programmes[28] and enabling frameworks that support or influence conservation and sustainable use of biodiversity for food and agriculture and the provision of ecosystem services

[27] Policies include laws and legislature, as well as regulations, certification procedures and other mechanisms that incentivize conservation and sustainable use of biodiversity for food and agriculture.

[28] Programmes include initiatives and actions implemented and organized at all levels from community and stakeholder groups to national and regional organizations, as well as local implementation of international programmes.

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[29];

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;

e) 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.

The main strategies on the federal level of relevance for biodiversity for food and agriculture are the:

- **Federal Government's National Biodiversity Strategy (BMU, 2007).** The current status of implementation is detailed in the Progress Report 2013 on the implementation of the National Biodiversity Strategy (BMUB, 2013).
- **National Policy Strategy on Bioeconomy** (BMEL, 2014c)
- **National Strategy for the Sustainable Use and Protection of the Seas** (BMU, 2008).
- **Strategy of the Federal Ministry of Agriculture "Conservation of Agricultural Biodiversity, Development and Sustainable Use of Its Potentials in Agriculture, Forestry and Fisheries" (strategy for agrobiodiversity),** sectoral strategy of the Federal Ministry of Agriculture from 2007 to supplement the National Biodiversity Strategy (BMELV, 2007).
- **National Strategy Plan for the Development of Rural Areas** 2007 to 2013 (BMELV, 2011a).
- **Partnership agreement between Germany and the European Commission for the establishment of ESI funds under the Common Strategic Framework during the 2014-2020 funding period. [competent Division 413 Ms Dietz]**
- **For the support of AECMs the national framework of the Federal Government of Germany 2014-2020**
- **Protein crop strategy future strategy organic farming and the DAFA process**
- **Biodiversity strategies of the Länder**

The National Strategy for sustainable development "Perspectives for Germany" (Bundesregierung, 2002), the Strategy for Adaptation to Climate Change (Bundesregierung, 2008) and the Forest Strategy 2020 (BMELV 2011c) are also of relevance for issues on biodiversity for food and agriculture. More information on these strategies is provided in the answer to question 70.

a) Multi-sectoral support for the integrated conservation and sustainable use of agrobiodiversity[28]

National Biodiversity Strategy (NBS)

[29] Countries that previously presented or are currently preparing a Country Report on Forest, Aquatic, Animal or Plant Genetic Resources may wish to use information from their different sector reports.

In the Federal Government's Biodiversity Strategy (BMU, 2007) the objective is formulated of increasing the land share of agricultural biotopes of high nature conservation value (prime grassland, scattered orchards) by at least 10% compared with 2005. The basic indicator "High Nature Value Farmland" has been introduced as part of European support policy. The Member States are bound to regularly collect and report data for this indicator. The indicator is designed to promote statements on the impact of agriculture on biodiversity and successes in the promotion of biodiversity in agricultural landscapes. It documents the share of high nature value farmland in the total farmland area. Extensively used, species-rich grassland, arable land, scattered orchards, wine-growing areas and fallows are deemed to be high nature value farmland. This designation also encompasses structurally diverse landscape elements like, for instance, hedgerows, field margins, thickets and small water bodies as long as they are part of agricultural landscapes. The mapping results from 2009 reveal an indicator value of a 13% share of high nature value areas in total farmland area. 2.2% of farmland areas were classified as areas with an extremely high and 4.5% as areas with a very high nature value. With an area share of 6.3%, just under half of HNV farmland area was classified as farmland with a moderately high nature value. Further substantial and concerted efforts are needed to increase the total HNV farmland area to 19% by 2015 (BMUB, 2014b).

The NBS also contains numerous additional visions for areas of relevance for biodiversity for food and agriculture like the genetic diversity of domesticated species, agricultural landscapes, forests, lakes, rivers and seas. Furthermore, one chapter explicitly addresses agriculture (cf. www.biologischevielfalt.de).

Federal Biodiversity Programme

The implementation of the National Biodiversity Strategy has received annual financial backing of 15 million euro from the permanent “Federal programme Biodiversity” since the beginning of 2011. Funding encompasses four main areas: Species for which Germany has a special responsibility, hotspots of biodiversity, safeguarding ecosystem services, further measures of special representative importance for the strategy.

National Strategy for Agrobiodiversity

The Strategy for Agrobiodiversity (BMELV, 2007) is based on the realisation that the best precondition for the conservation of biodiversity for food and agriculture is the active and sustainable use of as many of its components and ecological functions as possible. The strategy identifies three main areas for future action:

1. the long-term conservation and wider use of genetic resources
2. the sustainable use of biodiversity for food and agriculture coupled with the simultaneous conservation of natural ecosystems and endangered species
3. improved international collaboration and the coordinated worldwide management of global resources.

Important elements in the strategy for agrobiodiversity are implemented in the sectoral national programmes.

Sectoral programmes and measures in the field of genetic resources:

The sectoral national programmes are the framework for measures and activities with regard to genetic resources:

- Plant genetic resources (BMELV, 2012b)

- Animal genetic resources (BMELV, 2008)
- Forest genetic resources (BMELV, 2010c)
- Aquatic genetic resources (BMELV, 2010a)
- A programme for the genetic resources of micro-organisms and invertebrates is currently being elaborated; a first draft is available.

Implementation of the national programmes is accompanied and supported by the sectoral coordinating bodies with representatives from political, administrative, scientific and breeding circles, practice and other specialist bodies and organisations. The Scientific Advisory Board on Biodiversity and Genetic Resources at the Federal Ministry of Food and Agriculture deals with the multi-sectoral cross-sectional topics of biodiversity for food and agriculture. The Advisory Board prepares assessments and draws up recommendations on current agrobiodiversity topics like biodiversity protection for grassland, biopatenting, implementation of ABS rules.

The **Information and Coordination Centre for Biological Diversity (IBV)** of the **Federal Office for Agriculture and Food (BLE)** coordinates many of these activities, does central public relations work and runs the secretariats/offices of the Scientific Advisory Board and expert committees.

Joint Task for the Improvement of Agricultural Structures and Coastal Protection

Contributions to more environmentally-friendly and resource-conserving agriculture and forestry and to the conservation of genetic resources in agriculture are made - with the financial backing of the federal government, Länder and EU - through the Joint Task for the Improvement of Agricultural Structures and Coastal Protection. There is a wide range of agri-environment-climate measures (AECs) which have a direct or indirect impact on biodiversity (see answer to question 54).

Contractual nature conservation programme

Contractual nature conservation, a voluntary, cooperative nature conservation measure by agriculture, has taken on increasing importance since the mid-1980s. Contractual nature conservation has frequently proved itself to be superior to regulatory rules and is, therefore, often seen as a model for the future. In contractual nature conservation farmers undertake to manage specific areas in line with nature conservation principles for five years. In return, they receive an allowance from funds of the European Agricultural Fund for Rural Development (EAFRD). The contractual nature conservation programmes are put in place by the federal Länder. They lay down the main areas of the programmes and the eligible measures. For instance North Rhine-Westphalia supports, *inter alia*, the use in line with nature conservation principles of arable land/arable strips to protect particular species and ecological communities in arable land, the use of grassland in line with nature conservation principles (e.g. restrictions on use, and the non-use of grassland areas to protect wetlands and flood plains, restrictions on use that go beyond existing specifications in nature conservation areas, in areas of Community importance (FFH areas) and European bird sanctuaries), and the maintenance and additional planting of scattered orchards or hedgerow upkeep.

Federal Programme for Organic Farming and Other Forms of Sustainable Agriculture (BÖLN)

In Germany, organic farming receives extensive funding, firstly within the framework of agri-environmental measures and beyond that through the "Federal Programme for Organic Farming and Other Forms of Sustainable Agriculture" (BÖLN) that was already launched in 2001. Initially, the focus of BÖLN was on providing information to and raising the awareness of farmers, processors, distributors, consumers and scientists. The focus of the federal programme has since shifted to supporting research projects. In 2015, 17 million euro were set aside in the federal budget for BÖLN.

Despite the ongoing positive trend and the favourable predictions for organic farming, the current share of 6.4% is still very far behind the target of 20% (BMUB, 2014b).

Pilot projects, demonstration projects and surveys in the field of biodiversity

"Pilot and demonstration projects" serve to promote projects in the field of the conservation and the innovative, sustainable use of biodiversity like the conservation of diversity within species of wild fruit trees, the development of a cryoreserve for chicken and carp, and the creation of a gene bank for wild plants (for more information and an overview of all projects, please visit: http://www.ble.de/DE/03_Forschungsfoerderung/04_BiologischeVielfalt/BiologischeVielfalt_node.html).

The goal of the surveys is the recording, inventorying and documentation of genetic resources, the monitoring of stock development and the preparation of other information bases in this field. Backing has been given, for instance, to the recording and documentation of several rare species of trees, the collection of population data for pigs, rabbits and poultry as well as studies on the genetic variability of various fish species.

b) Promoting the conservation and sustainable use of associated biodiversity

National Action Plan on Sustainable Use of Plant Protection Products

The Action Plan was drawn up with the assistance of the Länder and the participation of associations involved with plants or plant products, plant protection, consumer protection, water management, environmental protection or nature conservation. Bearing in mind existing risk-mitigating measures, it encompasses quantitative specifications, targets, measures, indicators and risk minimisation timelines, and the impact of the use of pesticides on human health, animal health and the balance of nature. There are targets for plant protection, user protection, consumer protection and protection of the balance of ecosystem.

The Action Plan is part of the implementation of the Pesticides Framework Directive of the European Union (Article 4(1) of Directive 2009/128/EC of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides, OJ L 309 of 24 November 2009 pp. 71-86). With its implementation the provisions of Article 4 Plant Protection Act of 6 February 2012 (Federal Law Gazette I p. 148) are met (cf. www.nap-pflanzenschutz.de/nap-deutschland).
Integrated plant protection is embedded in Article 3 Plant Protection Act. It states that plant protection may be carried out solely in line with good practice. This encompasses more particularly compliance with the general principles of integrated plant protection as defined in Annex III to the Pesticides Framework Directive (BMELV, 2013a, p. 31):

Individual goals of the National Action Plan for agriculture, forestry and horticulture include:

- Reducing the use of chemical-based pesticides that significantly deviate from the necessary measurement value (data set: network of reference farms)
- Maintaining, extending and/or strengthening the official advisory services of the Länder, including the use of electronic media
- Continuing the Federal Programme for Organic Farming and Other Forms of Sustainable Agriculture (BÖLN); evaluation of the results
- Increasing the proportion of agricultural land farmed in accordance with the Regulation on organic production (National Strategy for sustainable development)

- Drawing up crop- or sector-specific guidelines for integrated plant protection for all relevant crops or sectors linked to arable land and the intensity of plant protection including a systematic description and evaluation of available methods for integrated plant protection (cf. BMELV, 2013a, pp. 35-36)

c) **Strategies which address food security and nutrition with express reference to agrobiodiversity, associated biodiversity and/or to wild species used for food;**

All the above programmes also take food security and biodiversity into account. Therefore, the protein crop strategy (BMELV, 2112a) should be mentioned. In 2012, BMEL developed a strategy to strengthen the cultivation and use of native legumes and to promote, in a concerted manner, the supply and demand for them as feed or for food production. This strategy strengthens all factors along the value chain, in particular regional approaches. The goal is to integrate legumes to a greater degree into agricultural cultivation in Germany and, in this way, promote diversity in crop production. In 2015, four million euro were earmarked for the protein crop strategy in the federal government's budget.

a) Strategies which address the conservation of ecosystem services with express reference to the biodiversity of food and associated biodiversity and/or to wild species used for food;

b) Improvements to the resistance and sustainability of production systems with express reference to agrobiodiversity, associated biodiversity and/or to wild species used for food;

c) Support for farmers, shepherds, forest managers and fishermen for the introduction and maintenance of management methods which promote the conservation and use of agrobiodiversity.

Most of the above-mentioned programmes take these topics into account.

67. List up to 10 major policies, programmes and enabling frameworks in your country that enhance the application of an ecosystem approach[30] or a landscape approach[31] 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.

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

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

Briefly describe policies, programmes and enabling frameworks that meet the objectives described in questions 0 and 0. 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.

Detailed descriptions of the strategies, programmes and guidelines listed below are given in the answers to questions 66 and 70.

1. National Strategy for stustainable development
2. German Strategy for Adaptation to Climate Change
3. Federal government's National Biodiversity Strategy
4. National Strategy for the Sustainable Use and Protection of the Seas
5. National Strategy for Agrobiodiversity
6. Forest Strategy 2020
7. National Strategy Plan for the Development of Rural Areas 2007 to 2013
8. Partnership agreement between Germany and the European Commission for the establishment of ESI funds under the Common Strategic Framework during the 2014-2020 funding period.
9. Protein Crop Strategy
10. Future strategy organic farming
11. Biodiversity strategies of the federal Länder
12. National Action Plan on Sustainable Use of Plant Protection Products
13. Water framework directive

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.

Germany has a system to safeguard the supply of the population with food during supply crises in the event of war or disaster. The authoritative legal foundations are the Emergency Food Securing Act of 27 August 1990 (Federal Law Gazette 1 p. 1802 and the Food Supply Act of 20 August 1990 (Federal Law Gazette I p. 1766). They do not make any specific reference to biodiversity for food and agriculture.

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.[32]).

1. German Strategy for Adaptation to Climate Change
2. National Strategy for sustainable development
3. Federal government's National Biodiversity Strategy
4. National Strategy for the Sustainable Use and Protection of the Seas
5. Forest Strategy 2020
6. National Strategy for agrobiodiversity
7. National Programme for the Conservation and Sustainable Use of Plant Genetic Resources of Agricultural and Horticultural Crops
8. National Programme for the Conservation and Sustainable Use of Animal Genetic Resources in Germany
9. National Programme for the Conservation and Sustainable Use of Forest Genetic Resources in Germany
10. National Programme for the Conservation and Sustainable Use of Aquatic Genetic Resources

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)?

On the federal level the National Strategy for sustainable development sets out the framework for the National Biodiversity Strategy whereas various sectoral strategies further shape and add individual thematic priorities to the National Biodiversity Strategy.

National Strategy for sustainable development

In March 2002 the federal government approved the National Strategy for sustainable development entitled "Perspectives for Germany". This strategy is based on the sustainable development model. That means: Not living in the here and now at the expense of people in other regions of the world or at the expense of future generations. The National Strategy for sustainable development sets out guidelines for sustainable development in four thematic areas: Intergenerational equity, quality of life, social cohesion and international responsibility. 21, mostly quantifiable goals were formulated on this basis for the 21st century. These goals are assigned to key indicators for sustainable development which aim to measure the extent to which these goals have been achieved and where there is a need for further action. In addition, concrete sets of measures were formulated for priority areas of action: energy and climate stewardship, transport, agriculture and global responsibility in 2002. Within the federal government the National Strategy for sustainable development is seen as an inter-ministerial action programme for all areas of policy. Hence it also served as a guideline for the

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

National Biodiversity Strategy adopted in 2007. The thematic area "quality of life" in the National Strategy for sustainable development encompasses, *inter alia*, the topic "Protect the environment - Enjoy nature". In this context it stresses the importance of nature and conservation of biodiversity. The 21 goals include "Production of healthy food in an environmentally compatible manner" (with the two sub-goals "Organic farming" and "Reduction of the nitrogen surplus"), "Reduction of land use to 30 ha/day by 2020" and "Conserve species - Protect habitats". These goals and the related indicators were taken over into the National Biodiversity Strategy. The National Strategy for sustainable development is continuously developed in a dialogue with society. The latest progress report was published in February 2012. The progress reports are supplemented by an Indicator Report, prepared by the Federal Statistical Office, which is published every two years. It describes the progress made in implementing the political strategy on the basis of 21 key indicators.

German Strategy for Adaptation to Climate Change

In December 2008 the Federal Cabinet approved the German Strategy for Adaptation to Climate Change (Bundesregierung, 2008). The strategy aims to create a nationwide action framework to prevent risks to the population, natural habitats and the economy. Beside the current level of knowledge about the expected changes to the climate (globally and for Germany) and the related potential impact, possible effects of climate change and action options are outlined for 15 action areas, including "biodiversity", and for selected regions. Furthermore, the international context and the German contribution to adaptation in other parts of the world were sketched and the next steps described for the ongoing development of the German Strategy for Adaptation to Climate Change. The strategy mainly presents the federal government's contribution and, in this way, it offers an orientation for other stakeholders. In August 2011 the "Action Plan Adaptation" was added to the strategy. This plan mainly encompasses the activities of the federal ministries that are, however, elaborated in close coordination with the Länder. The Action Plan pursues - directly building on the adaptation strategy - the goal of driving forward the systematic inclusion and weighing up of factors of relevance to climate and extreme weather conditions in all political, technical, farming and private planning and decision-making processes. The aim is to reduce in particular the negative effects of climate change and, where appropriate, to grasp the resulting new opportunities. Furthermore, the Action Plan details measures and activities in the field of the adaptation to the effects of climate change, which are to be set up and implemented under the National Biodiversity Strategy. A report on the evaluation of the German adaptation strategy and the Action Plan, and proposals for their updating and further development are currently being prepared.

National Seas Strategy

In October 2008 the Federal Cabinet approved the National Strategy for the Sustainable Use and Protection of the Seas (National Seas Strategy) (BMU, 2008). A balanced overall concept is presented for the first time in the National Seas Strategy, which identifies special interests and competences and defines national policy goals. The strategy builds on the relevant goals of the National Biodiversity Strategy for the conservation of marine biodiversity and presents them in conjunction with consideration of the seas as ecosystems exposed to many different forms of use. It highlights ways of achieving the goals and formulates concrete proposals for action which, in some cases, come with an implementation timeline. The ecosystem approach calls for the comprehensive integrated management of all human activities that impact the condition of the oceans. Integrated coastal zone management (ICZM), on the basis of the ICZ strategy approved by the federal government in March 2006, is helpful in this context. ICZM is to help to develop and conserve coastal areas as ecologically intact and economically prosperous habitats for man. On 15 July 2008 the European Marine Strategy

Framework Directive entered into force. It aims to facilitate both protection and rehabilitation of European seas and their sustainable use. It obliges the Member States to draw up strategies for their respective marine regions. Mid 2012 reports (initial evaluations, determination of the good environmental status and formulation of environmental goals) for both the North and Baltic Seas were submitted to the European Commission within the framework of this Directive. They reflected on the goals contained in the National Biodiversity Strategy and the National Marine Strategy for the conservation of marine biodiversity. In the International Year of Biodiversity 2010 major steps to create a network of marine protected areas proved successful, for instance in the north-east Atlantic and in the Baltic Sea.

Forest Strategy 2020

In September 2011 the federal government approved the Forest Strategy 2020 (BMELV, 2011b). The strategy was drawn up with the assistance of stakeholders from science, forestry and the wood-based industry, nature conservation, hunting and tourism. As a strategy for the natural and economic area "Forests" the Forest Strategy 2020 aims to establish a viable balance geared to future requirements between the growing demands made on forests and their sustainable performance. The basis for this is equal consideration of the three dimensions of sustainability (ecology, economy, social aspects) as the goal of sustainable forest use calls for a balanced combining of economic performance with ecological responsibility and social justice. In nine areas of action (including climate stewardship, property, raw materials, biodiversity, silviculture, hunting, recreation, research) the existing challenges and opportunities are listed, potentially trade-offs analysed and suitable solutions formulated. The Forest Strategy is intended for all relevant stakeholders on the federal level and in the Länder. For the purposes of reducing habitat loss, fragmentation and new land use, the statutory framework conditions (Federal Region Planning Act, Federal Building Code, etc.) envisage the spatial concentration of settlement activities and the strengthening of inner city development in towns implemented as part of the weighing up of public and private concerns in regional and urban land-use planning. For the conservation of biodiversity it is particularly important that habitat networks are not further fragmented and existing fragmentations are removed. The consideration of adequate ecological passability is already standard practice in the construction and extension of federal traffic routes. Once the need for this type of measure has been established, crossing aids are regularly envisaged for animals like, for instance, animal passages or wildlife crossings (green bridges). Furthermore, the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and the Federal Ministry of Transport and Digital Infrastructure elaborated the federal programme "Relinking" that was approved by the Federal Cabinet on 29 February 2012. The federal programme contains a list of priority relinking sections in the federal highway network. It is, therefore, an important foundation for the construction of crossing aids at the main points in the network of habit corridors. As part of the Economic Recovery Package II around 80 million euro were released until the end of 2011 as upfront investment in the Federal Construction Programme for the building of a total of 18 green bridges.

This process is the interface for implementation of the National Biodiversity Strategy with other state stakeholders (e.g. Inter-Ministerial Working Group for the Implementation of the National Biodiversity Strategy (IMA, NBS, cf. question 81)), with federal government-Länder working groups, with other strategy processes (e.g. National Sustainability Strategy) and with the implementation and dialogue processes with non-state stakeholders

71. Has your country identified any obstacles to developing and implementing legislation that would protect associated biodiversity?

List and describe initiatives in Table 25.

Germany has a well-established and comprehensive statutory framework for the conservation of associated biodiversity.

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

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

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

72. Has your country taken measures with the aim of ensuring that access to its genetic resources shall be subject to its prior informed consent (PIC) and that benefits arising from their utilization shall be shared in a fair and equitable manner?

If yes, identify for which resources and for which uses (e.g. to conduct research and development on the genetic and/ or biochemical composition of the genetic resource) prior informed consent has to be obtained and benefits have to be shared. Indicate in Table 26 for the different categories (and possibly uses) of associated biodiversity, if prior informed consent has to be obtained and benefits have to be shared (Y: yes, N: no).

Germany is a Contracting Party to the Nagoya Protocol since 20 July 2016. As EU Member State, Germany is bound to the EU Regulation 511/2014, that entered into force at the same day as the Nagoya Protocol (12 October 2014), all of its provisions apply since 12 october 2015. The EU ABS Regulation implements in the EU those international rules (contained in the Nagoya Protocol) which govern user compliance – i.e. what users of genetic resources have to do in order to comply with the rules on access and benefit-sharing (ABS) established by the countries providing genetic resources. In Germany, the EU-legislation is supplemented from 1 July 2016 with the entry into force of the Act Implementing the Obligations under the Nagoya Protocol and Transposing Regulation (EU) No 511/2014.

Access to genetic resources collected in situ within the national jurisdiction of the Federal Republic of Germany is generally free. It is solely subject to the general restrictions of public law and where applicable private law. Ex situ access to genetic resources via a collection located in Germany may, on the other hand, be linked to rights of the provider country where they were collected in situ.

Germany is a member country of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and makes plant genetic resources for food and agriculture available within the framework of the Treaty's Multilateral System.

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)

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.

See question 72.

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 collection, documentation and user-oriented provision of data on the occurrence, characteristics and performance traits of genetic resources for food, agriculture, forestry and fisheries are important tasks of the Information and Coordination Centre for Biological Diversity (IBV) of the Federal Office for Agriculture and Food (BLE). This is the purpose of the GENRES-Information System on Genetic Resources (www.genres.de). It offers an overview of relevant information, documents, projects, stakeholders and other measures for the conservation and sustainable use of biodiversity for food and agriculture including genetic resources for food, agriculture, forestry and fisheries in Germany.
In line with the monitoring of biodiversity for food and agriculture requirements, IBV manages databases on plant genetic resources (PGRDEU), animal genetic resources (TGRDEU), forest genetic resources (FGRDEU) and aquatic genetic resources (AGRDEU) as National Inventories that can be searched online.

See question 75 for information on the individual GENRES databases.

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
Information systems on genetic resources		
PGRDEU http://pgrdeu.genres.de/	National Inventory of Plant Genetic Resources Information and Coordination Centre for Biological Diversity (IBV) of the Federal Office for Agriculture and Food (BLE)	*PGRDEU encompasses:* the list of plant genetic resources with all cultivated or wild plant species in Germany that are currently or could be used for food, horticulture, agriculture and forestry Information about *ex situ* stocks in German gene banks and other special collections Information about the *in situ* occurrence of wild species and local varieties the Red List of endangered native crops in Germany Details about arable land and seed multiplication areas of agricultural species and varieties
TGRDEU http://tgrdeu.genres.de/	National Inventory of Animal Genetic Resources in Germany (TGRDEU) IBV of BLE	Information about agricultural livestock and domestic animal breeds of the animal species horse, cow, water buffalo, pig, sheep and goat and productive poultry species and rabbits bred in Germany Stocks of breeding animals since 1997 Information about recognised breeding associations, breeding enterprises, insemination organisations and biotechnological facilities
FGRDEU http://fgrdeu.genres.de/	National Inventory Forest Genetic Resources (FGRDEU) IBV of BLE	List of tree and shrub species Details of *in situ* conservation areas Details of *ex situ* conservation Forestry regions of provenance as defined in the Act on Forest Reproductive Material
AGRDEU http://agrdeu.genres.de/agrdeu	National Inventory of Aquatic Genetic Resources IBV of BLE	Species lists of fish, cyclostomes, shellfish and decapoda that are found in the sea, freshwater and aquaculture Information on taxonomy, propagation and threat
FloraWeb http://www.floraweb.de	Wild plants, plant communities, vegetation map	Online information system of the Federal Agency for Nature Conservation (BfN) FloraWeb offers information on: plant species (ferns and flowering plants): Signatures of 3,500 wild plant species in Germany with information, *inter alia*, on taxonomy, systematics, biology, ecology and propagation. Vegetation: Vegetation surveys (phyto-sociological). Red List of plant associations in Germany Vegetation units in Germany with vegetation map

Neobiota http://www.neobiota.de/	Invasive species Federal Agency for Nature Conservation (BfN)	Information portal of the Federal Agency for Nature Conservation about alien and invasive species in Germany. It contains information about, for example, invasive species, their spread, characteristics, framework conditions and impacts.
German Collection of Micro-organisms and Cell Cultures (DSMZ)	Micro-organisms and cell cultures	Largest collection of micro-organisms in Germany.

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.

In Germany no distinction is made between traditional and other forms of knowledge. There are numerous ways of preserving and sharing knowledge which are also used for traditional knowledge. Various NGOs play an active role in publishing knowledge about the cultivation and use of traditional plant varieties and animal breeds (e.g. Internet, books).

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.

Multi-sectoral

organization	link
DBV - German Farmers' Association	www.bauernverband.de
AbL - German Small Farmers' Association	www.abl-ev.de
BÖLW - German Organic Food Production alliance	www.boelw.de
NABU - Nature and Biodiversity Conservation Union Germany	www.nabu.de
BUND - Friends of the Earth Germany	www.bund.de
DVL - German Landcare Association	www.lpv.de
SAVE - Safeguard for Agricultural Varieties in Europe	www.save-foundation.net
Pro Specie Rara	www.prospecierara.de/
Umbrella organisation for crop and livestock diversity	www.kulturpflanzen-nutztiervielfalt.org
WWF Germany	www.wwf.de
Greenpeace	www.greenpeace.de/
German Environmental Aid	www.duh.de
Environmental conservation association	www.grueneliga.de/
Wadden Sea Conservation Station	www.schutzstation-wattenmeer.de/

Plants

organization	link
ZVG - German Central Horticultural Association	www.g-net.de
BEKO - Advisory and Co-ordinating Committee for Plant Genetic Resources	www.beko-pgr.genres.de
BDP - Federal Association of German Plant Breeders	*www.bdp.info*
BdB - Federation of German Nursery Gardens	*www.gruen-ist-leben.de*
DGG - German Horticultural Society 1822	*www.dgg1822.de*
Network Organic Plant Breeding	www.bundesprogramm.de/forschungsmanagement/projektliste/pflanze/?fkz=06OE135&pos=473
VEN - German Association for the Conservation of Crop Diversity	www.nutzpflanzenvielfalt.de
Pomology Association	www.pomologen-verein.de

Animals

organization	link
Expert Committee on Animal Genetic Resources	beirat-tgr.genres.de
ADT - German Animal Breeders' Association	www.adt.de
ADR - German Cattle Breeders' Federation	www.adr-web.de
ZDS - German Central Pig Production Federation	www.zds-bonn.de
VDL - Confederation of German Sheep Breeding Associations	www.schafe-sind-toll.com
BDZ - Federation of German Goat Breeders	www.ziegen-sind-toll.com
FN - German Equestrian Federation	www.pferd-aktuell.de/
DGfZ - German Society for Animal production	www.dgfz-bonn.de
GEH - Society for the Conservation of Old and Endangered Domestic Breeds	www.g-e-h.de
BDRG - German Association of Poultry Breeders	www.bdrg.de
ZDRK - Central Association of German Rabbit Breeders	www.zdrk.de
DJV - German Hunting Association	www.jagdverband.de

Forestry

organization	link
BLAG-FGR - Federal Government/Länder Working Group "Forest Genetic Resources and Legislation on Forest Reproductive Material"	blag-fgr.genres.de
Working Group of German Forest Owners	www.waldeigentuemer.de
German Forestry Council (DFWR)	http://www.dfwr.de/
German Forestry Association (DFV)	www.forstverein.de
SDW - German Association for the Protection of Forests and Woodlands	www.sdw.de

Fish

organization	link
DFV - German Fishing Association	www.deutscher-fischerei-verband.de
German Deep-Sea Fishing Association	www.deutscher-fischerei-verband.de
Expert Committee on Aquatic Genetic Resources	fachausschuss-agr.genres.de
VdBi - Association of German Inland Fisheries	www.vdbi.de
DAFV - German Recreational Fishing Association	www.dafv.de

MGR and invertebrates

organization	link
DSMZ - German Collection of Micro-organisms and Cell Cultures	www.dsmz.de
DIB - German Beekeepers' Association	www.deutscherimkerbund.de
DIL - German Institute of Food Technologies	www.dil-ev.de
VAAM - Association for General and Applied Microbiology	www.vaam.de

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 programmes for the conservation and sustainable use of biodiversity for food and agriculture are described in the answer to question 66.

Experience with AEMs during the funding period 2009-2013 was largely positive. They are, therefore, being continued in a modified form in the current programmes. The greening defined under CAP is implemented for the first time in 2015 and in 2017 its impact will be reviewed (Midterm Review).

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.

Pilot and demonstration projects and surveys about the BMEL support guideline "Biodiversity" during the reporting period:

- Molecular-genetic variety characterisation in the gene bank fruit - apple, executive Body: Ecogenics GmbH (2013-2014)
- Nationwide survey of fruit from orchard meadows using remote sensing data - survey North Rhine-Westphalia, executive Body: GAFAG (2013-2014)

- Recording and documentation of the genetic variability of wild populations of crayfish (*Astacus astacus*), executive Body: University of Koblenz-Landau, Institute for Environmental Sciences (2012-2015)
- Recording and documentation of the genetic variability of wild populations of burbot (*Lota lota*), executive Body: University of Koblenz-Landau, Institute for Environmental Sciences (2012-2015)
- Recording and documentation of the genetic variability of wild populations of barbel (*Barbus barbus*), executive Body: GWT-TUD GmbH (2012-2015)
- Recording and documentation of the genetic variability of wild populations of common trout (*Salmo trutta fario*), executive Body: University of Koblenz-Landau, Institute for Environmental Sciences (2012-2015)
- Molecular-genetic variety characterisation of the gene bank fruit - sweet and sour cherry, exective Body: Lake Constance Bavendorf centre of excellence for fruit-growing (2012-2014)
- Molecular-genetic variety characterisation of the gene bank fruit - apple, executive Body: Ecogenics GmbH (2012-2014)
- Pomological variety determination of the gene bank fruit - sour cherry, executive Body: Dr. Annette Braun-Lüllemann (2009-2012)
- Pomological variety characterisation of the gene bank fruit - sweet cherry, executive Body: Dr. Annette Braun-Lüllemann (2009-2012)
- Pomological variety characterisation of the gene bank fruit - apple, executive Body: Lake Constance Bavendorf centre of excellence for fruit-growing (2009-2011)
- Recording and documentation of the genetic resources of grey alder (*Alnus incana*), green alder (*Alnus viridis*) and bird cherry (*Prunus padus*) in Germany, executive Body: Brandenburg forestry state agency, Eberswalde forestry state centre of excellence Forest development/Monitoring Department (2009-2012)
- Recording and documentation of the genetic resources of field maple (*Acer campestre*) and common yew (*Taxus baccata*) in Germany, executive Body: East Bavaria Forestry office (2009-2012)
- Recording and documentation of the genetic resources of European crab apple (*Malus sylvestris*) and European wild pear (*Pyrus pyraster*) in Germany, executive Body: Brandenburg forestry state agency, Forest development/Monitoring Department (2009-2012)
- Recording and documentation of the genetic resources of pubescent oak (*Quercus pubescens*), wild service tree (*Sorbus torminalis*) and service tree (*Sorbus domestica*) in Germany, executive Body: East Bavaria Forestry office (2009-2012)
- Monitoring of animal genetic resources in Germany: animal species sheep/goat, executive Body: Confederation of German Sheep Breeding Associations, German Goat Breeders Association (2009-2012)
- Monitoring of animal genetic resources in Germany: animal species bovine, executive Body: German Cattle Breeders' Federation (2008-2010)
- Collecting of population data on animal genetic resources in Germany: animal species pig, executive Body: German Pig Production Federation (2007-2009)
- Collecting of population data on animal genetic resources in Germany: rabbit, executive Body: Central Association of German Rabbit Breeders (2012-2013)
- Collecting of population data on animal genetic resources in Germany: rabbit, executive Body: Central Association of German Rabbit Breeders (2008-2010)
- Collecting of population data on animal genetic resources in Germany: poultry species chicken (including bantam), goose, duck, turkey and guinea fowl, executive Body: German Association of Poultry Breeders (2007-2009)

- Recording of grapevine genetic resources in Germany, executive Body: ARGE Joint agency for the recording of grapevine genetic resources in Germany Jung + Fischer (2007-2010)
- Recording and documentation of the genetic diversity of farmed *salmonidae* and additional species of *salmonidae* farming, executive Body: Institute of Inland Fisheries (2005-2008)
- Recording and documentation of the genetic diversity of broodcarp and the additional species of the carp pond culture in Germany, executive Body: Institute of Inland Fisheries (2005-2008)
- Recording of fruit genetic resources *in situ* in Germany, executive Body: Humboldt University Berlin, Institute of Horticultural Sciences (2005-2006)
- Recording of fruit genetic resources *ex situ* in Germany, executive Body: Humboldt University Berlin, Institute of Horticultural Sciences (2005-2006)
- Recording of the genetic structure of wild cherry (*Prunus avium*) as the basis for the genetic monitoring of important forest tree species in Germany, executive Body: Hamburg University, Institute for World Forestry (2005-2008)
- Recording the genetic structure of common beech (*Fagus sylvatica*) as the basis for the genetic monitoring of important forest tree species in Germany, executive Body: Rhineland Palatinate Research Institute for Forest Ecology and Forest Management (2005-2008)
- Recording and documentation of the genetic resources of black poplar (*Populus nigra*) in the Federal Republic of Germany, executive Body: Eberswalde State Forestry Office (2005-2007)
- Recording and documentation of the genetic resources of elm species (*Ulmus spec.*) in the Federal Republic of Germany, executive Body: Eberswalde State Forestry Office (2005-2007)

In addition:

- Establishing a European Network of Demonstration Sites for the Integration of Biodiversity Conservation into Forest Management (Integrate +), duration: 2013-12.2016, responsible organisation: EFI

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)
UNESCO - The Man and the Biosphere Programme - biosphere reserves	**There are 15 German biosphere reserves:** Vesser valley-Thuringian Forest Biosphere Reserve Grassland accounts for 9% of the area with around 60% meadows and 40% pasture land. Habitats in a biosphere reserve that are used extensively are mountain meadows and nutrient-poor acidic grassland on silicate and natural meadows or valley meadows of the crystalline mountains In the Berchtesgaden Biosphere Reserve there are deciduous and mixed forests, alpine pastures, high-elevation heaths, moors and alluvial forests, just a few villages and some farming communities with an agricultural landscape. Schorfheide-Chorin Biosphere Reserve The "potato crop" project seeks to draw attention to the loss of	17,081 ha 84,000 ha 129,161 ha

	potato diversity. Brodowin-Pehlitz orchard meadow: Planting of 75 high-elevation fruit trees with old, typical regional varieties in the autumn of 1996. In the Rhön Biosphere Reserve efforts are made to tap into the already strong regional identification of the population for regional marketing and to promote typical regional forms of use and products. For instance the Rhön sheep, an almost extinct sheep breed, has become a new popular symbol of the region - and, what's more, an outstanding custodian of the countryside. The same can be said of the *Rhön grazing ox* which is also called the *Rhön biosphere bovine*. The typical regional orchard meadows are now again being used in an efficient and publicity-catching manner (pilot project: *Orchard meadow nature trail*) for the production of ecologically valuable food. Careful, ecologically sound energy concepts are to safeguard and enhance the quality of the Rhön living environment. The motto is "protection through use" and the aim is to conserve the agricultural landscape of the Rhön which is shaped by man. Spreewald Biosphere Reserve: Healthy food from the region - that has become the region's programme with the active participation of the management of the Biosphere Reserve. It has had a positive impact by generating the first value chains. The Spreewald gherkin but also Spreewald meat and sausage specialities are well-known examples here. Oberlausitzer Heath and Pond Landscape Biosphere *Arable weed project (since 1993)* A project to conserve highly endangered arable weed communities is running since 1993. *Conservation of old cereal varieties (since 1997)* This project promotes endangered arable weed species and seeks to conserve and process old, typical regional cereal varieties. Varieties like Norddeutscher Champagnerroggen (northern German champagne rye) and Jägers Pommerscher Dickkopfweizen (hunter's Pomeranian squarehead wheat) are grown at rotating locations. *Bee pastures and apiculture* As a consequence of the predominant cultivation of maize, rape and cereals on arable land, honey bees and wild insects scarcely find any flowering plants after the rape flowering season. That's what prompted the management of the Biosphere Reserve to launch the project "Promotion of Apiculture" in the autumn of 2010. *Regional fruit varieties*: up to now establishment of 2 orchard meadows with historical regional apple, pear, cherry, plum and quince varieties (e.g. Lausitzer Nelkenapfel, Herrnhuter). *Regional vegetable varieties and herbs* Demonstration and teaching site in Friedersdorf with many historical but also interregional varieties	184,939 ha 47,492 ha On 6.: 30,094 ha
Nature parks	The campaign "Diversity thrives" for the conservation of biodiversity for food and agriculture in the Bergisches Land nature park is an	2,100 km²

	outstanding project of the nature park and unique in Germany. In this way the nature park makes a contribution to conserve the diversity of farm animal breeds and crops.	
Landcare associations	In many regions in Germany handling fruit from orchard meadows is one of the key tasks of care associations. Conserving, planting old varieties, tree maintenance, orchard meadow mowing and pasturage, fruit exploitation and regional fruit marketing - all this is done by landcare associations in order to conserve a species-rich agricultural landscape.	
Network „living space agricultural landscapes for wild animals“/ project “energy from wild plants”	Association of 25 partners, energy production from biomass as an alternative to maize, close linkages between nature protection, species conservation and landscape protection.	
Local hunting communities	Numerous activities on care of hedges and other biotops.	
Stiftung Rheinische Kulturlandschaft (Rhine Agricultural Landscape Foundation)	**Projects with a link to biodiversity for food and agriculture:** Nature conservation advice for Rhine fruit growers Humming Rhineland Arable weed conservation Wild flower propagation Blooming strip project Rhine Wild Plant Seed Initiative Help in sowing an orchard meadow	
Biological stations	Many biological stations actively maintain old orchard meadows.	
NABU	Many local NABU (Nature Conservation Association Germany) groups actively maintain old orchard meadows.	
BUND	Many local BUND groups actively maintain old orchard meadows.	
Orchard meadow initiatives	Besides the biological stations, NABU and BUND there are other initiatives which maintain and conserve old orchard meadows.	
Agri-environmental measures	**Examples of AEMs with a link to biodiversity for food and agriculture:** Flowery areas and blooming strips Thinly stocked arable land / cereal growing in thinly stocked rows and seed row spaces Protected arable weed land Managed setting aside of arable land ("nature conservation fallow") and borders Cultivation of rare crop varieties Long-term conversion of arable land (into extensive grassland) Nature conservation-friendly management of clover grass, alfalfa and red clover Extensive management of meadows (and pastures) Species-rich grassland	Share of arable land about 0.3% and of grassland approximately 11% in Germany (Opperman, 2013).

	Extensive grazing and large-scale, semi-open grazing systems Border strips Nature-compatible mowing methods Solid manure management and other add-on modules extensive grassland Orchard meadows - management/upkeep Steep-slope wine-growing Species-rich vineyard path greening	

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.

With its **National Biodiversity Strategy** the federal government already approved in 2007 an overarching and ambitious action programme for the conservation and sustainable use of biodiversity. In the federal government several federal ministries are directly and indirectly involved in implementing the National Biodiversity Strategy. The existing, smoothly operating policy coordinating mechanisms are anchored in the federal government's rules of procedure.

The **Inter-Ministerial Working Group** for the Implementation of the National Biodiversity Strategy (IMA NBS) was set up in January 2010 to advance collaboration and exchange between these ministries in respect of implementing goals and measures, and to coordinate their ministry-specific activities. The executive management of IMA is in the hands of the Federal Ministry for the Environment and 10 other federal ministries participate in IMA (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB), Federal Ministry of Labour and Social Affairs (BMAS), Federal Ministry of Food and Agriculture (BMEL), Federal Ministry of Finance (BMF), Federal Ministry of Health (BMG), Federal Ministry of the Interior (BMI), Federal Ministry of Transport and Digital Infrastructure (BMVI), Federal Ministry of Defence (BMVg), Federal Ministry of Economic Affairs and Energy (BMWi), Federal Ministry for Economic Cooperation and Development (BMZ).

Within the framework of the BMEL **sectoral Strategy for Agrobiodiversity** , detailed **national programmes** have been elaborated for the sectors of genetic resources - animal, plant, forestry and fisheries. A specialist panel with representatives of the federal government, Länder, the scientific community and associations coordinates the implementation of each of these programmes. The Scientific **Advisory Board on Biodiversity and Genetic Resources** was set up to advise BMEL. Selected individuals from different disciplines prepare opinions and recommendations on the conservation of biodiversity for food and agriculture.

The **Senate Biodiversity Working Group** coordinates research activities of the federal research institutes and the Leibniz institutes within the remit of BMEL on all aspects of biodiversity.

The inclusion of aspects of biodiversity for food and agriculture in other programmes (sustainability, climate change, marine and forest strategy) was already described in the answer to question 70.

82. How are ministries working together to meet Aichi Targets[33] as they may apply to the conservation and sustainable use of biodiversity for food and agriculture in your country?

Cooperation is mainly ensured through the Inter-Ministerial Working Group mentioned in the answer to question 81.

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?

The implementation of the programmes and strategies already mentioned is being carried forward and their topicality guaranteed through regular review. A National Programme for the Genetic Resources of Micro-organisms and Invertebrates for Food and Agriculture is being prepared. CAP is also to make major contributions to the conservation and sustainable use of associated biodiversity through the continuation of agri-environmental measures and the introduction of greening.

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.

Germany is a party of CBD and ITPGRFA and a member of CGRFA. Besides these multilateral approaches it also cooperates bilaterally with more than 50 countries. Over the last 20 years the Federal Republic has markedly increased funding for the conservation and sustainable use of biodiversity. Since 2013, Germany has made some 500 million euro available around the globe for the conservation of forests and other ecosystems. Compared with the average amounts made available every year between 2006 and 2010 the commitment of the Federal Republic has more than doubled, too. Hence Germany has already reached the funding targets agreed at the CBD Conference of the Parties to the Convention in Pyeonchang (2014). They envisage doubling the international financial flows to achieve the goals of the Convention on Biological Diversity (compared with the average for the years 2006 to 2010) and continuing this financial commitment at least on the same scale up to 2020. The largest share, around 90% of these funds, is channelled into bilateral development collaboration. In this context the Kreditanstalt für Wiederaufbau (KfW Group) is responsible for implementing financial collaboration and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH for implementing technical collaboration. Other funds are disbursed by multilateral institutions like the Global Environment Facility (GEF) and the Forest Carbon Partnership Facility (FCPF) of the World Bank. With an average share of 11-13% of the overall budget the Global Environment Facility, founded in 1991, is of the three largest multilateral contributors. Bilateral development collaboration with partner countries encompasses both financial and technical collaboration. The KfW Group) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GbmH are mainly responsible for its implementation. (http://www.bmz.de/de/was_wir_machen/themen/umwelt/biodiversitaet/index.html; 08.06.2015, BMZ & BMUB 2014). Furthermore, Germany supports the economic and social development of

[33] http://www.cbd.int/sp/targets/

developing countries and is a member of the UN Commission on Sustainable Development of the Organisation for Economic Cooperation and Development (OECD).

In addition, Germany supports the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES), with its headquarter in Bonn, set up in 2012, in the performance of its tasks and compliance with requirements.

On the European level Germany is active in various regional initiatives like, for instance, the European cooperation programmes on PGR (ECPGR), TGR (ERFP) and FGR (EUFORGEN). Improving the information situation and approving global action plans within the framework of the work of CGRFA of FAO on the topics of micro-organisms, invertebrates and the ecosystem approach is a priority task. It seeks to step up international and regional collaboration in the field of associated biodiversity.
On the scientific level there are comprehensive initiatives with German participation, e.g.:

- German Centre for Integrative Diversity Research (iDiv)
- German Centre for Infection Research
- KALT - cryostress - Adaptation mechanisms of cells to the lowest temperatures
- North German Centre for Microbial Genome Research
- Microbial Resource Research Infrastructure (MIRRI)
- WFCC - World Federation for Culture Collections organizing the International Conferences on Culture Collection
- ECCO - European Culture Collections' Organisation
- GBIF - Global Biodiversity Information Facility
- TFO - The Future Okavango
- GEBA - Genomic Encyclopedia of Bacteria and Archaea
- DNA Bank Network
- Transregional Collaborative Research Centre 51 (Roseobacter)
- BIOLOG - Biodiversität und Global Change
- Biodiversa, ERA-Net

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

Initiatives	Scope (R: regional, I: international)	Description	References

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?

In the field of education and advisory services there are several programmes and activities in Germany which are geared to the conservation and sustainable use of biodiversity. For instance questions about the conservation and sustainable use of biodiversity are addressed in the vocational education and training (VET) of farmers, animal caretakers, agricultural services specialists, winegrowers, equestrian technicians, forest managers and district hunters at the two VET sites - the vocational school and the training enterprise - in such a way that they become part of these professionals' occupational competences.

Furthermore, there are special further training schemes for experts in this area. They include, more particularly, further training as a certified nature and landscape conservationist and as a qualified agricultural technician for tree maintenance and restoration.

In addition, there are continuing vocational training courses and advisory services in this field, some of which have a special link to the regional issues and challenges of biodiversity. They are primarily intended for specialists and managers in the agricultural sector. They are run by state agencies, professional training organisations and other professional bodies and organisations.

Moreover, there are many other training and advisory schemes, for instance in adult education centres, social bodies, foundations, that are aimed at target groups beyond the agricultural sector. There is no list of all the measures in the field of education and advisory services.

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.

The German Network-Forum for Biodiversity Research (NeFo) has prepared various overview studies of different areas of German biodiversity research. 502 institutions of relevance for biodiversity research in Germany were identified (www.biodiversity.de/images/stories/Downloads/nefo_synthese_final-2012.pdf, accessed on 5.2.2015). Universities make up the largest group followed by non-university research institutes and bodies of the federal government and Länder. An online search within the framework of the overview study on the science of biodiversity found more than 1,500 events on relevant biodiversity topics at 63 universities (www.biodiversity.de/images/stories/Downloads/schiffer_2010_lehre.pdf accessed on 5.2.2015) There are no exact figures on university programmes which specifically focus on the conservation and sustainable use of associated biodiversity in Germany.

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	Male	Female

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

87. List up to 10 major institutions within your country directly involved in research on the conservation and sustainable use of associated biodiversity.

Provide a concise description of the institutions, of their key research programmes and, where possible, provide the number of active researchers.

In Germany, a large number of institutions are directly or indirectly involved in research on the conservation and sustainable use of associated biodiversity (see also answer to question 86). In Germany, research on various aspects of biodiversity for food and agriculture is conducted at universities, universities of applied science and in numerous non-university bodies of the federal government and Länder. They include the Max Planck Institute (MPI), institutes of the Leibniz and Helmholtz Associations, departmental research of the federal government and various Länder research bodies.

Biodiversity for food and agriculture-related research in German universities focussing on different aspects and directions is mainly conducted in institutes of biology and agricultural science faculties or departments.

The main non-university institutions that have set up research priorities in the field of biodiversity are the Leibniz and Helmholtz Associations. In some cases this research is carried out in collaboration with universities and departmental research bodies. 22 bodies from the Leibniz community have joined forces in the **Leibniz-Network-Biodiversity**. Four of these bodies also come under the remit of BMEL (ATB, IAMO: Leibniz Institute of Agricultural Development in Transition Economies, IGZ, ZALF). Out of all the institutions of the Helmholtz Association, biodiversity research is conducted in particular at the Helmholtz Centre for Environmental Research (UFZ) in Leipzig. In a network with other institutions of the Leibniz Association and the institutes of the neighbouring universities Halle, Jena, Leipzig and MPI in Jena, UFZ is active in the new German Centre for Integrative Diversity Research (iDiv).

Within the remit of BMEL research of relevance for biodiversity for food and agriculture issues is conducted directly in the four federal research institutes (Julius Kühn Institute, Friedrich Loeffler Institute, Max Rubner Institute and Johann Heinrich von Thünen Institute), the Federal Institute of Risk Assessment (BfR) and in six Leibniz institutes (ZALF, IAMO, ATB, FBN, IGZ, DFA). The Johann Heinrich von Thünen Institute of Biodiversity plays a key role in this circle. Besides the coordination of research within the Ministry, the scientific activities are coordinated by the **Senate of the federal research institutes** in which the above institutions are represented.

A separate Senate Biodiversity Working Group has been set up for the field of biodiversity. Its task is to draw together research activities in the field of biodiversity particularly within departmental research but also outside research activities. The Working Group looks at questions of biodiversity on various levels - the genetic level, the species level down to the landscape level - in agriculture, forestry and fisheries.

Gaps and priorities

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

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

Spatially detailed and high-resolution temporal data on changes in and intensity of land use and the development of farm structures are only available to a limited degree for scientific evaluations. Furthermore, differentiated considerations and impact assessments of individual policy instruments are dependent on substantial use of monitoring activities which are not currently carried out at all or only partially. There is not currently any ongoing uniform nationwide assessment of the most important components of biodiversity for food and agriculture in Germany.

b) What are the main capacity or resources limitations?

The use and scale of policy instruments like AECMs and other support programmes are mainly limited by the level of funds available from the EU, federal government and Länder. The human resources for addressing the questions are still limited. Various data sources like, for instance, geodata, are not easily accessible because of data protection rules and limit the opportunities for the design and evaluation of, and advice on national policies and programmes.

c) What are the main policy and institutional constraints?

The conservation and sustainable use of biodiversity for food and agriculture and the provision of ecosystem services are mainly influenced by the level of producer prices for agricultural products. In recent years a trend towards rising producer prices has been observed (DBV 2014). This further incentivised the intensification of production with potentially negative consequences for biodiversity. The reform of CAP approved last year was, therefore, oriented *inter alia* towards creating the political framework conditions for taking up the challenges of the sustainable use of natural resources. In future, 30% of direct payments will, therefore, be made available for methods that facilitate sustainable use of natural resources in order to strengthen the ecological sustainability of agriculture.

The intensity of agricultural production in Germany is influenced by energy policy, too. The remuneration structure in earlier versions of the Renewable Energies Act (EEG) increased the incentive to cultivate energy crops with a negative impact on biodiversity. These incentives, in particular higher levels of support for the use of renewable resources, were dismantled in the 2014 EEG reform for new facilities. Pursuant to EEG 2014 support is henceforth concentrated on waste material and residual matter. Another consequence of EEG is a rise in leasehold rent. That's why many farmers need to increase their yield per unit of area. The example of the current framework conditions for organic farming can be used to demonstrate the negative impact of this policy. A study on the phasing out of organic farming revealed (Kuhnert et al. 2013) that organic farming practices constitute one of numerous business strategies for many farmers. Independent of the actual profitability of organic farming, the overriding factor in a farmers' decision to embark on or end this form of farm management is how attractive alternative management strategies are. Given the good earning opportunities and economic climate in conventional farming, organic farming has lost some of its appeal in recent years.

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

The necessary measures and priorities are outlined in detail in the above-mentioned programmes and strategies. Their implementation must be pursued in a consistent manner.

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?

In order to conserve biodiversity in a sustainable way, there is a need not only for major efforts by state stakeholders but also for broad support from and participation of society. People in Germany should feel personally responsible for conserving biodiversity (BMUB, 2014b).

According to survey results from 2013 25% of the German-speaking resident population over the age of 18 has at least adequate knowledge about and a positive attitude towards biodiversity. Indeed the picture is more differentiated. 40% of the respondents are familiar with and understand the term biodiversity (knowledge indicator). 54% of the respondents have a positive attitude to biodiversity (attitude indicator) and 50% are willing to gear their behaviour to the goal of conserving biodiversity (behaviour indicator). Hence, there is a major need for awareness-raising activities. Awareness-raising and education programmes should, therefore, be oriented towards different target groups and cater for their needs and interests in a differentiated manner. The National Biodiversity Strategy and the National Strategy for Agrobiodiversity contain numerous measures in terms of social awareness, education and information. Their consistent implementation should help to raise awareness about biodiversity (BMUB, 2014b).

b) What are the main capacity and resources constraints?

In some cases the financial resources of the main stakeholders in conservation and awareness-raising are limited. Conservation initiatives can scarcely finance themselves from the earnings from "diversity products".

c) What are the main political and institutional constraints?

The degree of organisation of the main stakeholders in the conservation and sustainable use of biodiversity for food and agriculture is still in need of improvement despite the major successes achieved through the establishment of an umbrella organisation.

d) What activities are necessary, what are the priorities?

In line with the dictates of the National Biodiversity Strategy and Strategy for Agrobiodiversity the importance of the conservation and sustainable use of biodiversity should be more firmly established as an educational topic. In order to reach as large a share of the population as possible, corresponding offers should be extended in the most diverse educational bodies and oriented towards people's real life situations. Conveying the value of biodiversity and raising individual willingness to take action to conserve biodiversity must be done across the entire spectrum of modern communication channels in a target group-oriented manner (BMUB, 2014b).

Furthermore, the networking of the main stakeholders should be supported. To this end, the existing support instruments should be reviewed with regard to their effectiveness, targeting and efficiency and, if necessary, improved.

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?

See answer to question 89.

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?

Gaps in knowledge about biodiversity for food and agriculture still include highly inaccurate ideas about the components of biodiversity in soils and about microbes and micro-organisms in other habitats. There is no comprehensive and representative area-based estimation of the occurrence and scale of indicator species of biodiversity in agriculture. In principle, there is a need for further research on the importance of functional biodiversity in agroecosystems and agricultural landscapes in terms of their production and other ecosystem services.

To overcome these shortcomings research support should be reassessed with a view to adequate consideration of the issues of the conservation and sustainable use of biodiversity for food and agriculture on the national and European levels. Amongst other things, corresponding criteria for the evaluation of research projects and an active transfer of findings to practice should be taken into account in the decision-making process by the funding body. In terms of content, a greater focus of natural science and agri-scientific research on agri-ecological and agroecosystem and socio-economic contexts is needed to improve understanding of the functional importance of biodiversity for food and agriculture. This research orientation is under-represented in terms of the importance of agricultural land use compared with ecosystem research in the field of forests in Germany. It would be helpful, for instance, to create regionally differentiated research clusters focusing on this topic in Germany, and provide them the corresponding resources over longer periods.

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[34] 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[35] as well as to how they link to other related processes undertaken through the Convention on Biological Diversity.

[34] Especially Targets 6, 7, 13.

[35] In particular Targets 6, 7, 13.

As a party of CBD Germany has set itself the goal of achieving the Aichi Biodiversity Targets. There are three targets specifically for the area of biodiversity in agriculture and food:

Target 6 - By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Target 7 - By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Target 13 - By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species is maintained and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.
As a member country of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) Germany backs its goals for the conservation and sustainable use of plant genetic resources.

On the European level the European Biodiversity Strategy, the dictates of the Common Agricultural Policy and the Common Fisheries Policy constitute the main political framework for the conservation, sustainable use and promotion of biodiversity for food and agriculture.

A clear framework for the achievement of the goals and the necessary measures has also been pegged out on the national level with the National Biodiversity Strategy, the BMEL Strategy for Agrobiodiversity and the national programmes on genetic resources in agriculture and food.

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.

The main aspects of future activities and priorities were already listed in the previous answers on the individual thematic areas. They mainly encompass the further implementation of the measures listed in the individual programmes and strategies. This also includes greater consideration of the genetic resources of micro-organisms and invertebrates for agriculture and food through the development of a National Programme.

The CAP reform has a major impact on associated biodiversity. The 2014 reform added what is known as greening component, a new policy instrument, to previously implemented agri-environmental measures (see answer to question 54).

Germany's ongoing commitment to international collaboration, specifically with the CGRFA of FAO and the implementation of the measures of the Global Action Plans on genetic resources, if necessary, and with the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the Global Crop Diversity Trust (GCDT) supports this.

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

The Helmholtz Centre for Environmental Research (UFZ) has launched an exploratory study to record and assess the current condition and possible development trends of ecosystems and their services (http://www.ufz.de/index.php?de=31427). This exploratory study is to examine the extent to which an "Assessment of ecosystems and their services for the economy and society in Germany?" (National Ecosystem Assessment, NEA-DE) is feasible and would be welcomed.

Within the framework of the project "Natural Resource Capital Germany - TEEB DE" (project duration: 2012-2015), the economic arguments for the conservation of "natural resource capital" are to be submitted to supplement ethical and ecological reasons in a sound manner. A thematic report addresses the spectrum of ecosystem services provided by rural areas and reveals their importance for human well-being (http://www.naturkapital-teeb.de/publikationen/projekteigene-publikationen/bericht-2.html). The project is coordinated by the Helmholtz Centre for Environmental Research and funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety.

As a consequence of the 2014 reform the Common Fisheries Policy gives more backing to the protection, conservation and safeguarding of the sustainable use of living aquatic resources by integrating in particular the precautionary and ecosystem approach into fisheries management. The systematic implementation of long-term replenishment and management plans, the application of the principle of maximum permanent yield and the development of sustainable fishing practices and fishing gear are mentioned here by way of example.

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.

- Continuation of the work of the Information and Coordination Centre for Biological Diversity (IBV) of the Federal Office for Agriculture and Food (BLE) in the fields of coordination of and information on biodiversity for food and agriculture.
- Continuation of the work of the Länder centres of excellence for biodiversity in the fields of the coordination of and information on biodiversity for food and agriculture.

Continuation of the support for NGOs in the field of the conservation and sustainable use of biodiversity for food and agriculture and their involvement in state agencies and decision-making processes

- Establishment of a pilot management network for biodiversity for food and agriculture in Germany. The integration of aspects of biodiversity into agricultural practice including raising awareness amongst practitioners, consumers and other stakeholders should be promoted in this way.
- See also answer to question 89.

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.

- Continuation of support for agri-environmental measures and contractual nature conservation in the current CAP support period.
- Continuation of the commitment of the federal government and Länder to support biodiversity for food and agriculture measures within the framework of CAP and the Länder landscape upkeep programmes.
- Continuation of the Federal Biodiversity Programme to implement the federal government's National Biodiversity Strategy.
- Continuation of BMEL's support guideline "Pilot and demonstration projects in the field of biodiversity for food and agriculture"

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.

At the present time, there is not deemed to be any need for action to increase recognition of the role of women in the conservation and sustainable use of components of biodiversity in agriculture and food in Germany.

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ANNEX 1: Recommended scope of the Country Report

Biodiversity for food and agriculture

Biodiversity for food and agriculture includes the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that sustain the ecosystem structures, functions and processes in and around production systems, and that provide food and non-food agriculture products. Production systems, as defined for the purposes of this report, include the livestock, crop, fisheries and aquaculture and forest sectors. The diversity found in and around production systems has been managed or influenced by farmers, pastoralists, forest dwellers and fisherfolk over many hundreds of generations and reflects the diversity of both human activities and natural processes.

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

Associated biodiversity

For the scope of this report, associated biodiversity comprises those species of importance to ecosystem function, for example, through pollination, control of plant, animal and aquatic pests, soil formation and health, water provision and quality, etc., including *inter alia*:

a) Micro-organisms (including bacteria, viruses and protists) and fungi in and around production systems of importance to use and production such as mycorrhizal fungi, soil microbes, planktonic microbes, and rumen microbes;

b) Invertebrates, including insects, spiders, worms, and all other invertebrates that are of importance to crop, animal, fish and forest production in different ways, including as decomposers, pests, pollinators, and predators, in and around production systems;

c) Vertebrates, including amphibians, reptiles, and wild (non-domesticated) birds and mammals, including wild relatives, of importance to crop, animal, fish and forest production as pests, predators, pollinators or in other ways, in and around production systems;

d) Wild and cultivated terrestrial and aquatic plants other than crops and crop wild relatives, in and around production areas such as hedge plants, weeds, and species present in riparian corridors, rivers, lakes and coastal marine waters that contribute indirectly to production.

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

Integrated analysis of biodiversity for food and agriculture

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

ANNEX 2: Production systems

Table 1. Climatic zones definitions

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

Table 2. Production systems descriptions

Name of production system	Climatic zone	Description
Livestock grassland-based systems	Tropics Subtropics Temperate Boreal and /or highlands[36]	Systems in which the animals obtain a large proportion of their forage intake by grazing natural or sown pastures, includes: • 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)
Livestock landless systems	Tropics Subtropics Temperate Boreal and /or highlands	Systems in which livestock production is separated from the land where the feed given to the animals is produced.
Naturally regenerated forests	Tropics Subtropics Temperate Boreal Boreal and /or highlands	Includes: • 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)
Planted forests	Tropics Subtropics Temperate Boreal Boreal and /or highlands	Includes : • 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

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

Self-recruiting capture fisheries	Tropics	Includes capture fisheries in marine, coastal and inland areas that can involve • 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: • 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 shrubs[38] • 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

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	**Trade-** Changing terms of trade, globalization of markets, commercialization of products, retailing, the separate capacities of women and women to commercialize products, etc. **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 **Private sector -** The changing role and influence of private sector and corporate interests
Policies	**Policies** - Global, regional, national, and subnational legislation and regulations (e.g., conservation regulations, participation and compliance with International treaties and conventions); **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) **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.
Population growth and urbanization	**Population** - Changes in population metrics (e.g., growth, fertility, composition, mortality, migration, health and disease, including different affects on men and women.) **Urbanization**- (e.g., shifts in proportion of urban and rural; change in urbanization trends, including different effects on men and women)
Changing economic, socio-political, and cultural factors	**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.) **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. **Participatory actions** – the role of collective action toward conservation and use of biodiversity by stakeholders
Advancements and innovations in science and technology	The development and diffusion of scientific knowledge and technologies, (e.g., advances in breeding; improvements in mobile extension; tools for monitoring; biotechnology applications, access of men and women to information).

ANNEX 4: Ecosystem services

The SoWBFA Guidelines focus primarily on regulating and supporting ecosystem services, described below. Provisioning services relating to biodiversity for food and agriculture are the focus of sectoral State of the World Reports, and are addressed in these guidelines only in relation to associated biodiversity and wild foods, which often fall outside of traditional sectoral reporting. Countries may choose to address additional ecosystem services, including cultural services, for the completion of national reports, particularly where they are directly relevant to the objectives of the SoWBFA Report[37].

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	Providing diverse and suitable habitats

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

		creating and maintaining habitats for a wide variety of organisms	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 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.

Annex 7:

Answer to question 34

Huntable animal species under Section 2 of the Federal Hunting Act

(1) The following animal species are subject to the right to hunt:

1. Furred game:

European bison (Bison bonasus L.),*

moose (Alces alces L.),*

red deer (Cervus elaphus L.)

fallow deer (Dama dama L.)

sika deer (Cervus nippon TEMMINCK),

roe deer (Capreolus capreolus L.),

chamois (Rupicapra rupicapra L.),

ibex (Capra ibex L.),*

moufflon (Ovis ammon musimon PALLAS),

wild boar (Sus scrofa L.),

brown hare (Lepus europaeus PALLAS),

mountain hare (Lepus timidus L.),*

wild rabbit (Oryctolagus cuniculus L.),

marmot (Marmota marmota L.),*

wildcat (Felis silvestris SCHREBER),*

lynx (Lynx lynx L.),*

fox (Vulpes vulpes L.),

stone marten (Martes foina ERXLEBEN),

pine marten (Martes martes L.),

polecat (Mustela putorius L.),

ermine (Mustela erminea L.)

weasel (Mustela nivalis L.),

badger (Meles meles L.),

otter (Lutra lutra L.),*

common seal (Phoca vitulina L.);*

2. Wild feathered game:

partridge (Perdix perdix L.),

pheasant (Phasianus colchicus L.),

quail (Coturnix coturnix L.),*

wood grouse (Tetrao urogallus L.),*

black grouse game (Lyrurus tetrix L.),*

hybrid grouse (Lyrus tetrix x Tetrao urogallus),*

hazel grouse (Tetrastes bonasia L.),*

rock ptarmigan (Lagopus mutus MONTIN),*

wild turkey (Meleagris gallopavo L.),

wild pigeons (Columbidae),

mute swan (Cygnus olor GMEL.),

wild geese (genera Anser BRISSON and Branta SCOPOLI)

wild ducks (Anatinae),

sawbills (genus Mergus L.),

woodcock (Scolopax rusticola L.),

coot (Fulica atra L.),

gulls (Laridae),

great crested grebe (Podiceps cristatus L.),*

great bustard (Otis tarda L.),*

grey heron (Ardea cinerea L.),*

accipitrids (Accipitridae),*

falcon (Falconidae),*

common raven (Corvus corax L.).*

* Species without hunting season, i.e. conservation all year round

(2) The federal states may designate additional species as being subject to the right to hunt.

(3) Hoofed game shall include European bisons, moose, red deer, fallow deer, sika deer, roe deer, chamois, ibex, moufflon and wild boar.

(4) Big game shall include hoofed game with the exception of roe deer, wood grouse, golden eagles and sea eagles. All other game shall be counted among small game.

Source: Federal Hunting Act in the version promulgated on 29 September 1976 (I, 1976) (Federal Law Gazette I, p. 2849)

Edible plants from forest genetic resources

hardy kiwi (Actinidia arguta)

variegated kiwi vine (Actinidia kolomikta)

purple kiwi (red kiwi) (Actinidia melanandra)

shadbush (Amelanchier)

snowy mespilus (Amelanchier lamarckii)

smooth shadbush (Allegheny serviceberry) (Amelanchier laevis)

thicket shadbush (Amelanchier spicata)

snowy mespilus (Amelanchier ovalis)

saskatoon serviceberry (Amelanchier alnifolia)

downy shadbush (Amelanchier arborea)

(Amelanchier X grandiflora)

(X Amelasorbus jackii)

chokeberry (Aronia melanocarpa), (Aronia mitschurinii), (Aronia arbutifolia), (Aronia x prunifolia), (X Sorbaronia dippelii), (X Sorbaronia sorbifolia)

European barberry (Berberis vulgaris)

Berberis koreana Palib. **'Rubin'**

Berberis **'Azisa'**

sweet chestnut (Castanea sativa)

Japanese chestnut (Castanea crenata)

American chestnut (Castanea dentata)

Chinese chestnut (Castanea mollissima)

flowering quince (Chaenomeles)

Japanese quince (Chaenomeles japonica)

Chinese quince (Chaenomeles speciosa)

quince hybrids (Choenomeles x superba)

Cornelian cherry (Cornus mas)

hawthorn (Crataegus)

azarole hawthorn (Crataegus azarolus)

thicket hawthorn (Crataegus intricata)

Midland hawthorn (Crataegus laevigata)

(Crataegus x lavallei)

common hawthorn (Crataegus monogyna)

C. monogyna'Aurea'

C. monogyna 'Compacta'

C. monogyna 'Flexuosa'

C. monogyna var. *eriocarpa*

C. monogyna 'Stricta'

Hungarian hawthorn (Crataegus nigra)

(Crataegus pinnatifida)

(Crataegus x prunifolia)

silverberry (Elaeagnus)

Russian silverberry (Elaeagnus angustifolia)

(E. angustifolia var. orientalis)

(E. angustifolia var. spinosa)

American silverberry (Elaeagnus commutata)

cherry silverberry (Elaeagnus multiflora)

Japanese silverberry (Elaeagnus umbellata)

(E. umbellata var. parvifolia)

common sea-buckthorn (Hippophae rhamnoides)

common juniper (Juniperus communis)

savin juniper (Juniperus sabina)

honeyberry (Lonicera caerulea)

honeyberry (Lonicera caerulea var. kamtschatica)

Oregon grape (Mahonia aquifolium)

European crab apple (Malus sylvestris)

(Malus sylvestris ssp. Praecox)

apple (Malus domestica)

plum-leaf crab apple (Malus prunifolia)

purple crab apple (Malus X purpurea)

medlar (Mespilus germanica)

Intergeneric hybrids:

+ Crataegomespilus dardarii

+ Crataegomespilus dardarii 'Asnieresii''

X Crataemespilus gillotii

X Crataemespilus grandiflora

mulberry (Morus)

white mulberry (Morus alba)

(*Morus alba* L. 'Constantinopolitana'), Morus alba var. latifolia

(*Morus alba L.* 'Multicaulis')

(Morus alba L. 'Nigrobacca')

(Morus alba L. var. tatarica)

(Morus australis)

(Morus cathayana)

black mulberry (Morus nigra)

red mulberry (Morus rubra)

cherry plum (Prunus cerasifera)

bird cherry (Prunus padus)

(Prunus padus ssp. Padus)

(Prunus padus ssp. Borealis)

black cherry (Prunus serotina)

chokecherry (Prunus virginiana)

blackthorn (Prunus spinosa)

Nanking cherry (Prunus tomentosa)

European wild pear (Pyrus pyraster)

common pear (Pyrus communis)

oleaster-leafed pear (Pyrus elaeagrifolia)

snow pear (Pyrus nivalis)

willow-leaved pear (Pyrus salicifolia)

almond-leaved pear (Pyrus spinosa)

currant, gooseberry (Ribes)

alpine currant (Ribes alpinum), (Ribes multiflorum)

blackcurrant (Ribes nigrum)

rock currant (Ribes petraeum)

redcurrant (Ribes rubrum)

Nordic redcurrant (Ribes spicatum)

(Ribes sylvestre)

gooseberry (Ribes uva-crispa)

jostaberry (Ribes X nidigrolaria)

rose (Rosa)

prickly rose (Rosa acicularis)

Japanese rose (Rosa acicularis var. nipponensis)

meadow/wild rose (Rosa blanda)

dog rose (Rosa canina)

(Rosa X damascena)

glaucous dog rose (Rosa dumalis)

French rose (Rosa gallica)

redleaf rose (Rosa glauca)

cinnamon rose (Rosa majalis)

Moyes rose (Rosa moyesii)

(Rosa multibracteata)

alpine rose (Rosa pendulina)

Caucasian alpine rose (Rosa pendulina var. oxyodon)

Burnet rose (Rosa pimpinellifolia), (Rosa pimpinellifolia var. altaica)

sweetbriar (Rosa rubiginosa)

rugosa rose (Rosa rugosa)

harsh downy-rose (Rosa tomentosa)

apple rose (downy rose) (Rosa villosa)

blackberry (Rubus fruticosus), (Rubus laciniatus)

Arctic bramble (Rubus arcticus)

European dewberry (Rubus caesius)

cloudberry (Rubus chamaemorus)

(Rubus platyphyllos)

stone bramble (Rubus saxatilis)

European red raspberry (Rubus idaeus)

black raspberry (Rubus occidentalis)

wineberry (Rubus phoenicolasius)

salmonberry (Rubus spectabilis)

strawberry raspberry (Rubus illecebrosus)

elder (black elder) (Sambucus nigra), (Sambucus nigra L. var. albida), American elder (Sambucus canadensis)

European red elder (Sambucus racemosa)

European dwarf elder (Sambucus ebulus)

five-flavour berry (Schisandra chinensis)

(Schisandra grandiflora)

buffaloberry (Shepherdia argentea)

whitebeam (Sorbus aria)

Sorbus aria f. longifolia

Sorbus aria 'Majestica' (= 'Decaisneana')

service tree of Fontainebleau (Sorbus X latifolia)

dwarf whitebeam (Sorbus chamaemespilus), (Sorbus X thuringiaca), (Sorbaronia dippelii), (X Sorbaronia sorbifolia)

shipova (X Sorbopyrus)

rowan (mountain-ash) (Sorbus aucuparia)

edible rowan (edible mountain ash) (Sorbus aucuparia var. edulis)

true service tree (Sorbus domestica L. (Pyrus domestica L.))

with apple-shaped, larger fruits (Sorbus domestica f. pomifera)

with pear-shaped, smaller fruits (Sorbus domestica f. pyriformis)

Swedish whitebeam (Sorbus intermedia)

Vosges whitebeam (Mougeot's whitebeam) (Sorbus mougeotii)

Austrian whitebeam (Sorbus austriaca)

wild service tree (chequer tree, checker tree) (Sorbus torminalis)

lingonberry, blueberry, cranberry (Vaccinium)

lingonberry (cowberry) (Vaccinium vitis-idaea)

blueberry (Vaccinium myrtillus)

cranberry (Vaccinium oxycoccos L.) (Oxycoccus palustris Pers.)

small cranberry (Vaccinium microcarpus)

(Vaccinium gigas)

large cranberry (American cranberry)(Vaccinium macrocarpon Ait.) (Oxycoccus macrocarpos))

bog bilberry (Vaccinium uliginosum)

Various edible mushrooms (e.g.)

chanterelle (*Cantharellus cibarius)*

summer cep *Boletus aestivalis)*

sheathed woodtuft (*Kuehneromyces*)

Answer to question 37

"Species with a special German responsibility" are species for which Germany has a special responsibility at international level because they only exist in Germany or because a large share of the world's population is found there. Their protection is of great importance in species conservation. The measures under this funding priority are intended to directly protect these species and thus also contribute to the conservation and restoration of their habitats in order to ensure viable populations of these species on a long-term basis.

List of species for the funding priority "species of special responsibility"

This list of 40 animal and plant species eligible for funding under the Federal Biodiversity Programme has been developed by the Federal Ministry for the Environment (BMU) and the Federal Agency for Nature Conservation (BfN), in cooperation with the federal states. (Source: www.biologischevielfalt.de/verantwortungsarten.html)

List of species for the funding priority "species of special responsibility" under the Federal Biodiversity Programme

List of animals (25)

German name *Scientific name*

Mammals

Bechstein's bat *Myotis bechsteinii*

garden dormouse *Eliomys quercinus*

western barbastelle *Barbastella barbastellus*

Mediterranean (Southern or Miller's) water shrew *Neomys anomalus*

European wildcat *(Felis silvestris silvestris)*

Birds

greater scaup *Aythya marila marila*

European golden plover *Pluvialis apricaria altifrons*

northern lapwing (peewit) *Vanellus vanellus*

middle spotted woodpecker *Dendrocopos medius*

red kite *Milvus milvus*

common scoter *Melanitta nigra nigra*

tundra swan (Bewick's swan) *Cygnus columbianus bewickii*

Amphibians

fire salamander *Salamandra salamandra*

yellow-bellied toad *Bombina variegata variegata*

Fish

common barbel *Barbus barbus*

whitefish *Coregonus spec.*, all forms

Insects

apollo, subspecies

Parnassius apollo, all subspecies except *P. a.*

bartholomaeus and P. a. luitpoldus

marsh fritillary *Euphydryas aurinia aurinia*

clouded apollo; subspecies

Parnassius mnemosyne, all subspecies except *P.*

m. hartmanni and *P. m. korbi*

Forel's ant *Formica foreli*

black coloured ground beetle *Carabus (variolosus) nodulosus*

great capricorn beetle *Cerambyx cerdo*

Molluscs

depressed river mussel *Pseudanodonta complanata*

freshwater pearl mussel *Margaritifera margaritifera*

painter's mussel *Unio pictorum*

List of plants (15)

German name *Scientific name*

Arnica montana

Asplenium cuneifolium

Astragalus exscapus

Carex pseudobrizoides

Cochlearia bavarica

northern hawk's-beard *Crepis mollis*

western marsh orchid *Dactylorhiza majalis*

cheddar pink *Dianthus gratianopolitanus*

Belgian gagea *Gagea spathacea*

dune gentian *Gentianella uliginosa*

inundated clubmoss (bog club moss) *Lycopodiella inundata*

Oenanthe conioides

white beak-sedge *Rhynchospora alba*

fragrant scabiosa *Scabiosa canescens*

zinc violet *Viola calaminar*