COUNTRY REPORTS

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

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

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.

This report was created in cooperation of the Ministry of Agriculture and Rural Development (MARD) with the Ministry of Environment . Selected Departments of both ministries extended invitations to participate in the study, to external experts at scientific institutes and trade organizations. The substantive involvement of individual teams was used to compile a selection of answers to the below question list. The preparation of a collective report on the basis of collected expert opinions, and its final editing was entrusted with a team of the Agricultural Policy Analysis Unit Foundation of Assistance Programmes for Agriculture FAPA including: Katarzyna Bańkowska, Edmund Giejbowicz, Joanna Pietrzak-Zawadka, Radosław Lewandowski-Lepak.

Below is a list of institutions/units - authors of substantive contributions:

The Department of Food Safety and Veterinary Matters MARD
The Department for Direct Payments MARD
Foundation of Agriculture Assistance Programmes for Agriculture FAPA, commissioned by the The Department for Direct Payments MARD
Institute of Technology and Life Sciences, commissioned by The Department for Direct Payments MARD
Institute of Soil Science and Plant Cultivation in Puławy, commissioned by The Department for Direct Payments MARD
The Department of Strategy, Analyses and Development MARD
The Department of International Cooperation MARD
The Department of Plant Breeding and Protection MARD
Plant Breeding and Acclimatization Institute, commissioned by The Department of Plant Breeding and Protection MARD
Institute of Horticulture commissioned, by The Department of Plant Breeding and Protection MARD
Institute of Plant Protection, commissioned by The Department of Plant Breeding and Protection MARD
Institute of Technology and Life Sciences commissioned by The Department of Plant Breeding and Protection MARD
Institute of Soil Science and Plant Cultivation in Puławy, commissioned by The Department of Plant Breeding and Protection MARD
Institute of Natural Fibres and Medicinal Plants, commissioned by The Department of Plant Breeding and Protection MARD
Warsaw University of Life Sciences (SGGW), commissioned by The Department of Plant Breeding and Protection MARD
Ministry of the Environment

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Protection). The Ministry of the Environment requested cooperation from the General Environmental Protection Administration, where works were coordinated by Anna Liro anna.liro@gdos.gov.pl and General Directorate of State Forests.

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- Institute of Soil Science and Plant Cultivation in Puławy: dr hab. Mariusz Matyka, dr hab. Beata Feledyn-Szewczyk.

The contribution of the Department of Fisheries of Agriculture and Rural Development was based on the expertise 'State of national biological diversity in the scope of genetic resources of species of aquatic organisms in inland waters and aquaculture, and in internal marine waters and waters of the Baltic Sea under Polish jurisdiction' by Chybowski Ł., Dobosz S., Kolman R., Lirski A., Szczepkowski M., Wiśniewolski W., Wolnicki J., Wołos A., Pelczarski W., Wąs A.), as well as prepared by external expert:

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• Institute of Technology and Life Sciences – dr Hubert Piórkowski, dr Aleksandra Kazuń, Wojciech Jakubowski, mgr Paulina Dzierża, Łukasz Krajewski

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The report was prepared by means of own information, as well as strategic documents, expert studies, and research publications such as:

- *Strategia zrównoważonego rozwoju wsi, rolnictwa i rybactwa na lata 2012-2020 (Strategy of Sustainable Development of Rural Areas, Agriculture and Fishing for the period 2012-2020)* (Resolution No.103 of the Council of Ministers, of 25 April 2012),
- *Krajowa Strategia Zrównoważonego Użytkowania i Ochrony Zasobów Genetycznych Zwierząt Gospodarskich (National Strategy of Sustainable Use and Protection of Genetic Resources of Farm Animals)* (commissioned by the Ministry of Agriculture and Rural Development, December 2013),
- *V Krajowy Raport z Wdrażania Konwencji o Różnorodności Biologicznej (V National Report on the Implementation of the Convention on Biodiversity)*, prepared by FundEko The initiative on Good Practices,
- *Program ochrony i zrównoważonego użytkowania różnorodności biologicznej wraz z Planem działań na lata 2014-2020) (Protection and Sustainable Use of Biodiversity Programme, and the Plan of Operations for the years 2014-2020)* (project of the Minister of the Environment),
- *Plan Działań dla Żywności i Rolnictwa Ekologicznego w Polsce na lata 2011-2014 (Operational Strategy for Food and Ecological Agriculture in Poland for the years 2011-2014)* (issued by the Ministry of Agriculture and Rural Development).
- Numerous source materials, scientific publications.

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.

Poland is a country of a relatively wide natural diversity. Its location in the middle of Europe, between the sea and the mountains; on a diverse geological base (old crystalline discs and young, corrugated mountains); in a transitional climate (shaped by inflows of Atlantic sea air and the continental impacts of Eurasia), contributes to its vast natural wealth, which is a significant factor determining the character of our country.

Within the period of report preparation, there were approximately 365 types of plant associations in Poland, with half of them present in agricultural areas. Within the mosaic of utilised agricultural areas and permanent grasslands, 22.7%[1] of lands were occupied by areas of exceptional natural value that remain under legal protection. As a result of retaining traditional forms of extensive agricultural economy, local varieties of cultivated plants and local breeds of farm animals were present. Regions of old plant varieties, were mostly located in the southern part of the country (mountainous region).

Poland occupied 312 700 km^2, which constitutes ca. 7.1% of the total area of the European Union member states. The population of Poland was 38.5 million people, including: in cities 23.4 million, in rural areas 15.1 million people. Rural areas in Poland constituted 93.1%, which were inhabited by 39.2% of the total population. The cities were inhabited by 60.6% of the country's population, but this percentage was falling slightly each year, as a result of population migration from larger urban centres to suburban areas.

Average population density was 123 persons/km^2 (with the European average ca. 117 according to Eurostat estimates), with the ratio in cities at 1 085 persons/km^2, and in rural areas – 52 persons/km^2.

Rural areas in 2011 held 4.4 million out of 13.6 million of all households. The average number of people per rural household amounted to 3.40 (with the national average of 2.82). Most households were connected to

[1] Rural Development in the EU. Statistical and Economic Information, Report 2013.

farming. Agriculture in Poland has had a decisive influence on the socio-economic situation of rural inhabitants, the state of the natural environment, landscape structure, as well as biodiversity. Agriculture played a key role in protecting environmental qualities of rural areas. Between 2003 and 2013, utilised agricultural areas constituted ca. 60%, and forests ca. 30% of the total area of Poland. Within the structure of agricultural land use, arable land was the most prominent (74% of agricultural lands), as well as meadows and pastures, which altogether constituted ca. 21% of all agricultural lands[2]. A significant difficulty, which required greater involvement of knowledge, resources and measures from farmers than in other parts of Europe, were unfavourable natural conditions for agricultural production, such as a large share of poor and acidic soils, low rainfall and short vegetation period.

Between 2003 and 2012, the number of persons working in Poland was increasing, in spite of a reduction in 2009 (as compared to the previous year). In 2012, from among 15.6 million of all the working population, 38.9% were employed in the rural areas, and 12,6% in the agricultural sector[3] (i.e. almost 2 million people)[4].

Persons working in Polish agriculture constituted ca. 20% of all EU agriculture workers. In 2010, 14% of farms were run by farm manegers under 35 years of age. They managed 16% of arable lands, generating 17% of the total agricultural production (together with homesteads without farmlands). Farmers in this age group obtained better production results than others, especially people above 65 years of age[5].

In 2008, the unemployment rate reached its lowest level of 7.1% (according to LSF – Economic Activity of the Population Aged 15 and more). However, the world economic crisis has interrupted this positive trend. The deterioration of the Polish labor market situation, although noticeable, has never been so severe, as in other European countries. According to LSF, in 2012 the average unemployment rate amounted to 10.1%[6], which is a value similar to the average in the EU-27 countries (10.4%). Unemployment in Poland was, to a significant extent, long-term. An especially important problem was the low level of employment among young people. Unemployment was one of the most important factors affecting the scope of extreme poverty (i.e. below the level of minimum existence).

From the onset of the world economic crisis in 2008, Poland, until 2013, remained the only EU country, wherein no decrease in the gross domestic product (GDP) was recorded. However, the GDP per capita calculated according to purchasing power, was still lower than the EU average.

In 2013, the share of agriculture in GDP reached the level of 3.4%. The value of agriculture production in current prices in 2013, according to EUROSTAT, was estimated on the level of ca 23 billion EUR, which would place it in 7th place in the EU behind France, Germany, Italy, Spain, Great Britain, and the Netherlands. Within the commodity structure of agricultural production in 2013, the greatest share was: slaughter livestock (32.2%), cow milk (17.3%) and cereals (13.0%)[7].

An important constituent of the agricultural sector in Poland was vegetable production with the dominance of cereals, root crops, mostly potatoes, as well as fruit and vegetables. The total area for cereal cultivation land was maintained on a relatively stable level in the period of 30-35 years prior to the analysis, while a substantial change in those years was observed in the cultivation area of the potato, sugar beet, and agrimony.

Poland occupied the top places in the EU and the world in cereal production, mainly rye (1st place in the EU with 37.7% of total EU production, and 2nd in the world), oats (1st place with 17.4% of total EU production

[2] Geodesic status and directions of land use. Statistical yearbook of agriculture 2013. Central Statistical Office GUS, Warszawa.

[3] Statistical yearbook. Agriculture, forestry and fishing. 2013. GUS, Warszawa.

[4] On average annually. Economic Activity of the Population of Poland in the years 2010-2012. Central Statistical Office (GUS) 2014 and previous issues. In 2003, the number total of employed workforce amounted to 13.6 million, 38.7% of whom were employed in rural communities, the agricultural sector employed a total of nearly 2.5 million people, i.e. 18.3%, of the total workforce, 92% of those employed the agricultural sector, was working in the rural areas.

[5] Key Farm Variables: Area, livestock (LSU), labour force and standard output (SO) by agricultural size of farm (UAA) and age of manager [ef_kvage]. W 2010 r. Eurostat: http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/introduction last update 07.12.12, extracted on: 17.12.12.

[6] Since the 3rd quarter of 2012, for the purpose of test result generalization on the general population, data has been used on the population of Poland aged 15 and above, from balance sheets prepared on the basis of the National Census of 2011. In addition, methodological changes have occurred, designed to adjust the population covered by tests to the recommendations of Eurostat. In connection with the above, the LFS results since the 3rd quarter of 2012 are not fully comparable with test results from previous years.

[7] Concise Statistical Yearbook 2014, Central Statistical Office. GUS, Warszawa.

and 3rd in the world), wheat (4th place with 6.7% of total EU production and 16th in the world), barley (5th place with 6.4% of total EU production and 12th in the world). It should also be noted that Poland is the top EU (5th in the world) apple producer (21.5% of total EU production) and second (7 in the world) potato producer (14.7%, of total EU production)[8].

A factor of significant economic importance, especially in Poland, was animal production: poultry, swine and cattle. Since 2003, significant poultry production increase was recorded, in particular in the industrial sector, whose main driving force was export to the EU countries. A beneficial phenomenon, observed for several years in animal production, was the improvement in animal production efficiency.

With regard to animal agricultural products, a high place in the EU was held by Polish cow milk production (4th place in the EU with 8.3% of total EU production; 12th in the world) and chicken eggs (7th place in the EU with 8.6% of total EU production; 23rd in the world), as well as fourth place in swine production (9.0% of total EU production; 10th in the world), and 7th in cattle production (6.6% of total EU production; 44th in the world)[9].

One of the main factors affecting the development of the agro-food sector, especially after Poland's accession into the EU, was the increase in foreign agriculture and food trade turnover. Between 2003 and 2013 agricultural and food export increased over five times, i.e. from 4.0 to 20.4 billion EUR, and import by more than four times, i.e. from 3.6 to 14.3 billion EUR. The balance of agro-food trade turnover was significantly increased from 0.4 billion EUR in 2003, to upwards of 6.1 billion EUR in 2013 (nearly fourteen times).

Despite all the changes, Polish agriculture was characterized by a significant fragmentation of farm, as well as an unfavourable layout of used land, which restricted the effectiveness of incurred production costs and competitive position. Within the structure of approximately 1.5 million agricultural farms in 2010, farms with a total area of up to 5 ha (55%) and with standard production up to 4 000 EUR (51%) had a dominating position[10]. Low contribution of small agricultural farms in total production did not exclude them however, from having a significant function in the social, economic and environmental aspect. Small farms of up to 5 ha expressly dominated in provinces: Małopolskie, Podkarpackie, Śląskie, and Świetokrzyskie, whereas the largest percentage of farmsteads, of total area over 100 ha was recorded in the: Zachodniopomorskie, Warmińsko-Mazurskie and Lubuskie provinces.

For the audited period, the gross value added for one agricultural worker amounted to 65% of that of the city workers. Between 2002 and 2012, the average monthly disposable income per capita in country households, with minor variations, reached the level of 70% of the city income. Similarly, farmers' income constituted on average, 2/3 of the income generated by those working on their own account. As a result, rural inhabitants, including farmers, apart from pensioners and people living off of non-business sources (e.g. welfare), were to the greatest extent affected by poverty.

When considering the conditions affecting the situation in inland fishing and aquaculture, the total area of fresh waters, estimated as 6 000 km^2, should primarily be taken into consideration. From this area, 3200 km^2, 1400 km^2, 500 km^2 and approximately 400 km^2 are respectively lakes, rivers, ponds, and other water types. The supply of surface waters is mainly rainfall and snowfall, that vary annually in individual parts of Poland from 580.3 mm to 802.9 mm, which accounted for creating surface water sources between 181.4 (2005) and 251.1 km^3 (2010). Average annual outflow from Poland in the period of 1980-2010 reached 54.4 to 62.3 km^3. Therefore, Poland is considered a country poor in water resources, as the amount per capita is at the level of 1600 m^3 $annually^{-1}$, whereas in other European countries this figure reaches the level of 4600 m^3 $annually^{-1}$. Agriculture, forestry and aquaculture take up approximately 1.2 km^3 of available water. The share of highly polluted water in physical-chemical or biological terms in recent years did not exceed accordingly 10% and 40% of total river watercourse. An additional problem is the unequal distribution of rainfall with intensifying deficits in the central part of the country. In spite of that, only 6% of annual outflow is retained in reservoirs (140 structures), whereas neighbouring countries store appropriately 12 to 15% of annual outflow[11]. Surface waters are characterized by a relatively low habitat diversity, which is a consequence of lowland area dominance, i.e. below 300 masl, constituting 91% of the country area.

There are approximately 60 domestic species of fish and lampreys in Polish waters, and at least 19 species alien to the native fish-fauna (Witkowski et al. 2009; Witkowski & Grabowska 2012). From among this number, the most intensively exploited are five fish species i.e. bream *Abramis brama*, roach *Rutilus rutilus*,

[8] Statistical Yearbook of Agriculture 2013, Central Statistical Office. GUS, Warszawa.
[9] Statistical Yearbook of Agriculture 2013, Central Statistical Office. GUS, Warszawa.
[10] Structure similar to previous years. Eurostat.
[11] Concise Statistical Yearbook, 2011.

perch *Perca fluviatilis*, pike *Esox lucius* and, zander *Sander lucioperca*. For a long time however, a decrease in importance of commercial fishing is observed, and a gradual growth of use for leisure purposes, i.e. angling.

Decrease in commercial fishing was one of the factors stimulating aquaculture development. The breeding of aquatic organisms, for which an area of approximately 70 000 ha is used, exploits approximately 30 species of fish and invertebrates. However, more than 90% of total production is focused on two species: the carp (*Cyprinus carpio*) and the rainbow trout (*Oncorhynchus mykiss*). For example, in 2010 the total aquaculture production was estimated at 24 600 t, and was already a significant part of the total freshwater fish production for consumer purposes, estimated at 48 400 t.

Fishing and aquaculture face many problems of an environmental and socio-economic nature. Fish consumption in Poland is still significantly lower than in most European countries (annual fish consumption in Poland is 14 kg per capita, whereas in other EU countries – 22 kg per capita). Particularly low is the interest in products of inland fishing and aquaculture (3.1 kg per capita). Low consumption results from consumer preference, and not product availability. For example, in 2010 a market for approximately 23140 t of aquaculture products was found, which constituted 93.9% of the annual production of this sector. In consequence of the socio-economic changes, a decline in employment in the fishing sector is observed. In 2005, the average employment level reached 5.25 persons per 100 ha, whereas in 2010 this coefficient fell to 3.8 persons per 100 ha. Also discernible is the gradual decrease in the number of breeding farms, as fish producers cannot cope with increasing operating, maintenance, and employment costs, as well as, environmental fees imposed recently on fishers[12].

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.

Biological diversity in agriculture plays a special role, being the basis of food production, and hence the existence and development of society. The greatest economic sector, i.e. food economy, has, in Poland, undergone an evolution with regards to both market development and consumer preference, as well as due to active advertising of particular products (e.g. organic products, healthy food) and a gradual change in nutrition habits. The last twenty years in Poland was quite a special period regarding changes in food consumption. Changes in the consumption model were, to a large extent, the effect of the process of consumption globalization, which led to increased integration of national economies, and the standardization of consumer behaviour.

Food was also one of the leading items in Polish international trade. Poland was the eighth most important food exporter in the EU. The balance value of agro-food trade placed Poland in fifth place among 11 EU countries with a positive balance of that exchange (others were food net importers). Poland became a significant exporter of dairy products e.g. ripening cheese, powdered milk, butter, or whey. Additionally, the export of meat products, apples, juice concentrates, mushrooms, and frozen food products has also increased. When analyzing

[12] Lirski A., Myszkowski L.. 2014, Produkcja rybacka prowadzona w stawach rybnych i innych urządzeniach służących do chowu lub hodowli w roku 2013 na podstawie analizy kwestionariuszy RRW-22. Badania ekonomiczne z zakresu rybactwa śródlądowego przewidziane w Programie Badań Statystycznych Statystyki Publicznej, manuscript, p. 31.

statistics from 2000-2010, concerning agricultural production values in Poland, it was observed that those values were growing annually, with a significantly increasing participation of individual homesteads, from which, in 2010, over 80% of the global production, both plant and animal, originated.

Preserving biodiversity in plant production remained a key element in providing food security. The diversity and variability at the species, variety, intra-variety, and population level of domesticated plants and their crop wild relatives was a necessary basis for genetic improvement of crop plants.

The situation of Poland, as compared to Europe, is exceptional, due to the relatively diverse terrain, as well as soil, water, and climate conditions that provide an exceptionally large variety of habitats and landscapes. Agriculture plays a very important role in biodiversity protection in rural areas, which is proven by the fact that nearly half the types of plant associations in Poland grow in agricultural areas. The national biodiversity and rural area richness remained exceptional on a European scale. For example, for every 76 natural habitats from the list of the Habitat Directive, present in Poland, 15 are strictly related to agricultural land, and the condition of another 13 depends on the crop cultivation system in their immediate vicinity. Among the 44 plant species present in Poland, that were included on this list, 25 grow in agricultural areas. Preserving genetic resources of rare species and old varieties of crop plants was also paramount.

The genetic resources of crop plants have been placed under concervation *ex situ*, under the National Crop Plants Genetic Resources Concervation (pl. Krajowy Program Ochrony Zasobów genowych Roślin Użytkowych). These are mainly old varieties of crop species, their populations and ecotypes, as well as their crop wild relatives, and naturally occurring species, important for ensuring food security of people and animals, herbs, energy crops for biofuel production and area reclamation. The protection covers agricultural, horticultural, and honey plants. The latter were also partially covered by *in situ* protection (on-farm and on-garden conservation). Many species and neglected and underutilised species play an important role in stimulating and integrating rural communities, and their cultivation and processing are a serious source of income. Edible plants obtained from natural sites play a similar role.

Among the ca. 2300 species of vascular plants of the Polish flora, ca. 400 were or are used as a source of medicinal resources. Many of them were on the list of protected plants, and some were even endangered. The main hazards, for which they are exposed, include abiotic changes in the natural environment, and anthropogenic factors. Natural plant resources in Poland were very intensively exploited, often to a point of overexploitation. Raw materials obtained from these plants constituted an important source of revenue for the rural population, in particular in the less developed areas of eastern Poland. They were processed by herbal and pharmaceutical companies, and exported. However, urban development, increasing number of inhabited areas and transport routes, has resulted in a decline in the number of places, where herbal resources could be safely harvested. Maintaining balance seems to be impossible without introducing in the near future, a sustainable exploitation system of herbs and aromatic plants. Activities allowing to achieve this objective are: documenting these resources, conducting *in situ* tests concerning intra-species diversity and succession of these plants, as well as exhaustive works concerning the introduction of many of these plants into agricultural operations.

For several years much emphasis has also been put on preserving species important for maintaining correct functions and stability of agricultural ecosystems. The main sources of environmental hazards are: industry, particularly the power sector, urban engineering, and transport.

Agriculture intensification, as the result of attempting to increase agricultural output, negatively affects the biodiversity of the agricultural landscape. A characteristic feature of intensively used agricultural areas, observed throughout Europe, was the progressing deterioration of biodiversity. As a result of intensification of plant cultivation methods, a gradual loss of valuable habitats of many species was observed. Due to agriculture intensification, buffer strips, water holes, fallows, pastures and meadows have been slowly disappearing from the agricultural landscape. Such lands were of a relatively low economic value for farmers, at the same time having a substantial biological value. The deterioration of those areas, resulted in drastic reduction of biodiversity. It was observed for example, that excessive use of increasingly stronger herbicides or their combinations, resulted in the extinction of rare associated species of plants. A limited presence of these species in the fields, increased biological diversity and ecological balance in agricultural ecosystems, at the same time not lowering the yields. Anthropogenic factors, causing the biodiversity deterioration of such species, have been associated with modern agro-engineering works, such as e.g. change in the way of soil use, abandoning or reducing traditional production methods, habitat liquidation or dissolution, standardization and destruction of habitat mosaics. The intensification of agriculture, being the result of attempting an increase in agricultural production, adversely affects biodiversity of the agricultural landscape. The most important factors in the decline of biodiversity were contamination of the environment, changes in habitat conditions, over-exploitation

of natural resources and the inflow of invasive species. Systematically, the number and abundance of medicinal plant localities was declining.

In addition, within the recent 10 years, an intensification of horticulture and limitation of the number of cultivated species and varieties, which reduce biodiversity (depletion of the gene pool) in rural areas has been observed. This was due mainly to economical reasons – improvement in yield and work efficiency, as well as insufficient knowledge of farmers/gardeners, about the importance of maintaining biodiversity. In recent years, actions in the field have been undertaken (popularising and promotional actions, and an agricultural-environmental programme), the effect of which was the growth of interest in traditional varieties of agricultural plants, fruit and vegetables, and maintaining the existing local crops.

Biological diversity also plays a key role in animal production. A noticeable high internal demand for meat, milk and other animal products, necessitated providing a permanent and stable genetic base for the development of animal production. The contemporary consumer pays more and more attention to the quality of consumed products, hence the growing interest in organic products or functional food. This results in improving the situation of family farms, where greater emphasis is put on the quality of the final product, and a more significant role assigned to natural nutrition and animal welfare.

In recent years the structure of meat consumption in Poland underwent significant changes, it can be said that we are dealing with the phenomenon of substitution of beef and pork consumption with poultry and, to some extent, fish. However, taking into account the health qualities of fish and seafood, it should be stated that the consumption level of this group of products in Poland is still relatively low.

In recent years the size of basic livestock population in Poland, was gradually reduced, preserving significant racial diversity within particular species.

Swine production has, for years, been the most important branch of agricultural production in Poland. As recently as 2000, with 17.1 million heads it constituted 37.6% of the entire animal production and 23.5% of the entire agricultural production. In 2012, despite significantly lower numbers than at the beginning of the 1990's (which was 19.5 million heads), the national production of pork livestock again reached 2.2 million tons. Such production levels were attained alongside the rapidly growing import of piglets (3.5 million heads in 2012).

In 2012 the structure of poultry production was dominated by broiler chickens. Their production was characterized by a very rapid, ca. 15%, growth as compared to the previous year. In 2012 turkey production reached the record level of ca. 360 thousand tons i.e. 6% more than in 2010. In the scale of 2012, poultry production increased by 12%, to approximately 1600 thousand tons[13].

According to the data of the Central Statistical Office (GUS), in December 2012 the number of young cattle aged 1-2 years remained at the level 5.4% higher than in the last month of 2011, and amounted to 1.3 million heads. At the same time, the number of calves increased relative to the level of December 2011 by 1.9%, up to 1.4 million heads. During the studied period, a decrease in the number of cattle, aged above two years has also been observed. In connection with the above changes in the beef market, the total number of cattle in Poland amounted to 5.5 million heads – 0.4% more than in December 2011[14].

At this point we should also mention the role of fur carnivores, whose breeding gained additional significance at the time of introduction of regulations prohibiting the use of fodder for feeding farm animals. In particular, mink farms have found prominence in Polish agriculture; Poland was classified as the third largest producer of mink furs in the world. Apart from creating jobs for a few dozen thousand people, these farms used mainly animal by-products of the food industry, inedible for man, whose industrial recycling would not only be costly, but also very burdensome to the natural environment. Mink droppings, as a category 2 animal by-product, after composting, are a perfect natural fertilizer, successfully replacing industrial chemical products. Skins of fur animals are easily disposable after use, as they undergo rapid biodegradation. It should also be remembered that by breeding such animals on farms, we preserve wild species, living in their natural habitats. In 2013, approx. 10 million mink furs, 250 000 fox furs, and 50 000 raccoon dog furs were produced in Poland[15].

In individual, especially small-sized farms, or those situated in areas with difficult natural conditions, in the examined period, an increased interest in maintaining traditional, domestic races and varieties of farm animals was recorded, not only due to their greater adaptation to the environment and resistance to disease, but also

[13] Poultry market – the latest opinions, analyst summaries and forecasts of the Institute of Agricultural and Food Economics National Research Institute and the BGŻ bank. http://www.kipdip.org.pl/article/id/781.

[14] Cattle stock and beef slaughter production in Poland http://www.gospodarz.pl/aktualnosci/bydlo-i-mleko/poglowie-bydla-i-produkcja-zywca-wolowego-w-polsce.html.

[15] Polski Związek Hodowców i Producentów Zwierząt Futerkowych (Polish Fur Animal Farmers Association).

higher quality of the final product. It was of great importance in the context of consumer awareness increase, and the search for the so-called safe food, produced in natural conditions.

Apart from the benefits we draw from produce of local races, the animals, as an integral element of the agricultural ecosystems and through their vegetation control, contribute to preserving and nursing the landscape as well as fire protection. Domestic races also constitute an element of our culture and tradition, no less important than works of art, but harder to keep, due to biological processes, to which populations of living organisms are subject. The protection of animal genetic resources is also an investment in the future of the next generations.

Domestic races were also increasingly used in agritourist farms. They are a source of not only high-quality animal products, acquired in natural conditions, but also an inherent element of the landscape, and are a big tourist attraction. Breeding domestic races in agritourist farms performs important popularisation, promotional, and educational functions.

Both the Rural Development Programme and various protection programmes affected the popularization of domestic races of farm animals in Poland, also through the promotion of food products derived from those sources. It was, in particular, related to brand products, such as meat and its processed products, dairy products, especially cheeses, being the reflection of local culinary traditions. A significant role was also played by, textiles, leather accessories, ornaments, and handicraft made of wool bristle, and animal bones. These products were introduced to the market, and in spite of a relatively higher price, found buyers.

To ensure better knowledge, sustainable use, and the protection of genetic animal resources, identification and registration of animals was conducted, as well as keeping books, breeding, and controlling reproduction. Population size trends were monitored. Based on the results of evaluation of utility value of particular breeds, an evaluation of their breeding value took place. Implementation of breeding programs based in these results, was the source of genetic progress in the active population, which was then carried over to the general population.

Animal genetic resources protection programmes, were implemented in Poland mainly *in-situ*, in farms and typical breeding areas. This method provided protection by usage, which enables simultaneous improvement of specific and valuable features of a given race. There are several possibilities of conducting effective *in-situ* protection. In the case of some breeds, their broader incorporation into commercial production systems was possible, e.g. cross-breeding on the maternal side (Puławy pigs (pl. świnie puławskie) for production of sows for commercial herds); for extensive and free range breeding (e.g. green and yellow-legged partrige hens and the kielecka geese).

The scope of activities for protection of domestic races increased significantly in the last 10 years – the protection covered additional races, and the participation of farmers, herds, and animals in the implementation of protection programmes has grown. In June 2014 protection programmes covered 3 034 herds, 94 489 farm animals and 1476 bee colonies. The number of populations of farm animals, for which protection programmes have been prepared and implemented, increased from 61 in 2000 to 91 in 2014.

Fish, maybe except mushrooms, are the only group of organisms, wherein the biomass share obtained from wild species is almost equal to artificial systems' production, i.e. in aquaculture. This means that on the one hand, natural biodiversity and productivity is a significant factor stimulating this sector of agriculture, but also indicates a potential risk for the natural environment related to further intensification of fishing operations. The most important group of freshwater fish in terms of biomass obtained, are the cyprinidae, in particular roach and bream, which reflects the dominant lowland character of water reservoirs. These species, as opposed to carnivores like pike, zander and perch, have a relatively low unit value (i.e. sale price), and thus high pressure on carnivorous species is being maintained. Commercial fishing of these species is often disproportionate to their numbers in the habitat, which, on the one hand creates a danger of destabilization of water ecosystems, and on the other, forces the implementation of stocking programs, compensating for the lack of sufficient numbers of mature specimens capable of natural reproduction. Intensive stocking creates a risk of unifying the gene pool between local populations, and transfer diseases, parasites, and invasive species (e.g. the stone moroko). An additional pressure on wild fisheries, is the competition of foreign species introduced to open waters in order to increase their productivity and attractiveness. Currently, the main example of such a species is the carp. It should be noted however, that in the case of recreational fishing, the presence of the carp, preferred by the anglers, may diminish the pressure on wild species. With regard to the most intensively exploited wild species, the main protective methods are passive: restricting pressure during breeding periods (closed season), limiting fishing quantity and setting minimum sizes of caught fish (catch limits and size restriction), as well as active: reproduction supplementation by artificial means, and rearing the most valuable fish species in fishing farms.

Genetic resources protection programmes pertain mainly to establishing and maintenance of selection herds of the rainbow trout and 21 varieties of carp. Scientific-research units also took steps to establishing a gene bank, in order to store their genetic material in the form of frozen seminal fluid, wherein next to the above mentioned, aquaculture-important species, plans for *ex situ* protection of the genetic material of wild endangered and reintroduced fish species, such as: acipenser oxyrinchus (sturgeon), Atlantic salmon, sea trout, whitefish, grayling, huchen, vimba. Creating and funding a stock fish and economically important and endangered species seminal fluid bank, is planned as a part of the European Maritime and Fisheries Fund (EFMR) for the period of 2014-2020.

When attempting to assess ecosystem services, statistics regarding agriculture, hunting, forestry and fishing may be referenced.

When analyzing statistics from 2009-2011 concerning e.g. global production, and referring them to the easiest measurable ecosystem services, it can be concluded that they constituted a small percentage of national global production, exceeding 4.10% of its value (Table I).

Table I. Global production as per departments and sections of the economy (in millions PLN).

	2009	**(in %)**	**2010**	**(in %)**	**2011**	**(in %)**
Agriculture, forestry hunting, and fishing, including:	104.05	3.88%	108.44	3.79%	128.534	4.10%
Agricultural cultivations, animal breeding, hunting,	95.49	3.56%	99.039	3.46%	117.378	3.74%
Forestry and logging	8.11	0.3%	8.891	0.31%	10.774	0.34%
Fishing	445	0.0 %	515	0.02%	382	0.01%
Industry	961.65	35.83%	1 047.14	36.55%	1 198.16	38.20%
Other sections of the economy	1 618.27	60.29%	1 709.17	59.66%	1 809.58	57.70%
Total	2 683.97	100%	2 864.76	100%	3 136.27	100%

Source: Own study based on The Central Statistical Office (GUS) Statistical Yearbook of the Republic of Poland 2011 and 2012.

In the case of ecosystem services, special attention should be paid to carp aquaculture. Carp farms covering a large area, provide small water retention, improve water relations and microclimate in adjacent areas, and form valuable habitats for water-mud organisms. In the areas of carp farms, the presence of 1169 species of plants and 936 species of animals was recorded. It is reflected in the taking over of carp fish ponds by area protection programmes (e.g. Stawy Milickie) or NATURA 2000.

Table II. Persons working in agriculture, hunting, forestry, and fishing between 2009-2011 (in thousands).

	2009	**2010**	**2011**
Agriculture and hunting,	2 071	2 326.8	2 325.6
as a % of all employees	15.03%	16.49%	16.34%
Forestry and logging	49.8	46.3	47.8
as a % of all employees	0.36%	0.33%	0.34%
Fishing	4.1	3.0	3.3
as a % of all employees	0.03%	0.02%	0.02%
Total employment in Poland	13 782.3	14 106.9	14 232.6

Source: Own study based on The Central Statistical Office (GUS) Statistical Yearbook of the Republic of Poland 2011 and 2012.

Another way to frame the importance of ecosystem services, is the analysis from the employment level point of view in relation to total workforce. Employment in agriculture and hunting in 2011 constituted 16.49%, in forestry, 0.36%, and in fishing, 0.03%. This data shows that almost every fifth person employed in Poland, earn their income from enterprises, whose dependence on ecosystem services, is beyond any doubt. Additionally, in spite of the negligible percentile value and small economic importance in Poland, it is worth noting the decreasing trend of the employment level in fishing (see Table II). This data, due to its level of generality, as well as the marginal % share (e.g. fishing in overall employment), cannot, of course, be the basis for drawing far reaching conclusions. It should however, be treated as an example of a general tendency of the ecosystem condition and the level of ecosystem services, having a direct influence on the economy. The direction of the changes taking place is also a guideline for further research and analyses, enabling distinction between economic factors thereof, and strictly natural, ecosystemic aspects.

Polish sea fishing is divided into two basic sectors: Baltic fishing (involving the definite majority of the fleet) and deep-sea fishing. Among the five basic Baltic species (cod, herring, European sprat, European flounder, salmon), the cod remains the most vital for Polish fishermen[16].

The decrease in employment in the industry, occurs simultaneously with the decreasing yields of Polish fishing (Table III). It is worth noting that compared with meat production (livestock), as of mid 2011, their tonnage constituted 5.4% of all national animal production.

Table III. Polish sea and freshwater fishing, and carp aquaculture in the period of 2009-2012 (in thousands of tons).

	2009	**2010**	**2011**	**2012**
Sea fishing, including:	212.1	170.8	179.9	163
Baltic	131.4	110.1	110.8	100
Deep-sea	80.7	60.7	69.1	63.0
Freshwater fishing and aquaculture	50.5	42.7	45.0	47.4
National fishing(without deep-sea fishing)	181.9	152.8	155.8	147.4
Total national fishing	262.6	213.5	224.9	210.4

Source: Agriculture and food economy in Poland, Ministry of Agriculture and Rural Development, Warsaw 2012. For 2012, data based on the forecast.

Table IV. Fishing and livestock production in Poland between 2009 and 2012 (in thousands of tons, and in %).

	2009	**2010**	**2011**
National fishing(without deep-sea fishing)	181.9	152.8	155.8
percentage share	4.7%	3.7%	3.7%
Total fishing	262.6	213.5	224.9
percentage share	6.8%	5.2%	5.4%
Livestock production	3 623.0	3 909.0	3 965.0
percentage share	93.2%	94.8%	94.6%
Total Fishing and livestock production	3 885.6	4 122.5	4 189.9

Source: Statistical Yearbook of the Republic of Poland 2012, The Central Statistical Office (GUS), and Agriculture and Food Economy in Poland, Ministry of Agriculture and Rural Development, Warsaw 2012.

[16] Ministry of Agriculture and Rural Development, Agriculture and Food Economy in Poland, Warsaw 2012, p. 53.

When comparing data concerning the purchase of game with data related to fishery and the remainder of animal production, we can clearly see that from the point of view of acquired tonnage, game is a minute share of national animal production (Table V and Table VI). At the same time it is worth noting an increasing tendency regarding both tonnage, and value of game bought in Poland With further addition that from the point of view of ecosystem services, the value of game bought does not reflect its actual value.

Table V. Purchase of game between 2009-2012 (in tons).

	2009	**2010**	**2011**	**2012**
Wild boar	2 301	3 643	3 494	3 662
Deer	3 016	3 420	3 824	4 103
Roe	1 820	1 909	1 954	2 119
Total	7 137	8 972	9 272	9 884

Source: Statistical databases of the Central Statistical Office (GUS), based on data of the Agricultural Property Agency, the State Forests National Forest Holding, and the Polish Hunting Association.

Table VI. Purchase of game between 2009-2012 (in thousands PLN).

	2009	**2010**	**2011**	**2012**
Wild boar	6 539.70	16 155.30	19 501.30	17 785.70
Deer	19 212.70	26 017.80	34 370.20	33 345.90
Roe	16 867.60	20 959.80	26 290.20	29 297.80
Total	42 620.00	63 132.90	80 161.70	80 429.40

Source: Statistical databases of the Central Statistical Office (GUS, Warszawa), based on data of the Agricultural Property Agency, the State Forests National Forest Holding, and the Polish Hunting Association.

Another example of benefits derived directly from ecosystem services is data relating to forest fruit and fungi harvesting in Poland. They clearly indicate a relation between the yields and atmospheric factors (rainfall, temperature). On the other hand, data concerning the value of bought forest fruit and fungi suggests a growing economic pressure concerning the acquisition of these resources.

Table VII. Purchase of fungi and forest fruit between 2009-2012 (in tons).

	2009	**2010**	**2011**	**2012**
Forest Fruit	12.25	8.38	10.10	16.35
Fungi	4.18	4.47	4.01	5.94
Total	16.43	12.85	14.11	22.30

Source: Local Data Bank http://stat.gov.pl/bdlen/app/strona.html?p_name=indeks.

An interesting notion is the attempt to evaluate the significance of forest undergrowth harvests for household additional income, or non-financial benefits. Results of the CAWI survey [17] conducted among forest districts of the State Forests, indicated that 21% of persons surveyed evaluated the benefits as significant for at least half the households, 64% believe that they are important, but for a limited number of farms, while 15% acknowledged that forest underbrush harvests are of no economic importance for local communities. Forests in Poland occupy nearly 30% of the country, of which ca. 80% are public forests, belonging to the Treasury, where entry and use (beyond few exceptions) of forest underbrush resources is free and unlimited. The abovementioned examples are only very narrow segments of the economic reality.

[17] Survey conducted in 2013, on a test pool of 85% of Polish Forest Inspectorates (Forest Inspectorates, numbering 430, encompass the whole country).

Table VIII. Purchase of fungi and forest fruit between 2009-2012 (in thousands of PLN).

	2009	2010	2011	2012
Forest Fruit	66.07	55.54	56.24	115.61
Fungi	46.38	55.32	54.26	91.05
Total	112.46	110.86	110.51	206.66

Source: Local Data Bank http://stat.gov.pl/bdlen/app/strona.html?p_name=indeks.

When analyzing the possibilities of biodiversity protection, it is required to appreciate the role of agricultural farms using natural production methods. Over the last decade a dynamic growth of organic farms, that are permanent, self-sufficient, and potentially economically effective systems is observed (**Table IX.** Number of farms and processing plants in organic agriculture, and areas used in accordance with the regulations on Organic Agriculture in Poland between 2003 and 2010. Table IX). The vast majority of eco-friendly manufacturers in Poland are organic agricultural producers (approximately 98% between 2011 and 2012).

Table IX. Number of farms and processing plants in organic agriculture, and areas used in accordance with the regulations on Organic Agriculture in Poland between 2003 and 2010.

Years	Number of farms within the organic agriculture system	Areas used according to the regulations on Organic Agriculture (ha)	Number of processing plants within the organic agriculture system
2003	2286	61236	22
2004	3760	82730	55
2005	7182	166300	99
2006	9194	228009	170
2007	12121	287529	206
2008	15206	314848	236
2009	17423	416261	277
2010	20956	518527	293
2011	23847	605519	270
2012	26376	661687	312

Source: Plan of Operations for Food and Organic Agriculture in Poland for 2011-2014.

Structural, environmental, social, and historical conditions predestine Polish agriculture for organic food production. Poland is a country wherein the use of chemical production methods in agriculture has always been lower than in most European countries[18]. In the financial year 2009/2010, Poland used a total of 1.7 million tonnes of mineral fertilizers (Multi-ingredient fertilizer, per pure ingredient), which results in a dose of 114.7 kg per 1 ha of utilised agricultural area, whereas e.g. Germany used 128.3 kg, the Netherlands 131.7 kg, Norway 157.5 kg and Belarus 174 kg[19].

Between 2003 and 2010, the area of organic farmland increased 8.5 times, and currently constitutes ca. 2.8% of the total farmland area in Poland. The average area of organic farms currently exceeds 25 ha (25.82 ha), with the national average of 10.36 ha for conventional farms. However, in spite of this, the share of organic food in the total turnover of the food market in Poland is only 0.1%[20].

An increase in the market share of organic food is vital for satisfying growing consumer demand, and at the same time is beneficial for the development of Polish agriculture. In 2012, most (32.0%) of ecological processing plants processed fruit and vegetables, and 23.0% – cereals. Meat and dairy processing was clearly lower – 6.5% and 3.0% respectively.

[18] Action Plan for Organic Food and Farming in Poland for the years 2011-2014 of the Ministry of Agriculture and Rural Development.
[19] Statistical Yearbook of Agriculture, Central Statistical Office, 2011.
[20] Nowogródzka T. 2012. Stan i perspektywy rozwoju rolnictwa ekologicznego w Polsce. Zeszyty Naukowe SGGW, Problemy Rolnictwa Światowego T. 12, z 2: 54-65.

Over the last ten years numerous changes were introduced in Poland, designed for biodiversity protection. Especially after 2004, the knowledge on the condition of fauna and flora was largely improved, with changes introduced to some organizational and administrative solutions. Results of field observations concerning species distribution began to be recorded in computer databases. For a long time, though to a different extent, monitoring of plant communities and species in national parks is being conducted. Designs for protection (including restitution) of selected species were developed.

In 2004, a Pan-European form of nature protection was introduced – NATURA 2000, meant to protect those elements of nature which are endangered on a European scale. The main purpose of creating networks of NATURA 2000 protected areas, is countering the extinction process of species of animals and plants within the European Union. The second objective is the protection of the full spectrum of biodiversity in EU territory, under constant monitoring of its condition and changes taking place. Very important for improving our knowledge of many species and habitats, was implementing the obligations outlined in the Habitats Directive, including monitoring and determining, every 6 years, the conservation status of species and habitats deemed endangered.

The general evaluation of conservation status of natural habitats in the bio-geographic regions of Poland, listed in appendices to two EU directives: the so-called Habitat and Birds, is presented in Table X.

It should be noted that thanks to this type of activities, Poland has a high share of protected habitats and species in the foothill and mountainous areas. Also the conditions of ca. 1/3 of animal species in the continental region is deemed adequate, which is a lot, considering that most of them are recognized in Europe as endangered. In total, various forms of area protection (national parks, nature reserves, landscape parks, areas of protected landscape, NATURA 2000,) encompass more than 32% of Poland's area.

Table X. Conservation status of natural habitats and protected species.

Conservation status by category	**Conservation status in % of the number of examined objects**							
	Continental region			**Alpine Region**			**Baltic Region**	
	Natural habitats	**Plants**	**Animals**	**Natural habitats**	**Plants**	**Animals**	**Natural habitats**	**Animals**
FV - proper condition	10	22	30	39	60	32	0	0
U1 - unsatisfactory condition	54	53	41	49	35	21	0	14
U2 - bad condition	28	25	12	10	5	9	0	86
XX - unrecognizable condition	8	0	17	2	0	38	100	0

Source: The protection and sustainable use of biodiversity programme, and Plan of activities for the years 2014-2020, (project) the Ministry of Environment.

Since 2004, in Poland, an Agri-environmental programme is also realized, using financial instruments to encourage farmers to implement agricultural practices leading to greening of agricultural production, which should be something more than just good agricultural practice. The Agri-environmental programme is supposed to protect biodiversity of rural areas, the natural environment and landscape, organic farming, and genetic resources in agriculture.

A balanced system of environment-friendly agricultural production includes limiting adverse effects for the natural environment, resulting from the production process, and the introduction of restrictions with regard to the use of production methods, so that natural production potential of agrocenosis is utilized. At the same time it is intended to preserve and enrich biodiversity of wild organisms present in agricultural ecosystems and used in the production process.

In Poland, next to botanical and zoological gardens, where protection *ex-situ in vivo* is conducted, we have gene banks conducting protection *ex situ in vitro*. Gene banks are specialized institutions, meant to preserve and make available genetic resources and biological material (accessions) of endangered species, subspecies and varieties. Poland has a diverse gene pool of free-roaming species, as well as domesticated species varieties,

and breeds occurring in the wild, as well as ex situ collections. National gene banks maintain, in c.a 90 thousand genotypes of crop plants (National Centre for Plant Genetic Resources: Polish Genebank, 2014).

Additionally, in the National Research Institute of Animal Production, in 2014, a National Bank of Biological Material was opened, constituting a basic element of the National Cryoconservation Programme.

Production systems in the country

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 Table 1 are provided in Annex 2.

Table 1. Production systems present in the country.

Sector	Code	Production system names	Present (Y/N)
Livestock	L1	Livestock grassland-based systems: Tropics[21]	N
	L2	Livestock grassland-based systems: Subtropics[22]	N
	L3	Livestock grassland-based systems: Temperate [23]	Y
	L4	Livestock grassland-based systems: Boreal and /or highlands[24]	Y
	L5	Livestock landless systems: Tropics	N
	L6	Livestock landless systems: Subtropics	N
	L7	Livestock landless systems: Temperate	Y
	L8	Livestock landless systems: Boreal and /or highlands	N
Forests	F1	Naturally regenerated forests: Tropics	N
	F2	Naturally regenerated forests: Subtropics	N
	F3	Naturally regenerated forests: Temperate	Y
	F4	Naturally regenerated forests: Boreal and /or highlands	Y
	F5	Planted forests: Tropics	N
	F6	Planted forests: Subtropics	N
	F7	Planted forests: Temperate	Y
	F8	Planted forests: Boreal and /or highlands	Y
Aquaculture and Fisheries	A1	Self-recruiting capture fisheries: Tropics	N
	A2	Self-recruiting capture fisheries: Subtropics	N
	A3	Self-recruiting capture fisheries: Temperate	Y
	A4	Self-recruiting capture fisheries: Boreal and /or highlands	N
	A5	Culture-based fisheries: Tropics	N
	A6	Culture-based fisheries: Subtropics	N
	A7	Culture-based fisheries: Temperate	Y
	A8	Culture-based fisheries: Boreal and /or highlands	N
	A9	Fed aquaculture: Tropics	N
	A10	Fed aquaculture: Subtropics	N
	A11	Fed aquaculture: Temperate	Y
	A12	Fed aquaculture: Boreal and /or highlands	N
	A13	Non-fed aquaculture: Tropics	N

[21] Tropics: All months with monthly mean temperature, corrected to sea level, above 18°C. .

[22] Subtropics: One or more months with monthly mean temperatures, corrected to sea level, below 18°C but above 5 °C.

[23] Temperate: At least one month with monthly mean temperatures, corrected to sea level, below 5 °C and four or more months above 10 °C. .

[24] 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.

Sector	Code	Production system names	Present (Y/N)
	A14	Non-fed aquaculture: Subtropics	N
	A15	Non-fed aquaculture: Temperate	N
	A16	Non-fed aquaculture: Boreal and /or highlands	N
Crops	C1	Irrigated crops (rice) : Tropics	N
	C2	Irrigated crops (rice) : Subtropics	N
	C3	Irrigated crops (rice) : Temperate	N
	C4	Irrigated crops (rice) : Boreal and /or highlands	N
	C5	Irrigated crops (other) : Tropics	N
	C6	Irrigated crops (other) : Subtropics	N
	C7	Irrigated crops (other) : Temperate	Y
	C8	Irrigated crops (other) : Boreal and /or highlands	N
	C9	Rainfed crops : Tropics	N
	C10	Rainfed crops : Subtropics	N
	C11	Rainfed crops : Temperate	Y
	C12	Rainfed crops : Boreal and /or highlands	N
Mixed[25]	M1	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Tropics	N
	M2	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Subtropics	N
	M3	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	Y
	M4	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Boreal and /or highlands	N
Other	O1	*Other [please specify]*	N

5. List in Table 2 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 smallholders11;
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.

In Poland, within the examined period, there were approximately 1.5 million agricultural farms with a total area greater than 1 ha, including 1.36 million benefiting from direct subsidies. The average area of an agricultural farm in the country was 11.2 ha. Ca. 862 000 farms (constituting 57.5%) were smaller than 5 ha. More than half of Polish agricultural farms (56%) achieved the annual value of agricultural production below 4 000 EUR (to ca. 16 000 PLN). Production of value higher than 8 000 EUR (ca. 32 000 PLN) was reached only by every fourth farm (26%). Production in these farms was conducted according to systems described in Table 2 below.

[25] Note: in different questions throughout the questionnaire, you may want to specify data with a breakdown into components of mixed production systems.

Table 2. Production systems present in the country.

Code of production system	Name of production system	Description
L3	Livestock grassland-based systems: Temperate	Due to climate conditions the system most popular in Poland is seasonal grazing, consisting of maintaining cattle on the pastures from spring to late autumn and keeping them indoors during winter. This system is used mainly with cattle and sheep. Cattle is used mainly in terms of milk production, and concentrated in the north-eastern part of the country. Milk is generally produced in large commercial farms. Unfortunately, cattle breeding in Poland is steadily declining since the mid 1970s. This form of agricultural management was first of all abandoned by small and medium farm owners, breeding livestock for their own needs and sales. The reason behind it is the hardly beneficial cost to profit ratio of milk and cattle production. Sheep are traditionally bred in the southern foothill and mountainous parts of the country. Due to considerable population decrease in recent years, sheep production is of no great market importance. Breeding sheep may have, due to multi-directional use (milk, wool, meat), greater importance for small farms. Maintaining pastures in the mountains is of great importance to preserving their natural character (tundra), and restricting secondary succession. Since the 1990s. a great regress is recorded in sheep production, the second most popular breeding animal in Poland with the use of pastures. This is associated with low wool prices, and fashion departure from sheep coats. Meadows and pastures are spread in Poland roughly evenly, though a greater percentage is evident in the eastern part of the country – Mazury, Podlasie, Polesie and Podkarpacie. They occupy ca. 21.5% (3.2 million ha including permanent meadows ca. 2.6 million ha, pastures 0.6 million ha) of all utilised agricultural area. There is a tendency to shift to hay usage of pastures. Part of the meadows may also be periodically used for grazing. In Poland hay yields from 1 ha of meadows, range from 15 to 30 q, and green forage from 1 ha of pastures yields from 80 to 100 q. The reason for such low yields from meadows and pastures is their location on relatively weak soils (class IV and V), and the use of insufficient doses of mineral fertilizers, and in extreme cases not using any fertilizing at all. The average rainfall in most of Poland is inadequate for high yields of grass. A vast majority of permanent pastures are located in natural depressions, often in river valleys, where plants benefit from ground and rainfall waters, and find favourable air humidity. The current utilization/productivity of these meadows and pastures in Poland, are assessed at ca. 50% of their production/yield capacity. The data of the Agricultural Census of 2010 indicates that the area of permanent meadows in agricultural farms in relation to 2002 was higher by 3.9%, while the total surface of pastures was reduced by 36.5%. This is associated with intensive milk production developing in recent years, which resulted in permanent pastures loosing importance in production of roughage ruminants. At the same time fodder production from **utilised agricultural area** has increased, both roughage (corn silage, grass-legume and cereal-legume mixtures), and concentrated feeds. For this reason, part of the area of permanent grasslands remains in extensive use, and Part has been replaced with agricultural land.
L4	Livestock grassland-based systems: Boreal and /or highlands [26]	It is present in the Tatra Mountains between elevations of 1800-2300 masl (level of Alpine vegetation), the climate is humid, the landscape - mountainous, extensive pastures are located within the Tatra National Park, grazing is controlled by Park Authorities. In 2008 according to TPN authorities, 1000-1250 sheep and cattle were grazing within the area 150 ha in the Tatra Mountains. Grazing refers to the indigenous cultural tradition, and is

[26] Subarctic Zone and/or mountainous areas: At least one month with an average monthly temperature, revised to sea level, below 5°C, and more than one, but less than four months with temperature above 10°C.

Code of production system	Name of production system	Description
		hardly dependent on synthetic substances, modern varieties, fossil fuels etc.
L7	Livestock landless systems: Temperate	Without the use of pastures, the production of swine, poultry and fur animals is being conducted. Due to market conditions, such production is more and more focused in specialized farms, concentrating on commercial production. This system also includes farms producing feeds for their own purposes, and not (as in other European countries, e.g. Denmark, the Netherlands), farms with a typical intensive production without acreage. Maintaining swine and poultry in small farms, breeding animals for their own needs, is systematically loosing significance. The largest number of swine are breed in Wielkopolska, Kujawy, and Podlasie. These areas are characterized by high agricultural conditions. The main factor stimulating swine production is their market sales price. Poultry breeding focuses mainly on chickens. The number of hens exceeds 100 million heads. The largest number of chicken farms are located in southern Poland. Two trends of production are clearly distinguishable – meat and eggs. The meat production (broiler), is focused near big cities and meat processing plants. The largest quantity of poultry is located around agglomerations (target market), in southern Poland, Wielkopolska, and Pojezierze Pomorskie. Polish hens lay ca. 9 billion tons of eggs, which places Poland at 6th place in the EU[27]. Dual purpose poultry production (egg-meat) is conducted mainly in the back yard system, and is of no commercial significance. The poultry livestock production is dominated by broilers (81%) and Turkey (15%), whereas other poultry, i.e. geese, and ducks constitute only ca. 4% of total meat production and is of no significance. Such production is conducted mainly in small farms.
F3	Naturally regenerated forests: Temperate	Poland is one of the few countries wherein primary forests still exist. A typical example of a lowland forest is the Białowieża Forest, located, both in Poland and Belarus. Apart from primary forests, natural forests are also present within the National Parks, i.e. forests that grew without human involvement, and largely resemble primary forests
F7	Planted forests: Temperate	The vast majority of forests in Poland, is covered by the sustainable forest management. The forestation rate of the country exceeds 29%, of which most are forests (82%). The vast majority of forests are the property of the State Treasury. A dominant kind of habitats are coniferous forests, and the dominant species is the Scots pine.
A3	Self-recruiting capture fisheries: Temperate	Fishing is conducted both to acquire resources for sale and for recreational purposes. It is done both on the Baltic Sea and inland freshwater reservoirs. In the south and central part of the country, where the main water reservoirs are rivers and dammed reservoirs, the most popular form of fishing is angling. In the north, in the Lakelands and the Baltic Sea, commercial trawling is dominant.
A7	Culture-based fisheries: Temperate	Fishing is conducted both to acquire resources for sale and for recreational purposes. It is done both on the Baltic Sea and inland freshwater reservoirs. It applies mainly to aquaculture species, released into open waters, mainly lowland dammed reservoirs and eutrophic lakes. To most significant is the carp in reservoirs used for angling, which in 2013 yielded around 980 tons. Due to a hazard to water quality in dammed reservoirs, from excessive stocking with this species, limits have been introduced on the acceptable quantities of released fish.
A11	Fed aquaculture: Temperate	Aquaculture in Poland, is focused mainly on freshwater fish (carp and trout). With regard to production, carp is the most popular, with ca. 500 dedicated farms, delivering nearly 60% of the total aquaculture production (15 000 – 20

[27] http://www.krd-ig.com.pl/produkcjajajkonsumpcyjnychw2013roku,767,l1.html.

Code of production system	Name of production system	Description
		000 t). In ca. 90 trout farms, more than 30% of aquaculture production is bred (more than 10 000 t). Carp production is concentrated in the south of the country, whereas salmonidae - in the north, and foothill areas. Carp breeding uses a semi-intensive system with non-processed grain feeding, often in polyculture with other species. Production cycle lasts for two or three years, and is usually intended to yield fish with average weight of 1500 – 2000 g. Trout production cycle is shorter, and includes 12-15 months of intensive fattening with processed fodder in the form of extruded pellet. The average area of a trout farm is approximately 0.36 ha, whereas carp farms with the greatest share of carp yield are usually between 100 – 500 ha. The most important associated species in carp production are: Chinese carp (ca. 600 t), crucian (ca. 300 t), tench and sturgeons (less than 200 t). Sturgeons are also the most important group of fish diversifying trout farm production. A gradual growth in the importance of brook trout is also observed, along with its hybrids with arctic char due to their resistance to VHS.
C7	Irrigated crops (other): Temperate	Sprinkler systems are used in Poland mostly for gardening. They are used for watering permanent crops of fruit trees and shrubs e.g.: apple, raspberry, strawberry. In addition, sprinklers are also used in greenhouse farming.
C11	Rainfed crops : Temperate	Overhead sprinklers are used in specialized farms cultivating vegetables and potatoes.
M3	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	Many agricultural farms in Poland conduct both plant and animal production, and they often also own forests. Within mixed systems in Poland, three types of farms can be distinguished: those specialising in permanent crops and keeping animals, those specialising in horticultural crops and those keeping various crops and animals[28]. The „various crops and animals" type of farms is the most common in Poland, especially in low-profitability farmsteads, producing for their own needs and the local market. The number of these farms is decreasing each year, still they are classified at 2nd place, after farms specializing in field crops. In 2010, most (25.6%) of these farms occupied areas from 5 to 10 ha, and 17.3% - 3-5 ha of utilised agricultural area. Crop structure in these farms is primarily cereals and potatoes, and most popular animals are chickens, cattle and swine. Most of these farms between 2002-2010 resigned from keeping goats (66%), cows (61.4%), horses (61%), all cattle (56%), and swine (50.1%). Resigning from keeping animals to such a large extent, was caused by reductions in profitability of maintaining small animal herds, and in the case of the agricultural type analyzed, it can be assumed that these were not high-efficiency animals, and farmers could not expect adequate income from their use. The average herd size in farms of the type „various crops and animals", per species in 2010 was: cattle 5.09 (including cows 2.43), swine 17.91 (including sows 3.30), sheep 23.25, goats 3.6, chickens 64.09, horses 2.47 heads. In 2010, in relation to 2002, the number of farms specializing in horticultural crops and keeping animals has dropped by 20.4%, on the other hand, the number of farms specializing in permanent crops and keeping animals has increase by 34.3%. Additional increases in these farms included: sheep by 10.9%, poultry by 48.8% and horses by 38.8%. The number of other animals kept in those farms has been reduced, with the largest drop in cattle numbers - 27.2%. The average animal numbers per one farm of this type in 2010, were: 4 cattle, 11 pigs, 22 sheep, 3 goats, 33 chickens, and 3 horses. Farms specializing in permanent crops and keeping animals keep mostly chickens, (ca. 22 heads), swine (7.62 heads), and cattle (3.35 heads), mainly for own needs.

[28] Central Statistical Office. Changes in agricultural farms in the years 2002-2010, National Agricultural Census,Warszawa 2010.

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

No map of production systems is available, due to all regions including all production systems. Region map with indicated dominance of individual systems has not yet been prepared.

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

Table 3. Area under production, production quantity and contribution to the agricultural sector economy 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
L3	Livestock grassland-based systems: Temperate	National area of meadows and pastures – 21.9% of all utilised agricultural area, including permanent meadows 2567.1 thousand ha, permanent pastures 593.9 thousand ha. Permanent meadows were present in 945.4 thousand of agricultural farms. The average area of permanent meadows per 1 farm was 2.72 ha. 95.8% of total area of permanent meadows was used by individual farmers. Agricultural farms using from 7 to 50 ha of utilised agricultural area, had 53.3% of the total area of permanent meadows. 185.5 thousand agricultural farms had permanent pastures that occupied a total area of 543.8 thousand ha. In total, 91.6% of the permanent pasture area were used by individual farmers. The average area of permanent pastures per 1 individual farm amounted to 2.95 ha. Agricultural farms using from	Crops (combined 3 (mowings) 51.9 dt/ha. Domestic hay production 13.1 million tons annually. It is not possible to estimate the share of L3 and M3 systems in this production. The average number of farm animals between 2010-2012 was 48.0 DJP per 100 ha UR in a good culture.		

Code of production system	Name of production system	Area (indicate unit)	Production – quantity (indicate unit)	Contribution to the agricultural sector economy (%)	Reference year
		7 to 100 ha of **utilised agricultural areas**, there was 70.6% of the total area of permanent pastures.			
		Farms specialising in breeding animals based on the use of pastures, keep mainly cattle, horses, sheep and goats, and products delivered by them to the market have a significant meaning for food supply of rural communities.	In 2010, as compared to 2002, the average number of animals in farms using roughage for animal feeding has increased. Cattle from 7 to 11 heads, sheep from 20.2 to 20.9 heads, horses from 2 to 2.6 heads, goats from 2.7 to 9.6 heads. The share of farms keeping larger cattle herds (more than 50 heads) increased in that period from 0.6 to 3.2%, sheep from 3.9 to 4.3%, horses from 0.9 to 3.6% and goats from 0.6 to 1.6% 12.9 to 28.4%. The concentration process in animal breeding was connected with increase of farm area. It should be emphasized that substantial expansion of kept animal herds, fed mainly with roughage, was possible only in larger farms, with forage area reserves or the capacity to increase it.		2012
A3, A7 and A11	Self-recruiting capture fisheries: Temperate Culture-based fisheries: Temperate Fed aquaculture: Temperate	Area of inland seawaters - 8682 km^2 , lakes - 3200 km2, rivers - 1400 km2, dammed reservoirs - 500 km2 and aquaculture facilities (ponds) - 70 000 ha.	Marine fishing amounted to 228.5 thousand tons including marine 179.7 thousand tons, and freshwater 48.8 thousand tons.		2012
C7 and C11	Irrigated crops (other) : Temperate Rainfed crops :	Area of irrigated utilised agricultural areain 2012 was 66814 ha, 6235 were irrigated with overhead sprinklers.			2012

Code of production system	Name of production system	Area (indicate unit)	Production – quantity (indicate unit)	Contribution to the agricultural sector economy (%)	Reference year
	Temperate				
M3	Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	Number of farms keeping animals in 2010 was 1060.7 thousand, which constitutes 46.6% of all farms (including those smaller than 1 ha). The vast majority of these farms are also involved in plant production. The total area of this type of farms was 3294487 ha, of which 1598230 ha was used for crop cultivation, meadows occupied 307694 and permanent pastures 67740 ha. Livestock numbers in thousands: cattle 122.8, swine 112.7, and horses 25.4. Farms involved in both plant and animal production are located across the whole country, but mainly in the following provinces Lubelskie, Małopolskie, Mazowieckie, Podkarpackie, and Świętokrzyskie.		NK	2010
L3	Livestock grassland-based systems: Temperate	654295 ha	ca. 1108 thousand heads of cattle and ca. 223 thousand sheep		2010 area.
L4	Livestock grassland-based systems: Boreal and /or highlands	150 ha	1000-1250, mainly sheep		2008
L7	Livestock landless systems: Temperate	The area of crop cultivation constitutes 71.3%, i.e. 10.3 million ha of utilised agricultural area. In 2010, as compared to 2002, the number of farms utilizing concentrated feeds in Poland increased by 34%.	Of the total crop area most was occupied by cereals - 72.6%, industrial plants - 11.0%, and legume crops - 10.3%	NK	2013
		These farms had 54.2% of swine and 81.3% of chickens (hens and broilers) of the total national stock of these animals. Data regarding the number of	The number of animals fed with concentrated feeds in these farms in thousands: swine - 7 119.3, chickens 113 424.9.		2010

Code of production system	Name of production system	Area (indicate unit)	Production – quantity (indicate unit)	Contribution to the agricultural sector economy (%)	Reference year
		animals kept in farms using concentrated feeds, indicate a growth in 2002-2010 in the number of farms breeding chickens (by 50.3%), sheep (by 23.8%) and a small increase (by 7.5%) of farms breeding horses.			

Source: The Central Statistical Office (GUS) The use of land and area sown in 2013, The Central Statistical Office (GUS) Statistical Results Report Agricultural Census 2011, The Central Statistical Office (GUS) Livestock and selected elements of animal production methods Agricultural Census 2010, The Central Statistical Office (GUS) Changes in Agricultural Farms 2002-2010 Agricultural Census 2010, Assistance for small agricultural farms in Poland in the new financial perspective 2014-2020.

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

In 2013, the value of export of agri-food products reached a record level, amounting to nearly 20 billion EUR, and 11.5% higher than in 2012 (and 4.4 times bigger than before Poland's accession). The share of export of agri-food products in the total export amounted to 13.1%. In 2013, the surplus of goods exchange concerning agri-food products reached a previously unrecorded level of 5.7 billion EUR, as compared to 4.3 billion EUR in 2012 (increase by more than 32%), contributing to the reduction of the negative balance of Polish foreign trade. The main export products of this sector included: meat and meat products (2.8% of Polish export), dairy products (1.1%), processed cereals and milk (0.7%), processed fruit and vegetables (0.7%), confectioneries (cocoa, and processed cocoa, 0.6%), and other food products (0.6%). Main meat to be exported was pork (mostly processed), poultry (including chickens and filets) and fish products.

Export sales constituted 19.7% of total sales revenues of the food sector. This share was higher in the production of groceries: 22.3%, whereas in the beverage production it amounted to 4.5%. As much as 77% of the sales value of foreign agri-food products trade came from the European Union markets. The largest recipient of Polish food from among EU countries was Germany (export value 3.8 billion EUR), with the UK in second place (1.3 billion EUR), subsequent places have been taken by the Czech Republic (1.1 billion EUR), France (1 billion EUR), the Netherlands (958 million EUR), Italy (868 million EUR) and Slovakia (566 million EUR). Polish food producers and exporters are constantly diversifying export directions. For several years, a slow decrease of EU participation in Polish export was noticeable, with an increase of eastern market share: middle-eastern, far-eastern, Asian. Export value to countries of the Commonwealth of Independent States in 2012 amounted to 2 billion EUR, of which 1.1 billion EUR worth of produce went to Russia. In 2014 however, Russia introduced embargoes on virtually all fruit and vegetables imported from Poland, some types of meat and offal, and agri-food products, which significantly reduced the revenue of this year's export.

Poland is active not only on the European arena or in North America, but also in Asia, the Middle and Far East. In the last four years, provisions have been made for the access of Polish food products to ia. Japan, China, Vietnam, and Singapore. In 2012 Poland also recorded a three-time increase in the sales of agricultural products to China. This is particularly due to pork trade. A significant increase of food export was also noted to such countries as Vietnam, Japan, Saudi Arabia, The United Arab Emirates.

Over the last 20 years the Polish food sector underwent significant transformations. It was one of the first industries to rise after the crisis related to the political transformation, at the same time becoming an important stimulator of economic growth. Thanks to constant technical, technological, and organizational development of

this sector, Poland is now one of the European leaders in modern and innovative food production. The result is i.a. a remarkable export success of Polish companies. Poland's membership in the European Union strengthened the process of specialization and concentration of agricultural production in Polish farming. This process causes more and more farms to increase their effectiveness and competitiveness on the domestic and European markets. Specialization of farms is commonly considered an important manner of improving their effectiveness and, by extension, competitiveness. As a result, in 2002-2010 numerical increase and economic consolidation took place of a group of farms with a distinctive capacity for competitiveness and those, which were equipped to achieve such a capacity.

In Poland, in small farms keeping animals (swine and poultry), in 2002-2010, there emerged a phenomenon of expending parts of generated production for own needs of the families. The number of this type of farms increased over the concerned years by 34%, with a simultaneous drop in the number of farms focused on typical plant production, maintaining permanent crops and vegetable cultivation, farms specializing in breeding animals fed with concentrated feeds, and farms geared for mixed plant-animal production.

Farms specializing in permanent and horticultural crops, and breeding various species of animals, have, during the analyzed period, continued small-scale production of swine and poultry.

The total number of horticultural farms in Poland is systematically dropping. On the other hand, the number of farms cultivating fruit vegetables and mushrooms on a commercial scale, which is a very important sector of agricultural production, is growing. Production of fruit and vegetables occupying no more than 3% of utilised agricultural areas, constitutes more than 36% of total plant production and 14-15% of the total agricultural production. Export value of fruit, vegetables and mushrooms (fresh and processed) increased in recent years by 74%.

Most aquaculture production is sold on the internal market. The exception is rainbow trout, 27% of which is exported, including 6% fresh and 21% processed.

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 Chapter 1, Table 1 as present in your country. When referring to them in your answers, please provide the production system code and/or full name as found in Table 1.

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

Effects of drivers of change on associated biodiversity

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

Over the last twenty years, substantial progress has been made in reducing environmental pressure. However, in spite of the achieved success, further actions are necessary to increase ecological efficiency and greening of the Polish economy. This applies particularly to material and power consumption, which are significantly higher in Poland than the EU average. Despite the growth dynamics of final energy consumption in the country being much weaker than economic growth, growth of dynamics of material consumption is close to dynamics of GDP growth. It may be hypothesized that economic calculation of company operations shall increasingly dictate the need for introducing eco-innovations and saving raw materials and energy. Limiting consumption of raw materials shall result not only in a reduction of operating costs of the economy in the future, but also a reduction of environmental pressure.

It is worth noting that at constant GDP growth, the quantity of industrial waste remains at a similar level. An alarming phenomenon, observed since 2006, is the increase of the share of industrial waste directed to landfills and a decrease in the share of this waste subject to recycling. Since 2000, a decrease in mass of municipal waste can be observed, and the per capita waste generation indicator in Poland is one of the lowest in the EU.

Due to the geographic location, the country is characterized by exceptional natural and landscape wealth. The fact of the combined presence of rare, in the scale of the continent, plant and animal species, thus imposes on Poland a particular responsibility for the conservation status of natural heritage. The number of protected, valuable natural areas is increasing. Nature's value is also expressed by large areas protected under the Natura 2000 programme, created to protect endangered, on a European scale, species and natural habitats. This network constitutes ca. 20% of the total country area. However, the conservation status of most species and natural habitats endangered on a European scale is defined as unsatisfactory.

From the data of the State Nature Monitoring conducted between 2006-2013, it seems that serious hazards cause the abandonment of the extensive agricultural use of valuable non-forest areas (production systems L3 and M3), intensification of agriculture, changes in the land use structure, expansion of road, tourist, industrial and power infrastructure (small hydro power plants, wind power plants). These actions contribute especially for secondary succession, habitat fragmentation, decay of rare fauna and water-mud flora habitats. An important role is also played by natural factors e.g. severe winter in the case of birds. Prevention of these negative effects is to be achieved by i.a. developing and implementation of protection tasks and protection plans for protected areas and species, Agri-environmental programmes supporting pro-natural agriculture, as well as streamlining of decision-making, which determine, i.a., the location of investment projects that may significantly affect the environment, or biological compensation and other actions.

Biodiversity condition is a result of many factors. Below a list of selected determinants is presented, having the most significant impact on shaping the level of biodiversity in Poland.

Factor 1. Changes in the use and management of lands and waters

Intensive agricultural economy, urbanization and infrastructure development, cause deterioration and weaken the stability of ecosystems. Agricultural ecosystems are one of the most prone to loss of biodiversity. Currently the most serious hazards for biodiversity of agricultural areas include:

- development of intensive large-scale agriculture, which involves intensification of soil use and elimination of the biodiversity refuges, such as shrubs, trees, water holes etc.
- the disappearance of some, valuable natural ecosystems of the agricultural landscape, especially related with very extensive or historical uses (e.g. molinia meadows);
- rapid population decline and the decrease in the number of habitats of many amphibian species connected with disappearing mid-field ponds;
- extinction of many species of weeds and meadow plants (e.g. kingcup, snakeroot, eyebright);
- a regress of population of many, until recently, common birds, connected with the agricultural landscape (e.g. Hoopoe, Northern Lapwing, Tree Sparrow, Meadow Pipit, Goldfinch, Lark), visible mostly in western and northern Poland, i.e. areas of more intensive agriculture;
- in the fishing sector, an evident loss of natural features is indisputable within areas with pervasive fish ponds established due to profitability and a slow abandoning of traditional, semi-extensive forms of productions in carp breeding farms, resulting in a reduction in the functional area of said ponds;

the disappearance of wetlands ecosystems.

The main unfavourable natural changes, observed as part of, e.g. the species and natural habitats monitoring, include: loss of non-forest and wetland bird habitats, the fragmentation of habitats, including: interrupting wildlife corridors, disturbing species composition of natural habitats (especially non-forest, wetland and semi-natural), secondary succession of non-forest habitats by the intrusion of trees and shrubs, and the eutrophication of lakes and plant communities, displacement of typical and domestic species by invasive and alien species, pollution of water as habitat for flora and fauna, mechanical destruction of rare plants and natural habitats, degradation of landscape qualities. The main causative factors, which may constitute a hazard in the future are: meliorations, abandonment of agricultural use, improper hydrotechnical construction, and river regulation of construction, transport and tourist infrastructure, urbanization, excessive fertilization, as well as hurricanes, and forest fires.

The condition of maintaining biodiversity in rural areas in Poland is strongly spatially diversified. A clear division of the country in this aspect can be distinguished into two parts: the zone of extensive agriculture and better preserved agri-biodiversity in south-eastern and central Poland (mainly Lubelskie, Mazowieckie, Łódzkie, Świętokrzyskie, Śląskie, Małopolskie and Podkarpackie provinces), and of intensive agriculture production wherein biological diversity of agricultural areas has already suffered serious damage, and its loss

is still progressing in a relatively fast pace (Zachodniopomorskie, Lubuskie, Dolnośląskie, Pomorskie, Wielkopolskie, Opolskie, Kujawsko-Pomorskie, Warmińsko-Mazurskie and partially Podlaskie provinces).

One of the more important factors affecting agroecoststem iodiversity is the way of agricultural management and use of lands. Intensive agriculture, using considerable amounts of mineral fertilizers and chemical plant pesticides is regarded by many authors as the main cause of flora and fauna diversity and abundance decrease within the agrocenosis. While good quality utilised agricultural areas are subjected to intensification, areas of worse conditions for agricultural production are abandoned or forested. Traditionally, extensively used agricultural areas of a highly valuable nature are quickly disappearing.The use of fertilizers and pesticides, tree removal in buffer strips, wastelands, and boundary strips, leading to fragmentation and degradation of habitats are one of the most significant hazards. In aquaculture, the decreasing profitability, increasing water deficits, and gradual production intensification in carp ponds leads to abandoning the, beneficial for the biodiversity of water-mud organisms, large-scale, semi-extensive production model. Shortening of the traditional three-year carp production cycle may be viewed as an indicator of these changes (the so called Dubisz system) for production of table fish in a period of two years, change the way of use and reconstruction of the pond facilities (limitation of natural reservoirs like: spawning areas, and rearing tanks, i.a. due to an increasing share of seeding material produced by means of artificial reproduction), and hence the reduction of habitat variety in fish farms [29]. Albeit to a smaller extent than in western EU countries, Poland's biodiversity is still threatened by factors typical of civilization processes, such as: progressive urbanization, unfavourable changes in soil use methods, synanthropization of flora and fauna, penetration of foreign species. In Poland, from among 165 species of archaeophytes associated with farming plants, approximately 60% are endangered species, mainly due to agriculture intensification[30]. A poorly examined, but still progressing process is the expansion of single-family housing areas in the vicinity of larger urban areas, wherein groundwater usage for irrigation of home gardens remains uncontrolled. Wells for own needs, with max. depth of 30 m, do not require a permit, and water consumption is not monitored. It may lead to a local decrease in groundwater level, and even flow restrictions in stream river sections. An additional aspect is the growing popularity of garden ponds, which in agricultural areas (e.g. summerhousing areas) often exceed the legal surface of 30 m^2, and are supplied illegally by pumping or redirecting surface waters. This limits the ecological continuity of flowing waters, and may modify their natural hydrological course regime by increasing and extending low flow periods[31]

Tests conducted in different types of farms in Poland generally confirm the greater species diversity of weeds and the general number and degree of coverage on the fields of organic farms, as compared to conventional and integrated farms. The diversity and numbers of segetal flora are the largest within fields of organically grown cereals, and the smallest in conventional cultivations, with intermediate levels in traditional farms. The use of herbicides does not significantly affect species composition of associations, only the number of some of them. Agricultural crops are accompanied by relatively fixed weed associations, the number of which remains unaffected by agriculture intensification.

One of the hazards for biodiversity is the popularization of monoculture and agriculture intensification. Cultivation of cereals within monoculture, especially with chemical weed regulation, has a degenerating effect on weed associations, and, with time, causes the reduction of the diversity index and a simultaneous growth of the dominance index, mainly as a result of an intensified presence of windgrass – *Apera spica-venti*[32].The process of simplifying crop rotation and increasing field areas/integrating lands, has also had an adverse effect on bee diversity in an agricultural environment In agrocenosis in Poland, currently dominated by cereals, further increasing the area planted plants. With the launch of the 2010 special subsidies to crops. In 2014 this area was approx. 337 871 ha (CDB 2015).

The shape of associated plant species composition in agriculture is increasingly affected by agrotechnical factors arising from changes in cultivation technology, such as simplifying cultivation, especially direct

[29] Lirski, A., Myszkowski, L. 2011. Polska akwakultura w 2010 roku na podstawie analizy kwestionariuszy RRW-22. [Polish aquaculture in 2010 according to the analysis of the questionnaires RRW-22.] Komunikaty Rybackie 5 (124), 5-40. [in Polish].

[30] Zając M., Zając A., Tokarska-Guzik B.: Extinct and endangered archaeophytes and the dynamics of their diversity in Poland. Biodiv. Res. Conserv. 2009, 13: 17-24.

[31] Kaczkowski, Z., Zalewski, M. 2010. Traditional carp (*Cyprinus carpio* L.) culture – linking sustainable development with integrated water management – ecohydrologically sound perspective for small catchments. In: Multifunctionality in pond aquaculture in Poland – Perspectives and Prospects. (eds M. Cieśla & M Kuczyński M.), p. 30-37. Wydawnictwo Wieś Jutra, Warszawa.

[32] Feledyn-Szewczyk B. 2013. Wpływ sposobu użytkowania gruntów na różnorodność gatunkową flory segetalnej. Monografie i Rozprawy Naukowe IUNG-PIB, Puławy, 36, ss. 184.

drilling, which additionally can be favourable for migration of foreign species or the introduction of expansive species to plant associations [33].

A representative example of the changes taking place in the natural environment are varying numbers of bird species selected as most representative, being indicators of extensive landscape use:

- the national population of white stork between 2005 and 2008 remained lower by ca. 20% than in 2004;
- populations of crane and mute swan are increasing from 2001 at an annual pace of 7-8%;
- the number of nesting rooks has been decreasing from 2001 at an annual pace of almost 3%;
- populations of western marsh harrier did not show clear directional tendencies over the past 7 years[34].

One of the bird species showing significant downward trends in recent years is the Partridge. It is believed that the decrease in its population is caused by i.a., the simplification of agricultural landscape structure (e.g. elimination of boundary strips), as well as nutritional depletion (large insects being the main food source for nestlings), due to the decades-long agriculture chemicalization[35].

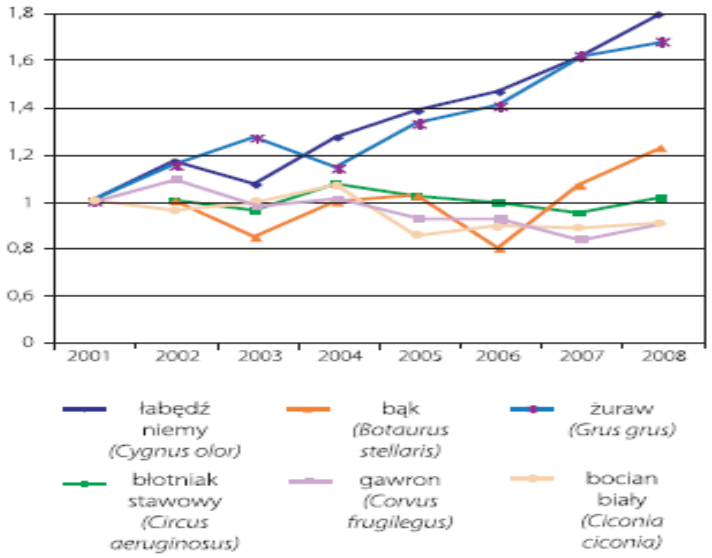

Figure. 1. Population ratio of selected representative bird species.

Source: Chief Inspectorate of Environmental Protection, Report on the Environmental Condition in Poland 2008, 2010.

Factor 2. Climate changes

Climate changes observed over recent years, especially rises in temperature, pose a hazard for the broadly understood biodiversity and ecosystems. Changes in species distribution, population, reproduction duration (shortening), cases of migration, and increase gradation frequency of pests and diseases have been observed[36]. Climate changes in terms of more frequent drought episodes, serious changes in hydrological cycles stimulate the mineralization processes in organic soils, which induce or speed up green house gases emissions, eutrophication, degradation of seminatural ecosystems of wet meadows and mires.

[33] Gołębiowska H.: Dynamika występowania flory segetalnej w uprawie kukurydzy na Dolnym Śląsku w latach 1972-2008 i obecne możliwości jej regulacji (Dynamics of Segetal Flora Occurrence in Corn Cultivations in the Dolnośląskie Province in the Years 1972-2008 and Present Possibilities of Its Regulation). Monografie i Rozprawy Naukowe, Wyd. IUNG-PIB, Puławy, 2011, 30: 7-113.

[34] Chief Inspectorate of Environmental Protection, Report on the Environmental Condition in Poland 2008, 2010.

[35] Biuletyn Monitoringu Przyrody. Monitoring Ptaków Polski w latach 2012-2013. Biblioteka Monitoringu Środowiska 11 (2013/1), GIOŚ Warszawa 2013.

[36] Kędziora A., Karg J. 2010. Zagrożenia i ochrona różnorodności biologicznej (Hazards and Protection of Biodiversity). Nauka 4/2010, 107-114.

Poland was already familiar with the problem of early appearance of cereal pests, e.g. leaf beetles, which results in the need for increase use of plant pesticides and timely pest control. Recently, a growth in thermophilic weed population has been observed in Poland, coupled with an increased winter hibernation of weeds thus far considered as maladjusted to that process. Greater pressure of weeds classified as thermophilic, e.g. foxtails (*Setaria* spp.) and black nightshade (*Solanum nigrum*) has been observed in corn cultivations[37]. As a result, higher risk of yield losses is present. Due to the increase in the farmland area of corn in Poland in recent years, as a result of heat resources increase, corn pests (like the European corn borer[38] and western corn rootworm[39]), so far present only in southern Poland, expanded northwards.

Critical changes in biological systems have been observed, including phenological changes of plants: time of leaf development, blossoming, fruit ripening, and fauna activity – appearance of butterflies, times of bird migrations[40].

Within production systems based on permanent grasslands, draughts during vegetation period resulted in the reduction of yields and adversely affected animal production (e.g. lower milk production). The intensification of low flows becomes an important factor restricting aquaculture production, as it makes it impossible to e.g. use the whole available pond area due to the inability to fill them. For example, in the years 2010-2013 on average 82.5% of available earth ponds area was flooded[41]. The extended low flow periods are also a problem for open-water fishing, as fish resources during those periods are more exposed to overfishing and predator pressure, as they are restricted to the areas of greatest depth. This problem may intensify, as some climatic scenarios for the area of Poland stipulate a 50% decrease in river outflow during vegetation period, and a 70% increase in outflow during winter, and consequently, an increased likelihood of droughts or floods. The increase of water temperature may adversely affect the reproduction of cryophilic species, and increase the threat from invasive goby fish species[42].

Factor 3. Pests, diseases, foreign invasive species

New and increasing hazards have been observed, from pests (insects and saprophytes) and diseases affecting biodiversity for alimentation and agriculture. Transport development, changes in agricultural production technologies, simplifying cultivation, especially direct drilling, may be favourable for migration of foreign plant species or the introduction of expansive species to plant communities [43].

[37] Gołębiowska H.: Dynamika występowania flory segetalnej w uprawie kukurydzy na Dolnym Śląsku w latach 1972-2008 i obecne możliwości jej regulacji (Dynamics of Segetal Flora Occurence in Corn Cultivations in the Dolnośląskie Province in the Years 1972-2008 and Current Possibilities of Its Regulation). Monografie i Rozprawy Naukowe, Wyd. IUNG-PIB, Puławy, 2011, 30: 7-113.

[38] Lisowicz F., 2003. Narastająca szkodliwość omacnicy prosowianki (Ostrinia nubilalis Hbn.) dla kukurydzy w południowo-wschodniej Polsce (The Increasing Adverse Effect of the European Corn Borer (Ostrinia nubilalis Hbn.) on Corn Cultivations in South-Eastern Poland). Progr. Plant Protect./ Post. Prot. Rośl., 43: 247-250.

[39] therein.

[40] Kundzewicz Z. W., Kozyra J. 2011. Reducing Impacts of Climatic Threats to Agriculture and Rural Areas. Polish Journal of Agronomy 2011, 7, 68–81.

[41] Lirski, A., Myszkowski, L. 2011. Polska akwakultura w 2010 roku na podstawie analizy kwestionariuszy RRW-22. [Polish aquaculture in 2010 according to the analysis of the questionnaires RRW-22.] Komunikaty Rybackie 5 (124), 5-40. [in Polish].

[42] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A.. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015.

[43] Gołębiowska H.: Dynamika występowania flory segetalnej w uprawie kukurydzy na Dolnym Śląsku w latach 1972-2008 i obecne możliwości jej regulacji (Dynamics of Segetal Flora Occurence in Corn Cultivations in the Dolnośląskie Province in the Years 1972-2008 and Current Possibilities of Its Regulation). Monografie i Rozprawy Naukowe, Wyd. IUNG-PIB, Puławy, 2011, 30: 7-113.

The list of external invasive flora species, constituting a hazard to the indigenous flora of Poland, has been presented in the trade study by Tokarska-Guzik et. al.[44] Category IV species, whose presence in Poland is of significant importance, due to a large number of localities, large numbers in patches, and increasing number of their localities or occupied area, included: box elder (*Acer negundo* L), brome grass (*Bromus carinatus* Hook. & Arn), wild cucumber (*Echinocystis lobata* (F.Michx) Torr. Et A. Gray), Sosnowsky's Hogweed (*Heracleum sosnowskyi* Manden), giant hogweed (*Heracleum mantegazzianum* Sommier et Levier), Copper Tops (*Impatiens glandulifera* Royle), Small Balsam (*Impatiens parviflora* DC), black cherry (*Prunus serotina* (Ehrh.) Borkh), red oak (*Quercus rubra* L), polygonales (*Reynoutria* spp.), black locust (*Robinia pseudoacaccia* L.), Canadian goldenrod (*Solidago canadensis* L.), late goldenrod (*Solidago gigantea* Aiton), cocklebur (*Xanthium albinum* (Widder) H.Scholz), common ragweed (*Ambrosia artemisiifolia* L), thicket shadbush (*Amelanchier spicata* (Lam) K. Koch, New York Aster (*Aster novi-belgii* L), rugosa rose (*Rosa rugosa* Thunb), goldenglow (*Rudbeckia laciniata* L.), grass-leaved goldenrod (*Solidago graminifolia* L.) Elliott), meadowsweet (*Spiraea tomentosa* L.).

External invasive species include: *Rhagoletis cingulata* (Loew), *Monilinia polystroma*, *Monilinia fructicola* (brown rot), *Xanthomonas corylina* (bacterial blight), Rhizobium skierniewicense (root tumors) *Raspberry leaf blotch virus* (RLBV). The latter of which was found in Poland in the last 5 years. For the purpose of protecting fruit trees against pests, predatory saprophytes of the *Phythoseiidae* family are introduced.

The range of corn pests like the European corn borer[45], or the Western corn rootworm[46], so far present only in southern Poland, expanded northwards.

Surface waters are also plagued by foreign species. Among fish species we can distinguish breeds introduced to aquaculture and stockings performed within the fishing management of open waters, and species that propagate on their own via the Dnepr-Bug Canal, connecting the Vistula River system with the Black Sea area. The former includes the stone moroko *Pseudorasbora parva* and Prussian carp *Carassius gibelio*, which find favourable conditions for reproduction in carp ponds, and penetrate open waters on their own, or are accidentally introduced together with stocking material. The latter includes the Chinese sleeper *Perccottus glenii* and four goby species, mainly the Racer goby *Neogobius gymnotrachelus* and monkey goby *Neogobius fluviatilis*[47]. Among invertebrates, the invasive species, negatively affecting domestic breeds of crayfish, and common except for south-eastern Poland, is the Eastern Crayfish *Orconectes limosus*[48].

Factor 4. Policy

Biodiversity is adversely affected by changing economic (trade conditions and requirements concerning the product standardization, water fees in fishing), socio-political and cultural factors, causing a change of the economic situation of agricultural/horticultural farms (growth in wealth causing cultivation intensification, including the increased use of plant protection products, mineral fertilizers, increase in monoculture cultivations).

Improvement in the environmental condition in rural areas, including maintaining and increasing biodiversity of rural areas is due to actions undertaken, for several years now, by farmers, under the compliance with cross-compliance requirements and fulfilment of some rural development programme provisions, such as Agri-environmental programme in the years 2004-2006 and 2007-2013. In addition, roughly 1/3 of utilised agricultural areas is included in the NATURA 2000 network, wherein the provisions of the Birds and Habitats Directives must be observed, obligating farmers to not deteriorate the existing natural habitats and numbers of plant and animal species protected within a given area.

[44] Tokarska-Guzik B., Dajdok Z., Zając M., Zając A., Urbisz A., Danielewicz W., Hołdyński Cz. 2012. Alien Plants in Poland with Particular Reference to Invasive Species. Wyd. GDOŚ, Warszawa 2012, s. 197.

[45] Lisowicz F., 2003. Narastająca szkodliwość omacnicy prosowianki (Ostrinia nubilalis Hbn.) dla kukurydzy w południowo-wschodniej Polsce (The Increasing Adverse Effect of the European Corn Borer (Ostrinia nubilalis Hbn.) on Corn Cultivations in South-Eastern Poland). Progr. Plant Protect./ Post. Prot. Rośl., 43: 247-250.

[46] Bereś P., Sionek R., 2007. Preliminary Observations on Western Corn Rootworm (Diabrotica Virgifera Le Conte) Biology in Rzeszów Area. Prog. Plant Protect./Post. Prot. Rośl., 47(1): 188-193.

[47] Grabowska, J., Kotusz, J., Witkowski, A. 2010. Alien invasive fish species in Polish waters: an overview. Folia Zoologica 59 (1), 73-85; Witkowski, A., Grabowska, J. 2012. The non-indigenous freshwater fishes of Poland: threats to the native ichthyofauna and consequences for the fishery: a review. Acta Ichthyologica et Piscatoria 42 (2), 77-87. DOI: 10.3750/AIP2011.42.2.01

[48] Strużyński W., Śmietana P. 1999. On the distribution of Crayfish in Poland. Freshwater Crayfish 12, s.825-829.

In accordance with the provisions of the Convention on Biological Diversity of 1992, and the National Strategy for the Protection and Wise Use of Biodiversity of 2007, Poland is obliged to counteract the biodiversity decrease, also in agricultural areas.

Implementing the provisions of the Water Framework Directive, forced the preparation of the National Ichthyofauna Preservation State Monitoring System. In the future it will allow to monitor changes occurring within ichthyofauna associations, currently such data is available only for selected water reservoirs (e.g. Pilica and Warta rivers) that were under periodical monitoring realized by scientific units (e.g. Department of Ecology and Vertebrate Zoology, Faculty of Biology and Environmental Protection, University of Łódź).

Factor 5. Contamination and external substances

Factors of the greatest impact on the condition of associated biodiversity are air, water, and soil pollution, affecting plant and animal growth rate, as well as changing their reproduction methods. Environment pollution growth adversely affects domestic species, and increases their susceptibility to other harmful factors, such as habitat changes or fighting invasive species[49].

A favourable effect on biodiversity of soil microorganisms is achieved through introducing new, environmentally friendly methods of cultivation e.g. ecological and integrated. Application of organic fertilizers increases protective properties of the soil. Organisms multiply, which are competitive towards soil plant pathogens.

Proper crop rotation is also of tremendous importance. Increase in the acreage of organic cultivation is favourable for frequent alternation and, as a consequence, a greater diversity of microorganisms. Plants cultivated in monoculture impoverish biodiversity and cause the accumulation of plant pathogens and the so-called deleterious microorganisms.

A factor of substantial meaning for biodiversity of microorganisms, is the limitation of synthetic plant pesticide use. It forces larger producer interest in biological methods, but lack of an effective agent may cause the accumulation of endosporic forms of fungal pathogens. Another aspect of the possible lack of use of synthetic plant pesticides, with a simultaneous use of organic fertilizers (manure and composts) in organic farms, is increase in numbers (both in soil and on plants) of some groups of microorganisms e.g. bacteria belonging to the *Enterobacteriaceae* family.

An important factor influencing the size and biological diversity, is mineral fertilization (NPK) that reduces the presence of soil microorganisms. On the other hand, the introduction, both to plants and soil, of bio-stimulators and organic mulch results in an over 3-time increase in the general number of fungi and a 5-time increase in the general number of bacteria, as compared to population sizes of microorganisms in the control plant rhizosphere.

With regard to soil contamination, salts used for e.g. snow removal from streets, have an adverse effect, causing partial or entire vegetation decay. The increase in the content of salt easily soluble in soils, can also be the effect of too intensive mineral fertilizing. The problem of anthropogenic soil salinity applies, first of all, to large industrial centres that developed on the basis of natural fossils, such as hard coal, stone salt, or copper ore. The annually increasing salinity of Polish rivers, especially the Oder and Vistula and some of their tributaries, creates a very significant element of water pollution. Salinity effectively limits economic use of water resources in some regions of Poland, causing at the same time, damage not only to the natural environment, but also the technical infrastructure. However, on the whole, the quality of surface waters, especially flowing waters has in the last twenty years, improved due to the fall of heavy industry during the political-economic transformation, and the growing quantity of investments into sanitizing urban and rural areas, and modernizing and expanding public and industrial sewage treatment systems. For example, in the period from 1995 to 2012, the percentage of inhabitants connected to sewage treatment plants increased from 42% to 69%, with a simultaneous capacity increase of the sewage treatment system by 35%. A very important factor is also the over 50% reduction in the quantity of discharged raw sewage, which in 2012 amounted to 144.1 hm^3 /year, whereas in 2000 it was 301.3 hm^3 /year. Currently the greatest problem with open waters is the pollution with biogenic substances, i.e. nitrogen and phosphorus compounds, which increase water fertility. A consequence of this process is the loss of habitat conditions fostering the presence in lakes of valuable species of fish e.g. of the *Coregonus* variety, and the dominance in eutrophic reservoirs of common and least valuable cyprinids species of fish (bream, white bream and roach). Eutrophic reservoirs are also exposed to periodic deficits of oxygen and the development of algae blooms, including blooms dominated by toxin-

[49] „Zagrożenia dla siedlisk i gatunków chronionych w ramach sieci NATURA 2000" (Threats for Habitats and Species Protected under the Natura 2000 Network), www.natura2000.org.pl.

generating species of blue-green algae. Economic, recreational, and natural potential of such waters is tightly limited[50].

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.

Polish climate is characterized by high variability of weather and considerable variations in subsequent year seasonal conditions. Average annual air temperature values vary from above 5°C to nearly 9°C. The warmest area is the south-western part of Poland, while the coldest, the north-eastern part of the country and mountain areas. Average annual temperature amplitude vary from 19°C on the seaboard to 23°C in the eastern ends of the country. The diversity of air temperature affects the duration of the vegetation season and the active plant growth period, measured as the number of days with a daily average temperature exceeding accordingly 5°C and 10°C. On average, the vegetation period in Poland, lasts for 214 days, oscillating between 199 to 233 days in accordance with the temperature gradient north-east – south-west. Atmospheric precipitation show great dependence on the terrain. The average sum of rainfall is nearly 600 mm, but varies from below 500 mm in central Poland, to almost 800 mm on the seaboard, and more than 1000 mm in the Tatra Mountains.

The two last twenty years of the XX century and the first decade of the XXI century are the warmest recorded in the history of instrumental observation in Poland. During every season an increase in air temperature is observed, with the biggest occurring in winter and the smallest in summer. A noticeable increase of temperature extremes is in place since 1981. By the end of the XXI century, a possible increase of the average annual air temperature in Poland may reach ca. 3° C, as compared to standards from 1961-1990[51].

Between 1971-2000, the total precipitation did not significantly change. In this period it was characterized however, by substantial annual variations – periods of increased and decreased humidity in short intervals. At the same time, downward trends of precipitation quantity were observed, in north-eastern Poland and in the area of the Central Oder Valley. In other areas of the country an upwards trend was recorded.

The greatest impact on climatic conditions is caused by extreme phenomena, whose present intensification, considerably changes the dynamics of climate features in Poland. Among unfavourable thermal phenomena, onerous for the population, the environment and the economy, it is worth mentioning the recurrence, especially since the 1990s, of severe heat waves and hot days, most often in the south-western part of Poland, and least frequently in the coastal and mountainous areas. Most of Polish territory registers downward trends of the number of frosty and a very frosty days. Small increases of the number of frosty days were only observed in mountain areas and the south-western part of the country.

Climatic changes affect species distribution, reproductive cycles, vegetation periods, and interactions with the environment. However, different species and habitats react differently to climatic changes – for some such effect will be favourable, for others, not. Most of predicted changes are based on average climatic parameter fluctuations: precipitation, temperature, wind directions, but equally often it is the result of extreme situations, such as floods, strong winds and rainstorms. Biological diversity under the effect of these changes shall undergo gradual transformations.

The expected global warming will result in species migration, including external invasive ones, mainly from Southern Europe, North Africa, Asia, along with simultaneous withdrawal of species, which are not adapted to high temperatures and summer draughts, and are well suited to harsh winter conditions. Species migrations, as

[50] Wagner I., Izydorczyk K, Kiedrzyńska E., Mankiewicz-Boczek J., Jurczak T., Bednarek A., Wojtal-Frankiewicz A., Frankiewicz P., Ratajski S., Kaczkowski Z., Zalewski M. 2009. Ecohydrological system solutions to enhance ecosystem services: the Pilica River Demonstration Project. Ecohydrology&Hydrobiology, Vol. 9 (1), 13-39. DOI: 10.2478/V10104-009-0042-8.

[51] Alcamo, J., Moreno J.M., Nováky B., Bindi M., Corobov R., Devoy R.J.N., Giannakopoulos C., Martin E., Olesen J.E., Shvidenko A.: Europe. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, Canziani O.F., Palutikof J.P., van der Linden P.J., Hanson C.E., Eds..Cambridge University Press, Cambridge, UK, 2007, 541-580.

an adaptive mechanism to climate change, may however, be prevented by „ecological occlusion", of significantly transformed landscapes: lack of ecological continuity of vegetation formations, occlusion of ecological corridors (river and forest), low landscape saturation with natural elements that may constitute „environmental islands", for individual species (e.g. small mires, bogs, ponds).

Another serious consequence of global warming is the expected increase in sea level that will result in changes for seaside ecosystems, such as erosion intensification and increased salinity of coastal zones. As a result of these changes, habitats on seaside and inland dunes will also suffer from indirect changes such as increased wind speeds and soil salinity. Lakelands, natural and semi-natural meadows, and grasslands and mires are endangered by the effects of global warming, due to the reduction of underground water levels and progressive eutrophication. Also, the Polish Lowlands are in danger of reducing the water-mud areas, including the gradual drying up and disappearance of mires, humid forests and pine woods.

Observed and expected changes in the hydrological regime of the entire country, have a direct effect on biological diversity. Change in rainfall structure during vegetation period is observed, namely more frequent spring and summer draughts, and the increase in the heavy rainstorms, and hailstorms. Due to increased frequency of these phenomena, an increasing number of extreme situations must be taken into account, i.e. floods, draughts, landslides, and watercourse erosion. Particularly visible effects of these changes will be present in the Polish Highlands, wherein biodiversity depletion or direct damages may easily occur. The snow cover thickness and its retention period will also decrease. The problem of changes in the hydrological regime, applies also to fresh water habitats. This group is also exposed to dangers resulting from heavy rainfall increase, draughts, eutrophication processes, and disorders of water flows in reservoirs. Furthermore, as a result of the forecasted climate changes, the number of small surface water reservoirs (bogs, joints, water holes, small, shallow lakes, as well as streams and small rivers) will also decrease. This is a threat to numerous species, that either indirectly inhabit these areas, or use them as drinking water reservoirs, and may result in the extinction or migration of these species.

One of the factors strongly differentiating the presence of forests in Poland, apart from geological conditions, are climatic conditions connected with the ecological optimum of individual species. Therefore, one should expect that, as a result of climate changes, the species composition and forest types will also change. Ecological optimums of woody plant species may be shifted north-east, and the forest boundary in the mountains may lift. Soil requirements of tree species may be a barrier for the adjustment of species composition in these areas to the changes in average temperature and precipitation volume. This creates problems difficult to anticipate. Mountain ecosystems are the most vulnerable to climate change. Mountain forest communities may lose some of their species, and forest productivity and their durability may dramatically collapse. Evaporation increase associated with temperature growth, as well as reduction in thickness and retention time of the snow cover, will foster a decrease in humidity in forests, boosting the risk of fires and accelerating the process of soil mineralization. The process of global warming and the increased risk of draughts is favourable for the development of diseases and pests, including invasive species, and this trend will continue. As a result, significant damage must be taken into consideration, as native species are not resistant to new threats. Warmer winters will have a favourable effect on pest hibernation, and the reduced snow cover will facilitate herbivore wintering. Extended periods with positive temperatures in autumn with intensive rainfall softening the soil, in combination with tree weakening by diseases and pests, can additionally increase forest sensitivity to winds and foster wind-felling.

The forecasts conducted show that, as a result of temperature increase, the vegetation period is prolonged – in the decades following 2020 it is expected to last even 230 days. As a result, a shift will take place of agrotechnical treatments, as well as a change in crop productivity. As a result of the aforementioned changes, conditions for thermophilic plants such as corn, sunflower, soy bean, grapevine or wheat will improve, thanks to which the quality of yields will be higher than currently. The extended vegetation period will however, increase the threat to crops, of late spring ground frosts. Territory-wise, the most significant changes in the vegetation period will take place in northern and north-western part of Poland. At the same time, along with the temperature increase, the threat of pests that, like plants, will react with development acceleration, will also be higher. Pests will appear, which so far were never of much economic importance. E.g. economically significant yield losses in corn cultivations are starting to be caused by the western corn rootworm and the European corn borer, so far considered as of little importance in the crop protection programmes[52].

[52] Lisowicz F., 2003. Narastająca szkodliwość omacnicy prosowianki (Ostrinia nubilalis Hbn.) dla kukurydzy w południowo-wschodniej Polsce (The Increasing Adverse Effect of the European Corn Borer (Ostrinia nubilalis Hbn.) on Corn Cultivations in South-Eastern Poland). Progr. Plant Protect./ Post. Prot. Rośl., 43: 247-250.

As a result of global warming, an acceleration of the plant development rate takes place, including weeds and pests, which are an increasing inconvenience for agriculture. In recent years Poland is witness to a growth of the thermophilic weeds population, e.g. yellow foxtail, green foxtail, European black nightshade in corn[53], increasing hibernation of weeds so far classified as poorly hibernating. An increasing problem is combating weeds during cold May periods and with low soil humidity.

Expected climate changes and the associated increase in frequency and intensity of droughts in agriculture, will result in the demand increase for water for irrigation. From prognostic calculations of soil water shortage values for selected plants, it seems that a continuous process is occurring of soil over-drying and increasing drought hazard. When analysing these results, an increase in yield losses is predicted, as a result of agricultural drought hazard in the decades following 2020. Particularly so, if we consider the small capacity of reservoirs, capable of storing only 6% of annual outflow.

Apart from draughts, intensive rainfall poses a significant hazard for plant production. Due to increased frequency of heavy rainfall in the summer period, dehydration needs may be expected to rise. The conducted analyses indicated that farmers should expect more years with yield losses, resulting from unfavourable weather. Local floods and field inundations will cause changes in populations of soil microorganisms of these areas. Mechanisms of these changes are diverse, however, the most important factor is the increase in anaerobic conditions in upper soil layers. The presence or lack of oxygen significantly modifies the type of chemical compounds produced in the soil. Any increased quantity of toxic compounds selectively affects different groups of microorganisms.

With regard to animal production, climate changes, and hence the increase in yield variability of cultivations and pastures, may cause fodder shortages in farms and price increases. The growing number of very hot days will boost the risk of thermal stress in animals, which may cause a reduction of herd productivity. Alteration of the thermal conditions during vegetation period and winter, may result in increased frequency of, so far less important, pathogenic units, affecting health of farm animals.

Effects of drivers of change on biodiversity for food and agriculture

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

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

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

Production systems	**Drivers** [54]	**Effect of drivers on sector biodiversity for food and agriculture** (2, 1, 0,-1, -2, NK, NA)			
Code or name		**PGR**	**FGR**	AnGR	AqGR
C7 Irrigated crops	Changes in land and water use and management	0			

[53] Gołębiowska H. 2011. Dynamika występowania flory segetalnej w uprawie kukurydzy na Dolnym Śląsku (The Dynamics of Segetal Flora Occurrence in Corn Cultivations in the Dolnośląskie province) w latach 1972-2008 i obecne możliwości jej regulacji (Dynamics of Segetal Flora Occurence in Corn Cultivations in the Dolnośląskie Province in the Years 1972-2008 and Current Possibilities of Its Regulation). Monografie i Rozprawy Naukowe, Wyd. IUNG-PIB, Puławy, Nr 30, s. 7-113.

[54] Factor descriptions can be found in Appendix 3.

Production systems	Drivers [54]	Effect of drivers on sector biodiversity for food and agriculture (2, 1, 0,-1, -2, NK, NA)			
Code or name		**PGR**	**FGR**	AnGR	AqGR
(other) : Temperate	Polution and external inputs	-1			
	Over-exploitation and overharvesting	NA			
	Climate change	0			
	Natural disasters	0			
	Pests, diseases, alien invasive species	-1			
	Markets, trade and private sector	-1			
	Policies	0			
	Population growth and urbanization				
	Changing economic, socio-political, and cultural factors	-1			
	Advancements and innovations in science and technology	-1			
C11 Rainfed crops : Temperate	Changes in land and water use and management	-1			
	Polution and external inputs	-1			
	Over-exploitation and overharvesting	NA			
	Climate change	-1	-1	0	-1
	Natural disasters	0			
	Pests, diseases, alien invasive species	-1	-1	-1	-1
	Markets, trade and private sector	-1			
	Policies	0			
	Population growth and urbanization				
	Changing economic, socio-political, and cultural factors	-1			
	Advancements and innovations in science and technology	1			
M3 Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	Changes in land and water use and management	-1		0	
	Polution and external inputs	-1		-1	
	Over-exploitation and overharvesting	NA		0	
	Climate change	0		0	
	Natural disasters	NK		0	
	Pests, diseases, alien invasive species	0		0	
	Markets, trade and private sector	-1		1	
	Policies	0		1	
	Population growth and urbanization			0	
	Changing economic, socio-political, and cultural factors			1	
	Advancements and innovations in science and technology	1		1	
L3 Livestock grassland-based systems: Temperate	Changes in land and water use and management	-2	-1	0	-1
	Polution and external inputs	-1	NA	-1	-1
	Over-exploitation and overharvesting	-1	NA	0	-1
	Climate change	NK	NK	NK	NK
	Natural disasters	0	NA	0	-1
	Pests, diseases, alien invasive species	-2	NA	-1	NA
	Markets, trade and private sector	-1	NA	0	-1

Production systems	Drivers [54]	Effect of drivers on sector biodiversity for food and agriculture (2, 1, 0,-1, -2, NK, NA)			
Code or name		**PGR**	**FGR**	AnGR	AqGR
	Policies	2	NA	1	-1
	Population growth and urbanization	-1	NA	-1	-1
	Changing economic, socio-political, and cultural factors	-1	-1	-1	-1
	Advancements and innovations in science and technology	1	NA	1	0
L4 Animal production with the use of pastures: Subarctic Zone and/or mountainous areas	Changes in land and water use and management	-1	-1	-1	-1
	Polution and external inputs	-1	NA	-1	-1
	Over-exploitation and overharvesting	-1	NA	-1	-1
	Climate change	NK	NK	NK	NK
	Natural disasters	0	NA	0	0
	Pests, diseases, alien invasive species	-1	NA	-1	NA
	Markets, trade and private sector	-1	NA	-1	-1
	Policies	2	NA	1	-1
	Population growth and urbanization	0	NA	0	0
	Changing economic, socio-political, and cultural factors	-1	NA	-1	-1
	Advancements and innovations in science and technology	1	NA	1	1
L7 Livestock grassland-based systems: Boreal and /or highlands	Changes in land and water use and management	1	NA	0	NK
	Polution and external inputs	0	NA	-1	0
	Over-exploitation and overharvesting	-1	NA	0	NK
	Climate change	NK	NK	NK	NK
	Natural disasters	0	NA	0	0
	Pests, diseases, alien invasive species	-1	NA	-1	NK
	Markets, trade and private sector	0	NA	0	0
	Policies	1	NA	1	NK
	Population growth and urbanization	NA	NA	NA	NA
	Changing economic, socio-political, and cultural factors	1	NA	1	0
	Advancements and innovations in science and technology	0	NA	1	0
A3 Self-recruiting capture fisheries: Temperate	Changes in land and water use and management				1
	Polution and external inputs				1
	Over-exploitation and overharvesting				-1
	Climate change				NK
	Natural disasters				NK
	Pests, diseases, alien invasive species				-1
	Markets, trade and private sector				0
	Policies				0
	Population growth and urbanization				0
	Changing economic, socio-political, and cultural factors				-1
	Advancements and innovations in science and technology				-1

Production systems	Drivers [54]	Effect of drivers on sector biodiversity for food and agriculture (2, 1, 0,-1, -2, NK, NA)			
Code or name		**PGR**	**FGR**	AnGR	AqGR
A7 Culture-based fisheries: Temperate	Changes in land and water use and management				-1
	Polution and external inputs				1
	Over-exploitation and overharvesting				0
	Climate change				NK
	Natural disasters				NK
	Pests, diseases, alien invasive species				-1
	Markets, trade and private sector				0
	Policies				-1
	Population growth and urbanization				0
	Changing economic, socio-political, and cultural factors				0
	Advancements and innovations in science and technology				1
A11 Fed aquaculture: Temperate	Changes in land and water use and management				-1
	Polution and external inputs				1
	Over-exploitation and overharvesting				NA
	Climate change				NK
	Natural disasters				NK
	Pests, diseases, alien invasive species				-1
	Markets, trade and private sector				-1
	Policies				-1
	Population growth and urbanization				0
	Changing economic, socio-political, and cultural factors				-1
	Advancements and innovations in science and technology				1

Impact of factor changes 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).

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

Production systems	Drivers [55]	Effect of drivers on ecosystem services (2, 1, 0,-1, -2, NK, NA)								
Code or name		**Pollination**	**Pest and disease regulation**	**Water purification and waste treatment**	**Natural hazards regulation**	**Nourishing cycling**	**Soil formation and protection**	**Water cycling**	**Habitat provisioning**	**Production of oxygen/ Gas regulation**
C7 Irrigated crops (other) : Temperate	Changes in land and water use and management	-1	-1	0	-1	-1	0	0	-1	0
	Polution and external inputs	-1	NK	-1	NK	-1	NK	-1	-1	NK
	Over-exploitation and overharvesting									
	Climate change	NK	-1	NK	-1	NK	NK	-1	-1	-1
	Natural disasters	0	-1	-1	-1	-1	-1	-1	-1	-1
	Pests, diseases, alien invasive species	NK	-1	0	0	0	0	0	-1	0
	Markets, trade and private sector	NK	1	NK	0	NA	NA	NA	NA	NA
	Policies	NK	1	1	0	NK	NK	NK	0	1
	Population growth and urbanization									
	Changing economic, socio-political, and cultural factors									
	Advancements and innovations in science and technology	0	1	1	NK	NK	NK	NK	1	1
C11 Rainfed crops: Temperate	Changes in land and water use and management	-1	-1	-1	-1	-1	0	0	-1	0
	Polution and external inputs	-1	NK	-1	NK	-1	NK	-1	-1	NK
	Over-exploitation and overharvesting									
	Climate change	NK	-1	NK	-1	NK	NK	-1	-1	-1
	Natural disasters	-1	-1	-1	-1	-1	-1	-1	-1	-1
	Pests, diseases, alien invasive species	NK	-1	0	0	0	0	0	-1	0
	Markets, trade and private sector	NK	1	NK	0	NA	NA	NA	NA	NA
	Policies	NK	1	1	1	NK	NK	NK	0	1
	Population growth and urbanization									
	Changing economic, socio-political, and cultural factors									
	Advancements and innovations in science and	0/1	1	1	NK	NK	NK	NK	1	1

[55] Factor descriptions can be found in Appendix 3.

Production systems	Drivers [55]	Effect of drivers on ecosystem services (2, 1, 0,-1, -2, NK, NA)								
Code or name		Pollination	Pest and disease regulation	Water purification and waste treatment	Natural hazards regulation	Nourishing cycling	Soil formation and protection	Water cycling	Habitat provisioning	Production of oxygen/ Gas regulation
	technology									
M3 Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	Changes in land and water use and management	0	0	0	-1	0	0	0	-1	0
	Polution and external inputs	0	NK	-1	NK	-1	NK	-1	-1	NK
	Over-exploitation and overharvesting	-1	0	0	0	0	-1	0	-1	NK
	Climate change	NK	-1	NK	-1	NK	NK	-1	-1	-1
	Natural disasters	-1	-1	-1	-1	-1	-1	-1	-1	-1
	Pests, diseases, alien invasive species	NK	NK	0	0	0	0	0	-1	NK
	Markets, trade and private sector	NK	1	NK	0	NA	NA	NA	NA	NA
	Policies	NK	1	1	0	NK	NK	NK	0	1
	Population growth and urbanization	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Changing economic, socio-political, and cultural factors	0	0	0	0	0	0	0	0	0
	Advancements and innovations in science and technology	1	1	1	NK	NK	NK	NK	1	1
L3: Naturally regenerated forests: Temperate	Changes in land and water use and management	NK	NK	1	1	1	1	NK	1	NK
	Polution and external inputs	-2	NK	0	NK	1	1	NK	-1	NK
	Over-exploitation and overharvesting	-1	NK	-1	-1	NK	NK	NK	-2	NK
	Climate change	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Natural disasters	NK	-1	NK	-1	NK	NK	NK	NK	NK
	Pests, diseases, alien invasive species	NK	-2	NK	NK	NK	NK	NK	-2	NK
	Markets, trade and private sector	NK	NK	NK	NK	NK	NK	NK	-2	NK
	Policies	NK	NK	1	1	1	1	1	1	NK
	Population growth and urbanization	NK	NK	-2	-2	NK	NK	NK	-2	NK
	Changing economic, socio-political, and cultural factors	NK	NK	NK	NK	NK	NK	-1	-2	NK
	Advancements and innovations in science and technology	NK	NK	1	NK	NK	1	1	1	NK
L4: Livestock grassland-based systems: Boreal										
	Changes in land and water use and management	-1	NK	-1	NK	NK	NK	NK	-1	-1
	Polution and external inputs	NK	NK	NK	-1	-1	-1	NK	-1	-1

Production systems	Drivers [55]	Effect of drivers on ecosystem services (2, 1, 0,-1, -2, NK, NA)								
Code or name		Pollination	Pest and disease regulation	Water purification and waste treatment	Natural hazards regulation	Nourishing cycling	Soil formation and protection	Water cycling	Habitat provisioning	Production of oxygen/ Gas regulation
and /or highlands	Over-exploitation and overharvesting	NK	NK	NK	-1	NK	NK	NK	-1	-1
	Climate change	NK	-1	NK	-1	NK	NK	NK	NK	NK
	Natural disasters	NK	-1	NK	NK	NK	NK	NK	-1	NK
	Pests, diseases, alien invasive species	NK	NK	NK	NK	NK	NK	NK	-1	NK
	Markets, trade and private sector	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Policies	NK	NK	-1	-1	NK	NK	NK	-1	NK
	Population growth and urbanization	NK	NK	NK	NK	NK	NK	NK	-1	NK
	Changing economic, socio-political, and cultural factors	NK	NK	1	1	NK	NK	NK	1	1
L7: Livestock landless systems: Temperate	Changes in land and water use and management	NK	NK	NK	NK	NK	NK	NK	NK	NK
	Polution 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 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
A3: Self-recruiting capture fisheries: Temperate	Changes in land and water use and management	NA	-1	1	NK	NK	NA	NA	1	NK
	Polution and external inputs	NA	NK	-1	NK	NK	NA	NA	-1	NK
	Over-exploitation and overharvesting	NA	NK	-1	NK	NK	NA	NA	-1	NK
	Climate change	NA	NK	NK	NK	NK	NA	NA	NK	NK
	Natural disasters	NA	NK	NK	NK	NK	NA	NA	NK	NK
	Pests, diseases, alien invasive species	NA	-1	-1	NK	NK	NA	NA	-1	NK
	Markets, trade and private sector	NA	NK	NK	NK	NK	NA	NA	NK	NK

Production systems	Drivers [55]	Effect of drivers on ecosystem services (2, 1, 0,-1, -2, NK, NA)								
Code or name		Pollination	Pest and disease regulation	Water purification and waste treatment	Natural hazards regulation	Nourishing cycling	Soil formation and protection	Water cycling	Habitat provisioning	Production of oxygen/ Gas regulation
	Policies	NA	1	1	NK	NK	NA	NA	1	NK
	Population growth and urbanization	NA	-1	-1	NK	NK	NA	NA	-1	NK
	Changing economic, socio-political, and cultural factors	NA	-1	-1	NK	NK	NA	NA	-1	NK
	Advancements and innovations in science and technology	NA	NK	1	NK	NK	NA	NA	1	NK
A7: Culture-based fisheries: Temperate	Changes in land and water use and management	NA	-1	1	NK	NK	NA	NA	1	NK
	Polution and external inputs	NA	NK	-1	NK	NK	NA	NA	-1	NK
	Over-exploitation and overharvesting	NA	NK	-1	NK	NK	NA	NA	-1	NK
	Climate change	NA	NK	NK	NK	NK	NA	NA	NK	NK
	Natural disasters	NA	NK	NK	NK	NK	NA	NA	NK	NK
	Pests, diseases, alien invasive species	NA	-1	-1	NK	NK	NA	NA	-1	NK
	Markets, trade and private sector	NA	NA	NK	NK	NK	NA	NA	NK	NK
	Policies	NA	1	1	NK	NK	NA	NA	1	NK
	Population growth and urbanization	NA	-1	-1	NK	NK	NA	NA	-1	NK
	Changing economic, socio-political, and cultural factors	NA	-1	-1	NK	NK	NA	NA	-1	NK
	Advancements and innovations in science and technology	NA	NK	1	NK	NK	NA	NA	1	NK
A11: Fed aquaculture: Temperate	Changes in land and water use and management	NA	-1	1	NK	NK	NA	-1	-1	NK
	Polution and external inputs	NA	0	1	NK	NK	NA	NK	1	NK
	Over-exploitation and overharvesting	NA	NA	NA	NA	NK	NA	NK	-1	NK
	Climate change	NA	NK	NK	NK	NK	NA	-1	-1	NK
	Natural disasters	NA	NK	NK	NK	NK	NA	NK	NK	NK
	Pests, diseases, alien invasive species	NA	-1	-1	NK	NK	NA	NK	-1	NK
	Markets, trade and private sector	NA	NA	NK	NK	NK	NA	NK	NK	NK
	Policies	NA	1	1	NK	NK	NA	NK	NK	NK
	Population growth and urbanization	NA	NA	NK	NK	NK	NA	NK	NK	NK
	Changing economic, socio-political, and cultural factors	NA	-1	1	NK	NK	NA	NK	-1	NK

Production systems	Drivers [55]	Effect of drivers on ecosystem services (2, 1, 0,-1, -2, NK, NA)								
Code or name		Pollination	Pest and disease regulation	Water purification and waste treatment	Natural hazards regulation	Nourishing cycling	Soil formation and protection	Water cycling	Habitat provisioning	Production of oxygen/ Gas regulation
	Advancements and innovations in science and technology	NA	0	1	NK	NK	NA	1	NK	NK

13. Briefy 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.

Rainfed crops : Temperate [C11]

Intensive management system using large quantities of mineral fertilizers and chemical plant pesticides, causes species deterioration of flora and fauna associated with crops[56,57]. Simplifying crop rotation, ground re-parcelling, liquidation of marginal habitats has a negative impact on bee diversity in the agricultural environment[58].

Shaping species composition of plants accompanying agricultural cultivation in recent years, is increasingly affected by agrotechnical factors arising from changes in cultivation technology, such as simplifying cultivation, especially direct drilling, which additionally can be favourable for migration of foreign species or the appearance of expansive species in plant communities[59,60].

Livestock grassland-based systems: Temperate [L3]

In Poland there is a significant regional diversity with regard to system operations (type of used practices, their intensity, spatial distance etc.) affecting natural resources.

With regard to grasslands in the north-eastern regions and Podkarpacie, an intensification of use is observed, in the form of excessive grazing, fertilizing, application of plant pesticides and resowing, land consolidation leading to landscape structure standardization and loss of habitat mosaics, which results in the disapperance of habitats of valuable species, mainly of plants and invertebrates. Agriculture chemicalization has a particularly unfavourable effect on individual species and populations of fauna and flora in rural areas at the genetic level.

Intensification of agriculture in recent years is the cause of many unfavourable impacts on biodiversity of rural areas: decay of habitats in consequence of ploughing, contamination with fertilizers and eutrophication,

[56] Tryjanowski P., Dajok Z., Kujawa K., Kałuski T., Mrówczyński M.: Threats to Biodiversity in Farmland: Are Results from Western Europe Good Solutions for Poland?, Polish J. Agron., 2011, 7: 113-119.
[57] Rosin Z.M., Takacs V., Báldi A., Banaszak-Cibicka W., Dajdok Z., Dolata P. T., Kwieciński Z., Łangowska A., Moroń D., Skórka P., Tobółka M., Tryjanowski P., Wuczyński A.: Ecosystem Services as an Efficient Tool of Nature Conservation: a View from the Polish Farmland. Chrońmy Przyrodę Ojczystą, 2011, 67(1): 3-20.
[58] Ibidem.
[59] Gołębiowska H.: Dynamika występowania flory segetalnej w uprawie kukurydzy na Dolnym Śląsku w latach 1972-2008 i obecne możliwości jej regulacji (Dynamics of Segetal Flora Occurrence in Corn Cultivations in the Dolnośląskie Province in the Years 1972-2008 and Present Possibilities of Its Regulation). Monografie i Rozprawy Naukowe, Wyd. IUNG-PIB, Puławy, 2011, 30: 7-113.
[60] Tokarska-Guzik B., Dajdok Z., Zając M., Zając A., Urbisz A., Danielewicz W., Hołdyński Cz. 2012. Alien Plants in Poland with Particular Reference to Invasive Species. Wyd. GDOŚ, Warszawa 2012, s. 197.

Landscape unification, spread of external invasive species. Species withdraw (mainly of plants and invertebrates) can also be observed, in consequence of agriculture chemicalization and common use of pesticides. The most alarming phenomenon is the massive dying out of bees *Apis mellifera*, however, it also applies to other organisms, e.g. rare weeds, associated with traditional forms of cultivations[61,62]. Meadows and pastures due to ensuring a base for pollinators for a long period, cause an increase in the numbers of these insects. Kitchen gardens adjacent to pastures have a very positive impact on increasing the biodiversity of a given area, e.g. increase in the number of pollinators, invertebrates.

Production intensification involves soil meliorations which threaten specific habitats – marsh and mire, protecting organic carbon and playing a great role in water retention and treatment, as well as decay of specific conditions fostering the presence of many bird species. Meliorations are also connected with disturbance of natural watercourses and limiting the habitats of water organisms[63,64,65,66,67,68,69,70].

Natural forests in Poland except larger complexes on protected premises, are usually present on small areas, usually in watercourses or marshes. The main hazard for their biodiversity (all species groups) is thus land draining, as well regulation and hydrotechnic works in river and stream valleys. A great hazard, especially in the riverside areas, is also penetration of external invasive species, especially plants[71,72]. Production intensification also involves, occurring locally, focusing of animal production, adversely affecting habitat conditions, contamination, leading to eutrophication of water and soil and the degradation of natural habitats. Intensification of free-roam production cumulates fertilization, use of hormones and antibiotics, which negatively affect fauna – e.g. changes reproductive cycles in the polluted environment, animal habitats disappear in consequence of overfertilization of plant habitats. Water contamination with fertilizers, hormones and antibiotics – leads to deficiencies of oxygen, problems with breeding of amphibians and fish (hormones). Water contamination with biogenic substances often causes degradation of water habitats, and thus easier spreading of invasive species, displacing domestic flora (e.g. nitrophilous calamus).

Introducing contaminants and external substances to permanent grasslands is connected with settlements from industrial sources. This problem occurs in the immediate vicinity of emission sources, and, due to the use of more and more technologically advanced solutions restricting the size of emissions, has a lesser unfavourable effect on biodiversity.

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[61] Mirek Z., Zarzycki K., Wojewoda W., Szeląg Z. (red.) 2006. Red list of plants and fungi in Poland. Czerwona lista roślin i grzybów Polski. Instytut Botaniki im. W. Szafera, PAN, Kraków, 99 ss.

[62] Anioł-Kwiatkowska J., Szczęśniak E. 2011 (red.). Endangered Archaeophytes of Lower Silesia – Acta Bot. Siles., Suppl.1, s 227.

[63] Jermaczek A., Wołejko L., Misztal K. 2009. Poradnik ochrony mokradeł w górach (Mountain Wetland Protection). Wydawnictwo Klubu Przyrodników, Świebodzin, s. 303.

[64] Cierlik G., Makomaska-Juchiewicz M., Mróz W., Perzanowska J., Król W., Baran P., Zięcik A. (red.) 2010a. Sprawozdanie z prac monitoringowych w roku 2010 (Report from Monitoring Works in 2010). Volume 1. Natural habitats. Institute of Nature Conservation PAS Cracow. p. 458.

[65] Cierlik G., Makomaska-Juchiewicz M., Mróz W., Perzanowska J., Król W., Baran P., Zięcik A. (red.) 2010b. Sprawozdanie z prac monitoringowych w roku 2010 (Report from Monitoring Works in 2010). Volume 2. Plant Species. Institute of Nature Conservation PAS Cracow. p. 316.

[66] Cierlik G., Makomaska-Juchiewicz M., Mróz W., Perzanowska J., Król W., Baran P., Zięcik A. (red.) 2010c. Sprawozdanie z prac monitoringowych w roku 2010 (Report from Monitoring Works in 2010). Volume 3. Animals Species. Institute of Nature Conservation PAS Cracow. p. 463.

[67] Cierlik G., Makomaska-Juchiewicz M., Mróz W., Perzanowska J., Król W., Baran P., Zięcik A. (red.) 2011a. Sprawozdanie z prac monitoringowych w roku 2011 (Report from Monitoring Works in 2011). Volume 1. Types of natural habitats. Institute of Nature Conservation PAS Cracow. p. 505.

[68] Cierlik G., Makomaska-Juchiewicz M., Mróz W., Perzanowska J., Król W., Baran P., Zięcik A. (red.) 2011b. Sprawozdanie z prac monitoringowych w roku 2011 (Report from Monitoring Works in 2011). Volume 2. Plant Species. Institute of Nature Conservation PAS Cracow. p. 332.

[69] Wołejko L. Stańko R. Pawlikowski P., Jarzombkowski F., Kiaszewicz K., Chapiński P., Bregin M., Kozub Ł., Krajewski Ł., Szczepański M. 2012. Krajowy program ochnrony torfowisk alkalicznych (7230) (National Programme for the Conservation and Restoration of Alkaline Fens) Wydawnictwo Klubu Przyrodników, Świebodzin, s. 120.

[70] http://siedliska.gios.gov.pl/index.php/wyniki-monitoringu/wyniki-2009-2011.

[71] Jermaczek A., Wołejko L., Misztal K. 2009. Poradnik ochrony mokradeł w górach (Mountain Wetland Protection). Wydawnictwo Klubu Przyrodników, Świebodzin, s. 303.

[72] Dajdok Z., Pawlaczyk P. (red.) 2009. Inwazyjne gatunki roślin ekosystemów mokradłowych Polski (Invasive Plant Species of Wetland Ecosystems in Poland). Wydawnictwo Lubuskiego Klubu Przyrodników, Świebodzin, s. 167.

Another intensification aspect influencing biodiversity is the increase in the number of swaths, as well as the changing time of mowing – earlier acquisition of biomass, which leads to restrictions in development of numerous species of flora, elimination of conditions favourable for invertebrates, creating a hazard for herpetofauna and numerous species of avifauna. With the aforementioned persisting tendencies a significant reduction of biodiversity can be expected. The intensification of production on utilised agricultural areas, particularly in a diverse landscape, affects the condition of habitats, soils, water conditions, and also neighbouring grasslands. Intensive fertilization of fodder cultivations (e.g. corn), causes e.g. the introduction of nitrophilous species to adjacent forests, meadows and pastures, which results in the reduction of biodiversity. It also changes the flora and causes its depletion in the grasslands area of fodder production intensification. Many forage plants turned out to be invasive species, displacing domestic flora (e.g. Caucasian hogweeds).

In recent years, an improvement in the water quality of many Polish rivers has occurred, which resulted in e.g. an increase of fish biodiversity, however, the hazard of eutrophication remains high, e.g. in connection with agriculture intensification. A serious hazard is also the regulation of watercourses and soil meliorations, causing a drop in water levels and the disappearance of small reservoirs; these factors threaten the habitat diversity of water organisms, eliminating meanders, point bars, shallows, wetlands as well as small water reservoirs. In addition, regulated rivers have a smaller capacity for water treatment. The hydro-technical infrastructure on rivers is still a threat to migratory fish. Another problem are also alien invasive species, displacing the native ones (e.g. plants – Canadian waterweed *Elodea canadensis*, invertebrates – zebra mussel *Dreissena polymorpha*, eastern crayfish *Orconectes limosus*, fish – stone moroko *Pseudorasbora parva*, Chinese sleeper *Perccottus glenii*, Racer goby *Neogobius gymnotrachelus* and monkey goby *Neogobius fluviatilis)*, poaching, as well as tourism and recreation and the related infrastructure. The latter creates a particular hazard for cleanliness and quietness of and around Polish lakes [73,74].

Economic conditions – demand for certain products – lead to changes in the structure of use. Some branches of pasture farming disappear as a result of low profitability, first and foremost, these are forms of extensive grazing beneficial for the environment, as well as pasturing species like sheep and goats. This results in i.a. disappearance of habitats of many grassland species (plants, invertebrates)[75]. The market, forcing the intensification of animal husbandry, contributes to the decrease of meadow and pasture species, as well as, regionally, in consequence of pasturage intensification in the forest-adjacent areas, to reducing forest biodiversity. Hazards associated with forest pasturing are known, but also currently examined is its positive impact on shaping select forest habitats – xerothermic oak forests (projects implemented by the National Forests and NGOs on forest pasturing of the Polish Konik horse).

In numerous regions, due to the unprofitability of breeding, a total disappearance of meadow economy is observed. Grasslands are abandoned in consequence of which, occurs a withdraw of organisms connected to meadow habitats – plant, invertebrates, birds. Valuable species are displaced by expansive and invasive species[76,77]. The proliferation of alien species is conducted both through zoochory and by resowing pastures. They also encroach on forest habitats.

Invasive fauna species related to semi-natural ecosystems of meadows and pastures, in particular in river valleys i.e. raccoon, American mink, as well as domestic expansive species i.e. fox, pose a hazard for the biodiversity of the aforementioned ecosystems as a result of growing predator pressure and the lack of competition. If possible, the hazards associated with disease transmission between farm and domestic animals and the local fauna are identified and reduced, e.g. the issue of minimizing contacts of the forest bison with domestic cattle.

[73] Cierlik G., Makomaska-Juchiewicz M., Mróz W., Perzanowska J., Król W., Baran P., Zięcik A. (red.) 2010c. Sprawozdanie z prac monitoringowych w roku 2010 (Report from Monitoring Works in 2010). Volume 3. Animals Species. Institute of Nature Conservation PAS, Cracow, p. 463.

[74] http://siedliska.gios.gov.pl/index.php/wyniki-monitoringu/wyniki-2009-2011.

[75] Barańska K., Chmielewski P., Cwener A., Pluciński P. 2013. Ochrona muraw kserotermicznych w Polsce (Conservation of Xerothermic Grasslands in Poland). Teoria i praktyka. Wydawnictwo Lubuskiego Klubu Przyrodników, Świebodzin, s. 44.

[76] Tokarska-Guzik B., Dajdok Z., Zając M., Zając A., Urbisz A., Danielewicz W., Hołdyński Cz. 2012. Alien Plants in Poland with Particular Reference to Invasive Species. Wyd. GDOŚ, Warszawa 2012, s. 197.

[77] Jarzombkowski F., Goldstein K., Gutowska E., Kazuń A., Kotowska D., Kotowska K., Kowalska M., Krajewski Ł., Piórkowski H., Szczepaniuk A., Żmihorski M. 2013. Monitoring siedlisk pakietów przyrodniczych programu rolnośrodowiskowego 2012-2015 (Habitat Monitoring of Natural Packages of the Agri-environmental Programme 2012-2015). Final report of 2012. The Institute of Technology and Life Sciences in Falenty, mscr., p. 214.

In many cases, a replacement of grasslands with utilised agricultural areas (landscape of large river valleys in western and south-west Poland), which results in the disappearance of marshy and mire habitats, and thus areas with retention capabilities (decreasing flood hazard), water treatment capabilities and carbon sequestration in the form of organic deposits as well as an increased emission of carbon dioxide. The intensification of fodder production also means repossessing natural floodplains, and flood protection of these crops e.g. with embankments, which in turn increases flood hazards further along the watercourse.

The elimination of grasslands occurs also as a result of urbanization pressure, in particular in close proximity of larger cities they are often used for development (process of expansion of suburban zones, building development, including services along the main communication routes). Also, attractively situated grasslands in the Lakeland and lowland landscape, as well as foothills, are replaced with recreational areas. Urbanisation pressure also involves hazards resulting from different contamination aspects (e.g. illegal landfills, sewage dumps), communication infrastructure development (in the context of eliminating habitat fragmentation of landscape structure, creating barriers for fauna migrations).

The impact of natural disasters, such as draughts, fires, floods, adversely affects individual habitats and populations of fauna and flora. For some habitats and species, natural disasters i.e. flooding, fires, may have a beneficial effect by shaping biodiversity (e.g. heathlands, alluvial meadows, xerothermic grasslands). In situations where natural disasters occur in cycles and with greater frequency, which may be associated with climate changes, particularly threatened are semi-natural ecosystems with hydrogenic habitats – the disappearance of wetlands and shallow water reservoirs from agricultural landscape, disappearing of spring areas, over-drying leading to mineralization of organic material, changes in species composition, etc. Under conditions of diverse landscapes, natural disasters, draughts and heavy rainfall may foster erosion processes, including landslides. Increase in drought frequency and resulting fires, reduced snowfall, and shorter winters lead to a reduction of the fodder base.

Development of knowledge related to the hazards on grassland ecosystems and associated habitats made it possible, in recent years, to undertake actions to restrict the adverse impact of farming on biodiversity, implemented under the Agri-environmental programme or NGO operations, national parks, and other institutions of nature protection. It constitutes e.g. resumed extensive use, halting the liquidation of grasslands, active protection actions on mires, small retention projects. However, both the scope and effectiveness of these operations do not seems satisfactory.

Despite positive initiatives in the context of promoting a sustainable use of natural resources in agriculture, the country's market trade development of the private sector is mainly focused on increasing production through intensification. Projects with a greater extent of natural potential use in income generation of agricultural farms, are local (less frequently regional) in scope and based on specific services/products. An insufficient support for such initiatives is observed, in the context of consulting, promoting and financing.

The shaping of biodiversity in rural areas is influenced by ratified international conventions, implementing directives and programs of the EU, and administrative and legal regulations operating on the state level. The most important are: „The Rural Development Programme" RDP 2007-2013, the network system NATURA 2000, EU Directives (Habitat, Birds, Water Framework Directive, nitrate), specifying and enforcing the code of good agricultural practices, implementing mechanism of *Cross compliance*, prevalence of use of procedures evaluating environmental impact, establishing and operating monitoring systems, perspectives of a greater focus on promoting solutions related to renewable energy sources, including biomass conversion, the requirement of active protection of select species, including those related to ecosystems of meadows and pastures.

There are also administrative-legal solutions that create a threat to shaping biodiversity of permanent pastures, e.g. initiatives related to regulation of river beds, and maintenance of the melioration network. The analyzed 10 year period is characterized by small use of domestic R&D potential towards developing solutions responding to the demand formulated on the part of practice in the field of sustainable management of natural resources. Existing prototype and/or highly specialized solutions in this respect, connecting the goals of protection of natural resources and production optimization, are implemented on a small scale – local or regional (e.g. snowgroomers, brush cutters, scarers etc).

Livestock grassland-based systems: Boreal and /or highlands L4

Impacts in the forest-adjacent areas related to pasture economy in mountain areas are similar to the lowland practices (L3 system), however, human pressure on the environment here is smaller and hazards, usually, occur with decreased intensity. To a smaller extent, a tendency is visible here to intensify the use of grasslands, or to replace them with arable land, on the other hand, many valuable meadows are present, used for traditional,

extensive pasturing, mowing, or mowing-pasturing[78]. Recreational architecture pressure in the mountains results in the disappearance of pasturing, and hence, the reduction in flora wealth associated with it. Increase in population in mountain areas so far used for pasturing, leads to the disappearance of grazing, greater penetration and depletion of adjacent forests.

Impact of factor changes on traditional knowledge, gender and livelihood among rural communities

When answering questions 16 through 18, please describe the main factors, which had the impact over the past 10 years and, if possible, specify indicators used for measuring change and sources of information.

- **Changes in the use and management of lands and waters**

Ecosystems constitute the basis for life and any human activities. Products and functions provided by them are essential for maintaining nature and human welfare, as well as for the future economic and social development. The agricultural ecosystems' condition depends on the methods of their use by humans. Within production systems L3 and M3, the use of genetic animal resources, especially in rural communities, is closely connected with crop cultivation, the use of pastures, forests and other biological resources, and with land and water management in production areas.

A wide range of animal breeds provides environmental services, particularly in pasture ecosystems, which is one of the significant reasons for their maintenance in situ. Such production dependencies between animal breeds and landscapes should be maintained and better managed by correct land management. Failure to use herbivore animals has a negative impact on biodiversity and environmental services provided by it.

- **Excessive use and harvests**

Fast production intensification is a result of several factors. Inappropriate planning of intensive animal production may have an adverse effect on the natural environment through excessive exploitation of soil and plant cover, which leads to soil depletion and erosion.

- **Contaminations and external substances**

In Poland, a growth of artificial fertilizers expenditure is observed, however, it still remains within the preset standards. There is no problem with excessive use of artificial fertilizers or production intensification. A considerable part utilised agricultural areas is used by small, low-yield farms. According to the Central Statistical Office (GUS), the expenditure of NPK artificial fertilizers observed throughout the agriculture sector in 2011 was 126.4 kg/ha of arable land.

Industrial animal farms create difficulties with proper waste management, especially of liquid manure. Liquid manure is a source of microbiological contamination. The main hazard connected with liquid manure involves its penetration to ground and surface waters, because it causes their contamination and contributes to their eutrophication with nitrogen and phosphorus.

- **Natural disasters**

In Poland natural disasters are of a limited, local and short-term nature. These are: fires, floods, draughts, severe cold and blizzards, heavy rainfall, avalanches that are the cause of damages and material losses. They caused agriculture losses, reduce the arable value of flooded areas, and, at the same time, the destruction and damage to residential, public and economic utility buildings.

- **Policy**

Poland's accession to the EU has had a positive impact on the development of Polish agriculture, because within the RDP, substantial funds were directed, encouraging the modernization of farms and of the agri-food industry. The Agri-environmental programme, realized in Poland (2007-2013), caused an upward trend in the areas covered by Agri-environmental payments. Compared to the beginning of the RDP in the years 2007-2013, in 2012 the protected acreage increased to 2 282 944 ha (by over 103%) from 1 123 667 ha in 2007. This area constituted over 13% of agricultural areas in Poland.

[78] Jarzombkowski F., Goldstein K., Gutowska E., Kazuń A., Kotowska D., Kotowska K., Kowalska M., Krajewski Ł., Piórkowski H., Szczepaniuk A., Żmihorski M. 2013. Monitoring siedlisk pakietów przyrodniczych programu rolnośrodowiskowego 2012-2015 (Habitat Monitoring of Natural Packages of the Agri-environmental Programme 2012-2015). Final report of 2012. The Institute of Technology and Life Sciences in Falenty, mscr., p. 214.

In Poland, after introducing the Agri-environmental programme, financial support has been significantly improved, for farmers who limited adverse effects of agricultural production on the natural environment of rural areas, by restoration of qualities or maintaining the current condition of valuable habitats used for agriculture, and preserved biodiversity in rural areas, promoting a sustainable management system, appropriate use of soils and water protection, as well as protection of endangered local races of farm animals and local varieties of crops.

Self-recruiting capture fisheries: Temperate - A3

- **Changes in the use and management of lands and waters**

The most important change is the introduction of new principles for determining boundaries of fishing districts on open waters, i.e. the basic management units of inland fishery. Since 2004 the boundaries of 2370 circuits are determined first of all, on the basis of hydrological and thus habitat, and not administrative criteria. In most cases, they are adjusted to the boundaries designated according to the requirements of the EU Water Framework Directive, the so-called uniform water bodies (pl. Jednolite części wód – JCW), i.e. the basic management units of surface waters. The basis for obtaining the right to use a given circuit is to prepare a fishing modus operandi stating the scope and character of fish resources exploitation and protective measures. Operations of the fishery user are specified for 10 years and are subject to control by the Marshal's Office, and also partially by the water managing institution, i.e. the Regional Water Management Administration (RZGW). This ensures proper control over water management implemented by the user, but in case of ineffective or incorrect stocking strategy, may hamper corrections of supporting and protective activities. The basic indicators facilitating evaluation of the condition and direction of trends of biodiversity changes of ichthyofauna communities will be the changes in participation and numbers of rheophilic species in flowing waters, as well as predatory and cryophilic species (mostly of the types *Coregonus* and *Osmerus*) in standing waters, and the presence of foreign species in all types of waters (e.g. the share of Prussian carp at the level of 0.75% of food fish). Currently, data showing long-term trends is available only for individual reservoirs [79]. Under works related to the assessment of the ecological condition of waters, according to the requirements of the Water Framework Directive, the present state of biodiversity has been specified for fish communities in particular water types that will in the future be the basis for tracking changes in biodiversity at the level of fish communities[80]. In marine waters, the main instrument influencing biodiversity of marine fish communities are TACs (Total Allowable Catches) determined for the most important fish species (cod), and, in the future, areas excluded from operations, agreed under the Common Fisheries Policy. These actions are aimed at, protecting herds of major production species, but perhaps, in the future, they will also have a positive effect on protected species, e.g. porpoise (*Phocoena phocoena*). In the case of retention reservoirs, attempts have been made of combining fish resource management with water quality management. The basic activities in this case are intensive, industrial catches of carp species, and recent experiments in regulating the reproductive effectiveness of undesirable species through hydromanipulation (managing the damming level of the reservoir).

- **Contaminations and external substances**

Most water contamination is related with industrial centres and urbanised areas, mainly generating point contaminations, and agriculture responsible for area-wide contaminations. The state of surface waters has been improved from the 1990s, in connection with economical transformation, investments into water treatment systems and low-emission technologies. Fishery itself also generates contaminations related, mostly to angling, which is accompanied by applying groundbait. Czerniawski tests[81] indicated that the statistical angler uses

[79] Witkowski, A., Kotusz, J., Przybylski, M. 2009. Stopień zagrożenia słodkowodnej ichtiofauny Polski: Red List of Lampreys and Fish – 2009. [The degree of threat to the freshwater ichthyofauna of Poland: the Red list of fishes and lampreys – the status in 2009], Chrońmy Przyrodę Ojczystą 65 (1), 33-52. [in Polish.]

[80] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015: Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

[81] Czerniawski R., Domagała J., Pilecka-Rapacz M. 2010. Analysis of the Intensity of Angling Pressure and the Amount of Nutrients in Groundbaits Introduced to Waters of the Middle and Lower Drawa River System. Year Nauk. PZW 23: 119-130.

approximately 2.68 kg of groundbait/day, wherein the content of nitrogen and phosphorus compounds was about 12.01 g and 4.08 g of the wet mass respectively. Additionally, anglers often contribute to polluting the water banks with bait and food packaging etc. However, detailed information on the nationwide severity of these impacts is unavailable. Another problem, negatively affecting the self-cleaning ability of waters is the excessive pressure on predatory species[82]. Release of carp fry from under predator pressure, leads to acceleration of the ichtioeutrophication phenomena as a result of unfavourable trophic structure of these reservoirs, which is favourable for reduced bio-retention effectiveness of biogenic substances in segments of the trophic network. This causes excessive development of primary producers, including phytoplankton with the dominance of blue-green algae or thread algae that are difficult to digest for consumers, and do not provide hiding places or reproductive substrate for invertebrates and fish fry[83]. In the Baltic Sea, the main problem is generation of anaerobic areas in the deepest and most saline-heavy areas, which adversely affect reproduction of marine species, e.g. cod[84].

- **Excessive use and harvests**

All kinds of waters are susceptible to contamination, in particular with regard to predatory and migrating species. In the case of commercial fishing, it is easier to adjust excessive pressure by establishing TACs. In the Baltic Sea, introducing TACs enabled a gradual reconstruction of cod population[85]. In some cases, i.e. in eutrophic water bodies, it is advised to implement intensive carp catches as a method of water quality protection. Significantly more difficult is, however, regulating the level of angling operations. In Poland this form of leisure is practised by roughly 1.5 million people. Existing data indicates that angling catches are 5-times higher than commercial fishing catches, amounting to at the minimum 13 000 tons. An important problem is also the selective pressure, e.g. commercial catches of pike are approximately 300 tons, while anglers catch more than 900 tons, and in the case of perch accordingly ca. 150 and over 900 tons annually[86].

- **Climate change**

At present, there is no available data concerning the impact of this phenomenon on the Baltic Sea water organisms in the Polish Marine Area. In inland waters the main problem are short, warm and dry winters, combined with short periods or even lack of ice crust on lakes, and increasingly more frequent and longer low flows in rivers and the lowering level of standing water (after the snowless winter of 2013/2014 in northern Poland the level of waters reduced as compared to regular, by 50-70 cm). These phenomena adversely affect the reproduction of cryophilic species (e.g. whitefish, vendace) and may increase the death rate of river fish as a result of increased angling and predator pressure. Climatic changes can also be a factor enabling the invasion

[82] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015: Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

[83] Wagner I., Izydorczyk K, Kiedrzyńska E., Mankiewicz-Boczek J., Jurczak T., Bednarek A., Wojtal-Frankiewicz A., Frankiewicz P., Ratajski S., Kaczkowski Z., Zalewski M. (2009). Ecohydrological system solutions to enhance ecosystem services: the Pilica River Demonstration Project. Ecohydrology&Hydrobiology, Vol. 9 (1), 13-39. DOI: 10.2478/V10104-009-0042-8 [on-line].

[84] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

[85] Ibidem.

[86] Ibidem.

of foreign species, e.g. expansion of ponto-caspian species of fish from the gobidae family and increase the chances for survival and reproduction of species related to aquaculture (Prussian carp, stone moroko) [87].

- **Natural disasters**

Prolonged low flow periods have an adverse effect, mainly on river fisheries. These phenomena increase the threat to fish population as a result of increased susceptibility to overfishing, poaching, or predators[88].

- **Pests, diseases, foreign invasive species**

Fishing management significantly based on stocking increases the risk of diseases parasites and foreign species transmission. In the case of Salmonidae, special risk is posed by viral diseases such as VHS. Undesirable species in stocking material from carp farms, i.e. foreign or not the object of stocking may even comprise 5% of the total stocking material[89]. Currently, it is one of the main transmission routes of the stone moroko. In the Baltic Sea, the growing population of the grey seal affects an increase in infections of cod population with the Anisakidae family roundworms[90]. The increasing number of piscivorous birds is an increasing danger both because of predator pressure and transmitting diseases and fish parasites (e.g. taeniasis).

- **Markets, trade and the private sector**

Economic transformations have for many years lead to the disappearance of commercial fishing on inland waters, that today is limited mostly to natural lakes in the northern part of the country. The most important user of inland waters is now the Polish Angling Association, which uses 36% of the total area of inland waters, including 66% rivers, 88% dammed reservoirs and 21% lakes. Very high popularity of angling (ca. 1 million people) affects not only the condition of exploited fish communities, but also the destruction and contamination of the coastal zones, however, no detailed data showing the scale of this phenomenon is available. Growth in the society's wealth translates to a growing demand for the most valuable fish species (predatory, migrating), and may adversely affect the ecological condition of water ecosystems.

- **Policy**

Fishery, due to a small share in the total agricultural production, draws only minor attention of political circles. The greatest influence was had by changes resulting from the need to adjust the Polish law to regulation of the European Union, and concerning changes in water management. A growth of post-environmental approaches to water management can also be observed, reflected in an increase in the economic importance of species of a relatively a small economic value, but of great natural importance (e.g. rheophilic carp species), and an increase of areas covered by territorial forms of protection. Of the greatest importance in the last decade is undoubtedly the development of the NATURA 2000 network. These actions substantially limit the possibility of implementation of socially unjustified projects related to water regulation and transverse architecture. Also, the approach of administrative bodies to the classification of individual projects as activities requiring the execution of complex environmental impact assessments, is becoming more severe.

- **Population Growth and Urbanization**

Poland is a country with a negative birth-rate[91]. Nevertheless, progressing economic growth and improvement in the material situation of the society, result in the extension of urban areas. Usually however, this process does not affect biodiversity associated with fishing. These impacts have only a local effect in the areas located

[87] Witkowski, A., Kotusz, J., Przybylski, M. 2009. Stopień zagrożenia słodkowodnej ichtiofauny Polski: Red List of Lampreys and Fish – 2009. [The degree of threat to the freshwater ichthyofauna of Poland: the Red list of fishes and lampreys – the status in 2009.] Chrońmy Przyrodę Ojczystą 65 (1), 33-52 [in Polish.]

[88] Kaczkowski, Z., Zalewski, M. 2010. Traditional carp (Cyprinus carpio L.) culture – linking sustainable development with integrated water management – ecohydrologically sound perspective for small catchments. In: Multifunctionality in pond aquaculture in Poland – Perspectives and Prospects. (eds M. Cieśla & M. Kuczyński), p. 30-37. Wydawnictwo Wieś Jutra, Warszawa.

[89] Ibidem.

[90] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

[91] Concise Statistical Yearbook of Poland 2014. Central Statistical Office, Warsaw.

close to large urban centres, or having high recreational values, where occupying the water banks with residential or recreational architecture is taking place. Locally this may lead to conflicts with fishing use of waters and biodiversity protection through a negative impact on water cleanliness and the degree of preservation of the coastal zone. However, no detailed data illustrating this problem nationwide is available.

- **Changing economic, socio-political, and cultural factors**

The main trend is the departure from commercial fishing on inland waters, towards recreational fishing i.e. angling. Due to the special character of Polish angling, this is not a favourable process for the preservation of water biodiversity. This is due to the fact that contrary to most European countries, the majority of angling catches is still treated as consumables. This means that, despite a relatively low, as compared to the rest of Europe, fish consumption, interest in independent acquisition of fish meat is still high[92]. Additionally, leisure and recreational activities are also gradually changing with increasing numbers of people choosing to spend their free time away from the city and search for deserted locales (prior to socio-economic changes, fuel rationing effectively limited angling exploitation of areas distant from urban centres). This means that, there is less and less reservoirs free of exploitation pressure and that may act as refuge for areas located in proximity of urban centres[93].

- **Scientific and technological progress and innovations**

Research development concerning the biology and ecology of the most economically and naturally valuable fish and crayfish species, enabled the development of their reproduction and breeding biotechnology. In combination with research development concerning the impact of ecological processes on water quality, it is possible to create water management and utilization of living water resources programmes, in accordance with the principle of sustainable use of natural resources. The developed knowledge and the presence of numerous academic centres educating in the fields connected with fishing and water ecology, allows to train professional personnel for fishing and water management institutions, conscious of the importance of biodiversity The index of these changes may be the requirement of employment of people with relevant university degrees, by institutions applying for fishing rights.

Culture-based fisheries: Temperate - A7

In the case of this production system, most factors remain the same as with the A3 or A11 systems, and thus only aspects specific for fishing bred organisms are described.

- **Changes in land and water use and management**

Legal regulations have been introduced, specifying which aquaculture species may be the object of fish farming in open waters. It applied mainly to foreign species: carp and herbivore fish – grass, bighead, and silver carp in standing waters, and rainbow and brook trout in flowing waters[94].

- **Contaminations and external substances**

[92] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

[93] Kaczkowski, Z., Zalewski, M. 2010. Traditional carp (*Cyprinus carpio* L.) culture – linking sustainable development with integrated water management – ecohydrologically sound perspective for small catchments. In: Multifunctionality in pond aquaculture in Poland – Perspectives and Prospects. (eds M. Cieśla & M Kuczyński M.), p. 30-37. Wydawnictwo Wieś Jutra, Warszawa.

[94] Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi w sprawie wykazu gatunków ryb uznanych za nierodzime i wykazu gatunków ryb uznanych za rodzime oraz warunków wprowadzania gatunków ryb uznanych za nierodzime, dla których nie jest wymagane zezwolenie na wprowadzanie (Minister of Agriculture and Rural Development Ordinance on the List of Fish Species Considered Non-native, and the List of Fish Species Considered Native, and Requirements for Introducing Fish Species Considered Non-native, for which Introduction Permits are not Required) – Journal of Laws of 3 December 2012 r., item 1355.

For the purpose of restricting eutrophication, limits on acceptable carp stocking doses have been introduced depending on the size of the water reservoir[95].

Fed aquaculture: Temperate **A11 systems**

- **Changes in the use and management of lands and waters**

As a result of accession into the European Union, it was necessary to adjust legislation to the provisions of the Water Framework Directive. The most important change for aquaculture was the introduction of water fees (the so-called cost reimbursement for water services), in Poland called the sewage discharge fee. Fee calculations were dependent on the type of conducted farming and the degree of deterioration of the physical and chemical water parameters between the point of collection, and the post-production water discharge point.

- **Contaminations and external substances**

For salmon farms, or farms of similar character, legally accepted limits have been introduced of the growth in contamination with biogenic substances (Biochemical oxygen demand - BZT_5, Chemical oxygen demand – $ChZT_5$, suspension nitrogen and phosphorus compounds) in post-production waters. Such regulations exclude traditional, semi-extensive fish farming in carp earth ponds, provided that production is kept at the level not exceeding 1500 kg from 1 ha of pond utility area. The use of chemicals in aquaculture has been restricted to medicinal products authorized for veterinary purposes, and used in accordance with their characteristics. No detailed data about the content of biopharmaceutical products in post-production waters and their impact on biodiversity of waters receiving such discharges is available.

- **Climate change**

The increase of thermal water conditions may endanger functioning of salmon farms utilizing river water intakes, if its temperature achieves values lethal for cryophilic species. Carp farms, on the one hand will achieve accelerated growth rate of thermophilic fish (e.g. carp, tench, white amur), but at the same time may increase the danger from some pathogenic factors, including environmental (oxygen deficiency) or biological (e.g. KHV). Warm and dry winters, thermal water fluctuations in ponds will adversely affect fish condition, and foster the development of bacterial fungal, and parasitic diseases. This will result in an increased death rate and will be an additional factor supporting the increase of predator pressure (e.g. black cormorant) on stocking material during and after winter [96].

- **Natural disasters**

Prolonged periods of low flows have an adverse effect on aquaculture dependant on surface waters. Flow amplitude increase, including disastrous high waters, may increase aquaculture danger from floods[97].

- **Pests, diseases, foreign invasive species**

Fish farms are a potential source of diseases, parasites and foreign species, in particular when they are involved in international stocking transfer. This was a means to transfer into the country is created of such diseases as KHV, IHN, and such external fish species such as the stone moroko[98]. Centres involved in breeding material

[95] Ibidem.

[96] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

[97] Kaczkowski, Z., Zalewski, M. 2010. Traditional carp (Cyprinus carpio L.) culture – linking sustainable development with integrated water management – ecohydrologically sound perspective for small catchments. In: Multifunctionality in pond aquaculture in Poland – Perspectives and Prospects. eds M. Cieśla & M Kuczyński M., p. 30-37. Wydawnictwo Wieś Jutra, Warszawa.

[98] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity

for the purposes of fry-stocking of open waters are the spread centres of those biological threats. The increasing number of piscivore organisms, mainly birds, constitutes a growing risk both of predator pressure and spreading of diseases and parasites. In the case of fish breeding supplied by waters constituting independent fishing circuits, a risk of infection of these fisheries arises, with diseases such as VHS or KHV, if said circuits are stocked with material originating from other fisheries or water catchment areas.

- **Markets, trade and the private sector**

The growing level of production costs leads to specialization and intensification of fish production, including development of recirculated systems, often producing exotic species (African catfish, barramundi, tilapia). Recirculated systems, particularly in the case of indoor facilities, act as industrial plants and do not have any positive impact on associated biodiversity. In the case of traditional aquaculture, particularly unfavourable for biodiversity will be the continued unfavourable economic situation in the semi-extensive aquaculture sector. An indicator depicting this phenomenon is research indicating a decrease in the number of wetland bird species populating fish ponds from the moment of cessation of their use[99].

- **Policy**

At present, there is a lack of unambiguous and stable policy direction with regard to fishing in connection with biodiversity (no stable policy with regard to environmental fees and industry classification in terms of its nuisance for the environment). The basic problems include costs related to the use or consumption of water for the needs of fishing or aquaculture, as well as lack of „evaluation" of the value of ecosystem services generated by fishery[100]. Nevertheless, in recent years, using EU funds, programmes promoting consumption of domestic aquaculture products have been implemented (carp and trout), but at present, no assessment of the effectiveness of actions undertaken is available.

- **Population growth and urbanization**

Aquaculture in most cases occupies areas traditionally used for fish farms, or areas away from urban centres. In the first case, it constitutes a significant aspect of the cultural landscape of these regions (e.g. Cieszyn Śląki, the area around Milicz in the Barycz River Valley).

- **Changing economic, socio-political, and cultural factors**

Poland is still a country with at a relatively low level of fish consumption, as compared to the rest of Europe. Fish are commonly considered luxury goods, and consumption is, to a large extent, culturally determined. It applies mostly to the most important aquaculture product, i.e. the carp, most of which is sold and consumed during Christmas. Outside the holidays, a traditional day of fish consumption is Friday which is connected with the Catholic tradition. However, a gradual departure from these habits is observed, which is illustrated by the falling level of domestic carp sales during Christmas (a 28 % drop in the last 12 years), and also the increasing frequency of replacing the carp with species of higher taste values (e.g. marine fish or salmonidae), or cheaper carp varieties from neighbouring countries. The reasons for this process are complex, but they can be associated with, i.a., activities of animal rights advocates, designed to discourage traditional live carp purchases, unfair campaigns promoting other fish products as healthier than carp, or the decreasing price difference between native aquaculture products and other fish species[101]. A progressing phenomenon is the

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Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.).

[99] Kaczkowski, Z., Zalewski, M. 2010. Traditional carp (*Cyprinus carpio* L.) culture – linking sustainable development with integrated water management – ecohydrologically sound perspective for small catchments. In: Multifunctionality in pond aquaculture in Poland – Perspectives and Prospects. (eds M. Cieśla & M. Kuczyński M.), p. 30-37. Wydawnictwo Wieś Jutra, Warszawa; Kuczyński, M. 2010. Pond aquaculture as the tool for sustainable development. In: Multifunctionality in pond aquaculture in Poland – Perspectives and Prospects. eds M. Cieśla & M Kuczyński M., p. 17-23. Wydawnictwo Wieś Jutra, Warszawa; Wilk, T. (2010), The importance of fish ponds in protection of waterbirds in Poland. In: Multifunctionality in pond aquaculture in Poland – Perspectives and Prospects. (eds M. Cieśla & M Kuczyński M.), p. 38-44. Wydawnictwo Wieś Jutra, Warszawa.

[100]http://www.pankarprybacy.pl/protes_2014_2.pdf,http://www.sprl.pl/aktualnosci/313:spotkanie-w-ministerstwie-srodowiska).

[101] Lirski, A., Myszkowski, L. 2011. Polska akwakultura w 2010 roku na podstawie analizy kwestionariuszy RRW-22. [Polish aquaculture in 2010 according to the analysis of the questionnaires RRW-22.] Komunikaty Rybackie 5 (124), 5-40. [in Polish].

growth in demand for processed products (e.g. filets), which, due to lack of promotion and availability of processed carp products, are not widely sought- after. Salmonidae aquaculture is in a significantly better situation, with part of its production being successful on foreign markets (in 2011 ca. 36% of total production), and the sales values refer both to fresh and processed products.

- **Scientific and technological progress and innovations**

Research development and implementation of water treatment, fodder production and biotechnologies of fish reproduction and breeding creates immense possibilities for the development of aquaculture without any harm for water biodiversity preservation. In the last decade, the most important were investments in recirculation systems, allowing the separation of fish reproduction and stocking material production of the most valuable fish species, from the effects of natural reproduction. Equally important was biotechnology development, ensuring establishment of gene banks of the most valuable species and varieties (e.g. by means of seminal fluid cryoconservation)[102].

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).

Food, from wild sources in Poland, as in the majority of developed countries, is not currently of significant importance in the population alimentation. In the past, in the areas of modern-day Poland, particularly in times of famine, at least 159 taxons of plants were consumed. Currently this number is significantly lower. The most popular is the collection of forest underbrush. Most often collected are different types of fungi and bilberries. Fruit are used in smaller quantities: lingonberry, cranberry, wild strawberry, raspberry, blackberry, elderberry, hawthorn, mountain ash, hazel and others. Practically, the only limitation in the acquisition of underbrush is a ban on harvesting endangered species from very young forests (up to 4 m in height).

In contrast to plant products, participation of fish from natural reservoirs, obtained both through commercial and recreational fishing is quite significant. The most important is of course the produce form the Baltic Sea, which in 2013 amounted to 134 000 t. However, not without significance are inland waters from where, in the same year, about 15 700 t were caught, of which ca. 13 000 were caught by anglers. Generally, it is estimated that ca.1.5 million anglers on their own in one year acquires 2-3 kg of fish meat each. For comparison, fish produced in farms amounted to approximately 45 000 t[103].

[102] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015.

[103] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015

Table 6. Factors affecting availability, knowledge about the topic and diversity of wild food.

Drivers [104]	Effect of drivers (2, 1, 0,-1, -2, NK, NA)		
	Availability of wild foods	**Knowledge of wild foods**	**Diversity of wild food**
Changes in land and water use and management	0	NA	0
Pollution and external inputs	-1	NA	-1
Over-exploitation and overharvesting	-1	NA	-1
Climate changes	NK	NA	NK
Natural disasters	0	NA	0
Pests, diseases, alien invasive species	-1	NA	-1
Changing markets	1	NA	1
Policies	0	NA	1
Population growth and urbanization	NA	NA	NA
Changing economic, socio-political, and cultural factors	0	1	0
Advancements and innovations in science and technology	0	NA	0
Other *[please specify]*	NK	NK	NK

Consumption of wild species has no greater importance for food security in Poland. It has only a traditional-cultural character – it is embedded in the customs of Polish society, especially in rural areas, or amongst people coming from them. Knowledge concerning food obtained from wild sources was and still is widely available in the form of popular and popular-scientific books, scientific articles, information brochures, and numerous websites. No significant changes in the availability and knowledge of food obtained from wild sources over the past 10 years has been observed. It is worth noting that (as written by Łukasz Łuczaj): „Poland is currently a country, which has the best documented traditions of foraging wild edible plants, not only with regards to geographic diversity, but also its gradual disappearance over the past two hundred years".

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.

In the case of fishing and aquaculture, the main source of information on the availability and diversity of fish are the activities of social associations promoting angling and Internet forums for fans of this form of leisure. The most important of these is the Polish Angling Association (Polski Związek Wędkarski), which is a nation-wide organization, with established structures responsible for working with youths, and is involved in the process of education and examination of persons applying for angling licenses[105].

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

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

[104] Factor descriptions can be found in Appendix 3.
[105] National Angling Association, http://www.pzw.org.pl.

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?

In Poland since the post-war period, laws have been introduced on the equal treatment of women and men. These rights, after Poland's accession into the EU in 2004, are guaranteed by Council Directive 76/207/EEC of 9 February 1976 on introducing the principles of equal treatment of women and men with regard to access to employment, education and professional promotion and working conditions, as well as by Council Directive 79/7/EEC of 19 December 1978, on gradual implementation of the principles of equal treatment of women and men with regard to social security.

Women to an equal extent as men, perform most tasks related with maintenance of agricultural farms e.g.: harvests and sowing, any and all field and household works. The research surveys carried out by the Institute of Agricultural and Food Economics indicates that women constitute roughly 1/3 of all persons working in agriculture in Poland, and, at the same time, are owners of a limited part of lands, obtained through marriage or inheritance.

At the same time, rural women increasingly seek employment outside agriculture, establish their own companies or public benefit organizations, as well as participate in the modernization of agricultural farms, being a significant target group for activities aimed at development of non-agricultural entrepreneurship in rural areas. A growth of their educational aspirations is also observed, related to supplementing their formal education by increasing their professional qualifications and deepening their knowledge of foreign languages [106].

Despite the legal gender equality, at the local level, numerous initiatives are undertaken, addressed particularly to women, due to their customary social and familial functions. These activities are implemented through the Rural Housewives' Association and non-governmental organizations e.g. the Rural Development Foundation.

The Rural Housewives' Associations are voluntary and independent socio-professional women organizations, operating mainly in rural areas. Their operations focus on giving aid to rural families, with children upbringing and education, promoting health protection and social security of rural families, and development of women entrepreneurship, rationalizing of rural households and increasing rural inhabitants participation in culture and folklore cultivation[107].

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

Fragmenting agriculture, traditional, 3-generation family model in rural areas.

The most important influence on the preservation and use of traditional knowledge concerning biodiversity for alimentation and agriculture was the adopting, within the Act on shaping agricultural structure (2003), of the family farm as the basic category of an agricultural farm, and adopting the Strategy of Sustainable Development of rural areas, agriculture, and fishing (2012). Also, under the RDP, actions concerning preservation and use of traditional knowledge are supported.

The preservation and use of traditional knowledge is also supported by: organizing exhibitions of domestic breeds, actions undertaken by NGOs for cultivating tradition, habits and regional products (sheep drives to and from mountain pastures - redyk, e.g. the Carpathian redyk, pasturing sheep in the Tatra Park, exhibitions of oscypek cheese production, popularizing eggs from green-legged partridge hens – widely available, Podlasie-native products i.e. potato sausage, potato pie, revival of pulard production (young, undeveloped hens, fattened in a particular way) and capons, as well as more and more numerous culinary programs and forums, promoting cuisine from local produce.

[106] Radzewicz J., 2014.Współczesna kobieta wiejska (The Contemporary Rural Woman). Rolniczy Magazyn Elektroniczny, http://rme.cbr.net.pl.

[107] Śledź D. 2013. Determinanty rozwoju społeczeństwa obywatelskiego – relacja z konferencji (Determinants for the Development of a Civil Society – a conference report). National Rural Network. Instytut Badań i Analiz Grupa Olsztyńska Szkoła Biznesu (The Research and Analises Institute, the Olsztyn School of Business Group), http://ksow.pl/news/entry/5140-determinanty-rozwoju-spoleczenstwa-obywatelski.html.

There have been numerous exhibitions dedicated to preserving old varieties of friut trees, organized by the Polish Academy of Sciences Botanical Garden – Centre for Conservation of Biodiversity in Powsin, Arboretum and the Institute of Physiography in Belestraszyce, eg. "International Dogwood Festival" or a seried of even dedicated to traditional cuisine based on local products and traditions, organized by Society of the Friends of Lower Vistula, such " Weekend with Mennonites", Festival of taste" or "Easter traditions in Kociewie.

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

Table XI. Most important factors affecting biological diversity for alimentation and agriculture.

Factors	Positive	Negative
Changes in the use and management of lands and waters	• Within the structure of Polish agriculture, small agricultural farms prevail, and the agricultural landscape is dominated by limited-surface fields separated with buffer strips. Also, numerous intra-field buffer strips and unregulated water courses are preserved. • Agriculture productivity in our country is lower than in high-developed countries, as a result of a greater participation of extensive agricultural economy, significantly dependant on natural ecosystem functions. The presence of environmental enclaves (roadsides, inter and intra-field buffer strips), is also of crucial importance for species variety of bees, responsible for pollination – an ecosystem service of crucial importance for food production. • Biodiversity protection in rural areas is also associated with the development of integrated production and ecological agriculture. In the recent years a constant growth in the number of certificates issued can be observed. Development of integrated production in Poland is an important factor, influencing environmental protection and production of safe food products, as well as increasing agricultural and ecological awareness of farmers. Integrated production enables easier sales on the Polish and EU markets of certified, high-quality crops. • Worth highlighting is also the fact of the systematic increase of the total area and numbers of ecological farms. Compared to other countries of the European Union, the meaning of ecological agriculture in Poland is still relatively low, however it exhibits a significant development potential. Between 2009-2012 the share of ecological agriculture in the overall area of utilised agricultural areas increased from about 1.40% to 3.52%.	• The increasing quantity of activities related to river regulation and architecture, barrages and embankments, as well as actions involving meliorations draining agricultural lands; • Habitats and landscape fragmentation as a result of investment pressure: construction of a new road network and ineffective spatial planning system; • Occurring regionally, agricultural production intensification, and the increasing pollution level resulting from the increasing consumption of fertilizers and plant pesticides; • Ttransformation of semi-natural ecosystems (meadows, pastures, grasslands), caused by abandoning the use of these habitats; • The actions of forest management leading to felling of old trees, and removing dead and dying trees; • Agriculture intensification; • The progressing loss of profitability of carp breeding, along with the growing problem of water deficits, affecting restriction of the total area of fish ponds, and the departure from semi-extensive model of pond management; • Paying too much attention to stocking programmes, as the basic protective measure, with too little activity with regard to undertakings aimed at improving the habitat qualities of the water environment, e.g. through restoration of ecological continuity of rivers (i.e. removal of transverse barriers which lost their primary socio-economic functions, or unblocking impoundments, which for reasons of their function, cannot be dismantled), • The growing selective pressure on the most valuable fish species (mostly predatory), performing a significant

Factors	Positive	Negative
	The change in the principles of establishing fishing districts on inland waters, i.e. the departure from the criteria of administrative affiliation of reservoirs towards setting fishing districts based on designated, uniform areas of surface waters. This means that the fishery management is implemented based on units distinguished based on the hydrological criteria that are better suited to the real ecological systems. • According to the Common Fisheries Policy, restricting fishery management within the key area from a fish biology standpoint, of the areas in the Baltic Sea basin (e.g. spawning grounds).	ecological function.
Contamination and external substances	The improving care for the quality of the environment and effective actions should be noted, connected with reducing the emissions of pollutants discharged into waters and soil. What needs determining, is what emission levels of pollutants can be considered harmless for ecosystem functions and biodiversity. Currently unquestionable is the fact that preventing pollutant emissions is more financially reasonable than investing in subsequent removal of their effects. This results in a common consensus concerning undertaking activities with regards to air and water protection, or minimizing generating waste, and energy saving. The growing care for the impact of fishing on the quality of waters, including the development of modern treatment systems of post-production waters, undertaking actions aimed at evaluating the influence of fishing (groundbaiting), on water quality, and educational activities concerning actions, which should be taken in the case of water pollution, as well as concern with maintaining cleanliness of water banks.	• The growing availability of transport increases human pressure on inland waters, leading to littering water banks and destroying the coastal zone.
Excessive use of resources in agriculture	• A crucial strength of Polish agriculture, as compared to other EU countries, is the relatively large amount of utilised agricultural area. Poland belongs to a group of five European Union countries with the largest total area of utilised agricultural area, including farmlands, as well as area per capita. This means that, i.a agricultural production may be extensive – with lower costs incurred in agricultural farms, as well as lower costs for the environment, as compared with intensive agricultural production. • Foresting of marginal farmlands contributes to the increase of existing	• Weak soil conditions, and problems with water balance negatively affect agricultural productivity. • Polish agriculture struggles with the problem of scarce water resources and the associated steppe-formation, and also with the limitations, resulting from the lack of access to sufficient water-sewage network – water in the rural environment functions not only as intensifying agricultural production, but is also paramount to living standards of the population. Defective soil water-air relations often determine the need to discontinue running business activities in

Factors	Positive	Negative
	forest complexes, as well as soil water retention, restricting erosion processes, and improving the microclimate. It is important to also introduce small-scale afforestation, in accordance with municipality urban planning documents, especially in mountainous areas. • Regarding actions for the benefit of safe environmental limits and their assessment in terms of balanced production and consumption, it should be noted that many of this type of mechanisms are already used in Poland, e.g. plans concerning wood production, use of hunting species, fishing limits and dimensions in angling and catch quotas in marine fishing. However, they require permanent studies, improvement, and adaptation to current knowledge. • The implementation of breeding programmes supporting populations of exploited game and fish. • In Poland multiple mechanisms are introduced into most sectors, for sustainable management, cases of overexploitation with regard to natural resources have been eliminated. It may be surmised that with regards to maintaining use of natural resources within safe environmental limits, a leading role shall be played by EU and national regulations concerning protection of habitats and species. • In the case of efficient implementation of sustainable use of natural resources changes in the use and management of lands and waters might lead to more effective implementatation of nature friendly agricultural practices, procedures and measures	a given area; • Erosion is a natural cause of soil degradation, and one of more frequent forms of soil degradation in Europe. In Poland, due to strong land or soil cover formation, susceptible to washing, approximately 28% of farmlands and forests are endangered with water erosion. Apart from water erosion, approximately 11% of the territory of Poland is endangered by wind erosion, of average and strong intensity ; • Regional intensification of agricultural production; • transformations associated with a change in the hydrological regime of water-mud areas (regulations and maintenance of rivers, desiccation of mires , including those implemented to improve the effectiveness of agricultural economy) are the most frequent hazards for bird species; • Excessive harvests of fungal fruiting bodies; • A growing tendency of selective pressure on the most valuable fish species.
Climate changes		• Climate changes affect the range of species presence, reproductive cycles, vegetation periods, and interactions with the environment. However, different species and habitats react differently to climate change – on some, it will have a favourable effect, on others not. Most of predicted changes are based on average climatic parameter fluctuations: precipitation, temperature, wind directions, but equally often they are the result of extreme situations, such as floods strong winds and rainstorms. Biological diversity affected by these changes undergoes gradual transformations; • In the aspect of plant production needs, the most important are changes of

Factors	Positive	Negative
		characteristics of two basic climate elements i.e. temperature and rainfall. As a result of increasing temperature, the vegetation period is prolonged. Between 1971-2000 the vegetation period in Poland, lasted for 214 days (average for the whole country), while in the decades following 2020, it is presumed to last even 230 days. The difference between these periods thus would be 16 days. As a result, a shift will take place of agrotechnical treatments, as well as a change in crop productivity. As a result of the aforementioned changes conditions for of thermophilic plants such as corn, sunflower, soy bean, grapevine or wheat will improve, thanks to which the quality of yields will improve. The extended vegetation period will however, increase the threat to crops of late spring ground frosts. Territory-wise, the most significant changes of the vegetation period will take place in the northern and north western part of Poland. At the same time, along with increasing temperatures, the danger from farming plant pests will also increase, because, just like plants, they will react with accelerated development, and thus will constitute a larger threat to cultivations. • Habitats most endangered by climatic changes include mires of every type and natural rivers, and changes in area management resulting from adaptation to climatic changes. Interrupting the continuity of ecological corridors leads to the loss of habitats and their division into small, isolated patches, limits or even interrupts ecological communication, weakens the possibility of species adaptation to climatic changes, which affects their presence ranges and phenology, which in turn weakens species survivability with their limited ability to migrate to new areas. • Reproduction hazard for fish species with specific thermal cryophilic) and habitat requirements as a result of shortening the period of ice-cover presence in the winter, the growing water thermal activity, and increasing the frequency and duration of low flows, and the growing danger from foreign thermophilic species. • Climat changes affect carbon loss from upper soil layers.
Pests, diseases,		• Spreading of alien species;

Factors	Positive	Negative
foreign invasive species		• Foreign species predation; • Uncontrolled feeding of wild ungulates, leading to changes in their behaviour, and limiting their natural mortality factors, contributing to the growth of their populations and their environmental pressure.
Markets, trade and the private sector	• EU being one of the most important markets for wild animals and plants, parts thereof, and products coming from them, has implemented the CITES Convention [108] by means of regulations that are applied directly in member states, including Poland, i.a.: - Council Regulation (EC) 338/97 on the protection of species of wild fauna and flora by way of regulating trading; along with the list of species covered by trade regulation and a number of implementing and elaborating regulations of the Commission. - The abovementioned regulations establish stricter criteria on transport and commercial activities connected with these species, than those specified in the CITES Convention.	• The decreasing profitability of traditional carp farming will have a negative impact on water-mud species and habitats occurring within the semi-extensively utilized earth ponds.
Policy	• A significant increase in funding transferred to the protection of biological diversity. In the period of 2007-2012, nearly 2.2 billion PLN (0.75 billion USD) was allocated by the EU and national programmes for the implementation of projects promoting biodiversity[109] The most important group, from a quantitative and value perspective, constituted projects related to the protection of endangered species and habitats, concerning restoring the proper condition of natural habitats (ecosystems) and species refuges within protected areas, along with maintaining endangered species and the genetic diversity of plants, animals and fungi.	• Increasing fiscal burdens and the environmental requirements in the fishing sector, will have a negative impact on small retention and water-mud species habitats generated by traditional aquaculture, and thus implementation of the framework farming programs for fish species with relatively miniscule economic values, but valuable from the biodiversity perspective.
Growth in population numbers and		• Habitat and landscape fragmentation as a result of strong investment pressure; • Tourist pressure and scaring the animals,

[108] Konwencja o międzynarodowym handlu dzikimi zwierzętami i roślinami gatunków zagrożonych wyginięciem (eng. Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES), the Washington Convention – Multilateral treaty to control the cross-border trade of various flora and fauna species, and products derived from them.

[109] Actions promoting biodiversity were funded with the following programs and funds: Rural Development Programme, The Infrastructure and Environment Operational Programme, Program Operacyjny RYBY (Fisheries OP), LIFE+ Programme , Human Capital Operational Programme, European territorial cooperation programme, Regional Operational Programmes, Funds of the National Fund for Environmental Protection and Water Management, Funds of 16 provintional funds for environmental protection and water management data: *Piąty krajowy raport z wdrażania konwencji o różnorodności biologicznej (Fifth National Report on Introducing the Convention on Biodeversity) – March 2014 Ministry of the Environment.*

Factors	Positive	Negative
urbanization		and the growth of areas of dispersed settlements; • Competition for water and land resources in proximity of urban centres, and in areas of high leisure values.
Changing economic, socio-political and cultural factors	• Poland is a unique example of a country in Central Europe, wherein, as a result of a fragmented agricultural economy, local varieties of farming plants are still present. Regions of local farm plants occurrence are mostly found in the southern part of Poland, and include the areas around the Beskidy and Tatry mountains and the foothills. Smaller refuges occur in the eastern and south-eastern part of Poland, in the Podlasie region and the Sandomierz Valley. Geographical-ecological and sociological factors favour local varieties of farming plants in these regions. On the other hand, it should be emphasized that local varieties of farming plants are still effectively competing with new varieties within these regions. The enumerated regions are also characterized by relic cultivations of e.g.: Camelina, Radish, Panicum. Cases of active cultivation operations by farmers have been documented, e.g. vicia for fodder production, selected from weed population of this species.	• Poor economic condition of farms and a relatively low level of education and professional preparation of farmers; • Changes in the culturally conditioned consumption of carp, and, in consequence, a reduction in the usable pond area, and by extension, of valuable habitats in those areas.

Remedies against and emerging change factors, best practices and conclusions drawn

Integration with the EU contributed to the growth of the scale of manufacturing, and accelerated the processes of production concentration. The development of the domestic food market and the agri-food export has affected the growth in agricultural production. The long-term stagnation in agricultural production has finally been overcome, with its value in fixed prices increased by approx. 10-15%, with an increased final and commercial production, rather than global. It is also important that the increase in production value was larger than the growth in indirect consumption value, which means that the post-accession period saw an improved in effectiveness of use of the outlays incurred.

An unfavourable agrarian structure has an adverse impact on agricultural production results, which causes restrictions in introducing new technologies, improvement of commercial production ratio, and profitability. Poland is in need of continued change in agrarian and production structures. More than 90% of agricultural farms does not reach parity income and has limited development possibilities.

In Poland, maintaining own production resources was and still is a priority, so as to preserve the stability of agriculture and enable its greater participation in securing alimentation demand. At the same time, attention should be paid to ensuring high quality of food, and especially its health safety. With regard to food, security, it is inherently connected with legal regulations, standards, specification, and defined quality levels. Factors affecting the improvement in food security and durability are: high quality of the necessary nutrients, natural-state (organic, unprocessed products), freshness, lack of contamination.

The food market is heterogeneous, variable over time, often seasonal, and extremely demanding in terms of quality. Pursuit of high living standards and health of the general population is now one of the basic goals of the food law. In order to guarantee food health safety, many systems of guaranteed quality have emerged in Poland, that facilitate monitoring and hazard management.

The policy of the Republic of Poland fostered the promoting and support of balanced changes consisting of strengthening the economic, social, and territorial consistency, in particular by reducing disproportion between development levels of various regions. Towards that end, the possibility of financing projects related to biodiversity was employed.

According to data of the latter part of 2013, Poland came in 27th place from among 107 countries in the Global Food Security Index. Obtaining a score of 69.9 from a possible 100. It was classified low in terms of agriculture R&D expenditures, where it received only 12.5 points from a possible 100. On the other hand, in terms of food quality and safety, Poland noted a 6.9 point increase, reaching a result of 75.3[110].

An important element of activities supposed to guarantee safety of plant and animal production are actions focused on providing sufficient quantity of protein sources. For many years now, research has been conducted on the possibility of increasing the use of native protein resources to replace or at least supplement imported soybean pellets (e.g. the governmental program for support of leguminous plant production, Long-term Research Programme „Improvement of National Plant Protein Sources, their Production, Trade System, and Use in Fodders"). Results of implementation of the realized programme in material form leads to delivery of higher quality plant resources for processing and direct use. Food and fodder produced from these resources are of a higher quality. In this way the programme contributes to increasing the food and fodder security of the country, increases the revenue of agricultural farms, as well as their competitiveness.

More effective legal regulations are required for protection of high quality soils before committing them for none-agricultural use. Apart from their importance to national food security, high quality soils serve a number of environmental functions. Within newly established urban centres, the protection of soils with high water capacity and buffer capabilities, has a direct, significant impact on the quality of life and the environment. The need for such protection applies, first and foremost, to suburban areas, currently subject to intensive urbanization. A consequence of the lack of balanced spatial planning, taking account of soil quality, is the deterioration of environmental quality, biodiversity depletion, soil water retention, microclimate, and air quality.

The water environment since the 1990s has seen an increase in the number of investments related to the protection of water quality. In the last decade, actions were taken aiming to keep, and ultimately improve the availability of reproduction habitats and raising of juvenile stages of migratory fish by developing the „Provincial Programmes for the Protection and Development of Water Resources". The purpose of such programmes was to take inventory of existing obstructions, for fish migrations, and assess their importance for restoring natural migration routes. Programmes of active protection and restitution of the most important migrating species were introduced, including: salmon, brown trout, vimba, and recently, eel and sturgeon. Under the research programmes carried out by scientific and implementation centres, reproduction biotechnologies have been developed for the most important species of inland commercial fish and some endangered species. Awareness gradually increases the importance of traditional aquaculture for the preservation of valuable natural environments, as well as the cultural landscape, i.a. by supporting social programmes propagating traditional forms of aquaculture (e.g. the „Pan Karp" (Mr Carp) Fish Promotion Association).

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.

Biological diversity of Poland is one of the highest in Europe. Diverse landscape, diverse soil and climatic conditions, the limited range of intensive agriculture, and actions taken under nature protection programmes, result in Poland being characterised by a large diversity of habitats and natural landscapes. Biodiversity in Poland is shaped by a relatively large forest (9.1 million ha) and water-mud (1.8 million ha, including 455 thousand ha of inland waters) areas, as well as by the extensive use of agricultural land. 485 plant associations have been indentified, ca 12% of which are classified as unique[111].

[110] According to Polish Press Agency.

[111] Chief Inspectorate of Environmental Protection, Report on the Environmental Condition in Poland 2008, 2010.

Common Agricultural Policy (CAP)

Biodiversity preservation will be a tremendous challenge for the future Common Agricultural Policy (CAP), affecting the direction of future changes. Agricultural operations in refuge areas of rare plant and animal species has a fundamental effect on the preservation of a country's natural values. As a result, biodiversity preservation is realized within CAP through:

1) The Agri-environment payments, realized under RDP 2007-2013 – contains specifically prepared packages for the protection of soils and waters, valuable natural habitats, and habitats of endangered species of birds connected with agriculture, buffer zones, endangered genetic resources of plants and animals in agriculture, as well as packages supporting balanced and organic agriculture. In the case of natural packages, the process of plot qualification for subsidies involves, apart from an agri-environment advisor, an environmental expert (botanist or ornithologist). Between 2007 and 2013, natural packages were available throughout the whole country. The programme contributed to restore the use of naturally valuable grasslands on large areas, especially within protected areas (mostly in National Parks), as well as to the extensification of use of valuable meadows beyond these areas. Conclusions drawn and best practices indicate: the need for promotion of **Agri-environment payments**, maintaining specialized packages focused on the protection of valuable natural habitats in the financial perspective for 2014-2020, consulting, and the need for improving services performed by the environmental expert.

2) The Agri-environment-climate measure for 2014-2020 – the contains support packages for the protection of soils and waters, endangered bird species in the Natura 2000 areas, and natural habitats in the Natura 2000 areas and beyond, endangered genetic resources of plants and animals in agriculture, sustainable farming, and preservation of traditional orchards and fruit tree varieties. Under the **Agri-environment-climate** measure, the institutions of agri-environment advisor and environmental expert qualifying the plot with regard to valuable habitats or bird species are maintained. Expected results: maintenance of sustainable use of permanent grasslands in the protected areas and of limited scope.

3) Operational Programme: Sustainable development of the fishery sector and of coastal fishing areas 2007-2013 – supporting the development of the fishing industry through implementation of rational forms of living water resource management, improvement of the fishing sector efficiency, improvement in competitiveness of Polish marine fishing, inland fishing, and fish processing, and improvement in the living standard in areas dependant from fishery. The programme grants subsidies to, i.a. activities in the scope of modernization of existing fish farms (e.g. by creating recirculation systems for reproduction and nurturing of stocking material), adjustment of fish farms to the requirements of environmental protection, as well as maintaining employment in the sector and staff training. The programme also provides support for innovative activities, pilot projects, the exchange of experiences, implementation of informational campaigns on fish consumption and the fishing sector.

Essential completed or realized projects

1) Research programmes, natural monitoring Protection of species diversity of valuable natural habitats on agricultural lands on Natura 2000 areas in the Lublin Voivodeship (IUNG, ITP UPH, OTOP [112]), Inventory of key bird species of Polish Carpathians, and creating a system of their monitoring, and protection, protection programmes of alkaline mires and associated endangered species – marsh saxifrage, fen orchid, musk orchid, and the stellaria crassifolia (Klub Przyrodników, Centrum Ochrony Mokradeł (Naturalists' Club, Save Wetlands Association).

2) Support of sustainable handling and management of the environment, **hydrological conditions restoration and degradation prevention.** Civil control of ecosystem management in Poland (Save Wetlands Association), hydrographic network restoration in the Middle Basin of the Biebrza river valley (Biebrza National Park), Active protection of westland birds in the Northern Polder of the Warta Mouth National Park by means of improving water conditions of nesting habitats and feeding and resting grounds during migration and wintering (Polish Birds, Warta Mouth National Park), Monitoring of nature protection in national parks, nature reserves and State Forests (Polish Naturalists' Club), Monitoring of draft preparation of protection tasks for the Natura 2000 areas, and current intervention operations in administrative proceedings and of investment realization, having significant effect on nature protection in the country, including monitoring of environmental objective implementation of the Water Framework Directive (Polish Naturalists' Club), National western capercaillie protection programme (Polish Bird Protection Association – PTOP), Reinforcing achieved results of re-naturalizing the Narew National Park buffer zone (PTOP).

[112] IUNG -Institute of Soil Science and Plant Cultivation, State Research Institute; ITP – Institute of Technology and Life Sciences; UPH – Siedlce University of Natural Sciences and Humanities; OTOP – National Bird Protection Association.

3) Protection of endangered species and natural habitats. The protection of endangered plant species in the mineral islands of the Biebrza National Park (Biebrza National Park), Protection of the spotted eagle (Aquila clanga) population in Poland (Biebrzański National Park, Polish Birds, Eagle Protection Committee), The protection of bog habitats of the Górna Biebrza river valley (Biebrza National Park), Active protection of endangered natural habitats in nature reserves of the Mazowieckie and Podlaskie provinces (Save Wetlands Association), protection projects of the Aquatic Warbler habitats (2005-2011, 2010-2014; OTOP – National Polish Bird Protection Association), Active protection of the European roller in the Kurpiowska Plain (OTOP), Active protection of endangered island avifauna species in the SPA area of the Middle Vistula River Valley (OTOP), Restoring proper condition of protection of wet meadows and pastures in selected Natura 2000 areas in northern Poland (Polish Birds), Permanent preservation of endangered habitats and butterflies in the Natura 2000 network in South-Western Poland (Eko-Unia Association), Revitalization of nature-valuable meadows in the Dolnośląskie province (Eko-Unia association, Dolnośląska Fundacja Ekorozwoju (Dolnośląskie Eco-Development Foundation)), Limiting conflicts between beaver and man (Polish Naturalists' Club), Multi-purpose use of Polish mires, as an opportunity for biodiversity protection (Naturalists' Club, Save Wetlands Association), Protection programmes, of xerothermic grasslands and associated sites of rare species over the Central Oder, Warta, and Noteć rivers, lower Warta and Noteć and in the Lubelskie province (Polish Naturalists' Club), Active protection of snails enumerated in Appendix II of the Habitat Directive: narrow-mouthed whorl snail (Vertigo angustior) and Desmoulin's whorl snail (Vertigo moulinsiana) in north-western Poland (Polish Naturalists' Club), Protection of alkaline mires (code 7230) in the young glacial landscape of northern Poland (Polish Naturalists' Club), Protection of terns in Warmia and Mazury regions (Polish Bird Protection Association), 2 protection programmes, of Baltic bogs in the Pomorze region (Polish Naturalists' Club), protection programme of the great snipe (PTOP), 2 protection programmes of the white stork in the Warmińska Refuge (PTOP), The protection of the black grouse in the Knyszyńska Forest (PTOP), The protection of the lesser spotted eagle in the Podlasie region (PTOP), The protection of the European pond turtle (Emys orbicularis) in the Warmińsko-Mazurskie province, Protection of endangered mires in Gródecko-Michałowska Basin in the NATURA 2000 area of the Knyszyńska Forest (PTOP), Complex protection of bogs the Warmińsko-Mazurskie province (PTOP).

Achieved and Expected Results: maintaining the populations of endangered species and natural habitats, or impeding the drop in their numbers and degradation; supplementing knowledge and improving management of associated biological diversity. Conclusions drawn and best practices: the need for consistent financial support of nature protection: support of extensive agriculture, and balanced water management; the need to implement marketing solutions leading to natural maintenance of the proper condition of protection of related biodiversity (permanent restoration, in particular of the river valley and marsh ecosystems); the need for educating and raising qualifications of administration employees with regards to sustainable environmental management, and dissemination and implementation of nature protection programmes based on scientific research and field inventories conducted under targeted projects.

Apart from the abovementioned examples of research works, attention should be drawn to the special case study regarding the role of bees and microorganisms in maintaining biodiversity.

The most thoroughly researched situation within associated biodiversity in Poland is that of pollinators. At the same time it is of paramount importance, as it directly affects the functioning of the whole ecosystem, plant yields, and by extension, production results and population alimentation. Pollinators are considered strategic species for both cultivated and wild plant species. Their role is invaluable because they pollinate more than 90% of plants, enabling their reproduction.

One way of counteracting the vanishing populations of bees is the popularization of ecological agriculture, which, ensures high biodiversity. It does not use pesticides or artificial fertilizers, which, in turn, results in higher effectiveness of pollination and higher yields. In addition, quite popular in Poland are programmes propagated by Greenpeace, who organize many campaigns, i.a. „Adoptuj Pszczołę“ (Adopt-A-Bee). This campaign encourages people to make use of the consumer handbook „Project Bee“ – promotes building hotels for wild pollinators. Greenpeace has already built a 100 such shelters, and distributes a guide to bee hotel building[113].

Natural technologies are a successful and economically profitable alternative for plant production, nursery, orchard cultivations and blueberry plantations, without the possibility of crop rotation and on degraded soils. A new tool for microorganism identification would be necessary and helpful in the development of sustainable microbiological agricultural production technologies, as well as consulting and decision-making support system in this respect, as necessary for the various soil and climatic conditions and types of cultivation. Use of microorganism identification would enable the development of modern, environmentally and health friendly,

[113] http://www.greenpeace.org/poland/pl/co-robimy/Chronimy-pszczoly/

sustainable plant production techniques, easily accessible for food producers and other companies of the agri-food sector in Poland. Microbiological technologies will contribute to restricting the use of chemical production agents, i.e. mineral fertilizers, herbicides, pesticides, which shall be replaced with bio-herbicides, bio-pesticides and microbiologically enriched bio-fertilizers. Long-term research carried out in rizosphere soil of various orchard plant species, proved that mineral fertilization reduces the population of soil microorganisms. In this context, microbiological fertilizing and plant cultivation technologies will contribute to improving soil fertility in different agrotechnical systems, the quality of produced crops, and the protection of soils, waters and human health. The newly developed, energy-saving, low-expense, and environmentally-friendly technologies with the use of bio-fertilizer, compost, and useful microorganisms, will improve the bio-physio-chemical properties, and, as a consequence, increase the fertility of utilised agricultural area in Poland. The increase of organic matter content, especially humus, will increase the water retention capacity of the soil, the activity of useful soil micro-flora and fauna, and the availability of mineral components for plants.

The development of microorganism identification systems will allow the modelling of growth dynamics of roots, and sizes and activity of soil and rizospheric microorganisms. It will contribute to developing new knowledge, innovative methods and analytical skills that will be used for microbiological enrichment of bioproducts, developing domestic microbiological consortiums, and applications of useful soil micro-flora in applied sciences and agriculture.

Protective Tasks Plans in the NATURA 2000 areas - currently, PTPs for NATURA 2000 areas are created throughout Poland. So far, Protective Tasks Plans have been drawn up for ca. 50% (500) NATURA 2000 areas, of which ca. 320 are under implementation (approved)(as of October 2014). Implementation of binding PTPs may contribute to the reduction of potential impacts associated with human activities in the NATURA 2000 network. The most frequently, implemented PTP provisions concern increasing knowledge about the objects under protection in particular areas, increasing knowledge and strategy formulation on water management, the entering into force of regulations on the methods of use of nature- valuable permanent grasslands in the areas used for agriculture.

Actions promoting biodiversity were funded with the following programmes and funds:

- Infrastructure and Environment Operational Programme,
- funds of the National Fund for Environmental Protection and Water Management,
- funds of 16 provincial funds for environmental protection and water management,
- LIFE+ Programme,
- Rural Development Programme,
- Operational Programme FISH,
- Human Capital Operational Programme,
- European Territorial Co-operation Programme,
- Regional Operational Programmes.

Nearly 2.2 billion PLN (0.75 billion USD) from national and EU funds was allocated to the preservation of biodiversity between 2007-2012.

The Sustainable Rural, Agricultural and Fishing Development Strategy for 2012-2020, includes specific priorities and actions concerning the reduction of negative factors and changes raised in this chapter. One of the main goals of this strategy, is the environmental protection and adaptation to climate changes of rural areas, to a significant extent concerning environmental protection in the agricultural sector and biodiversity protection of rural areas.

Bearing in mind the reduction of negative change factors on biological diversity, Poland prepares the national action plan, which will in particular concern areas such as:

1) protection of State natural values, constituting refuges for rare plant and animal species, and the maintenance of natural habitats.
2) actions with regards to biodiversity protection, including unique ecosystems, and the flora and fauna associated with agriculture and fishery.
3) identification of the change impact on organisms – the environment via natural monitoring.

4) actions minimizing the risk of introducing into the environment of foreign species, posing a threat to biodiversity.

5) improving and popularization of good farming culture principles, and supporting and popularization of activities focused on the development of ecological farming, and a reduction in the expenditure of fertilizers and plant protection agents.

6) educating producers and processors in the agri-food sector on food hazards caused by contamination of waters and soils.

7) introduction of the Water Framework Directive programme with regard to rational use of water resources for agricultural purposes, water retention significant in the context of draughts and floods as consequences of climate change.

8) development of knowledge on agricultural environment and biodiversity protection, and its dissemination is realized by improving the consulting system.

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 Chapter 1, Table 1 as present in your country. When referring to them in your answers, please provide the production system code and/or full name as found in Table 1.

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.

Farmlands are highly exposed to various kinds of changes related to intensive agricultural production, the use of various cultivation techniques in the production of new species and plant varieties. Agricultural areas are also largely transformed by infrastructure, and the construction of roads, cities and housing estates. This type of unfavourable activities cause a deterioration of the physical-chemical properties of soils and microbiological biodiversity, and, in consequence, cause interference of plant-soil-microorganisms interactions.

Intensive plant production involves high doses of mineral fertilizing NPK pesticides and other chemical means of production. This results in great loss of biodiversity, and a deterioration in soil fertility and plant cover species. An alternative for this type of production is to use natural technologies, based on applying organic fertilizers and mulch, and microbiologically enriched bioproducts. This type of natural technologies is an effective and economically profitable alternative in plant production, in nursery production, in orchards, and plantations of blueberry plants without the possibility of crop rotation and on degraded soils. A new tool for identification of microorganisms is vital and helpful in the development of sustainable microbiological agricultural production technologies, as well as consulting and decision support system in this respect, as

necessary for the various soil and climatic conditions and type of cultivation. Use of the microorganism identification system enables the development of modern, environmentally and health friendly, sustainable plant production techniques, easily accessible for food producers and other companies of the agri-food sector in Poland. Microbiological technologies will contribute to restricting the use of chemical production agents, i.e. mineral fertilizers, herbicides, pesticides that will be replaced by applying bio-herbicides, bio-pesticides and microbiologically enriched bio-fertilizers. Long-term research carried out in rizosphere soil of various orchard plant species, proved that mineral fertilization reduces the population of soil microorganisms.

In this context, microbiological fertilizing and plant cultivation technologies will contribute to the improvement in soil fertility in different agrotechnical systems, the quality of produced crops and the protection of soils, waters and human health.

The rule persisting in contemporary agriculture, of sustainable fertilizing, provides optimal supply of cultivated plants in nutrients, and maintaining proper soil fertility. Such fertilization is provided, i.a., through the use of organic-mineral fertilizers and proper farming techniques. For this reason, a need exists for a better use of organic matter included in bio-fertilizers as safe, effective, environmentally-friendly and safe for human health products for plant cultivation.

One of the main factors ensuring optimal conversion of organic matter is the correct biodiversity and activity of useful microorganisms. It results from the fact that microorganisms play a key role in particular conversions within the food chain. The increase in the humus content and potential of beneficial soil microorganisms, provide optimal conversion of organic matter in soils, with focus on elimination of soil pathogens and other harmful microorganisms. Synanthropic (associated) flora of orchard cultivations which includes, i.a. weeds, is constantly present and difficult to eliminate. It is an important element of biological diversity, which it co-creates, by interacting with soil bacteria, mycorrhizal fungi, annelids, arthropods and other organisms. Flora present in agri-phytocenosis, stabilizes soil quality, i.a. by limiting soil erosion and buffering nutrients. Improvement of soil quality may not only result in better availability of nutrients for cultivated plants, but also for weeds, which, as a result of their mutual competition, minimizes the potential benefits of this process. The development of useful microorganisms depends on proper tending of the soil, which changes its structure, aeration and humidity. An important aspect remains the restriction of use of mineral fertilizers, and replacing them with bioproducts of organic composition: microorganisms, biochar, plant extracts etc.

- Main gaps in available information, and possibilities and priorities to improve knowledge and trends concerning biodiversity for alimentation and agriculture.

Whenever possible, please indicate whether information systems take account of gender, specifying to what extent different types and levels of knowledge of women and men are taken into account.

IMPORTANT NOTE: Throughout these guidelines, questions on production systems shall refer to production systems specified in Table 1 in Chapter 1, as to the existing ones in your country. If your answers include them, please specify the production system codes, and/or its full name from Table 1.

One of the main goals of the report, is to identify areas of insufficient knowledge and provide basic information for future assessments. Therefore please indicate areas for which information is not available.

General synthesized assessment on genetic resources of forests, waters, animals, or plants

Countries that had previously presented, or are currently preparing national reports on genetic resources of forests, waters, animals or plants, may have therein important information on genetic diversity. Therefore, states may make full use of their various sectoral reports in order to prepare a comprehensive description and comparison of conditions, trends, as well as the state of protection of genetic resources of forests, waters, animals or plants. The following indications are intended as guidelines with regard to topics that need addressing.

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.

Poland is a country with relatively high biodiversity. It stems from the intermediate climate, diverse landscape, geological makeup, and variability of the soil base, with a simultaneous lack of natural barriers. It is situated in two bio-geographic regions – continental (more than 90% of the country) and Alpine (the Polish part of the Carpathians). Its location in the middle of Europe, between the sea and the mountains; on a diverse geological base (old crystalline shields and young fold mountains and post-glacial areas); in a transitional climate (shaped by inflows of Atlantic sea air and the continental impacts of Eurasia), contributed to creating natural wealth, which is a significant factor determining the character of our country. Biological diversity in Poland is shaped by a relatively large forest area (9.1 million ha), swetlands (1.8 million ha, including 455 thousand ha of inland waters), as well as by extensive use of agricultural areas. Farmlands have a substantial impact on the condition of biodiversity of the whole country, as they occupy more than 50% of its territory and contain numerous refuges of endangered species of flora and fauna. About half of the 365 plant associations (including those covered by the NATURA 2000 network), occurring in Poland, is related to agricultural areas, of which 45 types are used as meadows and pastures. A diversified, post-glacial agricultural landscape is also related with many bird species and other animals endangered in other European countries, and still common in Poland, and maintaining relatively high populations. It may be expected that, with reduction of areas used for agriculture, the acreage of many plant, fungi and animal species will also be reduced. To evaluate the condition of farmlands, an aggregated index is used, of the populations of birds common for the agricultural landscape (Farmland Bird Index - FBI 23). Changes of this index showed an initial decrease by ca. 15% between 2000-2003, after which a slow return was registered to the initial level (year 2000, FBI = 1.00) in 2008. For the past five years, another drop in populations of bird from this group is observed, which in 2013 achieved the lowest level recorded during research. Its value amounted to 0.82, i.e. almost 20% less than in the base year. Changes of the FBI index value can be divided into three components. First, they correlate with the management intensity of farmlands, measured as the yield of cereals in the year preceding the bird census. High cereal yields negatively correlated with the bird populations in subsequent spring. The second factor, correlated with the index dynamics, were the weather conditions during the two winters prior to the bird census. Mild winters were associated with a growth of the FBI index value, and severe – with its drops. The third component was the general, long-term downward trend of the FBI index. Reasons for such a trend remain unidentified. The most likely seem to be factors associated with agriculture intensification, other than those expressed in yields, e.g. accumulated and/or delayed effects of the growth in agriculture mechanisation. Their identification requires longer measurement periods and better data concerning the intensity of agricultural land use.

Poland is in the group of the most developed countries. The main sources of environmental hazards are: industry, particularly the power sector, municipal economy and transport. Both the degree and types of hazards are strongly, spatially diversified, with a definitely higher pressure observed within the major urban centres. At the same time, due to its geographical location, the country is characterized by exceptional natural and landscape wealth. The fact of the combined presence of rare, in the scale of the continent, plant and animal species, thus imposes on Poland a particular responsibility for the conservation status of the natural heritage.

Polish agriculture is still fragmented, and the expenditure of mineral fertilizers and plant pesticides remains at a moderate level. Increasing the economic efficiency and productivity of agriculture can lead to the depletion of the agricultural landscape biodiversity, and increased pressure, in particular on the water and soil environment. The development of intensive, large-scale agriculture and monocultural farms can lead to depleting biodiversity of the agricultural landscape. The intensification of agricultural production is accompanied by increased chemicalization, which, consequently, can lead to increased environmental contamination of soil, as well as surface and underground waters. The development of transport networks is one of the conditions for a country's development, but also an important determinant, negatively affecting the environment. Transport infrastructure, including transport routes, affects the landscape and biological diversity, contribute to sealing the soil surface, cause fragmentation of natural habitats, cut ecological corridors, hindering migrations of many animal species. The transport sector in the last decade underwent dynamic changes and expansion, mainly of road and air transport. The greatest share in the transport of goods and passengers falls to road transport (69%

– goods and 48% – passenger). Increasingly noticeable is also the impact of transport on the environment and quality of life. An increasing number of vehicles negatively affects the acoustic conditions of urban areas and air quality. Another alarming fact, is the increase in greenhouse gas emissions from transport. It is necessary to fully implement the principles of sustainable development throughout all sectors of the economy, and increasing their ecological effectiveness, resulting in limiting the consumption of resources and reducing emissions of substances and energy to the environment.

Poland is a country wherein food safety is provided. Animal production is based on the use of basic species: cattle, swine, hens and turkeys, which supply the majority of animal-origin products both for the domestic market and for export.

The numbers of farm animals in most populations is falling. Cattle stock between 2000 and 2011 was reduced from 6 million to 5.8 million heads, between 2000 and 2012 swine stock has decreased from 16 million to 11 million heads, horse stock from 550 000 to 316 000, and sheep from over 350 000, to 218 000

Broiler production is based on import of stock material (parent flocks for production of commercial crossbreeds) and purchases – 35 million heads. annually, with a complete lack of own stock material. Stock material for turkey production is also fully imported, while in the case of breeding egg-laying hens, domestic production has a relatively small share.

In the studied period, the population of fur animals has seen a drastic reduction in the number nutrias and polecats, due to low demand for fur articles, while the populations of the American mink and chinchilla had increased. Bee population after mass collapses in 2007-2009 remains at a stable level of ca. 1 300 000 colonies[114].

Number of farm animals (breeds, families lines, strains, and varieties) entered into the European Farm Animal Biodiversity Information System - EFABIS, kept in Poland includes: cattle 25, swine 9, horses 15, sheep 32, goats 12, chickens 37, geese 15, ducks 13, rabbits 25, foxes 5, nutrias 6, chinchillas 2, polecats 2, bees 25, total 223 populations, for which records are kept.

Endangered local populations and domestic breeds are covered by the genetic resources protection programmes. Genetic resources protection is regulated by state legislature, and results from liabilities related to the ratification of the Convention on Biodiversity. The entity authorized by the Minister of Agriculture and Rural Development for coordinating the genetic resources protection programmes, since 2002 remains the National Research Institute of Animal Production.

In 2014, a total of 91 populations of breeds, varieties, grades, families and lines of farm animals are under protection. The number of animals covered by protection programmes is increasing for most populations, apart from swine races, and the Wielkopolski horses. In the case of bee lines, the situation remains stable.

In 1999 works began on the National Animal Genetic Resources Protection Programme, the primary objective of which was ensuring the preservation of genetic diversity of farm animals necessary for food production and agriculture. In May 2000, the Minister of Agriculture and Rural Development accepted for realization, stocking programmes for the protection of genetic resources of individual populations, including programmes for the Polish konik and hucul horses. These programmes contain information about the history of establishing an individual breed, and the justification of the need for its protection, specify goals and the schedule of activities, as well as the scope of protection in-situ and ex-situ. The programmes also define the principles and methods of breeding, and indicate organizations responsible for their realization[115].

[114] Ministry of Agriculture and Rural Development, Strategia Zrównoważonego Użytkowania i Ochrony zasobów genetycznych zwierząt gospodarskich (Strategy for Sustainable Use and Preservation of Genetic Resources of Farm Animals), 2013. www.izoo.krakow.pl/zalaczniki/czasopisma/Krajowa_strategia.pdf.
[115] http://pzhk.pl/hodowla/programy-ochrony/ochrona-zasobow-genetycznych-zwierzat-gospodarskich/.

Table XII. The number of herds and animals covered by the genetic resources protection programme in 2014 (data from National Research Institution of Animal Production, DBŻ, animals).

Species	The number of breeds/families/lines, for which a protection programme has been developed	Number of herds (heads)	Number of females (heads)
Horses	7	1320	5726
Cattle	4	808	7304
Sheep	15	748	52 328
Goats	1	2	29
Pigs	3	72	1644
Laying hens	19	20	17 179
Geese	14	15	5035
Ducks	10	10	3992
Rabbits	1	10	350
Fur animals (foxes, chinchillas, polecats, nutrias)	12	28	902
Total	86	3 034	94 489
Local bee lines	5	-	1476 colonies
Total	91	-	-

In-situ protection of genetic diversity of farm animals involves any and all actions for maintaining living populations of farm animals, also those covered by active breeding programmes in agrosystems from whence they originate or are currently normally kept, together with breeding activities undertaken to ensure a continuous participation of these resources in sustainable production of food and agriculture, currently and in the future. Ex-situ protection means the preservation of genetic material in the form of live animals beyond their natural environment, or outside the animal organism in an artificial environment, usually taking form of seminal fluid, oocyte, embryo, cell or tissue banks. In total, the Ministry of Agriculture and Rural Development approved the realization of 32 stocking programmes for the protection of genetic resources, including 75 breeds, varieties, and families of farm animals and fish. Stocking programmes for the protection of genetic resources are implemented mainly by means of the „in-situ" method, which enables protection by usage, coupled with improving specific and valuable features of a given breed.

Issues related to employment and use of genetic resources of farm animals are regulated in Poland by various legal acts, concerning the broadly understood field of raising and breeding of farm animals. In particular by:

- Ustawa o organizacji hodowli i rozrodzie zwierząt (Act on Stocking and Breeding of Animals)[116].
- Ustawa o ochronie zwierząt (Act on Animal Protection)[117];
- Ustawa o zwalczaniu chorób zakaźnych, badaniu zwierząt rzeźnych i mięsa oraz o Inspekcji Weterynaryjnej (Act on Combating Infectious Diseases of Slaughter Animals and the Veterinary Inspectorate)[118];
- Ustawa o rolnictwie ekologicznym (Act on Organic Farming)[119];
- Ustawa o stowarzyszeniach (Act on Associations)[120];
- Ustawa o społeczno-zawodowych organizacjach rolniczych (Act on Socio-Professional Agricultural Associations)[121].

[116] Act of 29 June 2007 on the organization of breeding and of farm animals, Journal of Laws No.133 item 921.
[117] Act of 21 August 1997 on the protection of animals, Journal of Laws 1997 No. 111 item 724.
[118] Act of 14 February 2003 amending the Act on counteracting infectious diseases of animals, medical examinations of slaughter animals and meat, and the Act on Veterinary Inspection and several other acts, Journal of Laws 2003 No. 52 item 450.
[119] Act of 25 June 2009 on Organic Agriculture, Journal of Laws 2009 No. 116 item 975.
[120] Act of 7 April 1989, Law on Associations, Journal of Laws 1989, No. 20 item 104.
[121] Act of 8 October 1982 on the Socio-Professional farmers' Organizations, Journal of Laws 2014 item 1555.

Ustawa o organizacji hodowli i rozrodzie zwierząt gospodarskich (Act on Breeding and Stocking of Farm Animals)[122] defines animal species considered farm animals in Poland. The Act regulates matters related to breeding and preserving genetic resources, utility and breeding value assessment, keeping books and registers of farm animals, as well as supervising breeding and stocking of farm animals. Regulations issued on the basis of this Act by the Minister of Agriculture and Rural Development, on the detailed principles of keeping books and registers of farm animals, and requirements to be met by stocking programmes, pay special attention to programmes focusing on the protection and preservation of genetic resources of breeds and varieties of farm animals.

Poland has very rich and diverse genetic resources of farm animals. Every species used, is represented by several to a dozen of different breeds or varieties. However, rapid changes in the economy of our country, have a huge impact on developing populations of farm animals. The main danger is a substantial reduction in biodiversity. This applies both to genetic variability of domestic races of farm animals, and individual variability within races of international range, commonly used and intensively perfected. It is also necessary to increase the interest and social understanding for activities for the protection of genetic resources and the importance of domestic breeds.

Domestic breeds, despite a lower level of usability, are characterized by such valuable characteristics as resistance to disease, high fertility and prolificacy, good maternal characteristics, longevity, as well as adaptive qualities to extreme environmental conditions and low-quality feed. In many cases, products received from these animals have a particular, unique quality.

Agri-environmental programmes prepared in the Ministry of Agriculture include actions for the *in-situ* protection of domestic breeds, as well as using animals for environmental protection and stocking and breeding in difficult environmental conditions (e.g. mountain areas) and in areas requiring reclamation (fallows). Protected domestic breeds of farm animals are not only an account of the Polish breeding school, but are also an inseparable part of the domestic landscape.

New trends of European Union assistance programmes are, i.a. the regeneration and aesthecization of villages, including the traditional cultural heritage, development of infrastructure related to agriculture, rural tourism, development of traditional crafts, and restoration and maintenance of the so-called cultural landscape. Breeding domestic breeds may support the creation of market niches, e.g. with regard to the ever so popular agritourist services. The presence of e.g. riding horses in such a farm, makes its offer all the more attractive.

Horseback tourism development provides many opportunities for significant use of a large number of horses. Promotion in this aspect, would provide significant benefits for both horse breeding and creating new jobs.

The genetic resources protection programmes for horses cover the following races:

- Małopolski – a race with a specific genotype and phenotype, emphasizing the identity and specific character of the Polish anglo-arabian;
- Śląski – a race, originating in female lines from local, noble mares and from oldenburg and east-friesian stallions;
- Konik polski – a typical representative of the Polish small horse races coming directly from wild horses – the tarpan;
- Hucul – belonging to one of the oldest races described in Poland, formed in eastern Carpathians, in severe mountain climate.

Conservation status of genetic diversity of crop plants: In the form of seeds kept in storage rooms of the gene bank in KCRZG (National Centre of Plant Genetic Resources), IHAR-PIB (Plant Breeding and Acclimatization Institute-National Research Institute) Radzików, constituting a total of 67500 accessions (8164 are vegetabls), and 1845 are in field collections of potatoes and 243 of hop accessions and 161 accessions of grapevine in the Poznan Univeristy of Life Sciences, bred by means of vegetative reproduction.

Conservation status of genetic diversity of total, in the Research Institute of Horticulture (InHort), in all field collections *ex situ* of fruit and ornamental plants 6271 specimens have been collected, including 4713 fruit plants, 964 ornamental plants in InHort collections and 594 ornamental plants in the collection of the Research Facility on Variety Assessment in Lisewo, 13 357 specimens representing 70 vegetable species including 589 specimens related with crop plants and wild species. In the form of seeds kept in storage rooms of the gene bank in KCRZG (National Centre of Plant Genetic Resources), IHAR (Plant Breeding and Acclimatization Institute)-PIB (National Research Institute) Radzików, constituting a total of 11693 specimens, and 1664 in

[122] Act of 29 June 2007 on the organization of breeding and of farm animals, Journal of Laws No.133 item 921.

field collections of the InHort in Skierniewice and the Poznan University of Life Sciences, bred by means of vegetative reproduction.

The conservation status of the genetic diversity of waters is dependent on the degree of preservation of the life environment of water organisms. Poland has two areas of particular significance to the preservation of national waters biodiversity. These are accordingly the southern and northern part of Poland, significant in terms of their piedmont or a post-glacial character. The southern part encompasses mainly the Carpathian tributaries of the Vistula river, constituting the main reservoir of genetic resources of rheophile carp species, including the common nase (*Chondrostoma nasus*), common barbel (*Barbus barbus*), Barbus peloponnesius, Kessler's gudgeon (*Romanogobio kesslerii*), or the resident form of the zarte (*Vimba vimba*). This area is also key for the preservation of genetic variability of the breeding carp population. The northern region, particularly Pomorze and the Suwałki Region, is key for the preservation of genetic diversity of fish typical for the Lakelands area, mainly of the type *Coregonus* and *Osmerus*, and for migrating of fish and lampreys. The middle part of the country, though unremarkable in terms of wealth of habitats or sets of ichthyofauna, serves as a migration corridor that enables specimen migrations, and thus their genes, between different populations [123]. The entire area of the country is important for the preservation of European waters biodiversity in the case of several small and non-use fish species (e.g. amur bitterling, Sabanejewia aurata) and lampreys (brook and Ukrainian lamprey)[124]. Proving difficult to describe, is the impact of the 8 foreign open water species, including the grass carp, Prussian carp, rainbow trout, brook trout, White-eye bream, silver carp, and bighead carp. Except the white-eye bream, the presence of these species is associated with purposeful or random realization of activities classified for A7 or A11 systems. Available data indicate that only the white-eye bream, Prussian carp and brook trout can directly affect the genetic structure of domestic fish species through disturbing the natural spawning grounds (gynogenesis process of the Prussian carp), or hybridization with wild species (brook trout, white-eye bream). Other species do not find appropriate conditions for reproduction[125]. The overriding factor for the preservation and the protection of genetic and species water biodiversity, and shaping of their potential for the food security and alimentation, is to maintain water quality in terms of both its physical-chemical parameters, and natural hydro-morphological features, and the natural permeability of watercourses. They determine the specificity, wealth and uniqueness of habitats created within these reservoirs, and organism communities found within. When analyzing factors threatening biodiversity, and related to water quality, it should be noted that all production systems present in the country, directly related to waters (A3, A7 and A11) since the 1990s, are beneficiaries of the constantly improving water quality, as a result of continuous development and modernization of waste gathering and disposing systems, and the increasing forestation of the country. A positive process is also the change of approach to recreating ecological continuity of river beds. By the end of the XX century, quite a frequent practice was building storage reservoirs, equipped with defectively designed, or completely lacking devices for the migration of water organisms. In consequence, essential elements of waters biodiversity were lost, both on the species and genetic level. For example, as a result of damming the Vistula river in Włocławek, primary genetic diversity was lost, and the numbers of migratory fish was severely limited, as the part of their population, which used spawning sites located in the Carpathian tributaries of the Vistula river were lost. In smaller rivers, e.g. Warta and Pilica, the population of rheophilic cyprinidis (common nase and barbel) was significantly reduced. Currently the construction of new, permeability restricting, hydro-engineering structures, as well as modernizing existing ones, is almost always conditioned by the construction of a fish pass. Of the potential future problems connected with the agriculture sector, special attention should be given to the intensification of agricultural cultivations, which may adversely affect local water retention and circulation, and increase the inflow of biogenic substances, and plant pesticides. Another problem connecting the country's fishing systems, is the, observed in recent years, increase in the intensity of exploitation or breeding of the most valuable species. In the case of freshwater fishing (A3

[123] Witkowski A., Kotusz J., Przybylski M., Marszał L., Heese T., Amirowicz A., Buras P., Kukuła K. 2004. Pochodzenie, skład gatunkowy i aktualny stopień zagrożenia ichtiofauny w dorzeczu Wisły i Odry (Origin, Species Composition and Present Degree of Threat to Fish Faune in the Vistula and Oder River Systems). Arch. Pol. Fish. 12 (Suppl. 2): 7-20.

[124] Appendix II to Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wild fauna and flora.

[125] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

system), between 2005 and 2013 a 20% catch decrease was recorded , mainly achieved by limiting exploitation of stagnophilous cyprinidis, and foreign herbivore species, but with a simultaneous catch increase of predatory fish and salmonidae. This means a pressure increase for the naturally rarest species, or those with the highest habitat requirements, and hence comprising the less numerous populations. In the case of aquaculture, and breeding species fishing, on the one hand a decrease in production and carp participation in stocking open waters (A7 system) is observed alongside the drop in stocking and breeding material production by 9.6%. On the other hand, between 2009 and 2013, a 18.1% growth has been noted in the production of commercial fish (A11 system)[126]. The reduction in the carp share in stockings, was a direct result of the new legal regulations aimed at reducing the open waters eutrophication process, as a result of excessive stocking of this species. Growth in aquaculture production was a result of production intensification of selected fish species (e.g. sturegons salvelinus), and the start-up of new facilities conducting industrial fattening in recirculated systems. The process accompanying the production growth in aquaculture is, unfortunately, a progressive reduction in the usable area most valuable for traditional biodiversity of the semi-extensive carp aquaculture. Between 2010-2013 on average 82.5% of available earth ponds were flooded. It is also indicative of the constantly decreasing carp production, which from the year 2000 was reduced by 8000 t[127].

A factor limiting the genetic biodiversity in each of the abovementioned fishery production systems, is the population of the reproductive herd. Both the A3 system, as well as A7 and A11 systems, are, to a significant extent, based on stocking material production through artificial reproduction. This is the element connecting all three of the country's fishing systems. In connection with the above, genetic diversity of exploited species is exposed to similar dangers. Here we should list, first and foremost, the narrowing of the gene pool by too limited a selection of bred specimens, insufficient numbers of breeding fish, and risk of domestication, in the case of basing breeding programmes on spawning herds maintained in artificial conditions. In the case of the A7 and A11 systems, the preservation of genetic diversity is subject to several specialized centres, keeping selected genotypes, and appropriate numbers of maternal herds of the most important species used in aquaculture. The maintenance, selection and crossbreeding of the 21 domestic and foreign lines of carp is handled by three centres: Polish Academy of Sciences Institute of Ichthyobiology and Aquaculture in Gołysz (ZIGR PAN), Experimental Fish Farm Inland Fisheries Institute in Zator (RZD Zator) and the Experimental Station SGGW in Warsaw (Łąki Jaktorowskie). Selected strains, and original genotypes of the rainbow trout, including strains from the spring and autumn spawning season, are maintained in Zwiazek Hodowców Ryb Łososiowatych Instytut Rybactwa Śródlądowego in Rutki (http://www.sprl.pl/). The existing maternal herd defined as the „Rutki“ line was created by means of family selection, initiated and consistently implemented from the second half of the 1980s (140 families). These centres provide spawners to stock material producers, and provide consulting on optimal crossbreeding for commercial purposes. The abovementioned breeding programmes are supported under the „Fish Genetic Resources Protection Programme”, which also encompasses wild, endangered fish species and populations, as well as restituted species such as: acipenser oxyrinchus (sturgeon), Atlantic salmon, sea trout, whitefish, grayling, huchen, vimba. These species also have dedicated centres responsible for the maintenance of their genotypes. Additionally, the genotypes of these species are subject to *ex situ* protection by creating gene banks in the form of cryo-conserved seminal fluid. In the case of other wild, commercial species, the care for their genetic diversity falls to numerous centres implementing local production programmes of stocking and breeding material. It is recommended that they are based on local sources of spawners for the purpose retaining local genetic diversity [128].

[126] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

[127] Lirski A. 2013, Strategia sektora karpiowego do 2020 roku (Carp Sector Strategies until 2020). Komunikaty Rybackie 4: 12-18.

[128] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under Contract No. BDGzp-2120A-

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).

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**
L3: Livestock grassland-based systems: Temperate		0 (honey bee)	2 (beaver, wild boar, fox) 1 (wolf, bear, roe deer) -1 (partridge, pheasant, hare)	
M3: Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate		0 (honey bee)	NA	
L7: Livestock landless systems: Temperate		NA	NA	
C7: Irrigated crops (other) : Temperate		0/-1	0/-1	0
C11: Rainfed crops : Temperate		0/-1	0/-1	-2
M3: Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate		0/-1	0/-1	0
Organic cultivations	1			
Conventional and organic agriculture	2			
A3: Self-recruiting capture fisheries: Temperate			1	

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.

In Poland between 2005 and 2006, the number of bee colonies was accordingly 827.4 thousand and 1091.9 thousand. At the turn of 2007/2008, mass losses of bee colonies were recorded, amounting to 30% of the bee population, but in 2009 apiaries have been rebuilt, the number of recorded bee colonies grew from 1 123 356 in 2009, to 1 246 633 in 2011; approximately 50 thousand apiaries are maintained in Poland.

For several years in Poland we observe a constant growth in bee population: in 2006, 3.5 colonies per 1 km^2 , in 2009, 3.68 per 1km^2 , in 2010, 3.88 per 1km^2 , and in 2011,3.99 colonies per 1km^2 , whereas in other EU countries this ratio is only 2.9 colonies per 1km^2 . Considering the growing awareness of the yield-forming role of honey bees, and a growing demand for pollinating large plantations of entomophilus plants, an increase of interest in beekeeping and a growth in their population are expected[129]. However, it should be emphasized that the total number of bee species in Poland is 454, of which the honey bee (*Apis mellifera* L.) is just one variety[130].

In the last few years, a significant growth was recorded in Poland of the wild mammal species populations, such as the wild boar, beaver, fox, and roe deer. In the opinion of naturalists, the negative effects of the population growth of these animals include a reduction of the hare, partridge and pheasant populations, and damages to saplings - forest younger than 20 years, losses in agriculture and breeding economy, and road accidents involving animals[131]. The fastest growing population is that of the beaver, which is a partially protected species. At the same time it is these animals that are causing the most damage. In 2012, losses caused by beavers throughout Poland have been estimated at 10.5 million PLN. The largest number of beavers populates the Podlaskie province. Regional Environmental Protection Directorate in Białystok assesses that the beaver population keeps growing.

The forest bison population is, as always, closely related to human activity. In recent years their population has increased significantly: from 715 heads in 2000, to 1225 specimens in 2011[132].

The last 10 years in Poland also saw the growth of the numbers of bears, wolves and lynxes. The largest refuge for bears in Poland is the Podkarpacie region, where 90% of the Polish population of this predator dwell. Naturalists estimate that in the early 1970s this region was inhabited by ca. 20 bears. In 2004 the total recorded number reached 100, and this year 150 heads.

The population of wolves is also growing. Within the past 10 years it was subject to fluctuations between 800 and 900 heads, of which more than half inhabited south-eastern Poland. Only in this region their numbers grew from ca 100 specimens in 1970, to 500. The lynx population, which also dwells in the in the Podkarpacie region, is also growing, albeit at a slower pace. In 2013, the total recorded number reached 260 lynxes, where over 40 years ago there were only a 100[133].

Along with the population increase of predators: the bear and wolf, damages caused by them to agriculture also increase. In 2013, only in the Małopolska and Podkarpacie regions, wolves killed 865 farm animals, mainly sheep, while bears destroyed, in southern Poland, more than 220 bee colonies along with their hives.

From the data of the General Environmental Protection Administration, it seems that within four years the sum of compensations for damages incurred on part of protected animals, paid to farmers and breeders increased more than twice. In 2008, a total of more than 5 million PLN, was paid, and in 2012, it amounted to over 11.5 million PLN. Protected animals are a significant problem for farmers. Last year, losses caused by protected

[129] Ministry of Agriculture and Rural Development, Strategia Zrównoważonego Użytkowania i Ochrony zasobów genetycznych zwierząt gospodarskich (Strategy for Sustainable Use and Preservation of Genetic Resources of Farm Animals), 2013 www.izoo.krakow.pl/zalaczniki/czasopisma/Krajowa_strategia.pdf.

[130] http://www.agronews.com.pl/print.php?id=32&aid=3515; Pasieczysko, 2014. Pasieczysko – organic holding: http://pasieczysko.wordpress.com/kurs/pasieka-wedrowna

[131] http://www.naukawpolsce.pap.pl/aktualnosci/news,395024,gus-w-polsce-wzrasta-liczba-zwierzat-chronionych.html

[132] data of the Central Statistical Office. GUS, Warszawa.

[133] Dostatny D. F., 2004. Preservation of weed diversity in protected areas. Bulletin Hort. Bot. Mus. and Collections vol. 13: 73-83. Dostatny D. F., 2013. The function of small farms in supporting biological diversity of agricultural ecosystem. Roczniki Naukowe Ekonomika rolnictwa i rozwoju obszarów wiejskich (Annals of Agriculture and Rural Development), vol. 100, z.4: 34-42.

animals: beavers, bison and wolves, to farmers and fisheries, only in the Podlaskie province, amounted nearly 2.6 million PLN. In Warmia and Mazury, losses in agriculture caused by wolves and beavers last year, have been estimated at 3.2 million PLN. Total damages caused by protected animals in Małopolska and Podkarpacie have been estimated in 2012 at more than 1.1 million PLN.

The more intensive the agricultural production, the less components of associated biodiversity are present. The use of increasingly more selective herbicides is one of the main causes of disappearing and/or total vanishing of plants accompanying cultivations or segetal and ruderal species, as well as shrubs and crop wild relativesof cultivated plants present within boundary strips. A reduction or disappearance of the aforementioned plants affects the population reduction of animals (e.g. birds or insects), indirectly contributing to e.g. lowering honey production, which is confirmed by provisions prepared by the organic farm „Pasieczysko“ (2014), which indicates that stationary beekeeping, especially in large apiaries, becomes less profitable, especially in the situation of depletion of bee plants related to the mowing of meadows prior to their blooming, weeding, etc.

Abandoning fields difficult to farm (on a smaller scale: -1 because it only occurs in some regions of Poland) contributes to the fall of diversity in agricultural ecosystems. In areas where such a fall is the biggest, or where the soil is too shallow or stony, as a result of eliminating such fields from cultivations, species of plants indigenous to such locales are quickly lost. Output values appear in: „Rzadkie chwasty segetalne województwa świętokrzyskiego”(Rare Segetal Weeds of the Świętokrzyskie Province)[134], wherein we can find the position numbers of 16 weed species and their dynamic presence tendencies in the last decades in the following scale[135]:

- -2: a large decrease in the number of positions
- -1: a decrease in the number of positions or a clear loss of specimens on positions
- +1: an increase in the number of positions
- +2: a strong increase and overtaking of positions
- +/_ positions disappear and new ones emerge

None of the studied species received the + 1, +2 or +/- status, with the majority falling into the –2 category[136].

In fields with crops of the intensive economy, e.g. in the area of Sandomierz on fertile degraded chernozem soils, we observe species changes in agricultural cultivations, with decreasing numbers of dicot broad-leaf weeds, and an increasing number of monocot weeds. The number of species populating associaitons of cultivated plants is decreasing, and a simultaneous increase is observed of species, which remained within organic cultivations, the share is increasing of the common wild oat, common windgrass, barnyard millet, green foxtail, yellow foxtail, and annual bluegrass, and in beets, of the red-root amaranth and *Galinsoga parviflora*. Visible changes of the green economy impact on cultivated plants and specific composition and population of weeds, depend on the time of the shift to from intensive to organic farming [137].

The changes and trends in the diversity of cultivated plants have been described in the national report on the condition of genetic resources for alimentation and agriculture[138].

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[134] Prepared by the Towarzystwo Badań i Ochrony Przyrody (Nature Protection and Research Association), 2012.

[135] Dostatny D. F., 2004. Preservation of weed diversity in protected areas. Bulletin Hort. Bot. Mus. and Collections vol. 13: 73-83; Haliniarz M., Kapeluszny J., 2014. Rare Species of Calcicole Flora in the Segetal Communities in the Lublin Region. Annales Uniwerytet Marii Curie-Skłodowskiej Section E, vol. LXIX(1): 11-23.

[136] Studies by other authors, such as: Dostatny (2007), Zając, Zając, Tokarska-Guzik (2009), Haliniarz, Kapeluszny (2014), i.a.,showcase the same tendency in other regions of Poland.

[137] Towarzystwo Badań i Ochrony Przyrody (Nature Protection and Research Association), 2012. Rzadkie chwasty segetalne województwa świętokrzyskiego (Rare, Segetal Weeds of the Świętokrzyskie Province). Samorząd Województwa Świętokrzyskiego (Local Government of the Świętokrzyskie Province) Kielce; Zając M., Zając A., Tokarska-Guzik B., 2009. Extinct and endangered archeophytes and the Dynamics of their diversity in Poland. Biodiv. Res. Conserv. 13: 17-24; Dobrzański A., 2007, The Impact of Weed Managementin Horticultural Crops on Biodiversity. Zeszyty Naukowe WSEH. in Skierniewice: 61-75; Dostatny D.F. 2007, Threats to diversity of the Caucalido-Scandicetum association. Zeszyty Problemowe. Post. Agricultural Sciences 517: 267-276.

[138] Bulińska-Radomska Z. et.al in Plant Genetic Resources for Ford and Agriculture in Poland – Second National Report, 2008 r. IHAR-PIB); Dostatny D.F., 2009. Znaczenie chwastów w krajobrazie rolniczym (The

Ichthyofauna waters research and fishing statistics indicate that in open waters, the numbers and density of rheophilous species are increasing. Also noticed is the increase in the share of the most valuable commercial species, i.e. predatory and migrating, in catches. Due to the fact that for the first time a nation-wide ichthyofauna monitoring was conducted, a trend assessment based on standardized indicators will not be possible for some time[139].

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

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

Production systems	**Trends in last 10 years (2,1,0,-1,-2, NK, NA)**									
Code or name	**Pollination**	**Pest and disease regulation**	**Water purification and waste treatment**	**Natural hazards regulation**	**Nutrient cycle**	**Soil formation and protection**	**Water cycling**	**Provisioning of habitat**	**Production of oxygen/ Gas regulation**	**Miscellaneous: *[please specify]***
L 3 Livestock grassland-based systems: Temperate	0	NK	NK	NK	NK	NK	NK	NK	NK	
M 3 Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	0	NK	NK	NK	NK	NK	NK	NK	NK	
L7 Livestock grassland-based systems: Boreal and /or highlands	NA	NA	NA	NA	NA	NA	NA	NA	NA	

meaning of weeds in agricultural landsape). Chwasty – wróg, czy przyjaciel rolnika? (The weeds: farmer's friend or enemy?). Conference materials from the 1st International conf. "Mission: BIODIVERSITY" Old varieties of farm plants and breeds of farm plants and animals - the protection of biological biodiversity in agriculture, p. 75-80.

[139] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015, Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (Condition of national biodiversity with regard to genetic resources of aquatic species in inland waters and aquaculture, and in marine inland waters and the part of the Baltic Sea under Polish jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

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 hazards regulation**	**Nutrient cycle**	**Soil formation and protection**	**Water cycling**	**Provisioning of habitat**	**Production of oxygen/ Gas regulation**	**Miscellaneous: *[please specify]***
C7 Irrigated crops (other) : Temperate	-1	-1	NK	-1	NK	NK	NK	0/-1	NK	NK
C11 Rainfed crops : Temperate	-1	-1	NK	-1	NK	NK	NK	0/-1	NK	NK
M3 Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	-1	-1	NK	-1	NK	NK	NK	0/-1	NK	NK
A3 Self-recruiting capture fisheries: Temperate	NA	NK	NK	NK	-1	NA	NK	NK	NK	NK
A7 Culture-based fisheries: Temperate	NA	NK	NK	NK	-1	NA	NK	NK	NK	NK
A11 Fed aquaculture: Temperate	NA	NK	NK	NK	-1	NA	NK	NK	NK	NK

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

Diversity changes or change tendencies related to the following issues:

- population decrease of pollinators in the agricultural landscape[140]. Crop rotation simplifying process, increasing field area, and liquidation of marginal habitats, have a negative impact on bee diversity in the agricultural environment. Within agrocenosis in Poland, currently cereals are dominant, additionally area of legume cultivation is decreasing, which results in reducing the number of bumblebees and other specialized pollinators[141] particularly significant is the drop in population of the

[140] Rosin Z.M., Takacs V., Báldi A., Banaszak-Cibicka W., Dajdok Z., Dolata P. T., Kwieciński Z., Łangowska A., Moroń D., Skórka P., Tobółka M., Tryjanowski P., Wuczyński A.: Ecosystem Services as an Efficient Tool of Nature Conservation: a View from the Polish Farmland. Chrońmy Przyrodę Ojczystą, 2011, 67(1): 3-20.
[141] Ibidem, p.3-20.

domestic European dark bee, which is forced out by other honeybee sub-species, i.e. Caucasian and Carniolan[142].

Currently no accurate data is available to reliably determine the facts regarding the global condition of pollinating insects, i.e. their numbers and diversity[143]. The discrepancy of calculations on the numbers of species is so great that „before we can find proof of a decrease in population, an actual reduction of 50% may take place[144]„. Local and regional demand for pollinating insects grows faster than the supply, thus we can expect present and future limitations of bee participation in the pollinating process The reason behind it is the fact that growth in the quantity of high-value cultivations dependant on pollinating increases faster than the number of bee colonies[145]. Pollinating is also done by wild bee populations, particularly in regions where honeybee pollination is limited (e.g. the UK). Unfortunately wild bees are under pressure from the agricultural production intensification through the destruction of habitats and biodiversity reduction[146]. Additionally, it is unlikely that any significant growth in the number of bee colonies would satisfy the growing agricultural demand for pollinating, or compensate for the decrease of indigenous pollinator populations[147].

In individual agricultural regions bee colonies are highly diversified. Some countries, regarded as major honey producers, observe a growth of honey bee populations, with a simultaneous drop in other regions, including those characterized by high agricultural production, such as the United States, the UK or Western European States[148].

- a higher intensification of invasive plant species[149]
- population decrease of domestic weeds.

In Poland from among 165 species of archaeophytes accompanying farming plants, approximately 60% are endangered species, mainly due to intensification of agriculture (Zając et al. 2009) [150]

- the value changes in the FBI 23 index for birds of agricultural areas (Bulletin 2013, Report 2010)[151].

[142] Polak G., Jasiński Z. 2013. Charakterystyka krajowych linii pszczoły środkowoeuropejskiej oraz możliwości chowu w gospodarstwach ekologicznych (Domestic European Honeybee Line Characteristics, and Breeding Possibilities in Organic Farming). In: Biologiczna różnorodność ekosystemów rolnych oraz możliwości jej ochrony w gospodarstwach ekologicznych (Agricultural Ecosystem Biodiversity, and Possibilities for its Preservation in Organic Farming). Tyburski J., Kostrzewska M.K. (red), Wyd. UWM Olsztyn: 261-267.

[143] Lebuhn G., Droege S., Connor E.F., Gemmill-Herren B., Potts S.G., Minckley R.L., Griswold T., Jean R., Kula E., Roubik D.W., Cane J., Wright K.W., Frankie G. & Parker F., 2013, Detecting Insect Pollinator Declines on Regional and Global Scales. Conservation Biology, 27: 113-120; Bees in Decline Greenepace Research Laboratories Technical Report (Review) 2013; Aizen M.A., Harder L.D., 2009, The Global Stock of Domesticated Honey Bees is Growing Slower than Agricultural Demand for Pollination. Current Biology, 19: 915-918; Tryjanowski P, Dajok WITH, Kujawa K, Kałuski T, Mrówczyński M: Threats to Biodiversity in Farmland: Are Results from Western Europe Good Solutions for Poland?, Polish J. Agron., 2011, 7: 113-119.

[144] Lebuhn G., Droege S., Connor E.F., Gemmill-Herren B., Potts S.G., Minckley R.L., Griswold T., Jean R., Kula E, Roubik D.W., Cane J, Wright KW, Frankie G. & Parker F., 2013, Detecting Insect Pollinator Declines on Regional and Global Scales. Conservation Biology, 27: 113-120.

[145] Garibaldi et.al., 2011; Lautenbach et.al., 2012.

[146] Kremen C, Williams NM, Aizen MA, Gemmill-Herren B, LeBuhn G., Minckley R, Packer L, Potts SG, Roulston Ta, Steffan-Dewenter I, Vazquez DP, Winfree R., Adams L., Crone EE, Greenleaf SS., Keitt TH., Klein A-M., Regetz J. and Ricketts TH. (2007). Pollination and other ecosystem services produced by mobile organisms: a conceptual framework for the effects of land-use change. Ecology Letters, 10: 299-314..

[147]Aizen M.A., Harder L.D., 2009, The Global Stock of Domesticated Honey Bees is Growing Slower than Agricultural Demand for Pollination. Current Biology, 19: 915-918.

[148] Ibidem; Garibaldi L.A., Aizen M.A., Klein A.M., Cunningham S.A. and Harder L.D., 2011, Global growth and stability of agricultural yield decrease with pollinator dependence. Proceedings of the National Academy of Sciences, 108: 5909-5914; Lautenbach i in., 2012; Lautenbach S, Seppelt R., Liebscher J. & Dormann C.F. 2012, Spatial and Temporal Trends of Global Pollination Benefit. PLoS ONE, 7: e35954.

[149] Tokarska-Guzik B., Dajdok Z., Zając M., Zając A., Urbisz A., Danielewicz W., Hołdyński Cz. 2012. Alien Plants in Poland with Particular Reference to Invasive Species. Wydawnictwo GDOŚ, Warszawa 2012, s. 197.

[150] Zając M., Zając A., Tokarska-Guzik B.: Extinct and endangered archaeophytes and the dynamics of their diversity in Poland. Biodiv. Res. Conserv. 2009, 13: 17-24;

- changes in populations of birds related to the agricultural landscape

A representative example of changes taking place in the natural environment, are changes in populations of bird species selected as most characteristic, being indicators of extensive landscape use[152]:

- the national population of white stork between 2005-2008 remained lower by ca. 20% than in 2004;
- populations of crane and mute swan are increasing from 2001 at an annual pace of 7-8%;
- the number of nesting rooks has been decreasing from 2001 at an annual pace of almost 3%;
- populations of the western marsh harrier did not show any clear directional tendencies over the past 7 years.
- population decrease of pollinators in the agricultural landscape.[153.]

Surface waters and fisheries are under an increasing influence of the growing numbers of the ichthyophagous black cormorant. The species is under legal protection, and thus until now no legal or organizational actions have been taken, control its population. Recent studies indicate a rapid growth in numbers. While in 1959, roughly 1 800 pairs of cormorants were recorded, the inventory of 2010, indicated 27 000 pairs. Studies of the cormorant diet indicated that these birds feed on over 14 fish species, including many relevant for food safety and alimentation. The degree of impact on the ichthyofauna is also intensified by climate change, as progressively milder winters enable extended bird presence over national waters, and, on heated reservoirs, even wintering. Presently, no clear assessment is available of the possible consequences of further growth of the cormorant population for water biodiversity or maintaining their significance for food security and alimentation. However, it may turn out that the predator pressure may be an important determinant for the effectiveness of some restitution programs[154].

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

[151] Biuletyn Monitoringu Przyrody. Monitoring Ptaków Polski w latach 2012-2013. Biblioteka Monitoringu Środowiska 11 (2013/1), GIOŚ 2013; http://www.monitoringptakow.gios.gov.pl/aktualnosci/items/nowy-numer-biuletynu-monitoringu-przyrody.

[152] Raport o stanie środowiska w Polsce, Główny Inspektorat Ochrony Środowiska, Biblioteka Monitoringu Środowiska, Warszawa 2010, s.123 (Report on the Environment in Poland, Central Environmental Protection Inspectorate, Environment Monitoring Library, Warsaw 2010, p.123).

[153] Rosin Z.M., Takacs V., Báldi A., Banaszak-Cibicka W., Dajdok Z., Dolata P. T., Kwieciński Z., Łangowska A., Moroń D., Skórka P., Tobółka M., Tryjanowski P., Wuczyński A.: Ecosystem Services as an Efficient Tool of Nature Conservation: a View from the Polish Farmland. Chrońmy Przyrodę Ojczystą, 2011, 67(1): 3-20.

[154] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015: Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

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 control	Water purification and waste treatment	Natural hazards regulation	Nutrient cycling	Soil formation and protection	Water cycling	Habitat provisioning	Oxygen production/gas regulation
L3 Livestock grassland-based systems: Temperate	Changes in animal genetic resources	0	0	0	0	0	0	0	-1	0
	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 invertebrate genetic resources (associated biodiversity)									
	Changes in vertebrate genetic resources (associated biodiversity)									
	Changes in plant genetic resources (associated biodiversity)									
C11 Rainfed crops : Temperate	Changes in animal genetic resources									
	Changes in cultivation genetic resources	-1	-1	NK	NK	NK	NK	NK	-1	NK
	Changes in forest genetic resources									
	Changes in aquatic genetic resources									
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrate genetic resources (associated									

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 control	Water purification and waste treatment	Natural hazards regulation	Nutrient cycling	Soil formation and protection	Water cycling	Habitat provisioning	Oxygen production/gas regulation
	biodiversity)									
	Changes in vertebrate genetic resources (associated biodiversity)									
	Changes in plant genetic resources (associated biodiversity)	NK	-1	NK	NK	NK	NK	NK	-1	0
M3 Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	Changes in animal genetic resources									
	Changes in crop genetic resources	-1	-1	NK	NK	NK	NK	NK	-1	NK
	Changes in forest genetic resources									
	Changes in aquatic genetic resources									
	Changes in microorganism genetic resources (associated biodiversity)									
	Changes in invertebrate genetic resources (associated biodiversity)									
	Changes in vertebrate genetic resources (associated biodiversity)									
	Changes in plant genetic resources (associated biodiversity)	NK	-1	NK	NK	NK	NK	NK	-1	0
A3 Self-recruiting capture fisheries: Temperate	Changes in animal genetic resources									
	Changes in crop genetic resources									

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 control	Water purification and waste treatment	Natural hazards regulation	Nutrient cycling	Soil formation and protection	Water cycling	Habitat provisioning	Oxygen production/gas regulation
	Changes in forest genetic resources									
	Changes in aquatic genetic resources	NA	NK	NK	NK	NK	NA	NK	NK	NK
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrate genetic resources (associated biodiversity)									
	Changes in vertebrate genetic resources (associated biodiversity)									
A7 Culture-based fisheries: Temperate	Changes in plant genetic resources (associated biodiversity)									
	Changes in animal genetic resources									
	Changes in cultivation genetic resources									
	Changes in forest genetic resources									
	Changes in aquatic genetic resources	NA	NK	NK	NK	NK	NA	NK	NK	NK
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrate genetic resources (associated									

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 control	Water purification and waste treatment	Natural hazards regulation	Nutrient cycling	Soil formation and protection	Water cycling	Habitat provisioning	Oxygen production/gas regulation
	biodiversity)									
	Changes in vertebrate genetic resources (associated biodiversity)									
	Changes in plant genetic resources (associated biodiversity)									
A11 Fed aquaculture: Temperate	Changes in animal genetic resources									
	Changes in cultivation genetic resources									
	Changes in forest genetic resources									
	Changes in aquatic genetic resources	NA	NK	NK	NK	NK	NA	NK	NK	NK
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrate genetic resources (associated biodiversity)									
	Changes in vertebrate genetic resources (associated biodiversity)									
	Changes in plant genetic resources (associated biodiversity)									

Currently, for disease protection of fruit plants, approximately 90 fungicides and bactericides are registered, of 20 chemical groups, including 40 active ingredients. They are recommended both for integrated and

conventional systems. On the other hand, ecological systems only permit copper and sulphur based products, as well as those of natural origin (plant, bacterial and fungal).

To combat pests of fruit plants, 52 insecticides and miticides are registered, of 18 chemical groups, including 28 active ingredients. The ecological systems permit products based on paraffin oil, horticultural soap, and agents containing viruses, e.g.. Madex.

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.

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

Production systems	**Changes**	**Pollination**	Pest and disease regulation	Water purification and waste treatment	Natural hazard regulation	Nutrient cycling	Soil formation and protection	**Water cycle**	Habitat provisioning	Production of oxygen/ Gas regulation
C11 Rainfed crops : Temperate	Changes in animal genetic resources									
	Changes in cultivation genetic resources	-1	-1	NK	NK	NK	NK	NK	-1	NK
	Changes in forest genetic resources									
	Changes in aquaticr genetic resources									
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrate genetic resources (associated biodiversity)									
	Changes in vertebrate genetic resources (associated biodiversity)									
	Changes in plant genetic resources (associated biodiversity)	NK	-1	NK	NK	NK	NK	NK	-1	0
M3 Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	Changes in animal genetic resources									
	Changes in cropgenetic resources	-1	-1	NK	NK	NK	NK	NK	-1	NK
	Changes in forest genetic resources									
	Changes in aquatic genetic resources									

Production systems	Changes	**Pollination**	Pest and disease regulation	Water purification and waste treatment	Natural hazard regulation	Nutrient cycling	Soil formation and protection	**Water cycle**	Habitat provisioning	Production of oxygen/ Gas regulation
	Changes in micro-organism genetic resources (associated biodiversity)									
	Changes in invertebrate genetic resources (associated biodiversity)									
	Changes in vertebrate genetic resources (associated biodiversity)									
	Changes in plant genetic resources (associated biodiversity)	NK	-1	NK	NK	NK	NK	NK	-1	0

- population decrease of pollinators in the agricultural landscape[155]
- a higher intensification of invasive plant species[156]

Due to changes of the chemical plant pesticides assortment, some fruit plant pests cannot be combated, which has a significant impact on production effectiveness of some species, e.g. the blackcurrant from the blackcurrant gall mite, or the peach from bark and wood diseases.

Species belonging to associated biodiversity in Poland, have not been encompassed by any form of active management in the last 10 years. Introduction for active management of such species, constituted a number of packages of the Agri-environmental programme uder RDP 2007-2013 eg. Package 9 – Buffer zones and variant 6.3 Seed production at the request of gene bank of Package 6. The Package 3. may contribute to retaining some meadow species of the aforementioned ecosystem. We can also mention the protection of endangered species of birds, plants and habitats in the Natura 2000 areas under Package 5. Protection of endangered bird species and natural habitats in Natura 2000 areas. Typically they are located in natural and semi-natural habitats, wherein the same species are present in agricultural ecosystems (associated with biological diversity).
Trends related to change of habitats resulting from succession after cessation or limiting grazing and use of meadows, pastures and marginal grounds, occur in production systems L3 and M3, intensive animal production system L7 is exempt.

This succession is mainly caused by a significant reduction in sheep, cattle and horse stocks, a change of animal maintenance technology (limiting pasture grazing of milk cows), and cessation of traditional pasturage,

[155] Rosin Z.M., Takacs V., Báldi A., Banaszak-Cibicka W., Dajdok Z., Dolata P. T., Kwieciński Z., Łangowska A., Moroń D., Skórka P., Tobółka M., Tryjanowski P., Wuczyński A.: Koncepcja świadczeń ekosystemowych i jej znaczenie w ochronie przyrody krajobrazu rolniczego (Ecosystem Services as an Efficient Tool of Nature Conservation: a View from the Polish Farmland). Chrońmy Przyrodę Ojczystą, 2011, 67(1): 3-20.
[156] Tokarska-Guzik B., Dajdok Z., Zając M., Zając A., Urbisz A., Danielewicz W., Hołdyński Cz. 2012. Alien Plants in Poland with Particular Reference to Invasive Species. Wydawnictwo GDOŚ, Warsaw 2012, p. 197; Tryjanowski P, Dajok WITH, Kujawa K, Kałuski T, Mrówczyński M: Threats to Biodiversity in Farmland: Are Results from Western Europe Good Solutions for Poland?, Polish Journal of Agronomy, 2011, 7: 113-119.

which was practiced on common lands by farmers from one or more villages/settlements. Larger herds were being created, constituting the property of various farmers, customarily tended to by teenagers or children. The modernization of agriculture, elimination of small farms, as well as the loss of pasturing traditions of sheep, cattle and horse stocks, caused the abandonment of meadows and pastures, and an uncontrolled growth of vegetation: shrubs and trees.

There is evidence, in many areas of the country, confirming that cessation of traditional pasturing of farm animals leads to uncontrolled succession of vegetation, shrub encroachment and the disappearance of meadows and pastures.

In order to prevent succession, actions have been taken under the Agri-environmental programme, RDP 2007-2013, wherein friendly practices in the NATURA 2000 areas and in other naturally valuable habitats in agricultural areas are implemented, by conducting extensive use thereof[157].

Noumerous NGOs operate in Poland, such as the „Bocian" Nature Society, realizing projects designed to protect valuable agricultural ecosystems and, by extension, the associated biodiversity and the growth in ecosystem services provided by it, such as: „Podlasie Bug Gorge Landscape Park", "Calcareous Grasslands", „Świniarka Sheep".

In the last 10 years, the assortment of recommended chemical plant protection products was significantly decreased (by ca. 30%). Measures most toxic for organisms, human health and the environment were withdrawn.

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

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

Ecosystem service provided	Actively managed species (name) and sub-species (where available)	Production systems (code or name)	Availability of diversity information (Y/N)	Source of information
Pollination	*Apis mellifera*	L 3, M 3	Y	Breeding programmes, protection programmes
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				

So far, only the honey bee is covered by breeding programmes. Breeding work and selection are not, however, focused on increasing ecosystem services. No information on the intended inclusion of other species is available.

[157] Regulation of 16 May 2005, (Journal of Laws of 2005 No. 94, item 795) referring to Appendix I to the Habitat Directive www.mos.gov.pl/g2/big/.../1f364cd9666cb6181532d0057d47e365.doc.

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.

According to the knowledge and competences of the National Institute on Animal Production, control and monitoring encompass individual sub-species and lines of bees. They are covered by utility control, and herd-books are kept for them and breeding programmes are conducted.

Lines for which are books are kept and breeding programmes conducted [158] (indefinite range):

- Race: Carniolan, line: Bielka 1
- Race: Carniolan, line: Prima, Gema
- Race: Caucasian, line: WG
- Race: Carniolan, line: Brzezinka
- Race: Carniolan, line: Marynka, GR1
- Race: Caucasian, line: Puławska
- Race: Carniolan, line: MAJA
- Race: Carniolan, line: Karpatka
- Race: Carniolan, line: Baltic
- Race: Carniolan, line: Baltic
- Race: Carniolan, line: Beskidka
- Race: Carniolan, line: Kujawska
- Race: Carniolan, line: Nieska, Alpejka, Jugo
- Race: Caucasian, line: Woźnica
- Race: Carniolan, line: SK
- Race: Caucasian, line: M
- Race: Carniolan, line: Iwa
- Race: Carniolan, line: Majówka
- Race: Carniolan, line: CT46, CJ10, Alsin, CNT
- Race: Caucasian, line: KPW
- Race: Carniolan, line: Ca, Cp, Cr, Pogórska
- Race: Carniolan, line: Vineta
- Race: Carniolan, line: Ab, Tb
- Race: Caucasian, line: Pb
- Race: Carniolan, line: R, S, Niw
- Race: Caucasian, line: PwK
- Race: Carniolan, line: Zosia
- Race: Carniolan, line: Ml
- Race: Carniolan, line: Wanda

[158] http://www.kchz.agro.pl/UserFiles/File/Pszczoly/Pszczoly_rejestry_2014.pdf

- Race: Carniolan, line: AGA
- Race: Caucasian, line: KP
- Race: Carniolan, line: Great
- Race: Carniolan, line: PWJOT
- Race: Carniolan, line: Kortowka

Lines for which books are kept and protection programmes in place:

- Race: Central-European, line: Augustowska, Północna (selective leading herds),
- Race: Central-European, line: Kampinoska (selective leading herd),
- Race: Central-European, line: Asta (selective leading herd),
- Race: Carniolan, line: Dobra (selective leading herd),
- Local range – maintained in the selective herd system. For three lines protection and habitancy regions are established: - the area of the Kampinos National Park, Augustowska – the area of Augustów Forest, Dobra – Tymbark and Dobra counties.

Lines for which registers are kept:

- Cross-breed, line: Kasia
- Cross-breed, line: Apipol 2
- Cross-breed, line: Bielka
- Cross-breed, line: MARGO
- Cross-breed, line: Hetmanka
- Cross-breed, line: Krywald
- Cross-breed, line: Dąbrówka
- Cross-breed, line: MDZ
- Cross-breed, line: Brnianka
- Cross-breed, line: Zulawska
- Cross-breed, line: LUBELKA
- Cross-breed, line: DolKa
- Cross-breed, line: PK
- Cross-breed, line: Wrzosowka
- Cross-breed, line: Chehnianka
- Cross-breed, line: Viktoria
- Cross-breed, line: Viking
- Cross-breed, line: Niwa
- Cross-breed, line: AM
- Cross-breed, line: AGA 3
- Cross-breed, line: Ewelka
- Cross-breed, line: Bardzka
- Cross-breed, line: AS
- Cross-breed, line: Galicja
- Cross-breed, line: Magda

- Cross-breed, line: Karolinka

- The monitoring of natural effects of the Agri-environmental programme, under RDP 2007-2013 conducted by the Institute of Technology and Life Sciences under the Long-term Programme entitled: *Standardization and monitoring of environmental projects, agricultural techniques, and infrastructural solutions for safety and sustainable development of agriculture and rural areas.*

The main assumption of the conducted monitoring of environmental effects of the Agri-environmental programme, is to obtain answers to questions to what degree and in what manner the implemented programme affects the natural environment. The subject of the monitoring are elements of the natural environment, to which the programme provisions refer to directly, i.e. natural habitats, avifauna, landscape and soils.

- The monitoring conducted by the Institute of Soil Science and Plant Cultivation State Research Institute under the project "Protection of species diversity of valuable natural habitats on agricultural land on NATURA 2000 areas in the Lubelin Vivodeship", between 2012 and 2016, financed from the funds of the Swiss-Polish Cooperation Programme. It includes flora tests on fixed grasslands, and utilised agricultural area, as well as spiders, orthoptera and birds within the Lubelskie province[159].

- The monitoring of vegetation, nocturnal butterflies, dragonflies, and birds in the Biebrza National Park between 2010-2011[160].

Between 2011-2012 the monitoring of ichthyofauna was started, which is an element of the state environmental monitoring (e.g. under the project „Research on Ichthyofauna between 2010 and 2012 for the Purpose of Evaluation of the Ecological Condition of Waters and Participation in the European Inter-Calibration Exercise – rivers"). The research works encompassed the majority of abiotic types of waters, for which in Poland separate waterbodies were established, according to the Regulation of the Minister of Environment of 9 November 2011 on the classification of the ecological state, ecological potential and chemical state of waterbodies[161]. The monitoring covers all species of fish and lampreys found in inland surface waters[162].

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.

[159] www.agropronatura.pl

[160] Bartoszuk H., Wiatr A., Frąckiel K., 2013, Czynna ochrona bioróżnorodności półnaturalnych łąk bagiennych w rejonie Szuszalewa (Active Conservation of Biodiversity and Semi-Natural Wet Meadows in the Szuszalewo Region). In: Biologiczna różnorodność ekosystemów rolnych oraz możliwości jej ochrony w gospodarstwach ekologicznych (Agricultural Ecosystem Biodiversity, and Possibilities for its Preservation in Organic Farming). Tyburski J., Kostrzewska M.K. (red), Wyd. UWM Olsztyn, Olsztyn 2013,s. 293-305.

[161] Regulation of the Minister of the Environment of 9 November 2011 on classification of the ecological potential, and chemical condition of uniform parts of surface waters, Journal of Laws 2011. No. 258 item 1549.

[162] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A., 2015, Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (Condition of National Biodiversity with Regard to Genetic Resources of Aquatic Organisms in Inland Waters and Aquaculture, and in Marine Inland Waters and The Baltic Sea Area under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

The best researched in Poland is the situation concerning endangered species, part of which can be classified as belonging to biodiversity associated with agricultural ecosystems. On 8 October 2014 the Regulation of the Minister of the Environment of 6 October in 2014 entered into force, on protection of animal species[163]. The list of protected animals has been included, in two appendices. In Appendix I 589 taxons of animals have been entered, remaining under strict protection, while appendix II encompasses 202 taxons of animals covered by partial protection. Species under partial protection, which may be used for animal production, by specified methods include: edible snail and *European beaver*. 30 animal species included on the list requires specifying their protection, reproduction, and regular occurrence zones, as well as the total area thereof. Some protected species were also entered into the register of rare and endangered species (Polish Red List, Red List of Endangered and Threatened Animals in Poland). Attention should also be paid to all species of bumblebees, due to their role in selective pollination.

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**
Apis mellifera	Endangered – genetic resources protection programmes	Limited nutritional base, simplification of crop rotation, (varroasis, nosemosis), mass extinction of bees for reasons/factors unknown	Genetic resources protection programmes of the European black bee, lines: Augustowska, Kampinoska, North, and Asta
Selected species, belonging to associated biodiversity from the Red List	589 taxons of animals have under strict protection, 202 taxons of animals under partial protection	Environment pollution, narrowing of nutritional base, restricting areas of occurrence, spreading of invasive species	Regulation of the Minister of the Environment of 6 October 2014 on of the species-specific fauna protection
Summer pheasant's eye (*Adonis aestivalis* L.)	IUCN: VU	Continuous reduction in the number of positions, it is in danger of extinction	National Centre for Plant Genetic Resources: http://genebank.ihar.edu.pl/galeria.php, Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.
Scarlet pheasant's eye (*Adonis flammea* JACQ)	IUCN: CN		National Centre for Plant Genetic Resources: http://genebank.ihar.edu.pl/galeria.php, Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.
Common corn-cockle (*Agrostemma githago* L.)	IUCN: VU	It is in danger of extinction. It occurs only in fields. The reasons for its endangerment are increasingly improved methods of weed seeds	National Centre for Plant Genetic Resources: http://genebank.ihar.edu.pl/galeria.php, Barbara

[163] Journal of Laws of 7 October 2014, item 1348.

Associated biodiversity species	Degree of threat	Main threat (indicate)	References or sources of information if available
		removal from grain.	Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.
Poorman's Weatherglass (*Anagallis coerulea* L)	IUCN: V		National Centre for Plant Genetic Resources: http://genebank.ihar.edu.pl/galeria.php, Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.
Hare's ear (*Bupleurum rotundifolium* L)	IUCN: EN		1, Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.
Burr parsley (*Caucalis daucoides* L.)	Red List of Plants and Fungi in Poland: E		Sylwia Nowak, Arkadiusz Nowak, Andrzej Jermaczek: Zagrożone chwasty polne Opolszczyzny i ich ochrona (Endangered Weeds of the Opole Region and Their Protection), ISBN: 978-83-63426-07-1, 2013.
Hare's ear mustard (*Conringia orientalis*)	Red List of Plants and Fungi in Poland: E; Polish Red Book of Plants: EN		National Centre for Plant Genetic Resources: http://genebank.ihar.edu.pl/galeria.php,3
False flax (*Camelina alyssum* (Mill) Thell)	Red List of Plants and Fungi in Poland: EX; Polish Red Book of Plants: EX		Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.
Burr parsley (*Caucalis platycarpos* L.)	Red List of Plants and Fungi in Poland: E		Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.
Nigella arvensis L	Red List of Plants and Fungi in Poland: V		Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.
Venus' comb (shepherd's-needle) *Scandix pecten-veneris* L.	Red Book - CR; Red List - E		Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-

Associated biodiversity species	Degree of threat	Main threat (indicate)	References or sources of information if available
			83-929577-3-7, 2012.
Corn buttercup (scratch burr) *Ranunculus arvensis* L.	Red List of Plants and Fungi in Poland: V		Barbara Bacler-Żbikowska: Rare weeds of the Świętokrzyskie Province. ISBN: 978-83-929577-3-7, 2012.

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.

The „National Programme of Plant Protection Ex-situ" is run by the Centre for Plant Genetic Resources of the Breeding and Acclimatization Institute National Research Institute in Radzików. Known as the Polski Bank Genów (Polish Gene Bank), it was established in the 1990s on the initiative of the Ministry of Agriculture and Rural Development. The official website of the National Centre for Plant Genetic Resources states that „the systematic gathering of genetic resources is conducted in Poland since 1971". The Plant Breeding and Acclimatization Institute (IHAR) - National Research Institute carries out research on „Gathering Local Populations of Utility Plants through field collections". It is implemented with the financial assistance of the Ministry of Agriculture and Rural Development". The program of gathering plant genetic resources includes most larger institutes and other scientific institutions related to biological sciences.

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					
Invertebrates					
Vertebrates					
Plants	All national species endangered by genetic erosion				

Protection of associated biodiversity

This part is intended to collect information about the conservation status of components of associated biodiversity providing ecosystem services within production systems in your country.

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).

An integrated programme is in place in Poland, for plant, animal, and habitat biodiversity protection in agricultural areas. It operates under the Axis II of the Rural Development Programme 2007-2013 and is called "Program Rolnośrodowiskowy" (Agri-environmental programme) (since 2015 under RDP 2014-2020 there is also "Program rolno-środowiskowo-klimatyczny" (Agri-environment-climate measure)). The programme is intended to improve the condition of associated biological biodiversity, and through it, the overall healthiness of the environment.

The Agri-environmental programme includes two packages aiming at protecting *in-situ* and supporting biodiversity organisms used in agriculture. The packages include preserving endangered genetic resources of plants in agriculture (Package 6.), and preserving endangered genetic resources of animals in agriculture (Package 7.). Package 6. provides protection for plant species listed in Table 13, while under Package 7. protection is provided to selected races of farm animals [164].

The protection of endangered species consists of their commercial and seminal cultivation, as well as for the purpose of the Gene Bank (plants) or breeding (animals) on a farm, for which the farmer receives subsidies per hectare of cultivated plants, or per head of threatened breeds kept.

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	Polish Red Cattle, white-back cattle, Polish red-white cattle, Polish black-white cattle, Polish Konik, hucul horses, Małopolskie horses, Silesian horses, Wielkopolskie horses, draft horses of the sokólski type, draft horses of		M3	The purpose of Package 7 is the protection of endangered domestic races of farm animals. The condition for commencing the implementation of Package 7 is keeping by the farmer of cows, mares, sows	Subsidies for animal keeping.

[164] „Program rolnośrodowiskowy objęty PROW 2007-2013 w pigułce" (Agri-environmental programme under RDP 2007-2013 - an overview), Ministry of Agriculture and Rural Development, Warsaw 2011.

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
	the sztumski type.Sheep races: wrzosówka, świniarka, olkuska, Polish mountain sheep - coloured variety, merino - coloured variety, uhruska, Wielkopolska, żelaźnieńska, korideil, kamieniecka, Pomeranian, cakiel Podhalański, Polish merino - old variety.Swine races: puławska, złotnicka white, złotnicka spotted (1)			and ewes of races listed below, entered into the breeding registry, covered by the protection programme of genetic resources. In order to qualify animals for the protection programme of genetic resources, an authorised entity should be contacted, to execute or coordinate activities with regard to the protection of genetic resources and the entity keeping the breeding registry, or the entity conducting assessment of the utility value of animals. (1)	
Plants	Semi-perennial rye (*Secale cereale var.multicale* (two-year plant), emmer wheat (*Triticum diccocum*), einkorn wheat (*Triticum monococcum*), common millet (*Panicum miliaceum* L), Lopsided Oat (*Avena strigosa*		C11, C7, M3	The purpose of Package 6 is to preserve local varieties of cultivated plants. Provision implementation of individual variants is supposed to contribute to extending availability of sowing	Subsidies to cultivations

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
	Schreb), false flax (*Camelina sativa* L), Big Trefoil (*Lotus uliginosus* Schkuhr (perennial plant), white melilot (*Melilotus albus* Medik), Caltuce (asparagus lettuce) (*Lactuca sativa* L. var.. angustana hort. Ex), grass pea(*Lathyrus sativus* L), Lentil (*Lens culinaris* Medik), parsnip (*Pastinaca sativa* L. (two-year plant)			material of local varieties of cultivated plants and their popularization. The protection also covers traditional orchards. (1)	

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.

In order to maintain traditional knowledge on associated biodiversity, grassroots projects and initiatives have been prepared and implemented:

- Social Ecological Institute - Społeczny Instytut Ekologiczny – www.sie.org.pl
- Projects of the Foundation for Sustainable Development – www.fer.org.pl
- Project „Protection of species diversity of valuable natural habitats on agricultural lands on NATURA 2000 areas in the Lublin Voivodeship" (KIK/25), in the years 2011-2016, financed from the funds of the Swiss-Polish Cooperation Programme (www. agropronatura.pl).
- Trainings for farmers in organic farming and Agri-environmental programme, conducted by various organizations (agricultural advisory centres, institutes, foundations, associations, private companies etc.).
- An educational aspect is also present in mandatory documents for farmers, realizing commitments under the Agri-environmental programme RDP 2007-2013 i.e. the agri-environmental plans and additional documentation in the case of packages focused on protecting valuable natural habitats and habitats of endangered species of birds.
- Active biodiversity protection of semi-natural marsh meadows in the Biebrza National Park – co-operation with farmers, local authorities and administration, which has been used under the project „Preservation of

Wetland Habitats in the Upper Biebrza Valley, co-financed from the financial mechanism LIFE+ National Fund for Environmental Protection and Water Management, and the Biebrza National Park.[165].

- One of the stages preparing the Rural Development Programme (RDP) for the years 2007-2013 and 2014-2020 in Poland, was preparation of the environmental impact of the RDP project forecast. RDP projects were submitted for public consultations, and the final document includes the opinions of environmentalists and environmental organizations[166].
- The monitoring conducted by the Institute of Technology and Life Sciences (ITP) in cooperation with the National Bird Protection Association (OTOP), commissioned by the Ministry of Agriculture and Rural Development „Evaluation of the Agri-Environmental Programme on the condition of Preservation of Natural Habitats, Birds and Landscape in Agricultural Areas" within 4 provinces: Mazowieckie, Podlaskie, Małopolskie, Podkarpackie, Zachodniopomorskie.
- The monitoring conducted by the Institute of Soil Science and Plant Cultivation State Research Institute in cooperation with OTOP, UPH, ITP under the project „Protection of species diversity of nature-valuable habitats on **utilised agricultural area** in the Natura 2000 areas in the Lubelskie province" (KIK/25), between 2012 and 2016, financed from the funds of the Swiss-Polish Cooperation Programme. It includes flora research on fixed grasslands, and **utilised agricultural area**, and spiders, orthoptera and birds within. the Lubelskie Province (www.agropronatura.pl).
- The monitoring of vegetation, nocturnal butterflies and dragonflies, and birds in the Biebrza National Park between 2010-2011[167].
- Register of protected and endangered fungi.
- Monitoring of ichthyofauna in selected waterbodies, co-financed by the General Board of the Polish Angling Association, the results of which were made available mainly through their publication in the science magazine Scientific Annual of the Polish Anglin Association[168].

Keeping the traditional knowledge on associated biodiversity, support development planning.

- Natural inventory of municipalities, identifying needs with regard to nature and landscape protection. Their advantages include: considering anthropogenic conditions and cultural qualities. Their disadvantages include, the limited spatial range of this type of studies, which are conducted only for those municipalities that have managed to secure financing for the research.
- The environmental protection programmes prepared for counties and municipalities. Issues of biodiversity protection are examined against the wider background of the entire environment protection issues, and aim to formulate a specific programme of activities. The weakness of the programmes is the lack of detailed field research, as, at a wide range of development, time and money are often lacking for the contractors to conduct independent field research.
- Studies on conditions and spatial management directions for municipalities. With regard to issues of biodiversity protection, they present diverse levels, largely dependent on the quality of used source materials, as, like the environmental protection programmes, they rarely refer to their own natural research.
- Eco-physiographic studies, by definition supposed to provide basic environmental documentation for land use planning.

[165] Bartoszuk H., Wiatr A., Frąckiel K. 2013. Czynna ochrona bioróżnorodności półnaturalnych łąk bagiennych w rejonie Szuszalewa (Active Conservation of Biodiversity and Semi-Natural Wet Meadows in the Szuszalewo Region). In: Biologiczna różnorodność ekosystemów rolnych oraz możliwości jej ochrony w gospodarstwach ekologicznych (Agricultural Ecosystems Biodeversity and its Conservation Posiibilities in Organic Farming). Tyburski J., Kostrzewska M.K. (red), Wyd. UWM Olsztyn: 293-305.

[166] Priwieziencew E., Sieniarska E. 2013. Rola organizacji pozarządowych oraz oddolnych inicjatyw rolników w ochronie dawnych odmian i ras (The Role of NGOs and Grassroots Farmer's Initiatives in the Conservation of Old Races and Varieties). In: Biologiczna różnorodność ekosystemów rolnych oraz możliwości jej ochrony w gospodarstwach ekologicznych (Agricultural Ecosystem Biodiversity, and Possibilities for its Preservation in Organic Farming). Tyburski J., Kostrzewska M.K. (red), Wyd. UWM Olsztyn: 351-368.

[167] Bartoszuk H. et.al. … 2013.

[168] Scientific Annual of the PAA, http://www.pzw.org.pl/roczniki/

- Forecasts of environmental impact – effects plan determinations, i.a., their impact on biological diversity. In practice, the level of detail of these studies depends on available materials.
- Plans for forest management and nature protection programmes in forest inspectorates – National Forests take inventory of protected, valuable natural areas and objects, and prepare a list of protected species present on grounds under administration of the The State Forests National Forest Holding.
- Reports on the environmental effects, forming the basis for assessment of the investment projects' effect on the environment – including biological diversity, and, as a consequence, constituting the base for decision on environmental conditions for issuing a permit for implementing such projects. For the purpose of these reports, oftentimes natural research is performed of varying detail. Among this type of studies, ornithological and chiropterological stand out, conducted mainly in accordance with the standard, national methodology which in connection with their scale and uniform proliferation across the whole country, gives potentially valuable data, due to their comparability not only in terms of quality, but also quantity.

Within the monitoring of agricultural lands the following actions take place:

- Monitoring the presence of pests of fruit plants is carried out in many orchards and plantations of blueberry plants, with a focus on identifying hazards for cultivations, and applying appropriate protection programmes. For this purpose forecasting and signaling systems are also used.
- Grassland Monitoring: Institute of Technology and Life Sciences in Falenty;
- Monitoring of arable fields (farm plant with accompanying plants) – The Plant Breeding and Acclimatization Institute (IHAR) – - National Research Institute, in Radzików, Mazovian Voivodship (2009-2013).

Long-term quantitative data are collected by the Central Statistical Office (GUS). They apply to the numbers of selected species of large mammals under protection, such as: forest bison (*Bison bonasus*), chamois (*Rupicapra rupicapra*), bear (*Ursus arctos*), lynx (*Lynx lynx*), and wolf (*Canis Lupus*). However, it should be emphasized that the GUS data are based on inventories with differing methodologies. Changes in numbers may as well be only a reflection of the differences in methodology, and not actual processes.

Within the monitoring of agriculture-related lands, a system is in place, monitoring the natural effects of the Agri-environmental programme under RDP 2007-2013, conducted by the Institute of Technology and Life Sciences (ITP) under the Long-Term Programme entitled: *Standardization and monitoring of environmental projects, agricultural techniques, and infrastructural solutions for safety and sustainable development of agriculture and rural areas.* The main assumption behind the conducted monitoring of natural effects of the Agri-environmental programme, is to obtain answers to the question in what scope and manner, the implemented programme affects the natural environment. The subject of the monitoring are elements of the natural environment, to which the programme provisions refer to directly, i.e. natural habitats, avifauna, landscape and soils.

Furthermore, preserving traditional knowledge on associated biodiversity is supported by the State Environmental Monitoring. State Environmental Monitoring includes:

- **Monitoring of birds, including NATURA 2000 areas of special bird protection source** http://www.monitoringptakow.gios.gov.pl/strona-glowna, availability: 07.10.14

Range Poland, global

Birds of Poland Monitoring (MPP) is a program coordinated by the National Inspectorate for Environmental Protection, and maintained under the National Environmental Monitoring.

Field works under the Birds of Poland Monitoring are coordinated by the National Birds Protection Association (OTOP), and performed by five major contractors responsible for individual programmes:

National Birds Protection Association (Ogólnopolskie Towarzystwo Ochrony Ptaków)

-Monitoring of Common Nesting Birds (MPPL)

-Monitoring of Rare Species 3 (MGR3)

Ornithological Station Museum and Institute of Zoology PAS

-Monitoring of Flagship Bird Species (MFGP)

-Monitoring of Wetland Birds (MPM)

-Monitoring of Rare Species 2 (MGR2)

-Monitoring of Crane Night Dwellings (MNZ)

Eagle Protection Committee

-Monitoring of Birds of Prey (MPD)

-Monitoring of Rare Species 1 (MGR1)

-Monitoring of Nesting Forest Owls (MLSL)

Polish Nature Protection Association „Salamandra"

-Monitoring of Geese Night Dwellings (MNG)

The primary goal of the programme is the monitoring of populations of the largest number of bird species possible, with particular focus on the NATURA 2000 network of areas of special bird protection. Under the extended system, monitoring covers almost 20% of the country area, and approximately 170 nesting bird species, 24 wintering bird species, 3 species of migratory birds, including 42 species from Appendix I to the Birds Directive. Each subprogram uses methodology adapted to the specific nature of the monitored group, or single bird species.

Biological Population Monitoring is a parameter evaluation, repeated in specified time intervals (e.g. the numbers, reproductive capacity, distribution), referring to a specific area, and designed to detect value changes of those parameters.

In a broader context, monitoring is a process of gathering information on selected parameters of a biological system (e.g. ecosystem, population), at various points in time, in order to assess the current condition of each system, and determine directional change tendencies of this condition over time (trend). Monitoring data analysis makes it possible to specify compliance of the current state with the target or expected state of a system. In particular, monitoring is intended to measure system response to implemented actions involving the protection and sustainable use of natural resources. For this reason, monitoring is an integral part of the biological resources management strategy and informed decision-making related to protection management thereof. Birds are commonly considered good indicators of the overall condition of the natural environment, or the „health" of ecosystems. In a number of EU member states, correctly selected bird numbers indexes are treated as indicators of their societies' quality of life. Population indicator of common agricultural landscape birds (so-called. Farmland Bird Index) is one of the official measures of sustainable development of the EU member states, in categories: 1) Structural Indicators/Environment, 2) Sustainable Development Indicators /Management of natural resources. Bird protection, and in particular of species indicated in Appendix I to the Birds Directive, is a legal obligation of EU member states; monitoring is a part of an efficient security system.

- **Monitoring of species and natural habitats with particular focus on NATURA 2000 areas of special protection of habitats,** source: http://siedliska.gios.gov.pl/index.php/sample-levels, access: 07.10.14 range: Poland, global

The project is realized on the order of the Chief Environmental Protection Inspectorate, by the The Institute of Nature Conservation is an institution of Division II (Biological Sciences) of the Polish Academy of Sciences, in Cracow, financed from the funds of the National Fund for Environmental Protection and Water Management. Monitoring research is conducted at the level of positions, located mainly within the designed areas of special protection for habitats of the NATURA 2000 network, but also beyond them, according to requirements of the Habitat Directive.

Monitoring operations are executed on the basis of regulations:

- Act of 16 April 2004 on Nature Protection with later amendments - places nature monitoring as part of the environment monitoring (Article 112). According to the Act, nature monitoring should consist of observations and assessment of the condition and changes in biodiversity and landscape components in selected areas, as well as evaluation of the effectiveness of applied nature protection methods, including observation of natural habitats, as well as plant and animal species, for the protection of which the NATURA 2000 area has been delimited.

- **Habitat Directive** (Council Directive no. 92/43 of 1992 on the conservation of natural habitats and wild fauna and flora), requires monitoring (literally „supervision") of the conservation status of natural habitats and species from Appendix I, II, IV and V of this document (Article 11). In Poland, this obligation applies to: 79 natural habitats, 49 species/genus/subgenus of plants; 141 species of animals. The directive also necessitates submitting reports (every 6 years) on the monitoring findings (Article 17).

-Convention on Biological Diversity (Rio de Janeiro of 5 June 1992, Journal of Laws 02.184.1532 of 6 November 2002) – Article 7 encourages the Parties to i.a., monitor biodiversity elements, including those, which require urgent protective measures, and have the greatest potential value for sustainable use, monitoring the effects of processes and activities, which have or may have a considerable, negative impact on the protection and balanced use of biodiversity, as well as gathering and compiling results of the identification and monitoring. According to the Convention on Biodiversity, natural monitoring should cover all biodiversity levels: ecosystem, species and genetic diversity.

- **Natural habitats and species covered by the monitoring in 2013**
  - **Natural habitats**

Field monitoring of natural habitats is conducted on two levels. The basic „field unit" constitutes a position, defined as a moderately uniform natural complex, consisting mostly of patches of the natural habitat examined. In most cases, such a post includes, a relatively uniform patch of a given habitat, however, in the case of microhabitats, mainly non-forest (e.g. screes 8160, spring complexes 7220, salt flats 1340) – examined patches of natural habitat can cover only small areas, surrounded by other, natural or semi-natural ecosystems. The size of studied sites is thus diversified, depending on the ecological characteristics of a given natural habitat – generally these are surfaces ranging from a dozen or so ares up to several hectares. In 2007-2008, as detailed monitoring, and later on, integrated monitoring were introduced, the area of studied sites has been described in detail in research forms, and delineated on attached maps. Since 2009, in all research posts, research transects are determined by means of a GPS receiver (one in each post), consisting of three points, at which phytosociological pictures are taken. Such methodology of collecting information, enables introducing a repetitive monitoring of the condition of a natural habitat within selected parts of a position. In the case of each of the examined natural habitats, monitoring positions are determined in a way enabling the monitoring of a representative majority of the most important areas of occurrence of these habitats in Poland. At the stage of delineating research areas, researchers mainly used information contained in the Standard Data Forms of the designed areas of special protection of habitats, and more precisely – assessment of the area of these habitats and their representative character, conservation status, and general assessment.

Types of natural habitats:

1150 Coastal lagoons

1210 Annual vegetation on drift lines

2110 Embryonic Shifting Dunes

2120 Shifting Dunes along the Shoreline (*Elymo-Ammophiletum*)

2180 Wooded Dunes of the Atlantic, Continental and Boreal region

2190 Humid dune slacks

3130 Oligotrophic to mesottrophic standing waters with vegetation of the *Littorelletea, Isoëto-Nanojuncetea*

3140 Hard oligo-mesotrophic waters with benthic vegetation of chara spp.*(Charetea)*

3270 Rivers with muddy banks

40A0 Bushes of dwarf cherry (*Prunetum fruticosae)*

6110 Rupicolous calcareous or basophylic grasslands of the *Alysso-Sedion*

6130 Calaminarian grasslands

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometea*)

6230 Species-rich Nardus grasslands on silicous subtrates in mountain areas (*Nardetalia*- floristically rich patches)

65XX Mesophile grasslands (or *Calthion*)

7110 Active raised bogs (live)

7120 Degraded raised bogs, still capable of natural and stimulated regeneration

7210 Calcareous fens (*Cladietum marisci, Caricetum buxbaumi, Schoenetum nigricantis*)

7220 Petrifying springs with tufa formation (*Cratoneurion commutati)*

8110 Silicous scree of the montane to snow level

8160 Medio-European calcareous scree of hill and montane levels (*Stipion calamagrostis)*

8310 Caves not open to the public

9110 *Luzulo-Fagetum*beech forests

9130 *Asperulo-Fagetum* beech forests

9170 *Galio-Carpinetumi*oak-hornbeam forests

9180 *Tilio-Acerion* forests of slopes, screes and ravines

91D0 Bog woodland

91E0 Alluvial forests with *Salicetum albo-fragilis , Populetum albae, Alnenion glutinoso-incanae* 91I0 Euro-Siberian steppic woods (*Quercetalia pubescentis-petraeae*beech forests

91P0 Fir Świętokrzyskie woodlands (*Abietetum polonicum*)

91XX Alders (*Carici elongatae-Alnetum*)

Plant Species

A monitoring position has been defined individually for each species. Position sizes varied, from a few dozen m^2 (in the case of positions of species related to microhabitats), to several ha (in the case of species present in larger ecosystems), when positions encompass whole clearings, forest complexes, mountain slopes, or mires, sometimes corresponding to areas of NATURA 2000, or their distinguishable fragment.

Monitored species:

Waterwheel plant *Aldrovanda vesiculosa*

Mountain arnica *Arnica montana*

Carlina onopordifolia

Ladybells *Adenophora liliifolia*

Bohemian bellflower *Campanula bohemica*

Campanula serrata

Floating water-plantain *Luronium natans*

Sudeten lousewort *Pedicularis sudetica*

Bohemian getianella *Gentianella bohemica*

Ligularia sibirica

Caldesia parnassifolia

Thesium ebracteatum

Fen orchid *Liparis loeselii*

Four Leaf Clover *Marsilea quadrifolia*

Cypripedium calceolus

Eleocharis carniolica

Galium sudeticum

Erysimum pieninicum

Hairy agrimony *Agrimonia pilosa*

Slovak Pasque Flower *Pulsatilla slavica*

Serratula lycopifolia

Marsh saxifrage *Saxifraga hirculus*

Marsh angelica *Angelica palustre (Ostericum palustre)*

Tozzia carpatica

Aconite *Aconitum firmum ssp. moravicum*

Polish Scurvy-grass *Cochlearia polonica*

Tatra Scurvy-grass *Cochlearia tatrae*

Fork moss *Dicranum viride*

Killarney Fern *Trichomanes speciosum*

Echium russicum

Animal Species

Monitoring position has been defined individually for each species. Size of the positions was extremely varied, from a few dozen m^2 (in the case of bats, positions of several invertebrates and amphibians), to a few dozen thousand ha (in the case of species with big requirements with regard to of living space, e.g. forest bison, bear, wolf, lynx), when positions encompass whole forest complexes and even mountain ranges, corresponding to NATURA 2000 areas.

Monitored species:

Goldstreifiger *Buprestis splendens*

European beaver *Castor fiber*

European Hamster *Cricetus cricetus*

Large Copper *Lycaena dispar*

Tatra pine vole *Microtus tatricus*

Sudeten ringlet *Erebia sudetica*

Phryganophilus ruficollis

Jersey Tiger *Callimorpha (Euplagia), quadripunctaria*

Xylomoia strix

Woodland brown *Lopinga achine*

Hermit Beetle *Osmoderma eremita*

Medicinal leech *Hirudo medicinalis*

Geyer’s Whorl Snail *Vertigo geyeri*

Desmoulin's Whorl Snail *Vertigo moulinsiana*

Narrow-mouthed Whorl Snail *Vertigo angustior*

Oxyporus mannerheimii

Boros schneideri

Willowherb Hawkmoth *Proserpinus proserpina*

Noble crayfish *Astacus astacus*

Pytho kolwensis

Pseudogaurotina excellens

Thick shelled river mussel *Unio crassus*

Southern Birch Mouse *Sicista subtilis*

Swamp minnow *Phoxinus percnurus*

European Ground Squirrel *Spermophilus citellus*

Burgundy snail *Helix pomatia*

Mesosa myops

Eurasian Otter *Lutra Lutra*

- **Integrated Environmental Monitoring**

source http://zmsp.gios.gov.pl/, access: 07.10.14

Range nationwide

Contractors Adam Mickiewicz University in Poznań, Centre of Integrated Environmental Monitoring, base stations established across the whole country, and specialists on different areas.

Integrated Environmental Monitoring (Zintegrowany Monitoring Środowiska Przyrodniczego – ZMŚP) operates under the National Environmental Monitoring, and its task, as opposed to specialized monitoring, is conducting observations of the highest possible number of natural environment elements, on the basis of planned, organized stationary research.

The purpose of the ZMŚP is to provide data determining the current environment condition, as well as, on the basis of long-term observation cycles, presentation of short and long-term environmental changes under conditions of climate change and increasing anthropopressure. The results obtained from the conducted observations constitute the basis for preparing short and long-term forecasts on environmental development, and presenting hazard directions and possible countermeasures.

The Integrated Environmental Monitoring, as opposed to trade monitoring, delivers complex information, not only within selected measurement programmes, but mostly of cause and effect analysis and outcomes of their impact on the geographic environment.

The ZMŚP is a scientific-research programme on the functioning of geo-ecosystems (landscapes), it serves the preservation of Polish landscape structure. With regard to methodology, the ZMŚP is based on the system operation concept, executes behavioural assumptions of geo-diversity and biodiversity of the whole country. The main object of ZMŚP research is the drainage basin (lake), wherein test surfaces are located, encompassing all types of ecosystems of the examined landscape.

The ZMŚP programme with regard to organization of the measurement system and test methods, refers to the International Co-operative Programme on Integrated Monitoring on Air Pollution Effects=ICP/IM. In each individual research station, monitoring of selected nature elements is conducted, and sometimes highly specialized tests.

Base station of the Integrated Environmental Monitoring, KAMPINOS (the Kampinos National Park), conducts specialized tests, i.a.:

- monitoring of staphylinidae, pselaphinae, spiders, ants, and elateridae (only in the drainage basin, from 1999 annually, planned completion in 2014);

- chiropterofauna monitoring (drainage basin, with its divide, from 2002 annually);

- white stork monitoring (drainage basin, with its divide, from 2004 annually);

- malakofauna monitoring (drainage basin only, from 2008, on average every 2 years).

Base station of the Integrated Environmental Monitoring, BIAŁA GÓRA (Adam Mickiewicz University in Poznań), i.a.:

- tree epiphyte monitoring;

- epigeic fauna monitoring;

- tree damage and communities monitoring.

Base station of the Integrated Environmental Monitoring, in Koniczynka (Nicolas Copernicus University in Toruń), i.a.:

- soil fauna monitoring;

- avifauna monitoring.

- **Forest Monitoring**

source http://www.gios.gov.pl/monlas/index.html, access: 07.10.14

Range Poland, global

Client: State Forests National Forest Holding, Department of Forestry and Nature Conservation of the Ministry of the Environment, Chief Inspectorate for Environmental Protection, the National Fund for Environmental Protection and Water Management.

Contractor: Forestry Research Institute

Fulfilling Poland's obligations under the Convention on Trans-boundary Waste Movements over Far Distances, the Convention on Biodiversity, the Strasbourg Convention and the Pan-European Ministerial Conference in Helsinki concerning Forest Protection in Europe.

Forest monitoring is an environmental evaluation system for forests and health of tree communities on the basis of continuous or periodical observations and measurements of selected indicators on permanent surveillance areas. Determination of spatial diversity of forest health.

The forest monitoring objectives are: tracking health changes of forests in time, analysis of cause and effect relations between forest health and biotic and abiotic environmental factors, preparation of short-term forecasts on changes in forest health, gathering information on forest condition, helpful when formulating state forest and environmental policy, providing information for the administration both state and local, as well as the society and administrative units of the State Forests administration.

- **Monitoring of genetic resources of farm animals – conducted across the whole country, by the National Research Institute of Animal Production in Balice, which also coordinates protection programmes of genetic resources of farm animals.**
- **Monitoring of genetic diversity of farm plants and associated flora – conducted by the Plant Breeding and Acclimatization Institute (IHAR) in Radzików (regional scope).**

3. Monitoring of environmental effects of the Agri-environmental programme

Range: nationwide

Contractor: Institute of Technology and Life Sciences

The monitoring includes several modules, i.a. habitats, avifauna and landscape monitoring. The purpose of effects monitoring of the Agri-environmental programme is assessing the impact of implementing the so-called environmental packages (Packages 4. and 5.) of the Agri-environmental programme RDP 2007-2013 on agricultural plots, which were qualified for the Agri-environment payments (supporting nature and environment friendly management in rural areas), on individual nature components.

1) **Monitoring of natural habitats** is intended to check whether plot use compliant with the requirements of Packages 4 i 5. of the Agri-environmental programme, is favourable for, or improves the condition of natural habitats. These are both Natura 2000 habitats, as well as rare and valuable habitats not mentioned in Appendix 1 to the Habitats Directive, i.e.:

- natural habitats covered by option 4.2/5.2:

  -transition mires and quaking bogs,

  -part of calcareous fens classified as *Caricion davallianae*,

  -mountain and lowland alkaline fens in the form of marshes, sedges, and mosslands;

- natural habitats covered by option 4.3/5.3:

  -*Magnocaricion* sedges,

  -part of calcerous fens classified as *Magnocaricion*;

- natural habitats covered by option 4.4/5.4:

  -Molinia meadows,

-Cnidion dubii meadows;

- natural habitats covered by option 4.5/5.5:

  -dry xeric sand calcareous grassland,

  -xerothermic grasslands,

  -thermophilic pienińska meadow;

- natural habitats covered by option 4.6/5.6:

  -humid meadows with *Calthion*;

- natural habitats covered by option 4.7/5.7:

  -lowland and mountain fresh extensively used meadows,

  -mountain, *Trisetum*, extensively used meadows;

- natural habitats covered by option 4.8/5.8:

  -mountain and lowland Nardus grasslands (*Nardion*-floristically rich patches);

- natural habitats covered by option 4.9/5.9:

  -inland, muddy salt flats with salirconia,

  -seaside salt flats (*Glauco-Puccinietalia* part - seaside communities),

  -inland, salty meadows, pastures and rushes (*Glauco-Puccinietalia* part - inland associations ,);

- natural habitats covered by option 4.10/5.10

  -damp moorlands with cross-leaved heath,

  -dry moorlands,

  -inland dunes with calcareous grasslands,

  -depressions on peat substrates with *Rhynchosporion*,

  -high peat bogs with peat-forming vegetation (live),

  -degraded raised bogs, still capable of natural and stimulated regeneration,

  -transition mires and quaking bogs,

  -calcerous fens,

  -mountain and lowland alkaline fens in the form of marshes, sedges, and mosslands.

2) **Avifauna Monitoring** conducted on agricultural plots that have been identified by agri-environmental experts as bird nesting habitats, or their closest surroundings. Ornithological monitoring conducted in the Institute of Technology and Life Sciences is intended to identify how the protection of bird nesting habitats, realized in accordance with the requirements of the Agri-environmental programme RDP 2007-2013, affects the condition and size of the bird population, including in particular, species deemed as priority, related to meadows and pastures. Ornithological monitoring is performed by two methods – point and surface

3) **Landscape Monitoring** implementation of individual packages of the Agri-environmental programme RDP 2007-2013, to a larger or smaller extent, indirectly affects the landscape, contributing mainly to preserving extensive meadows, pastures and natural enclaves, and semi-natural habitats. The largest role in this respect is played by natural packages i.e. Packages 4. and 5., designed to protect nesting habitats of endangered species of birds and valuable natural habitats, and Package 3. – Extensive permanent grasslands.

Landscape Monitoring is intended to:

- record the condition and changes in the rural landscape, including the diversity and spatial distribution of its elements,
- evaluation of the effectiveness of implementation of enviromental packages (Packages 4. and 5.) of the Agri-environmental programme in protecting the landscape diversity in rural areas i.e.:

-Package 4. – Protection of endangered bird species and natural habitats outside of the Natura 2000 areas;

-Package 5. – Protection of endangered bird species and natural habitats in the Natura 2000 areas;

-Package 3. – Extensive permanent grasslands (improving effectiveness of the Agri-environmental programme in landscape protection).

4. **The monitoring conducted by the Institute of Soil Science and Plant Cultivation - State Research Institute in cooperation with,** Polish Society for the Protection of Birds **OTOP, University of Natual Sciences and Humanities, ITP, under the project „Protection of natural biodiversity of valuable farmland habitats in NATURA 2000 areas in the Lubelskie Voivodeship"**, in the years 2012-2016, financed from the funds of the Swiss-Polish cooperation programme. It includes flora research on fixed grasslands, and **utilised agricultural area**, and spiders, *orthoptera*, and birds within the Lubelskie province (www.agropronatura.pl).
5. **Monitoring of vegetation, nocturnal butterflies, dragonflies, and birds in Biebrza National Park in 2010-2011**
6. **Each of the 23 National Parks in Poland conducts natural monitoring**, which covers nature elements associated with the specific natural character of a given park.

Range regional

Examples:

Warta Mouth National Park monitors the population of selected birds species, populations of beaver, predatory fish, game in Preservation Circuit Northern Floodplains and game protection zone.

The Kampinos National Park monitors lynx, beaver, large and medium mammals populations, and small mammal units.

The Magura National Park monitors, i.a., tree stands, populations of amphibians, rodents, deer, and large predators.

7. Landscape parks run monitoring of selected elements of the natural environment

Range local

Examples:

Pomeranian Complex of Landscape Parks the Landscape Park „Vistula Spit" runs monitoring of the sea holly and *Linaria odora*. Wielkopolskie Province Landscape Park Complex conducts monitoring and inventory of several bird and bat species. Monitoring of the noble crayfish occurrence is run in the Zaborski Landscape Park, regional range.

8. Planning studies

- **Natural inventories in municipalities**, identifying needs with regard to nature and landscape protection.
- **Environmental protection programmes** prepared for counties and municipalities. Issues of biodiversity protection are examined against the wider background of the entire environment protection issues, and aim to formulate a specific programme of activities.
- **Eco-physiographic studies** by definition supposed to provide basic environmental documentation for spatial development plans.
- **Forecast of environmental impact** – of effects of plan provisions, i.a., impact on biological diversity.
- **Forest Arrangement Plans and protection programmes in forest superintendencies** – State Forests take inventory of protected valuable natural areas and monuments, and prepare a list of protected species present in areas under their jurisdiction.
- **Reports on environmental effects**, forming the basis for assessments of the investment project's impact – including on biological diversity, and, in consequence, being a base for the decision on environmental factors of a permit for implementation of such projects. For the purpose of these reports, environmental research is often conducted of varying scope and detail. Among this type of studies, ornithological and chiropterological stand out, conducted mainly in accordance with the standard, national methodology

which in connection with their scale and uniform proliferation across the whole country, gives potentially valuable data, due to their comparability not only in terms of quality, but also quantity.

9. **Protection of the aquatic warbler's population in Poland: Project Life Aquatic Warbler, Protection of the Aquatic Warbler in Poland and Germany**, operating in 2005-2011 and currently, the project **Habitat Management of the Aquatic Warbler (*Acrocephalus paludicola*) by means of sustainable biomass management systems**

Source http://www.wodniczka.pl/, access 07.10.14

The Aquatic Warbler, is the only globally endangered singing bird species, more than 25% of the population of which occurs in Poland.

The range of the global population of the Aquatic Warbler is now limited to several countries, although in the early 20th century the species was common and numerous. In July 2004, under the Bonn Convention, the Polish government signed an Agreement for Aquatic Warbler Protection that obligates signatories to pay special attention to the protection of this species. OTOP (National Birds Protection Association) from its inception handles the protection of this species. In 2005 it won a grant to the Project LIFE „Protection of the Aquatic Warbler in Poland and Germany". Under this project, inventory has been taken of the Aquatic Warbler localities and the national bird census performed. Furthermore, the dangers for the species and its habitat requirements were researched more thoroughly. New methods were tested for the management of vegetation within the Aquatic Warbler habitats, as well as their effect on the population.

During the project, an observation was made that protection of the Aquatic Warbler's habitats must be continuous. Actions undertaken solely as part of similar projects are not sufficient. Therefore, OTOP, in the Project LIFE+ „The Aquatic Warbler, and biomass", postulates introducing a sustainable biomass management system that will ensure funding for protective actions on the Aquatic Warbler positions, through use of obtained biomass. As a result, even after project completion, the partners shall willingly conduct the mowing operations necessary for the habitat.

10. **Research and Development works, including monitoring elements**

Species composition analysis of weeds present in agricultural cultivations.

Farmers can protect weeds on arable fields under subvariant 6.3 of the Agri-environmental programme (RDP 2007-2013). Option 6.3. Seed production at the request of the gene bank: Segetal weeds. During the undertaken commitments, selected weeds were monitored.

11. **iTrap Polska is an all-Polish monitoring project of pests in orchards. Thanks to it, fruit growers will have access to data from a few dozen pheromone traps distributed across the whole country.**

12. **Pest monitoring of agricultural cultivations (i.a., potato blight, and cereal rusts) is carried out by the Institute of Plant Protection in Poznań (IPP), http://ior.poznan.pl/47,doradztwo.html.**

Recently greater attention is paid to the problems with maintaining traditional knowledge about associated biodiversity.

As an example, actions conducted by non-governmental organizations can be mentioned, concerning traditional beekeeping; e.g. honey hunting, the pilot project for the reactivation of honey hunting in Poland.

In 2006-2008, on the initiative of WWF[169] the pilot project for the reactivation of honey hunting in Poland. The WWF partner was the Mazowiecko-Świętokrzyskie Towarzystwo Ornitologiczne (Mazowiecko-Świętokrzyskie Ornithological Association), and the Biebrza and Wigry National Parks. The programme was supported by the administration of the Zespół Nadpilicznych Parków Krajobrazowych (Pilica Landscape Park Complex), State Forests and municipalities, and in a financial capacity, the Small Projects Programme UNDP GEF/SGP[170]. Exhibitions are organized in Poland, devoted to honey hunting:

- Skansen i Muzeum Pszczelarstwa im. prof. Ryszarda Kosteckiego (Prof. Ryszard Kostecki Open-Air Beekeeping Museum), Swarzędz, Wielkopolskie province,

[169] http://www.wwf.pl/ (access 20.05.2015)

[170] Source: Dzierżanowski T., Nawrocki P., Pazura A., Zawadzki J., 2009. Możliwość przywrócenia bartnictwa polskim lasom jako elementu zrównoważonego leśnictwa (Possibility of Restoring in Poland of the Tradition of Keeping Bees in Hives Scooped out of Trees, as a Component of Sustainable Forestry). Studies and Materials CEPL, R II, book2 (21), p. 49-56 http://cepl.sggw.pl/sim/pdf/sim21_pdf/45_sim21.pdf.; http://www.wwf.pl/ (access 20.05.2015).

- „'Sądecki Bartnik" Beekeeping Museum in Stróże, Nowy Sącz, Małopolskie province,
- Open-Air honey hunting and beekeeping museum in Radom, Mazowieckie province,
- Mazowiecka Village Museum in Sierpc, Mazowieckie province.

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.

No differences between men and women are observed in Poland within the scope concerning biodiversity. It is a result of equal access to knowledge, education and work for each gender. In recent years, according to the Central Statistical Office (GUS) (as of the end of the 1st quarter if 2012), higher education diplomas were held by 17.27% of all men (aged 15 and above) and 22.27% of all women (aged 15 and above). Currently there are 5% more women holding higher education diplomas than men[171].

State and trends of wild resources used for food

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

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

Species (local name)	Species (scientific name)	Production systems or other environments, which present and harvested	Change in state (2,1,0,-1,-2, NK)	Differences within species identified and characterized (Y/N)	Source of information
Edible snail	*Helix pomatia*	The edible snail is harvested mainly from the wild (most often encountered in not dense, humid scrubs; prefers lime soils, with the African snail kept for commercial purposes.	NK	N	Ministry of the Environment
Asp	*Aspius aspius*	A3	NK	Y	Chybowski et al. 2015[172]

[171] Concise Statistical Yearbook of Poland 2012, Central Statistical Office, Warsaw 2012.
[172] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015: Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski (State of National Biodiversity

Species (local name)	Species (scientific name)	Production systems or other environments, which present and harvested	Change in state (2,1,0,-1,-2, NK)	Differences within species identified and characterized (Y/N)	Source of information
Barbel	*Barbus Barbus*	A3	NK	Y	Chybowski et al. 2015
Zarte	*Vimba Vimba*	A3	NK	Y	Chybowski et al. 2015
Huchen	*Hucho hucho*	A3	NK	Y	Chybowski et al. 2015
Ide	*Leuciscus idus*	A3	1	Y	Chybowski et al. 2015
Dace	*Leuciuscus leuciscus*	A3	NK	Y	Chybowski et al. 2015
Crucian carp	*Carssius carassius*	A3	0	Y	Chybowski et al. 2015
Chub	*Leuciscus cephalus*	A3	NK	Y	Chybowski et al. 2015
Silver bream	*Blicca bjoerkna*	A3	-1	Y	Chybowski et al. 2015
Bream	*Abramis gate*	A3	-1	Y	Chybowski et al. 2015
Tench	*Tinca tinca*	A3	1	Y	Chybowski et al. 2015
Grayling	*Thymallus thymallus*	A3	NK	Y	Chybowski et al. 2015
Salmon	*Salmo salar*	A3	1	Y	Chybowski et al. 2015
Burbot	*Lota lota*	A3	NK	Y	Chybowski et al. 2015
Perch	*Perca fluviatilis*	A3	0	Y	Chybowski et al. 2015
Roach	*Rutilus rutilus*	A3	-1	Y	Chybowski et al. 2015
Brown trout	*Salmo trutta m fario*	A3	NK	Y	Chybowski et al. 2015
Zope	*Abramis ballerus*	A3	NK	Y	Chybowski et al. 2015
Zander	*Sander lucioperca*	A3	1	Y	Chybowski et al. 2015
Whitefish	*Coregonus lavaretus*	A3	1	Y	Chybowski et al. 2015
Vendace	*Coregonus albula*	A3	1	Y	Chybowski et al. 2015
Catfish	*Silurus glanis*	A3	1	Y	Chybowski et al. 2015
Smelt	*Osmerus eperlanus*	A3	-1	Y	Chybowski et al. 2015
Pike	*Esox lucius*	A3	1	Y	Chybowski et al. 2015
Nase	*Chondrostoma nasus*	A3	NK	Y	Chybowski et al. 2015

Regarding Genetic Resources of Aqatic Species in Inland Waters and Aquaculture, and in Inland Sea Waters and Parts of The Baltic Sea under Polish Jurisdiction). Report prepared under the Contract No. BDGzp-2120A-141/ES/14 of 29 December 2014 in Warsaw, between the Ministry of Agriculture and Rural Development and The Stanisław Sakowicz Inland Fisheries Institute in Olsztyn. Olsztyn, 2015 r.

Species (local name)	Species (scientific name)	Production systems or other environments, which present and harvested	Change in state (2,1,0,-1,-2, NK)	Differences within species identified and characterized (Y/N)	Source of information
Brown trout	*Salmo trutta m lacustris*	A3	NK	Y	Chybowski et al. 2015
Brown Trout	*Salmo trutta m trutta*	A3	1	Y	Chybowski et al. 2015
Bleak	*Alburnus alburnus*	A3	NK	Y	Chybowski et al. 2015
Eel	*Anguilla anguilla*	A3	-1	Y	Chybowski et al. 2015
Common rudd	*Scardinius erytrophthalmus*	A3	NK	Y	Chybowski et al. 2015
Common bilberry, black berry	*Vaccinium myrtillus L*	Species harvested mainly from the wild	NK	N	Trąba et al. 2012[173]

Wild food resources at risk

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

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

Where possible, please provide information on how extinction of wild food sources affects the livelihood of people, who depend on them, and the general impact of said extinction on food safety and alimentation. Whenever possible, please also specify references to sources of information.

No such research is conducted in Poland.

Currently, species listed in table 15 are of no economic importance.

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
Zarte *Vimba Vimba*	CR	Habitat changes, hydrotechnical architecture of watercourses	Witkowski, A., Kotusz, J., Przybylski, M. (2009) Stopiee zagroski, A., Kotusz,

[173] Trąba Cz., Rogut K.: Analiza sytuacji dla Borówki czarnej (Vaccinium myrtillus) na Płaskowyżu Kolbuszowskim (Situational Analysis for the European blueberry (Vaccinium myrtillus) on the Kolbuszowski Plateau). Association for Development and Promotion of Podkarpacie "PRO CARPATHIA" 2012.

Wild food species (scientific name)	Degree of threat	Main threat (indicate)	References or sources of information if available
			J., Przybylski, M. (2009) Stopieesta minog, A., Kot – stan 2009. Chrootusz, J., Przybylski, M. (2009) – 52.
Huchen *Hucho hucho*	EW	Loss of habitats, species wholly dependent on stocking	
Brown trout *Salmo trutta m lacustris*	EN	Habitat changes – lake eutrophication	

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.

Protection *ex-situ* is a very important element of the strategy of sustainable use and protection of genetic animal resources, supporting the realization of protection programmes, and the use of genetic material collected in banks *ex-situ* may be used to recover the lost intra-breed genetic variability.

Realized protection programmes of genetic resources of individual breeds should specify the needs, scope of gathering, and storage of biological material in banks *ex-situ*, as well as the principles of use of this material. Currently banks *ex-situ*, hold biological material of the Polish red cattle, of wrzosówka and świniarka sheep, rainbow trout, and carp.

The Genetic Material Bank (BMG), in the National Research Institute of Animal Production, as part of previous research projects holds: 680 seminal fluid portions of the świniarka sheep, 1217 seminal fluid portions of the wrzosówka sheep, and 2575 seminal fluid portions of the olkuska sheep (Krupiński i Martyniuk, 2009). For several years now, the National Research Institute of Animal Production, is gathering bull seminal fluid. Its resources, together with historical material of Polish red bulls include over 51 000 seminal fluid portions from 174 specimens. In addition, the Bank in Balice holds 1900 embryos of the Polish red cattle. Creating a gene bank is an extremely important venture, as possessing genetic resources of animals in the public sector has an additional, extremely important aspect, connected with the implementation in Poland of the Nagoya Protocol on access to genetic resources and sharing benefits resulting from their use[174]. Each country, being party to the Protocol, has an obligation to make available their resources to the other parties, with the possibility of achieving benefits from their commercialization. In the case of farm animals, they are mostly in private hands, while state administration may manage only genetic resources that are in the public sector. National banks of animal genetic material may, in the future, perform functions related to the implementation of the Nagoya Protocol, in particular with regard to the interest in rare native breeds. For the purposes of realizing the protection programme *ex situ*, of species and breeds, the National Research Institute of Animal Production has commissioned the National Bank of Biological Materials (KBMB). The Bank shall collect and store biological material, of cattle, horses, pigs, sheep and goats, in accordance with the devised methods and means of collecting and storage of biological material. In the case of cattle races covered by protection programmes, the scope of activities *ex-situ* should be expanded.

[174] http://www.cbd.int/abs/

In order to reinforce the protection of endangered populations, it would be prudent to extend the resources of biological material with embryo collection of races, covered by protection programmes. So far, no actions have been taken in Poland related to the protection of genetic resources of horses by means of the *ex-situ* method. However, each protection programme for a given breed includes provisions, enabling the application of this method. In justified cases, the biological material may be collected and stored *ex-situ*. This applies to seminal fluid, from selected stallions, and embryos collected from selected mares. It seems that, in order to secure the continuity of both male and female lines, especially those few in numbers, and maintain intra-breed genetic variability, it will be necessary to apply this method in the near future. With regard to sheep, there are no *ex-situ* genetic protection programmes in place. The BMG stores seminal fluid and embryos, gathered during earlier research, of several races of sheep. Routine sheep genetic material collection, for KBMB will apply to all races bred in Poland. The material shall be collected both from rams (seminal fluid) and ewes (embryos). Also planned are collections of biological material, of goats, both covered by the protection programmes (Carpathian goat), and production races: Saanen Alpine, cotton-grass, Polish white, and Polish coloured. Similarly, in the case of pigs, collections are planned of both seminal fluid and embryos from animals of races covered by the protection programmes. Later on, depositions are planned of biological material, of high production races. In the case of fish, milt cryoconservation is also conducted. The milt of breeding lines of carp is preserved and maintained by the Polish Academy of Sciences Institute of Ichthyobiology and Aquaculture in Gołysz. Systematic annual freezing is conducted since 2003. The number of milt portions of protected breeding lines of carp frozen, amounts to ca. 12 000. The programme covers nearly all spawners of the protected lines. Currently, the cryoconservation programme of carp milt is continued due to subsidies of the operational programme „Sustainable Development of Fisheries Sector and Coastal Fishing Areas, 2007-2013". The specific grant from Axis 2.2. for this programme, allows for the conservation of 1000 portions of carp milt annually. Trout milt was collected and conserved in the Rutki Institute in 1999-2008. Frozen trout milt is maintained in the Institute of Animal Reproduction and Food Research of PAS in Olsztyn. Currently, the collection and conservation of trout milt are not carried out. Although research is conducted in our country, on the possibility of effective freezing of bird seminal fluid, techniques of storing bird embryos and egg cells remain imperfect. Therefore, presently, there is no possibility of poultry genetic resources protection by means of the *ex-situ* method. Also, no protection *ex-situ* was undertaken of herbivore and carnivore fur animals, as well as protection *ex-situ* of individual subspecies of the domestic honeybee. In the case of deer, seminal fluid collection and cryoconservation is currently of no practical importance. This may change with the development of commercial deer breeding in the country [175].

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

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).

Protection programmes of genetic resources are realized for the domestic races of farm animals, mainly by means of the *in-situ* method. These are not races considered strictly as wild food, but specimens of primitive breeds, which due to their adaptation to the natural environment, extraordinary resilience to poor environmental conditions, ability to use poor soils, fodder, and resistance to diseases, may be regarded as similar to wild races.

[175] Krajowa strategia zrównoważonego użytkowania i ochrony zasobów genetycznych zwierząt gospodarskich (National Strategy for the Sustainable Use and Conservation of Genetic Resources of Farm Animals), IŻ PIB, MRiRW, 2013.

The *in situ* method provides protection through usage, which enables simultaneous improvement of specific and valuable features of a given breed. In the case of some, their broader incorporation into commercial production systems is a possibility, e.g. crossbreeding on the maternal side (puławskie swine for production of crossbred sows for commercial herds); for extensive and free-range breeding (e.g. green-legged and yellow-legged partridge hens).

Protection programmes cover domestic animal breeds – green-legged and yellow-legged hens, four domestic races of cattle: Polish red, white-back, Polish red-white and Polish black-white, the Polish konik, Małopolski and Silesian horses, the hucul, olkuska and wrzosówka sheep, Bilgoray (biłgorajska) and Pomeranian (pomorska) geese, miniature duck, and Polish Pekin P33 duck, złotnicka white pig.

Local plant varieties – old varieties of apple trees; cereals: wheat, i.a. the Emmer wheat; barley: Hanna Lubicki; oat: Proporczyk, Tatrzański, Udycz; legumes: peavine, vetch, field pea, bush and pole bean, sugar pea; potatoes: wyszoborski, Giewont, Amerykany, Bem Fliska, Pierwiosnek Dalia, Alma.

Populations covered by the genetic resources protection of farm animals and fish:

Cattle: Polish red and white-back; red-white and black-white of the old variety.

Horses: Polish konik, hucul, Silesian, Małopolski, Wielkopolski.

Swine: złotnicka coloured, złotnicka white, puławska.

Sheep: wrzosówka, świniarka, olkuska, pomorska, żelaźnieńska, uhruska, wielkopolska, korideil, Polish mountain, Polish coloured, coloured merino.

Chickens: polbar Pb, Green-legged Partridge ZK, leghorn G-99, leghorn H-22, rhode island red R-11, sussex S-66, Yellow-legged Partrige Ż-33, Green-legged Partrige Z-11, rhode island red K-22, rhode island white A-33.

Geese: biłgorajska Bi, zatorska ZD-1, lubelska Lu, kielecka Ki, podkarpacka Pd, kartuska Ka, rypińska Ry, suwalska Su, garbonosa Ga, roman Ro, pomorska Po, SD-01, słowacka Sł.

Ducks: Polish Pekin P-33, miniature duck K-2, domestic pekin P-11, domestic pekin P-22, Danish pekin P-8, French pekin P-9, KhO-1, A.

Common fox: pastel and whiteneck.

The popieliański white rabbit.

Beige chinchilla.

Domesticated polecat.

Central-european bee: Augustowska, North, Asta, Kampinoska.

Carp (lines): gołyska, knyszyńska, Ukrainian, Lithuanian, zatorska, starzawska.

Trout: spring and autumn spawning season.

Polish red cattle – there were three distinguishable varieties in Poland: valley, foothill, and Silesian; particularly valuable due to its adaptation to local conditions, resistance to disease, general healthiness, little fodder requirements, good fertility, longevity.

Polish Konik – the only, fully native horse race, bred without the participation of external races. Legally recognized as a natural relic. Farmers believe that their population should be regarded as a gene bank. Polish Koniks are perfectly suited for difficult environmental conditions, are unrefined, resistant, lively and at the same time even-tempered.

Hucul.

Local races of pigs – złotnicka was preserved as meat-fat slow growing swine. It is a domestic race distinguished from other varieties bred in the country, by its diversified gene set. Primitive pig genes have been preserved, which constitute a valuable element of the genetic diversity of this species. Złotnickie pigs are covered by the genetic resources protection programme, the goal of which is to increase the present population to 500 sows in the basic herd.

Złotnickie white and coloured pigs.

Puławska pig.

Sheep – primitive domestic races in Poland were disappearing, as the scope of breeding works grew to include an increasing part of the domestic stock. Thanks to those, the Polish lowland, longwool, and mountain sheep of today have retained several valuable characteristics: excellent adaptation to local environment, low feed requirements, general healthiness, and prolificacy.

The genetic resource programme of farm animals includes ten sheep varieties: Polish mountain, coloured mountain, swiniarka, olkuska.

Chickens: Green-legged Partridge, Yellow-legged Partridge, Leghorn, Rhode-Island Red, Sussex, Polbar.

Geese – northern varieties (suwalska, kartuska, rypińska) derived from primitive geese kept in the north of Poland. They are characterized by rapid growth, good musculature and reproductive characteristics. Southern varieties (lubelska, kielecka, podkarpacka) derived from primitive geese kept in southern and south-eastern Poland, are characterized by good musculature, tender, non-greasy meat, and great resilience.

Domestic duck races – Polish Pekin P33, miniature duck K2.

Fish stocking programmes – include at least 24 wild fish species. The most important are: pike, eel, zander, brown trout (Salmo trutta m. fario, Salmo trutta m. trutta), tench, vendace, catfish, ide, and whitefish.

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
parsnip (Pastinaca sativa L. (two-year plant). (1)			Preservation of local varieties of cultivated plants. Provision implementation of individual variants is supposed to contribute to extending availability of sowing material of local varieties of cultivated plants and their popularization. The protection also covers traditional orchards. (1)	Subsidies to cultivations under RDP 2014-2020
Polish red cattle, white-back cattle, Polish red-white, Polish black-white Polish konik, hucul, Małopolskie, Silesian and Wielkopolskie horses, draft horses of the sokólski and sztumski type Sheep races: wrzosówka, świniarka, olkuska, Polish mountain coloured sheep, coloured merino, uhruska,			Protection of endangered species of domestic farm animal races. The condition for commencing the implementation of Package 7 is keeping by the farmer of cows, mares, sows or ewes entered in the breeding register, of races listed below, covered by the genetic resources protection programme. In order to qualify	Subsidies to cultivations under RDP 2014-2020

Wild food species conserved (scientific name)	Site name and location	Size and environment	Conservation objective(s)	Actions taken
Wielkopolska, żelaźnieńska, korideil, kamieniecka Pomeranian, cakiel podhalański, Polish merino of the old type. Pig races: puławska złotnicka white and coloured varieties (1)			animals for the genetic resources protection programme, the entity, authorized to realize and coordinate activities with regard to the genetic resources protection programme, and the entity keeping the breeding register, or the entity in charge of animal extrinsic value assessment should be contacted. (1)	
Asp *Aspius aspius*, common barbus *Barbus Barbus*, vimba *Vimba Vimba*, huchen *Hucho hucho*, ide *Leuciscus idus*, crucian carp *Carassius carassius*, European chub *Leuciscus cephalus*, carp bream *Abramis brama*, tench *Tinca tinca*, grayling *Thymallus thymallus*, salmon *Salmo salar*, burbot *Lota Lota*, European perch *Perca fluviatilis*, roach *Rutilus rutilus*, brown trout *Salmo trutta m. fario* zander *Sander lucioperca*, whitefish *Coregonus lavaretus*, vendace *Coregonus albula*, catfish *Silurus glanis*, pike *Esox lucius*, common nase	Fishing circuits established on inland waters	All development stages of fish	Support for exploited fish population	Stocking programmes specified in fishing reports

Wild food species conserved (scientific name)	Site name and location	Size and environment	Conservation objective(s)	Actions taken
Chondrostoma nasus, brown trout *Salmo trutta m. lacustris*, brown trout *Salmo trutta m. trutta*, eel *Anguilla anguilla*				

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?

Protection programmes *in-situ* of the genetic resources of all breeds, particularly those with limited numbers, focus on maintaining high genetic variability within each race, and in some cases, reduction of infusion of external breeds. It should be stated that complex educational and promotional activities, concerning domestic farm animal breeds and products derived from them, supporting *in-situ* protection, are sorely lacking. Education should be directed towards children, as the sooner they will be acquainted with such notions as „local race", or „domestic product", the bigger the chances are to obtaining a conscious client, interested in specialized products in the future. Therefore, it would be prudent to appoint a team of representatives farmer and domestic manufacturers unions and organization, which would prepare a strategy concerning the promotion of this sector both in Poland and abroad. Mass media (mainly TV and press), should, to a greater extent, contribute to activities promoting the Polish farming, i.e. by information programmes covering exhibitions, shows, competitions, and farming-recreational events [176].

In the case of fishery and aquaculture, the main source of knowledge about fish species and their usability by people, are professional personnel, but also fishermen and social organizations involved with fishery, such as the Polish Angling Association.

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.

No differences are observed in Poland with regard to preservation and knowledge about wild food species between women and men. It is a result of equal access to knowledge, education and work for each gender. In recent years, according to the Central Statistical Office (GUS) (as of the end of the 1st quarter of 2012), higher

[176] Krajowa strategia zrównoważonego użytkowania i ochrony zasobów genetycznych zwierząt gospodarskich (National Strategy for the Sustainable Use and Conservation of Genetic Resources of Farm Animals), The National Research Institute of Animal Production in Kraków-Balice, Ministry of Agriculture and Rural Development (MARD), 2013. Krajowa strategia zrównoważonego użytkowania i ochrony zasobów genetycznych zwierząt gospodarskich (National Strategy for the Sustainable Use and Conservation of Genetic Resources of Farm Animals), 2013. Żabiński W. (2012). Oral information – President of the Polish Association of Breeders Deer.
http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A7-2011-0359+0+DOC+PDF+V0//EN 78. http://www.bioroznorodnosc.izoo.krakow.pl/ 79.

education diplomas were held by 17.27% of all men (aged 15 and above) and 22.27% of all women (aged 15 and above). Currently there are 5% more women holding higher education diplomas than men[177].

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).

Poland is a country which has not suffered great natural disasters, resulting in thousands of casualties. In our case, we are rather dealing with floods, flooding, spring thaws, which may result in landslides, constituting a hazard to business operations and human lives[178].

Most disasters in Poland are of a local character. The largest floods (national range), occurred in 1997 and 2010. Losses caused by floods usually have a greater impact on vegetation (cultivations), than on fauna, including farm animals. Floods and flooding cause important changes in habitats within utilised agricultural area, and, by extension, dwelling conditions of wild organisms of associated biodiversity of agri-ecosystems.

After the flood of 2010, the total losses in the agriculture sector have been estimated at 2.1 billion PLN. No data is available on flood losses with regard to farm animals, especially broken down into production systems. Therefore, no data for table 18 is available.

In the last 10 years, neither natural disasters, nor those caused by human activity have been recorded in Poland, which have had a significant impact on the biological diversity for alimentation and agriculture or ecosystem services.

Poland suffers from regular, annual small or large scale floods, resulting mainly in material losses related to the population. Losses in the biodiversity for alimentation and agriculture caused by e.g.: field flooding, are local, short-term, and do not have any significant importance nationwide, and consequently are not the subject of scientific research (no literature available). On the other hand, the biodiversity of plants and animals not having any importance for food, may increase due to floods, as a result of creating new habitats, rich in organic matter, carried by the river current.

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)
Avian influenza	L3	0	0
African swine fever	L3	0	0
Avian influenza	L7	0	0
African swine fever	L7	0	0
Avian influenza	M3	0	0
African swine fever	M3	0	0

[177] Concise Statistical Yearbook of Poland 2012, Central Statistical Office, Warsaw 2012.
[178]Grabowski D., Rączkowski W., 2012 Geozagrożenia w Polsce (Georisks in Poland), http://www.kgfiks.oig.ug.edu.pl/downloads/2012/jc/gp_pugp-materialy-1-geozagrozenia.pdf.

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.

A specific type of natural disasters are disease epidemics, i.e. Avian influenza or swine fever. A country, wherein an epidemic occurs, is at risk of very high economic losses in animal farming and meat industry, caused by mass deaths of poultry or swine, the costs of outbreak liquidation, and compensations paid, as well as suspension of trade and export of livestock, meat and animal products[179]. However, the effect on the general biological diversity for alimentation and agriculture was evaluated at „0", since it has been recognized that these epidemics were/are small in scale.

In Poland, the first two cases of the African swine fever (ASF) were observed in wild boars on the 17 and 18 February 2014. Immediately afterwards, the Chief Veterinary Officer decided on establishing a protection zone (restricted area due to cases of ASF in wild boars) on the territory of Poland.

Cases of outbreaks of the highly pathogenic avian influenza virus (the so-called bird flu) were observed in Poland in 2006 – only in wild birds, while in 2007 both in wild birds and poultry.

With regard to floods described in question 40, beyond the damages they caused, they may also have a positive impact on the ecosystem. Organic remains transported by the water and floating leaves and plant residues, constitute a nutritional base for many species of invertebrates. Logs lying in the riverbed, differentiate the current speed, and, as a consequence, modify the shape of the riverbed and create new habitats for animals, providing them with areas for hunting, as well as shelter. Uprooted trees lying across rivers are used by animals as communication routes. Observations indicate that such natural platforms are used both by small mammals, as well as large predators (e.g. wolves) [180].

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.

As has been described in question 40, areas affected by floods can suffer temporary problems with generating income, however, they are reversible (normally related to only the year of occurrence). On the other hand, no permanent changes in animal production were observed, which could be related to the occurrence of local disasters.

Economic losses caused by disease outbreaks, like the avian influenza, or ASF, are considerable both on the side of the state budget, and farmers and manufacturers (ban on sales, mass animal deaths). At the same time, they do not reduce the safety of produced food, or population alimentation capacity, as Poland is a country executing EU policy on food safety. Poland does not suffer from food shortages.

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.

No disasters of high significance occurred. Lack of evidence. This does not apply to the situation in Poland, as we have not suffered serious natural disasters.

[179] General Veterinary Inspectorate, www.wetgiw.gov.pl [dostęp 12.05.2015 r.].
[180] Ciapała S.,2004, http://pracownia.org.pl/dzikie-zycie-numery-archiwalne,2118,article,2543.

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).

According to current knowledge, no evidence has been found, confirming the opinion that within the last 10 years invasive species have had an influence on biological diversity concerning farm animal species.

In Poland in the last 5 years, the following invasive species have been indentified: *Rhagoletis cingulata* (cherry fruit fly), *Monilinia polystroma*, *Monilinia fructicola* (brown rot), *Xanthomonas corylina* (hazelnut blight), *Rhizobium skierniewicense* (root tumors), Raspberry leaf blotch virus (RLBV) *Aculus masseei*. However, no research on the influence of the aforementioned organisms on biodiversity, and yield of fruit plants was conducted.

Listed below are those, for which there is any information on their impact on biological diversity for alimentation and agriculture and/or ecosystem services.

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)**
Canadian goldenrod (*Solidago canadensis)*, tall/giant goldenrod (*Solidago gigantea)*	C11 Naturally irrigated crops: Temperate zone M3 Mixed systems (livestock, crops, forests and / or aquaculture and fisheries): Temperate zone	-1	NK
knotweed (*Reynoutria* spp.)	C11 Naturally irrigated crops: Temperate zone M3 Mixed systems (livestock, crops, forests and / or aquaculture and fisheries): Temperate zone	-1	NK
Sosnowsky's Hogweed (*Heracleum sosnowskyi* Manden.), giant hogweed (*Heracleum mantegazzianum* Sommier et Levier)	C11 Naturally irrigated crops: Temperate zone M3 Mixed systems (livestock, crops, forests and / or aquaculture and fisheries): Temperate zone	-1	NK
Western corn rootworm (*Diabrotica virgifera Le Conte)*	C11 Naturally irrigated crops: Temperate zone M3 Mixed systems (livestock, crops, forests and / or aquaculture and fisheries): Temperate zone	-1	NK
Canadian goldenrod (*Solidago canadensis)*, tall/giant goldenrod (*Solidago gigantea)*	C11 Naturally irrigated crops: Temperate zone M3 Mixed systems	-1	-1

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)
	(livestock, crops, forests and / or aquaculture and fisheries): Temperate zone		
knotweed (*Reynoutria* spp.)	C11 Naturally irrigated crops: Temperate zone M3 Mixed systems (livestock, crops, forests and / or aquaculture and fisheries): Temperate zone	-1	-1
Sosnowsky's Hogweed (*Heracleum sosnowskyi* Manden.), giant hogweed (*Heracleum mantegazzianum* Sommier et Levier)	C11 Naturally irrigated crops: Temperate zone M3 Mixed systems (livestock, crops, forests and / or aquaculture and fisheries): Temperate zone	-1	-1
Western corn rootworm (*Diabrotica virgifera Le Conte)*	C11 Naturally irrigated crops: Temperate zone M3 Mixed systems (livestock, crops, forests and / or aquaculture and fisheries): Temperate zone	-1	-1
Abutilon theophrasti Medik		-1	-1
Echinochloa crus-galli (L.) P. BEAUV.		-2	-2
Diabrotica virgifera LeConte		-1	-1
Oxychilus draparnaudi (Beck, 1837)		-2	-1
Juncus tenuis Willd.		-1	-1
Glischrochilus quadrisignatus (Say, 1835)		-2	-1
Festuca rupicaprina (Hack.) A. Kern.		-1	-1
Veronica filiformis Sm.		-2	-2
Trifolium patens Schreb.		-2	-1
Racer goby *Neogobius gymnotrachelus*	A3	NK	NK
Monkey goby *Neogobius fluviatilis*	A3	NK	NK
Chinese sleeper *Perccottus glenii*	A3	NK	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.

Alien invasive species were brought to Poland or emigrated on our territory by themselves. It is believed, however, that they do not have a fundamental impact neither on the components of biological diversity for food and agriculture, nor on ecosystem services. Some of these species have found their place in the national livestock production. The American Mink, racoon dog, deer and fallow deer, which are on the list of alien species maintained by the Institute of Nature Conservation in Krakow, are also livestock within the meaning of the *Act of 29 June 2007 on breeding and reproduction of farm animals*[181].

Collection of information on alien species has been started by the Institute of Nature Conservation PAS in 1999. It was then that the „Species introduced in Poland" database has been prepared for the Ministry of the Environment.[182] Initially it included 233 foreign species of fungi, plants and animals. The database is regularly updated. Currently, the total number of non-native species of plant, animal and fungi in the database amounts to 1.268. However, only some of these species create breeding populations in our country. Other species are only found occasionally. They include species that have been observed in nature only once or twice[183].

Each of the alien species is described in detail by the INC PAS. At the same time, the Institute does not take into account the invasive capacity of alien species in the description. Due to the multitude of alien species, it is impossible to specify their impact on the elements of biological diversity for food and agriculture, as well as on ecosystem services (ES) within a compact study.

Invasive species: Canadian goldenrod (*Solidago canadensis*), tall/giant goldenrod (*Solidago gigantea*), Canadian horseweed (*Conyza canadensis*) and knotweed (*Reynoutria* sp.) may pose a threat to native flora, as they form compact phytocenoses and force out native plants by suppressing and / or allelopathic impacts[184]. Allelopathic impacts of invasive plants can also significantly reduce crop yields in an agricultural landscape.[185] The transformation of native species communities' floral composition due to the development of neophytes also induces changes to the communities of other organisms related to a give habitat, including pollinating insects[186] and insectivorous birds[187]. Adverse impact of alien species on native ecosystems is now as much a serious phenomenon that, where possible, efforts are made to fight against or at least limit new-comers' presence. For example, during a study of agricultural areas in south-western Poland, it was reported that within marginal environments (important due to ES), only a few invasive species occurred, however the phytocenoses including them were significantly more limited in terms of flora than patches, where their presence hasn't been reported[188].

In Lower Silesia, Lesser Poland and Greater Poland, over the past few years, an increase of both the number of sites, as well as the occupied area within marginal environments, taken by species of the *Solidago* genus has been reported. Their spread in these habitats is facilitated by the cessation of grazing and mowing, once

[181] Ustawa z dnia 29 czerwca 2007 roku o organizacji hodowli i rozrodzie zwierząt gospodarskich (OJ No. 133, item 921, as amended).

[182] http://www.iop.krakow.pl/alien_species_in_poland_database_2_159.html [dostęp 15.05.2015].

[183] The list of alien species in Polish flora can be found at http://www.iop.krakow.pl/gatunkiobce/default.asp?nazwa=lalf&je=pl. All information on alien species found in Poland is available at: http://www.iop.krakow.pl/gatunki_obce_1_208.html.

[184] Tokarska-Guzik 2005, Tryjanowski et al, 2011.

[185] Tokarska-Guzik B., 2005. The establishment and spread of alien plant species (Kenophytes) in the flora of Poland. Wydawnictwo Uniwersytetu Śląskiego, Katowice.

[186] Moroń D., Lenda M., Skorka P., Szentgyorgyi H., Settele J., Woyciechowski M., 2009. Wild pollinator communities are negatively affected by invasion of alien goldenrods in grassland landscapes. Biological Conservation, 142: 1322-1332.

[187] Skórka P., Lenda M., Tryjanowski P., 2010. Invasive alien goldenrods negatively affect grassland bird communities. Biological Conservation, 143: 856-861.

[188] Dajdok Z., Wuczyński A., 2008. Alien plants in field margins and fields of southwestern Poland. Biodiversity Research and Conservation, 9-10: 19-33.

practiced on wide fields, country roads and plant strips along watercourses.[189] The development of communication and transport, as well as changes in agricultural production technology, including cultivation simplifications, especially direct sowing[190], may facilitate the migration of foreign plant species or the emergence of expansive species in biological communities.

A list of alien invasive species among plants, constituting a threat to Poland's natural flora, has been published in a study by Tokarska-Guzik et al (2012)[191]. The authors of the study included the following species to category IV species, whose appearance in Poland is vital due to a large number of sites, large number of specimens in patches and the increasing number of sites or occupied area: ashleaf maple (*Acer negundo* L.), mountain brome (*Bromus carinatus* Hook. & Arn.), wild cucumber (*Echinocystis lobata* (F.Michx.) Torr. Et A. Gray), Sosnowsky's Hogweed (*Heracleum sosnowskyi* Manden.), giant hogweed (*Heracleum mantegazzianum* Sommier et Levier), Policeman's Helmet (*Impatiens glandulifera* Royle), Small Balsam (*Impatiens parviflora* DC.), American bird cherry (*Padus serotina* (Ehrh.) Borkh.), northern red oak (*Quercus rubra* L.), knotweed (*Reynoutria* spp.), black locust (*Robinia pseudoacaccia* L.), Canadian goldenrod (*Solidago canadensis* L.), tall/giant goldenrod (*Solidago gigantea* Aiton), cocklebur (*Xanthium albinum* (Widder) H.Scholz), common ragweed (*Ambrosia artemisiifolia* L.), thicket shadbush (*Amelanchier spicata* (Lam.) K. Koch, New York aster (*Aster novi-belgii* L.), rugosa rose (*Rosa rugosa* Thunb.), cutleaf (*Rudbeckia laciniata* L.), grass-leaved goldenrod (*Solidago graminifolia* (L.) Elliott), steeplebush (*Spiraea tomentosa* L.). The study by Tokarska-Guzik et al (2012)[192] also contains a list of invasive plant species appearing in Natura 2000 natural habitats. Invasive species: Canadian goldenrod (*Solidago canadensis*), tall/giant goldenrod (*Solidago gigantea*), Canadian horseweed (*Conyza canadensis*) and knotweed (*Reynoutria* sp.) may pose a threat to native flora, as they form compact phytocenoses and force out native plants by suppressing and / or allelopathic impacts[193]. Allelopathic impacts of invasive plants can also significantly reduce crop yields in an agricultural landscape.[194] The transformation of native species communities' floral composition due to the development of neophytes also induces changes to the communities of other organisms related to a give habitat, including pollinating insects[195] and insectivorous birds[196]. Adverse impact of alien species on native ecosystems is now as much a serious phenomenon that, where possible, efforts are made to fight against or at least limit new-comers' presence. For example, during a study of agricultural areas in south-western Poland, it was reported that within marginal environments (important due to ecosystem services), only a few invasive species occurred, however the phytocenoses including them were significantly more limited in terms of flora than patches, where their presence hasn't been reported[197].

In waters, in terms of invasiveness, Ponto-Caspian species of fish of the Gobiidae, which reached national waters through the Pripyat-Bug channel on their own and are now rapidly spreading in Vistula's system[198].

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[189] Tryjanowski P., Dajok Z., Kujawa K., Kałuski T., Mrówczyński M.: Zagrożenia różnorodności biologicznej w krajobrazie rolniczym: czy badania wykonywane w Europie Zachodniej pozwalają na poprawną diagnozę w Polsce?, Polish Journal of Agronomy, 2011, 7: 113-119.

[190] Gołębiowska H.: Dynamika występowania flory segetalnej w uprawie kukurydzy na Dolnym Śląsku w latach 1972-2008 i obecne możliwości jej regulacji. Monografie i Rozprawy Naukowe, Wydawnictwo IUNG-PIB, Puławy, 2011, 30: 7-113.

[191] Tokarska-Guzik B., 2005. The establishment and spread of alien plant species (Kenophytes) in the flora of Poland. Wydawnictwo Uniwersytetu Śląskiego, Katowice.

[192] Tokarska-Guzik B., Dajdok Z., Zając M., Zając A., Urbisz A., Danielewicz W., Hołdyński Cz. 2012. Rośliny obcego pochodzenia w Polsce ze szczególnym uwzględnieniem gatunków inwazyjnych. Wydawnictwo GDOŚ, Warsaw 2012, p. 197.

[193] Tryjanowski P., Dajok Z., Kujawa K., Kałuski T., Mrówczyński M.: Zagrożenia różnorodności biologicznej w krajobrazie rolniczym: czy badania wykonywane w Europie Zachodniej pozwalają na poprawną diagnozę w Polsce?, Polish Journal of Agronomy, 2011, 7: 113-119.

[194] Tokarska-Guzik B., 2005, The establishment and spread of alien plant species (*Kenophytes*) in the flora of Poland. Wydawnictwo Uniwersytetu Śląskiego, Katowice.

[195] Moroń D., Lenda M., Skorka P., Szentgyorgyi H., Settele J., Woyciechowski M., 2009. Wild pollinator communities are negatively affected by invasion of alien goldenrods in grassland landscapes. Biological Conservation, 142: 1322-1332.

[196] Skórka P., Lenda M., Tryjanowski P., 2010, Invasive alien goldenrods negatively affect grassland bird communities. Biological Conservation., 143: 856-861.

[197] Dajdok Z., Wuczyński A., 2008, Alien plants in field margins and fields of southwestern Poland. Biodiversity Research and Conservation, 9-10: 19-33.

[198] Witkowski, A., Grabowska, J., 2012, The non-indigenous freshwater fishes of Poland: threats to the native ichthyofauna and consequences for the fishery: a review. Acta Ichthyologica et Piscatoria 42 (2), 77-87.

The following shows the impact of invasive alien species on various components of biodiversity for food and agriculture and / or impacts on ecosystem services[199].

- ***Abutilon theophrasti Medik – Velvetleaf (Herbaceous plant)***

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Invasive alien species.

Troublesome pest plant, especially in sugar beets.

Propagating population; numbers increasing.

Since 2002, recorded at several dozens plantations in Lower Silesia (Pusz 2007; Domaradzki et al 2008).

The species is controlled, but with limited effect.

Impact

Impact mechanism:

- Competition, Scope of impact: Medium

  Impact on: Beetroot (*Beta vulgaris* L.)

  (Data come from: Poland)

Introduction

Earliest introduction/observation: 2002

Means of transportation to Poland:

- The species was deliberately introduced

Reasons for which the species was transferred to Poland:

- For some introductions – no data on the reason for which the species was introduced to Poland.

Vectors responsible for spreading the species to Poland:

- Animal

Means the species got through to Poland's natural environment:

- Autonomous invasion to the natural environment after prior introduction in a neighbouring country

- ***Echinochloa crus-galli (L.) P. BEAUV.*** – **Cockspur grass (Grass)**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Invasive alien species.

Corn weed. In Western, South-Western, Central and South-Eastern regions of Poland, the species has overrun 60% of fields.

Propagating population; numbers increasing.

The species is controlled, but with limited effect.

Controlled with post-emergence herbicides. High efficiency: – Titus 25 WG at a dose of 60g/ha used with Trend 90 EC adjuvant at a dose of 0,1% – Milagro 040 SC at a dose of 1,5 l/ha.

Impact

Habitats occupied in secondary range:

[199] Alien species in Poland: http://www.iop.krakow.pl/ias

- **Arable land** and market gardens

  Areas sown with corn. Prefers fertile, moderately moist, humus soil. (Data come from: Poland)

- ***Diabrotica virgifera LeConte*** – **Western corn rootworm (Insect)**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Invasive alien species.

Propagating population; numbers increasing.

Means of dispersion after introduction to Poland: Data on means of dispersion after introduction to Poland are uncertain.

The species is controlled, but with limited effect.

Impact

Habitats occupied in secondary range:

- **Arable land** and market gardens

  cornfields (Data come from: regions of Europe, where the species is alien)

Impact mechanism:

- Impact on the economy, Scope of impact: Significant

  Impact on: corn (*Zea* L.)

  Corn pest. The larvae of the pest are the most dangerous to corn, as they feed on the roots of young plants – by gnawing on roots. (Data come from: Poland)

Introduction

Earliest introduction/observation: before 2005.

Means of transportation to Poland:

- For some introductions there is no data on the means of the species' transportation to Poland.
- The species spread autonomously after prior introduction in a neighbouring country

Reasons for which the species was transferred to Poland:

- Spread to Poland after prior introduction in neighbouring country.
- Transport.

Vectors responsible for spreading the species to Poland:

- Actively spread to Poland after introduction in neighbouring country.
- Airplane.

Means the species got through to Poland's natural environment:

- For some introductions there is no data on the means of the species' transportation to Poland's natural environment.
- Autonomous invasion to the natural environment after prior introduction in a neighbouring country

- ***Oxychilus draparnaudi (Beck, 1837)*** – **Dark-bodied glass snail (Terrestrial mollusc)**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Invasive alien species.

It is an aggressive and carnivorous species, out-competing native species.

Propagating population; numbers increasing.

Number of sites: 11 - 100; numbers: no data

Effective control of the species is not possible (e.g. because of the lack of effective methods and/or too large invasion scale).

Impact

Habitats occupied in secondary range:

- Cultivated fragments of gardens and parks (Data come from: Poland).
- Buildings in large and small cities, village basements (Data come from: Poland).
- Greenhouses (Data come from: Poland).

Introduction

Circumstances prior to the emergence of the species in Poland: East and north of its natural range area, the species becomes rare and can be found locally. In Sweden it has a lot of sites in the south of the country (since 1871), it is much rarer in the north. In the continent's interior, especially in the northern part, it lives only in greenhouses as a synanthrope, however along the coast it is quite common on the outside, locally it has even naturalised. Likharev and Rammelmeyer (1952) list the easternmost sites in Moscow and Kharkov, however currently this snail most certainly can be found farther. In west Ukraine it is listed only in Lviv. In 1953 it has been recorded in Sofia, Bulgaria for the first time. In Greece it is found synathropically, recorded in only a single site in Missolonghi. A few sites are located in the north of Albania. Lisický provides an up-to-date list of sites of this snail in Slovakia (1991), whereas Pintér and Suara in Hungary.

Earliest introduction/observation: circa 1870.

Means of transportation to Poland:

- For some introductions there is no data on the means of the species' transportation to Poland.

Reasons for which the species was transferred to Poland:

- For some introductions – no data on the reason for which the species was introduced to Poland.

Vectors responsible for spreading the species to Poland:

- No data.

Means the species got through to Poland's natural environment:

- For some introductions there is no data on the means of the species' transportation to Poland's natural environment.

- ***Juncus tenuis Willd.*** – **Path rush (Herbaceous plant)**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Propagating population; numbers increasing.

Number of sites: >1000; numbers: frequent at each site.

Effective control of the species is not possible (e.g. because of the lack of effective methods and/or too large invasion scale).

Impact

Impact mechanism:

- Competition, Scope of impact: Significant

  Impact on: Various species of native plants (no data) (Data come from: the area from which the data originated is not known).

Introduction

Earliest introduction/observation: 1862.

Means of transportation to Poland:

- For some introductions there is no data on the means of the species' transportation to Poland.

Reasons for which the species was transferred to Poland:

- For some introductions – no data on the reason for which the species was introduced to Poland.

Vectors responsible for spreading the species to Poland:

- No data.

Means the species got through to Poland's natural environment:

- For some introductions there is no data on the means of the species' transportation to Poland's natural environment.
- For some introductions the data on the means of the species' transportation to Poland's natural environment are not certain.

- ***Glischrochilus quadrisignatus (Say, 1835)*** – **Four-spotted sap beetle (Insect)**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Invasive alien species.

Propagating population; numbers increasing.

The species is controlled, but with limited effect.

Impact

Habitats occupied in secondary range:

- **Arable land** and market gardens

  cornfields (Data come from: Poland)

Introduction

Circumstances prior to the emergence of the species in Poland: In Europe it was recorded for the first time at the end of World War II in Berlin. It probably penetrated fruit and vegetable transports for the American army from the US. Subsequently, it was confirmed in Germany in 1948. Since that time it spread to Central and South-East European Countries (Austria, The Czech Republic, Moravia, Slovakia, Hungary, Serbia, Croatia, Slovenia, Romania, Bulgaria) and afterwards it appeared in western Russia, and recently in Switzerland and Italy.

Earliest introduction/observation: before 1989.

Means of transportation to Poland:

- For some introductions there is no data on the means of the species' transportation to Poland.

Reasons for which the species was transferred to Poland:

- For some introductions – no data on the reason for which the species was introduced to Poland.

Vectors responsible for spreading the species to Poland:

- No data.

Means the species got through to Poland's natural environment:

- For some introductions there is no data on the means of the species' transportation to Poland's natural environment.

- ***Festuca rupicaprina (Hack.) A. Kern.*** – **(Grass)**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Propagating population; numbers increasing.

Number of sites 1 – 10; number: more than a hundred specimen.

The species is not controlled; monitoring should be conducted, and in the case of finding an adverse impact – control undertaken.

Impact

Impact mechanism:

- Competition, Scope of impact: Significant

  Impact on: Dicotyledons (no data).

  (Data come from: the area from which the data originated is not known).

Introduction

Earliest introduction/observation: 1991.

Means of transportation to Poland:

- For some introductions there is no data on the means of the species' transportation to Poland.

Reasons for which the species was transferred to Poland:

- Scientific research.
- For some introductions – no data on the reason for which the species was introduced to Poland.

Vectors responsible for spreading the species to Poland:

- No data.
- In imported goods (plant seeds, wood, etc.).
- Animal

Means the species got through to Poland's natural environment:

- Intentional introduction; no data whether this action was legal.
- For some introductions there is no data on the means of the species' transportation to Poland's natural environment.

- ***Veronica filiformis Sm.*** – **Creeping speedwell (Herbaceous plant)**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Propagating population; numbers increasing.

Number of sites: 11 – 100; number: more than a hundred specimen at each site.

The species is not controlled; control should be taken, as it is an invasive alien species and effective control methods exist.

Proposed forms of targeting: intensive fertilization.

Impact

Impact mechanism:

- Competition, Scope of impact: Significant

  Impact on: grass (*Poaceae*).

  (Data come from: the area from which the data originated is not known).

Introduction

Earliest introduction/observation: 1936.

Means of transportation to Poland:

- For some introductions there is no data on the means of the species' transportation to Poland.

Reasons for which the species was transferred to Poland:

- Trade and cultivation of ornamental plants.

Vectors responsible for spreading the species to Poland:

- No data.

Means the species got through to Poland's natural environment:

- Escape from horticulture/farm.

- ***Trifolium patens Schreb.*** – **Herbaceous plant**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Propagating population; numbers increasing.

Number of sites: 11 – 100; number: very frequent at each site; creates compact patches; occurs en masse on some sites.

The species is not controlled; there is no need for control, as the species is not invasive.

Impact

Impact mechanism:

- Competition, Scope of impact: Significant

  Impact on: Dicotyledons on meadows (no data).

  (Data come from: the area from which the data originated is not known).

Introduction

Earliest introduction/observation: 1933.

Means of transportation to Poland:

- For some introductions there is no data on the means of the species' transportation to Poland.

Reasons for which the species was transferred to Poland:

- For some introductions – no data on the reason for which the species was introduced to Poland.
- Agriculture or horticulture (crop production).

Vectors responsible for spreading the species to Poland:

- No data.

Means the species got through to Poland's natural environment:

- For some introductions there is no data on the means of the species' transportation to Poland's natural environment.
- For some introductions the data on the means of the species' transportation to Poland's natural environment are not certain.

- ***Neogobius gymnotrachelus*** – **Racer goby**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Propagating population; numbers increasing.

Number of sites: increasing reach in the water catching area of the Vistula river.

The species' expansion is being tracked as part of academic research projects.

Impact

Impact mechanism:

- Competition, Scope of impact: Unknown

  Impact on: roe and spawning of native fish species.

Introduction

Earliest introduction/observation: 1995.

Means the species got through to Poland's natural environment:

- Autonomous spread via the Pripyat-Bug channel.

- ***Neogobius fluviatilis*** – **Monkey goby**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Propagating population; numbers increasing.

Number of sites: increasing reach in the water catching area of the Vistula river.

The species' expansion is being tracked as part of academic research projects.

Impact

Impact mechanism:

- Competition, Scope of impact: Unknown

  Impact on: roe and spawning of native fish species.

Introduction

Earliest introduction/observation: 1995.

Means the species got through to Poland's natural environment:

- Autonomous spread via the Pripyat-Bug channel.

- ***Perccottus glenii*** – **Chinese sleeper**

Species' status in Poland

The species is alien to the whole area in which it is present in Poland.

Propagating population; numbers increasing.

Number of sites: increasing reach in the water catching area of the Vistula river.

The species' expansion is being tracked as part of academic research projects.

Impact

Impact mechanism:

- Competition, Scope of impact: Unknown

  Impact on: roe and spawning of native fish species.

Introduction

Earliest introduction/observation: 1995.

Means the species got through to Poland's natural environment:

- Autonomous spread via the Pripyat-Bug channel.

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.

It can be assumed that farm animals were not originally carriers of invasive alien species, hence in no way contributed to their spread in our country. It is human activity, natural migrations, autonomous spread and expansion into new geographic areas that has led to the occurrence of alien invasive species in the country.

There are also views that some of the invasive alien species are „escapees from farms". However, due to the process of domestication and intensive selection carried out in breeding, most of today's livestock is worse or completely not adapted to life in the wild, these animals can survive only in farm conditions[200].

There are also examples of spreading in the world, including in Poland, of highly invasive animal diseases, but the reason for their spreading was man. These diseases include myxomatosis, a disease of domestic and wild rabbits and hares caused by the myxoma virus of the *Poxviridae* family. This disease was discovered and first described in 1896 in Uruguay, and imported to Australia in 1951 to reduce the rabbit population growth. She was then illegally transported to France in 1952 and within a few years spread to other areas of Europe. In Poland it is taking its toll since the end of the 50s of the last century. The myxomatosis virus is spread by blood-sucking insects and diseased animals. The disease is difficult to control in wild rabbits and hares, due to the lack of viable vaccination methods.

Another example of a disease that has spread almost all over the world is varroosis – a disease caused by *Varroa destructor* mites, developing in brood and adult honeybees. After transmitting the *Varroa destructor* mite from Asia from *Apis cerana* bees, varroosis has spread among bee families belonging to the honey bee species (*Apis mellifica*) worldwide. It found its way to Poland in 1980.

The natural ecosystems – mire, natural forests – and well- maintained semi-natural ecosystems – meadows and pastures are the most resistant against the invasion of alien plant species. Proper farming practices, such as regular mowing or grazing of grassland, are an effective barrier that impedes the penetration pf alien invasive species. It is undertaken both within the agricultural econjomy of production and nature conservation measures. Moreover, there ar projects aimed at combating the most dangerous and difficult for eradication species, such as Reynoutria spp., Spiraea tomentosa. They are implemented by nature protection institutions and NGOs in protected areas and other environmentally valuable areas.

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 the 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.

[200] The European Code of Conduct on Pets and Invasive alien Species, Strasbourg, 2011.

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.

As described above, the cessation of traditional livestock grazing leads to uncontrolled vegetation and the disappearance of meadows and pastures in many Polish regions. This has led to changes in agro-ecosystems, such as the reduction of the presence of many valuable species belonging to the associated biodiversity. One example is the Aquatic warbler, whose population is rapidly decreasing not only in Poland, but also in other European countries, since grazing or mowing of meadow bogs, where this bird locates its breeding sites, has stopped. Another problem that causes a disruption in the agro-ecosystem is the excessive growth of fox populations, in connection with mandatory rabies vaccination since 2002, which in turn causes a decrease in the populations of small rodents including hares, as well as birds, for example, partridges, quails and pheasants. In turn, the successful programme of reintroducing beavers to Poland, which caused a significant increase in the population of this species, contributed to unexpected changes in river ecosystems and disruptions in farming and habitats of the associated biological diversity. Locally, beavers can cause damage (flooding), which essentially changes environmental conditions, and at the same time raises the hostility of the local population to this animal. Damages caused by beavers negatively affect agricultural economy and rural tourism on the flooded areas.

Gaps and priorities

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

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

According to the current knowledge, the scope and access of the existing knowledge on associated biological diversity is limited. The information is very scattered and the research sketchy. This situation is exacerbated by the lack of monitoring of the protection of associated biodiversity in agricultural ecosystems and the lack of a platform for information exchange in this area.

b. What are the main capacity or resources limitations?

There are no such limitations, most probably these studies are not treated as a priority. Primarily, the shortage of funds and human resources constitutes an obstacle.

c. What are the main policy and institutional constraints?

There is no specialised scientific unit that would handle all the issues of associated biodiversity present in agro-ecosystems, hence access to knowledge on this subject is limited. For some species of wild animals living in agro-ecosystems, programmes for species protection have been developed and implemented[201]. Non-governmental organisations also work on problems and projects relating to the protection of individual, selected species belonging to associated biodiversity.

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

The priority is to develop research and better information management in the field of associated biodiversity. It is called for to determine stable funding for basic measures relating to the protection of biodiversity and the extension of programmes and sources of funding for monitoring and research on associated biodiversity.

The European Commission in a Communication of 03.05.2011 entitled „Our life insurance, our natural capital: an EU biodiversity strategy to 2020" has announced the adoption of a strategy for the conservation and improvement of biological diversity in Europe over the next decade. EU strategy for biodiversity for the period until 2020 includes six mutually supportive and inter-dependent targets that reflect the aspirations set out in the headline target for 2010. Their implementation will contribute to halting the loss of biodiversity and the degradation of ecosystem services, while individual targets concern the following issues: protection and restoration of biodiversity and associated ecosystem services (targets 1 and 2), strengthening the positive contribution of agriculture and forestry and reducing key threats to biodiversity in the EU (targets 3, 4 and 5), as well as increasing the EU's contribution to global biodiversity (target 6). Each target includes a package of

[201] http://www.gdos.gov.pl/ochrona-gatunkowa-roslin-zwierzat-i-grzybow

measures designed to solve specific problems to which it relates (document no.: COM(2011)0244). The most important measures to be implemented in Poland are considered to be:

1. Identification and assessment of the state of ecosystems and their services on Polish territory, assessment of the economic value of these services and the inclusion of their value to the accounting and reporting systems at a national level by 2020.
2. Cooperation with the European Commission as regards the development of a strategic framework for establishing priorities for ecosystem restoration at a regional, national and EU level, and their implementation.
3. Better targeting of rural development policy for the protection of biodiversity.
4. Ensuring zero net loss of biodiversity and ecosystem services.
5. Reduction of indirect drivers of biodiversity loss.
6. Regulation of access to genetic resources, as well as a fair and equitable sharing of the benefits from their use.

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?

The entire chapter on wild foods was not the subject of the expert opinion. It seems that the summarizing question should also be excluded.

In conclusion, it can be said that in Poland the wild animal resources (species) used as a source of food can only be considered in terms of their acquisition through hunting. In a developed country, whose GDP increases year-on-year, hunting, like fishing, is a hobby and does not affect the provision of food to the general public. There is no need to specify the status, trends and protection of wildlife resources, including wild species of animals, used as a source of food.

The use of aquatic resources is diverse, therefore there is a variety of ways of acquiring information (monitoring research, surveys, catch records, etc.). The main limitations include the availability and stability of funding for monitoring research and appropriate systemic solutions improving the efficiency and accuracy of data obtained by survey or register methods. It would be helpful to exclude fisheries and aquaculture as a distinct field of statistical studies. It would be a priority to create mechanisms supporting the collection of statistical data and disambiguating the methodology of data collection.

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

a. What are the majorgaps in information and knowledge?

According to current knowledge, there are no such gaps. A crisis management system is operating in Poland, the Centre for Crisis Management has been established with branches in each Voivodeship. Maybe generally available information about the losses to the livestock production sector caused by disasters could be helpful.

b. What are the main capacity or resources limitations?

There are no such constraints.

c. What are the main policy and institutional constraints?

There are no such constraints.

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

Priority should be given to compulsory livestock and potential produce insurance, so that possible disasters did not affect farmers' income.

51. With respect to the impact of invasive alien species on biological diversity for food and agriculture:

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

There is no available information about the size and trends in the populations of alien species, including changes to their size or range on a nationwide scale, and the classification of the degree of invasiveness.

According to information posted on the website of the Institute of Nature Conservation PAS in Cracow, the scale of impacts and threats caused by invasive populations are not sufficiently recognized.

b. What are the main capacity or resources limitations?

There are no such limitations.

c. What are the main policy and institutional constraints?

There are no such constraints. State institutions are involved in the creation of law and administrative tools, which allow to collect information about invasive species.

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

It may be possible to provide financial measures for accurate quantitative research (size of natural population) and determining the degree of invasiveness of the species and its adaptation to the new environment.

Required measures:

Combating invasive alien species

- By 2020, identifying and prioritising invasive alien species and their routes of entry, control or elimination of priority species, managing their routes of entry in order to prevent the introduction and settlement of invasive alien species.
- Cooperation with the EC in strengthening the EU animal and plant health protection systems and their implementation in Poland.
- Cooperation with EC in the field of establishing a special legal instrument allowing to combat invasive alien species.

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).

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

Management practices[202]	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)
M3 production system			
Integrated Plant Nutrient Management (IPNM)			
Integrated Pest Management (IPM)			
Pollination management			
Landscape management	100	2	2
Sustainable soil management practices			
Conservation agriculture			
Water management practices, water harvesting			
Agroforestry			
Organic agriculture		2	1
Low external input agriculture	48	0	2
Home gardens			
Areas designated by virtue of production features and approaches			
Ecosystem approach to capture fisheries			
Conservation hatcheries			
Reduced-impact logging			
C11 production system *NATURALLY IRRIGATED CROPS*			
Integrated Plant Nutrient Management (IPNM)	NK	NK	NK
Integrated Pest Management (IPM)	NK	2	2
Pollination management	40	1	1
Landscape management	NK	NK	NK
Sustainable soil management practices	NK	NK	NK
Conservation agriculture	5	NK	NK
Water management practices, water harvesting	NK	NK	NK
Agroforestry	NK	NK	NK
Organic agriculture	5	2	2
Low external input agriculture	20	0	0
Home gardens[203]	0,2%	-2	NK
Areas designated by virtue of production features and approaches	NK	NK	NK
Ecosystem approach to capture fisheries	NK	NK	NK

[202] Detailed descriptions of management practices that are considered to be fostering consercation and use of biodiversity for food ang agriculture can be found in Annex 5.

[203] Użytkowanie gruntów i powierzchnia zasiewów w 2013 r. Informacja i opracowania statystyczne. Warsaw GUS, 2014.

Management practices[202]	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)
Conservation hatcheries	NK	NK	NK
Reduced-impact logging	NK	NK	NK
Other (please specify)	NK	**NK**	**NK**
Production system *IPM*			
Integrated Plant Nutrient Management (IPNM)	10	2	1
Integrated Pest Management (IPM)	100	2	1
Pollination management	10	1	1
Landscape management	15	1	1
Sustainable soil management practices	10	1	1
Conservation agriculture	5	0	0
Water management practices, water harvesting	10	1	0
Agroforestry	10	0	0
Organic agriculture	2	0	0
Low external input agriculture	20	0	0
Home gardens	1	0	0
Areas designated by virtue of production features and approaches	NK	NK	NK
Ecosystem approach to capture fisheries	NK	NK	NK
Conservation hatcheries	NK	NK	NK
Reduced-impact logging	NK	NK	NK
Other (please specify)	NK	NK	NK
Production system *POLLINATION MANAGEMENT*			
Integrated Plant Nutrient Management (IPNM)	2	0	NK
Integrated Pest Management (IPM)	2	0	NK
Pollination management	NK	NK	NK
Landscape management	NK	NK	NK
Sustainable soil management practices	NA	NA	NA
Conservation agriculture	NA	NA	NA
Water management practices, water harvesting	NA	NA	NA
Agroforestry	NK	NK	NK
Organic agriculture	1	1	1
Low external input agriculture	1	1	1
Home gardens	NK	NK	NK
Areas designated by virtue of production features and approaches	NK	NK	NK
Ecosystem approach to capture fisheries	NK	NK	NK
Conservation hatcheries	NK	NK	NK
Reduced-impact logging	NK	NK	NK
Other (please specify)	NK	NK	NK
Production system *CONSERVATION MANAGEMENT*			
Integrated plant nutrient management	5	0	0
Integrated pest management	70	1	1
Pollination management	NK	NK	NK

Management practices[202]	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)
Landscape management	NK	NK	NK
Sustainable soil management practices	5	0	0
Conservation agriculture	5	0	0
Water management practices, water harvesting	NK	NK	NK
Agroforestry	NK	NK	NK
Organic agriculture	NA	NA	NA
Low external input agriculture	50	0	0
Home gardens	NK	NK	NK
Areas designated by virtue of production features and approaches	NK	NK	NK
Ecosystem approach to capture fisheries	NK	NK	NK
Conservation hatcheries	NK	NK	NK
Reduced-impact logging	NK	NK	NK
Other (please specify)	NK	NK	NK
Production system *ORGANIC AGRICULTURE*			
Integrated plant nutrient management	NA	NA	NA
Integrated pest management	70	1	1
Pollination management	25	1	1
Landscape management	30	1	1
Sustainable soil management practices	45	1	1
Conservation agriculture	25	0	0
Water management practices, water harvesting	NK	NK	NK
Agroforestry	NK	NK	NK
Organic agriculture	100	0	0
Low external input agriculture	100	0	0
Home gardens	NK	NK	NK
Areas designated by virtue of production features and approaches	NK	NK	NK
Ecosystem approach to capture fisheries	NK	NK	NK
Conservation hatcheries	NK	NK	NK
Reduced-impact logging	NK	NK	NK
Other (please specify)	NK	NK	NK
L3 Production system			
Integrated plant nutrient management	NK	1	1
Integrated pest management	NA	-1	-1
Pollination management	NK	-1	-2
Landscape management	NK	1	1
Sustainable soil management practices	NK	1	1
Conservation agriculture	NK	1	1
Water management practices, water harvesting	NK	-2	-2
Agroforestry	NK	1	1
Organic agriculture	NA	2	1
Low external input agriculture	48	0	2
Home gardens	NK	NK	1
Areas designated by virtue of production	NK	NK	1

Management practices[202]	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)
features and approaches			
Ecosystem approach to capture fisheries	NA	NA	NA
Conservation hatcheries	NA	NA	NA
Reduced-impact logging	NA	NA	NA
L4+ Production system			
Integrated plant nutrient management	NK	1	1
Integrated pest management	NA	-1	-1
Pollination management	NK	-1	-2
Landscape management	NK	1	1
Sustainable soil management practices	NK	1	1
Conservation agriculture	NK	1	1
Water management practices, water harvesting	NK	-2	-2
Agroforestry	NK	1	1
Organic agriculture	NA	NA	NA
Low external input agriculture	NK	NK	1
Home gardens	NA	NK	1
Areas designated by virtue of production features and approaches	NK	NK	1
Ecosystem approach to capture fisheries	NA	NA	NA
Conservation hatcheries	NA	NA	NA
Reduced-impact logging	NA	NA	NA
L7 Production system			
Integrated plant nutrient management	NK	1	1
Integrated pest management	NA	-1	-1
Pollination management	NK	-1	-2
Landscape management	NK	1	1
Sustainable soil management practices	NK	1	1
Conservation agriculture	NK	1	1
Water management practices, water harvesting	NK	-2	-2
Agroforestry	NK	1	1
Organic agriculture	NA	NA	NA
Low external input agriculture	NK	NK	1
Home gardens	NA	NK	1
Areas designated by virtue of production features and approaches	NK	NK	1
Ecosystem approach to capture fisheries	NA	NA	NA
Conservation hatcheries	NA	NA	NA
Reduced-impact logging	NA	NA	NA
[You should copy the table for each production system]			
[Note that the percentages may not produce a total of 100%, since different practices are often undertaken in the same part of the production system.]			
A3 Production system			
Integrated plant nutrient management			
Integrated pest management			
Pollination management			

Management practices[202]	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)
Landscape management			
Sustainable soil management practices			
Conservation agriculture			
Water management practices, water harvesting			
Agroforestry			
Organic agriculture			
Low external input agriculture			
Home gardens			
Areas designated by virtue of production features and approaches			
Ecosystem approach to capture fisheries	100	0	NK
Conservation hatcheries	5	1	1
Reduced-impact logging			
A7 Production system			
Integrated plant nutrient management			
Integrated pest management			
Pollination management			
Landscape management			
Sustainable soil management practices			
Conservation agriculture			
Water management practices, water harvesting			
Agroforestry			
Organic agriculture			
Low external input agriculture			
Home gardens			
Areas designated by virtue of production features and approaches			
Ecosystem approach to capture fisheries	NK	NK	NK
Conservation hatcheries	NK	NA	NA
Reduced-impact logging			
A11 Production system			
Integrated plant nutrient management			
Integrated pest management			
Pollination management			
Landscape management			
Sustainable soil management practices			
Conservation agriculture			
Water management practices, water harvesting			
Agroforestry			
Organic agriculture	NK	NK	NK
Low external input agriculture			
Home gardens			
Areas designated by virtue of production features and approaches			
Ecosystem approach to capture fisheries	NK	NK	NK

Management practices[202]	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)
Conservation hatcheries	NK	0	0
Reduced-impact logging			

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.

Landscape management

- The Rural Development Programme for 2007-2013, in which grazing animals would serve to actively protect open ecosystems in areas at risk of secondary succession and maintaining the diversity of flora and fauna. The type and density of animals on the pastures were dependent on the type of grazing and the accepted agri-environmental variant of Packages 4. and 5. implemented across the country.[204]
- Strategic support programme „Owca Plus" for sheep-farming. It covered six highland municipalities. The aim of the programme was to halt the liquidation of sheep herds, by conducting extensive pasture farming with regard to stocking the animals at a level of 0.5 LU/ha of grazing area, consistent with the protection plan implemented by landscape parks. It covered Beskid Śląski's mountain pastures and meadows in the municipalities of Szczyrk, Brenna, Goleszów, Istebna, Ustroń and Wisla, and in the Żywiec Beskids in the municipalities of Milówka, Radziechowy-Wieprz, Rajcza, Jeleśnia, Koszarawa, Ujsoły, Węgierska Górka, Lipowa.[205]
- Subcarpathian Natural Grazing – The overall aim of the project was economic and tourist stimulation of the Subcarpathian Voivodeship by promoting – unique in terms of nature and landscape – grazing areas while maintaining biodiversity by basing on natural grazing. An intermediate goal was the increase in cattle numbers and the restoration of extensive grazing of these animals on lands that were not used for agricultural purposes. The programme was implemented by the Self-Government of Subcarpathian Natural Grazing Voivodeship in Subcarpathia.[206]
- Local initiatives promoting grazing – grazing sheep on embankments. The Małopolska Agricultural Advisory Centre in Karniowice started a new research and implementation project titled „Analysis of the use of small herbivorous animals for innovative, natural maintenance of flood embankments in the proper condition". The initiative has been developed as a response to the request of the Agriculture and Rural Modernisation Committee of the Małopolska Sejmik for „innovative, natural maintenance of embankment zones" policies. The programme is implemented on a section of embankments along the Gróbka stream in Krzeczowo near Bochnia.[207]

Organic farming

Organic farming is the most environmentally friendly agricultural production. Thanks cultivation without agrochemicals and controlled production methods, organic farming helps to preserve biodiversity and protect natural resources, as well as produce high-quality food. Between 2002 and 2011, the number of certified organic farms increased from 882 to more than 15,000, while the agricultural area covered this system increased from 20 862 ha do 376 036 ha[208].

Currently, there is no data on the presence of aquaculture (A11 system) involved in production in accordance with the restrictions imposed by organic production, however semi-extensive production of carp is naturally

[204] http://www.minrol.gov.pl/pol/Wsparcie-rolnictwa-i-rybolowstwa/PROW-2007-2013
[205] http://www.slaskie.pl/owca/owca_plus.pdf
[206]http://podrb.pl/component/content/article/133-targi-konferencje-wystawy/2222-podkarpacki-naturalny-wypas.html
[207] http://owcenawaly.pl/
[208]Rocznik statystyczny rolnictwa 2012. GUS, 2013, Warsaw. – http://stat.gov.pl/obszary-tematyczne/roczniki-statystyczne/roczniki-statystyczne/rocznik-statystyczny-rolnictwa-2012,6,6.html.

well-suited for this production management practice. It cannot be excluded that there are fish farms carrying out production in accordance with the principles of organic farming. Some fish farms aspire to the status of an organic farm (e.g. http://www.karpkock.pl/; http://www.gospodarstwotoporow.pl; http://www.stawyrybne.com.pl/).

Agriculture with low use of artificial substances

In the analysed period in Poland the problem of excessive use of fertilizers, chemicals or the intensification of large-scale production did not exist. Total consumption of NPK fertilizers in agriculture in 2011 amounted to 126.4 kg/ha of agricultural land. In 2005-2009, the consumption of plant protection products increased (from 1.4 to 1.5 kg/ha) by 0.2 kg of active substance/ha of **utilised agricultural area** and orchards.[209]

In order to preserve and use biodiversity, the principles of Good Agricultural Practices have been applied to plant protection, taking into account pest signalling, forecasting, monitoring, hazard thresholds, cultivation of resistant varieties – and for establishing new crops – healthy planting material. These factors allow to limit the number of pesticide treatments.

Self-recruiting capture fisheries: Temperate (A3 system)

Since 2004, there has been a radical change to the hierarchy of factors determining the State's approach to natural resources, including fish. They are perceived as a natural resource subject to extraction, which can only be conducted within the framework of the so-called rational management of fisheries[210]. This management may not interfere with the functioning of aquatic ecosystems, and also it should support sound ecological status[211]. To this end, a fishery user obtained the ability to manage separated reservoirs on the basis of hydrological criteria, and thus conduct fishery management within a complex ecological system. The basis for carrying out economic activities is a fishing plan evaluated in terms of its adaptation to productivity and the natural specificities of the reservoir by a qualified scientific body. An integral part of each fishing plan is a list of areas included in fishing use and characteristics of planned conservation activities, including fish restocking. The introduced system has also greatly improved the efficiency of State surveillance over living aquatic resources management.

Self-recruiting capture fisheries: Temperate and Fed aquaculture: Temperate (A3 and A11 systems)

The growing understanding of the need to preserve biodiversity at the genetic level, in recent years was reflected in the appointment of selected scientific or commercial centres for the production of stocking material of endangered fish species (e.g. vimba, salmon, Danube salmon, local forms of lavaret) and maintain pure lines of farmed species (carp, rainbow trout). The role of these centres is not only the production of stocking material tonnage, but also commitment to maintaining adequate genetic diversity among breeding stocks and produced seeding. The overall share of production while maintaining stringent criteria for the protection of genetic biodiversity is difficult to estimate, since it is not excreted in the total seeding production. On the basis of available data, it has to be assumed that it is marginal and highly different from the assortment of produced material. For individual age categories it varies from 0 to ca. 8% of the total produced stocking material[212].

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

[209] http://stat.gov.pl/cps/rde/xbcr/gus/rl_srodki_produkcji_w_rolnictwie_2010-2011.pdf.
[210] OJ of 2001, No. 115, item 1229 Ustawa z dnia 18 lipca 2001 r. Prawo wodne.
[211] Stachowiak P.M. 2003. Operat rybacki. Olsztyn: IRŚ, p. 44.
[212] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski. IRŚ, Olsztyn.

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

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

Diversity based practices [213]	**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)**
C11 production system			
Diversification	NK	1	2
Base broadening	NK	-1	2
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	NK	NK	NK
Restoration practices	NK	1	2
Management of micro-organisms	NK	NK	NK
Polyculture/Aquaponics	NK	NK	NK
Swidden and shifting cultivation agriculture	NK	NK	NK
Enriched forests	NK	NK	NK
Other [please specify]	NK	NK	NK
Production system *NATURALLY IRRIGATED CROPS*			
Diversification	80	2	2
Base broadening	100	2	2
Domestication	100	2	2
Maintenance or conservation of landscape complexity	100	2	2
Restoration practices	100	2	2
Management of micro-organisms	10	2	2
Polyculture/Aquaponics			
Swidden and shifting cultivation agriculture			
Enriched forests			
Other [please specify]			
Production system..... IPM			
Diversification	90	1	1
Base broadening	70	1	1
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	70	0	0
Restoration practices	20	0	0
Management of micro-organisms	5	0	0
Polyculture/Aquaponics	NK	NK	NK
Swidden and shifting cultivation agriculture	5	0	0
Enriched forests	NK	NK	NK
Other [please specify]	NK	NK	NK
Production system *POLLINATION MANAGEMENT*			

[213] Specific descriptions of internvention measures based on diversity can be found in Annex 6.

Diversity based practices [213]	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	5	0	0
Base broadening	5	0	0
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	10	0	0
Restoration practices	5	0	0
Management of micro-organisms	2	0	0
Polyculture/Aquaponics	NK	NK	NK
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NK	NK	NK
Other [please specify]	NK	NK	NK
Production system *CONSERVATION AGRICULTURE*			
Diversification	5	0	0
Base broadening	5	0	0
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	10	0	0
Restoration practices	5	0	0
Management of micro-organisms	2	0	0
Polyculture/Aquaponics	NK	NK	NK
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NK	NK	NK
Other [please specify]	NK	NK	NK
Production system *ORGANIC AGRICULTURE*			
Diversification	2	0	0
Base broadening	3	0	0
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	5	0	0
Restoration practices	5	0	0
Management of micro-organisms	2	0	0
Polyculture/Aquaponics	NK	NK	NK
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NK	NK	NK
Other [please specify]	NK	NK	NK
L3 Production system			
Diversification	NK	1	2
Base broadening	NK	1	2
Domestication	100	NK	NK
Maintenance or conservation of landscape complexity	10	1	2
Restoration practices	6	1	2
Management of micro-organisms	NA	NA	NA
Polyculture/Aquaponics	NA	NA	NA

Diversity based practices [213]	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)
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NA	NA	NA
L4 production system			
Diversification	NK	1	2
Base broadening	NK	1	2
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	NK	1	2
Restoration practices	NK	1	2
Management of micro-organisms	NA	NA	NA
Polyculture/Aquaponics	NA	NA	NA
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NA	NA	NA
L7 Production system			
Diversification	NK	1	2
Base broadening	NK	1	2
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	NK	1	2
Restoration practices	NK	1	2
Management of micro-organisms	NA	NA	NA
Polyculture/Aquaponics	NA	NA	NA
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NA	NA	NA
M3 production system			
Diversification	8 - 100	1	1
Base broadening	100	1	1
Domestication	100	1	1
Maintenance or conservation of landscape complexity	10	1	2
Restoration practices	6	1	1
Management of micro-organisms			
Polyculture/Aquaponics			
Swidden and shifting cultivation agriculture			
Enriched forests			
[You should copy this table for each production system]			
[Note that the percentages may not produce a total of 100%, since different practices are often undertaken in the same part of the production system.]			
A3 production system			
Diversification	<100	-1	1
Base broadening	NK	NK	NK
Domestication	NA	NA	NA

Diversity based practices [213]	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)
Maintenance or conservation of landscape complexity	100	0	1
Restoration practices	NK	1	1
Management of micro-organisms	NA	NA	NA
Polyculture/Aquaponics	NA	NA	NA
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NA	NA	NA
Other [please specify]	NA	NA	NA
A7 production system			
Diversification	<100	-1	1
Base broadening	NK	NK	NK
Domestication	NA	NA	NA
Maintenance or conservation of landscape complexity	100	0	1
Restoration practices	NA	NA	NA
Management of micro-organisms	NK	NK	NK
Polyculture/Aquaponics	70	-1	-1
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NA	NA	NA
Other [please specify]	NA	NA	NA
A11 production system			
Diversification	100	1	NK
Base broadening	NK	NK	NK
Domestication	NK	NK	NK
Maintenance or conservation of landscape complexity	70	-1	-1
Restoration practices	NK	NK	NK
Management of micro-organisms	NK	NK	NK
Polyculture/Aquaponics	70	-1	-1
Swidden and shifting cultivation agriculture	NA	NA	NA
Enriched forests	NA	NA	NA
Other [please specify]	NA	NA	NA
[You should copy the table for each 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.

When summing up practices based on biodiversity present in livestock production, a few measures should be listed.

Diversification

- RDP 2007-2013. Package 7: Preservation of endangered animal genetic resources in agriculture, area: the whole country.

- Kurpie Model of Biodiversity
- Protection of biodiversity, area: Lublin Voivodeship.

Expanding the base

The introduction of new species of animals such as ostriches, llamas, alpacas, fish, companion animals, area: whole country, but in a very limited scope.

Domestication

The development of farm deer breeding, area: the whole country.

Preservation od protection of landscape complexity

- Owca plus, area: The Beskids and The Kraków-Częstochowa Upland
- Preservation of native animal breeds and active protection of steppe reserves, area: xerothermic reserves.

Restoration measures

Restitution of small animals in the Kuyavian-Pomeranian Voivodeship – reintroduction of wild rabbit and pheasant, area: Kuyavian-Pomeranian Voivodeship.

Slightly different practices can be cited in relation to crop production.

Diversification

The range of agricultural plant species, in terms of which registration and reproduction of seeds is implemented, has increased over the last 10 years. The number of fodder, legume and cereal plants species has increased. In turn, the number of oil and fibre plant species has decreased. The total number of 55 agricultural plant species present on the Research Centre for Cultivar Testing (COBORU) list in 2004 has increased to 58 after 10 years. Along with the increase in the number of varieties registered in the National Register (from 1 114 in 2003 to 1 306 in 2013), the area of field classification of agricultural plants has also increased (from 90 000 ha in 2003 to 115 000 ha in 2013). The biggest increase was recorded in the number of varieties of cereals and sugar beets.[214]

Expanding the base

Information on expanding the cultivation base are based on the number of tasks carried out within the framework of measures funded by the Ministry of Agriculture as the so-called basic research for biological progress in agriculture. These works are aimed at, among others, broadening the variability base for producing new varieties of crops.

Restoration measures[215]

The area of devastated lands in Poland amounts to 57 040 ha; degraded lands – 7 303 ha. In total, they currently comprise 64 343 ha. The area of devastated and degraded lands is gradually decreasing; in 2000 it amounted to 71 473 ha. Annually, over 2 000 hectares are reclaimed on average, only exceptionally in 2012 – approximately 2 700 ha. In most cases, biological reclamation methods are used. On reclaimed brownfields one can observe the development of biological life in the substrate in the form of soil microflora and microfauna, as well as complex organisms such as snails, earthworms, crustaceans, spiders, insects and vertebrates.
By way of natural succession, pioneering short-lived and perennial herbaceous plants with shrubs start to appear, followed by trees. Sites covered with herbaceous vegetation and trees are home to insects, spiders, birds and mammals. Depressions filled with water are inhabited by numerous species of fish and frogs, and the waterside are covered with multi-species hydrophilic vegetation. Biological reclamation and pioneer vegetation that entered this area is essential to the conservation of biological diversity of pollinating insects thanks to the emergence of very numerous plant species which serve honey bees in producing honey, other apidae and pollinator species.

[214] Information on "diversification" have been based on an analysis of COBORU studies („Lista odmian roślin rolniczych i warzywnych wpisanych do krajowego rejestru w Polsce", 2004, 2014 oraz Oleksiak T. 2014 „Rynek nasion. Analizy Rynkowe. Rynek środków produkcji dla rolnictwa – stan i perspektywy." No. 41, 36-45.).
[215] Information about "restoration measures" come mainly from the years of experience of the National Centre for Plant Gene Resources, IHAR-PIB on the reclamation of land devastated by industry.

The area of set-aside and fallow land, on which cultivation and production has been abandoned in Poland amounts to approx. 2 million hectares, of which 440 thousand are fallow. Biological processes taking place in these areas are conducive to the emergence of numerous species of nectar and pollen producing plants, they are also often used as so-called „bee pastures" for pollinators. Properly maintained and kept readily available set-aside areas can be quickly converted into **utilised agricultural area** or permanent grasslands after proper chemical and mechanical operations, mowing and fertilization. Biologically reclaimed and developed brownfields, as well as set-aside and fallow lands help boost diversity and area of bee nectar for pollinators and thus increase their numbers and species diversity, which has a huge impact on the process of pollinating entomophilus plants, and contributes to the growth of their yield.

A3 and A7 systems

Diversification

Due to the introduction of new legal regulations[216] the possibility to introduce alien species, including species present in aquaculture for many years and until recently commonly used for stocking open waters has been restricted. As part of the diversification of fisheries production, the most used species include: carp and herbivorous fish - grass carp, bighead carp in stagnant waters, as well as rainbow and brook trout in flowing waters. The consequence of these restrictions is the decline in production of these species in surface waters. For example, carp fishing yield from lakes has declined from 40 t obtained in 2005 to 18 t in the year 2013[217].

Expanding the base

There are no detailed data on the extent of use and interbreeding of different genetic lines of fish in A3 and A7 systems. No doubt in the case of the A3 system, fish not originating from areas for which the restocking material is produced are often used for fish breeding.

Domestication

In the case of the A3 system, wild fish species are the subject of fishing, which are not the subject of the effort to domesticate them. On the contrary, efforts are made to preserve the genetic structure of the population unaltered. In the case of the A7 system, alien species are used, which in domestic conditions may be considered to be already domesticated species, either due to a long history of their farming (carp – at least since the 12th century, rainbow trout – end of the 19th century) or the lack of the ability to reproduce in natural conditions (Chinese carps).

Preservation od protection of landscape complexity

Rational management of fisheries implemented in most of the national surface waters is an important element protecting waters from various forms of anthropogenic impacts. Protection of fish communities and implementation of measures promoting rational management of fisheries is an important element constraining the execution of projects aimed at regulating and constructing hydraulic facilities at watercourses.

Restoration measures

Protection of fish stocks is an important factor stimulating the speed of restoring fish migration routes through pressuring dam users, as well as acquiring funds for the modernisation of existing and construction of new devices for fish migration. The management of fish communities is also used to protect water quality in lakes and dam reservoirs[218].

A11 system

Diversification

The national aquaculture constantly enriches its range with new species. One of the most important factors that has affected the introduction of new fish species in recent years was an epizootic threat from virus diseases (e.g. VHS). The response to this threat came in the form of introducing fish from the *Salvelinus* genus, which are resistant to the disease. The threat to native species susceptible to this disease has been limited at the same

[216] Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi w sprawie wykazu gatunków ryb uznanych za nierodzime i wykazu gatunków ryb uznanych za rodzime oraz warunków wprowadzania gatunków ryb uznanych za nierodzime, dla których nie jest wymagane zezwolenie na wprowadzanie - OJ of 3 December 2012, item 1355

[217] Chybowski et al. 2015.

[218] Starmach J., Jelonek M. 2000. Specjalistyczna gospodarka rybacka – jeden z czynników ochrony jakości wody. In: Janusz Starmach, Grażyna Mazurkiewicz-Boroń (eds) Zbiornik Dobczycki Ekologia-Eutrofizacja-Ochrona. Zakład Biologii Wód im. Karola Starmacha PAN. Krakow, 233-240.

time. On the other hand, new species are a potential source of new diseases and parasites, but there is no clear assessment of the impact of production diversification on biodiversity[219].

Expanding the base

The selection of breeding species in order to improve their performance values is implemented in at least several breeding centres, which, where appropriate, introduce different genotypes (Chybowski et al. 2015). However, there are no information allowing to assess what percentage of the total national production is obtained using such select breeding lines. Many commercial farms operates production using foreign restocking material[220]. Available data do not allow to unambiguously determine whether one of the grounds for importing restocking material was also the desire to improve the genetic structure of reared fish stocks.

Domestication

The domestication process includes all species used for commercial purposes in aquaculture and artificial breeding. Planned domestication programmes are implemented in relation to carp and rainbow trout. Due to the involvement of numerous aquaculture centres in the production of restocking material for open water needs, it is unfortunately possible that domestication also involves wild species.

Preservation od protection of landscape complexity

The landscape aspect is most significantly highlighted in the case of semi-intensive farming of carp, requiring large areas and having the largest habitat-creating importance. Due to unfavourable climate, social and economic changes for this production system, a reduction in used pond area is observed, and thus a loss of habitats valuable for biodiversity[221].

Restoration measures

Aquaculture, through the creation of small retention, is of great importance for shaping local water[222], habitat, and – in the case of large complexes – even climate changes[223]. However, there were no studies that would allow a clear estimate of the impact of various types of aquaculture on the environment on a national scale.

Microorganisms management

There is no data on the use of probiotics in aquaculture and their importance for biodiversity.

Polyculture / Aquaponics

A significant proportion of the domestic aquaculture production, mainly carried out in earth ponds, is obtained using the polyculture system. This allows to obtain additional output without increasing biomass production costs. In the case of species traditionally used in policulture with carp (e.g. tench, crucian carp), additional obtained production reaches 20% of the production base, and for some species (e.g. ide) can even reach 30%[224]. This allows better use ponds' food web and is a positive stimulant for associated biodiversity.

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.

[219] Chybowski et al. 2015.
[220] Bontemps S. 2012. Analiza produkcji i sprzedaży pstrągów tęczowych w 2011 roku. Komunikaty Rybackie 4: 17-27.
[221] Lirski A. 2013. Strategia sektora karpiowego do 2020 roku. Komunikaty Rybackie 4: 12-18.
[222] Wojda R., Zygmunt G. 2012. Wpływ stawów karpiowych na jakość, retencje i bilans wodny zlewni. Komunikaty Rybackie 3: 1-8.
[223] Kaczkowski, Z., Zalewski, M. (2010) Traditional carp (Cyprinus carpio L.) culture – linking sustainable development with integrated water management – ecohydrologically sound perspective for small catchments. In: Multifunctionality in pond aquaculture in Poland – Perspectives and Prospects. (eds M. Cieśla & M Kuczyński M.), pp. 30-37. Wydawnictwo Wieś Jutra, Warsaw.
[224] Cieśla M., Kaczkowski Z., Wojda R., Frankiewicz P., Zalewski M. (2003). Ide (Leuciscus idus L.) new species established in traditional carp culture in Poland – ecohydrological approach. [In:]: Chopin T., Reinertsen H. [Ed.] Beyond monoculture. EAS Special Publication, No 33, 146 - 147.

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 continuous 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.

In Poland, there is a variety of measures that make use of biodiversity for food and agriculture, within the framework of programmes implemented by state and self-government administration, as well as by non-governmental organisations.

Agri-environment and Agri-environment-climate payments under Rural Development Programme (RDP).

The essence of these measures is to promote practices contributing to sustainable land management (in order to protect soil, water, climate), protect valuable natural habitats and endangered bird species, landscape diversity, traditional orchards and protect endangered genetic resources of crops and livestock.

Agri-environment-climate payments within the framework of the Rural Development Programme 2014-2020 (RDP 2014-2020) are in large part a continuation of the previous approach, i.e. measure Agri-environmental programme (Agri-environment payments) under RDP 2007-2013.

The aim of the Agri-environmental programme within RDP 2007-2013 is the improvement of the environment and rural areas, and in particular:

- restoring or maintaining valuable habitats used for agriculture and the maintenance of biodiversity in rural areas;
- promoting sustainable management systems;
- appropriate use of soil and water conservation;
- protection of local endangered breeds of livestock and local varieties of crops.

By the end of 2014 a total area of 3 310 729 ha of agricultural land has been supported in the 2007-2013 period, while the size of the area covered by agri-environment support[225] amounted to 2 789 602 ha. The number of animals on supported farms amounted to 63 579 animals (22 692 LU).

By the end of 2014, under:

- Package 1. Sustainable farming – agri-environment payments were made in the amount of 1 318 779 thousand PLN; supported area, resulting from issued decisions granting agri-environment payments amounted to 1 100 948 ha for 34 743 farms;
- Package 2. Organic farming – agri-environment payments were made in the amount of 1 664 342 thousand PLN; supported area, resulting from issued decisions granting agri-environmental payments amounted to 681 161 ha for 29 457 farms;
- Package 3. Extensive permanent grasslands– agri-environment payments were made in the amount of 552 716 thousand PLN; supported area, resulting from issued decisions granting agri-environmental payments amounted to 279 104 ha for 47 307 farms;
- Package 4. Protection of endangered bird species and natural habitats outside of Natura 2000 areas – agri-environment payments were made in the amount of 513 468 thousand PLN; supported area, resulting from issued decisions granting agri-environmental payments amounted to 162 184 ha for 15 902 farms;
- Package 5. Protection of endangered bird species and natural habitats in Natura 2000 areas – agri-environment payments were made in the amount of 731 330 thousand PLN; supported area, resulting from issued decisions granting agri-environmental payments amounted to 189 632 ha for 14 874 farms;
- Package 6. Preservation of endangered plant genetic resources in agriculture – agri-environment payments were made in the amount of 87 729 thousand PLN; supported area, resulting from issued decisions granting agri-environmental payments amounted to 55 933 ha for 5 041 farms;
- Package 7. Preservation of endangered animal genetic resources in agriculture – agri-environment payments were made in the amount of 142 909 thousand PLN; the number of supported farms resulting

[225]Without adding the area covered by simultaneous support under not mutually exclusive packages.

from issued decisions granting agri-environment payments amounted to 3 476, the population size of livestock breeds and species supported under Package 7. amounts to 63 579 animals (annual average);

- Package 8. Protection of soil and water– agri-environment payments were made in the amount of 1 084 049 thousand PLN; supported area, resulting from issued decisions granting agri-environmental payments amounted to 841 506 ha for 62 412 farms;
- Package 9. Buffer zones – agri-environment payments were made in the amount of 1 668 thousand PLN; the number of supported farms resulting from issued decisions granting agri-environment payments amounted to 174, the length of the buffer zones amounted to 579 444 linear metres.

Protection of genetic resources as part of biological progress: poultry, fur animals, bees

Under the Ministry of Agriculture's Regulation of 18 May 2010 on subsidy rates for economic operators implementing tasks for agriculture, the following species are subsidized:

- fur animals (pastel fox, white-necked fox, fitch, Popielno white rabbit, beige chinchilla, coypu: standard, white non-albino, amber-golden, pearl, pastel, sable, black dominant and Greenland);
- laying hens (Polbar Pb, Greenleg Partridge Z11, Yellowleg Partridge Ż33, leghorn: G99, H22, H33, Sussex S66, Rhode Island red: R11, K22, K44 i K66, Rhode Island white: A33, A22, A88, New Hampshire N11, barred rock P11, WJ44, barred Plymouth rock D11);
- geese (Biłgorajska, Zatorska, Lubelska, Kielecka, Podkarpacka, Kartuska, Rypinska, Suwalska, Swan, Roman, Pomeranian, Slovak, Landes, Cuban);
- ducks (Mini-ducks, Pekin: Danish, French, English, KhO-1, national Pekin: P11, P22, P33, P44, P55);
- bees (Central European line: Augustowska, North, Asta, Kampinos).

Economic Development and Preservation of the Beskidy and the Kraków-Częstochowa Upland's Cultural Heritage – Owca Plus

This programme provides protection of the most valuable natural mountain pastures and meadows of Beskid Śląski and Żywiecki, as well as xerothermic grasslands indicated by the Landscape Park Complex of the Silesian Voivodeship through stopping forest succession on the basis of pasture management. Moreover it provides cultivation of cultural identity related to shepherding, promoting folk culture traditions, development crafts and processing of sheep and goat products. The programme is implemented by state administration – marshal offices.[226]

„Subcarpathian Natural Grazing"

The overarching goal of the project is the economic and tourist stimulation of the Subcarpathian Voivodeship by promoting grazing areas unique in terms of nature and landscape, while maintaining biodiversity based on natural grazing. An intermediate goal was the increase in cattle numbers and the restoration of extensive grazing of these animals on lands that were not used for agricultural purposes. The programme is implemented by the Self-Government of Subcarpathian Voivodeship.[227]

Local initiatives promoting grazing – grazing sheep on embankments.

The Małopolska Agricultural Advisory Centre in Karniowice started a new research and implementation project titled „Analysis of the use of small herbivorous animals for innovative, natural maintenance of flood embankments in the proper condition". The initiative has been developed as a response to the request of the Agriculture and Rural Modernisation Committee of the Małopolska Sejmik for „innovative, natural maintenance of embankment zones" policies. [228]

Kurpie Model of Biodiversity

The aim of the project was to boost agricultural biodiversity through reintroduction and restoration of native animal breeds and local plant varieties, as well as raising environmental awareness in the countryside. The project included: native animal breeds – Greenleg and Yellowleg Partridge hens, Polish red cattle, Polish primitive horse, Hucul pony, Olkuska and Wrzosowka sheep, Biłgorajska and Pomeranian geese, the mini-

[226] http://www.slaskie.pl
[227] http://podrb.pl/component/content/article/133-targi-konferencje-wystawy/2222-podkarpacki-naturalny-wypas.html
[228] http://owcenawaly.pl/

duck and Polish Pekin P33 duck, Zlotnicka white pig and local plant varieties - varieties of old apple trees; cereals; Fabaceae, potatoes. The programme is implemented by the Social Ecological Institute[229].

Preservation of native animal breeds and active protection of steppe reserves

The project consists in preserving two stocks of old sheep breeds: Wrzosówka and Świniarka, which are grazed in xerothermic reserves and contribute to the protection of xerothermic flora and promotion of native livestock breeds subsided under the Agri-environmental programme RDP 2007-2013 as well as under Agri-enviroment-climate payments RDP 2014-2020. The programme is carried out by the Lower Vistula River Friends Society[230].

Protection of biodiversity

The project aims to extend ongoing measures for the promotion of biological diversity through the inclusion of the society in measures for the protection of animal and agricultural plants' genetic resources and direct participation of its members in activities for their preservation. The programme is implemented by the Social Readjustment Centre of „Plus" Association, ECO „School of Life" in Wandzin.[231]

The development of farm deer breeding.

Modern farm deer breeding began ca. 25 years ago. Deer and fallow deer are the dominant species. Cervidae became the object of domestication and genetic selection in a closed breeding system, based on pastures, just like other traditional ruminants (cattle, sheep or goats)[232].

Reconstruction of Small Game Population Programme in the Kuyavian-Pomeranian Voivodeship

The programme is implemented by the District Board of the Polish Hunting Association in Włocławek. The measures are carried out in terms of restoring the population of wild animals such as: wild rabbit, European hare, common pheasant and partridge. The aim is to restore vanishing populations of small game, and thus restore sustainable environment development, with a particular focus on field biotopes.

Organic farming outside of RDP-planned measures

1. Action Plan for Organic Food and Farming in Poland 2011-2014[233]
2. Framework of Actions for Organic Food and Farming in Poland 2014-2020[234].

Integrated pest management

1. National plan of action for the reduction of risks associated with the use of plant protection products for the 2007-2013 period[235].
2. The Plant Breeding and Acclimatization Institute (IHAR) - National Research Institute multiannual programme „Improvement of Plants for Sustainable AgroEcoSystems, High Quality Food and Plant Production for Non-food Purposes" for 2008-2013 (Regulation of the Council of Ministers, no. 117/2008 of 27 June 2008). In the framework of the implementation of area 1 of the Programme („Gathering, protecting, evaluating, preserving in alive state and sharing for the needs of the national economy of agricultural plants' genetic resources and their pathogens") works have been carried out aiming at: gathering and preserving in alive state, while maintaining the integrity of the genetic makeup, agricultural plants and endangered companion plants' genetic resources, characteristics relating in particular to the performance value of gathered items, documenting this information and providing reproductive material of gathered items along with information about them.

   Since 2008, during 126 domestic and 3 foreign field gatherings, a total of over 5 000 unique objects have been acquired. A central IT system on plant genetic resources, EGISET, has been developed and implemented, which currently gathers passport information on stored items, whereas in the long-term seed storage, the number of kept valuable genetic resources has risen to almost 70 000. As part of the cooperation with domestic and foreign research, breeding or educational institutes, a total of 344 000 plant material samples (seeds, stolons, seedlings, scions) of the above mentioned groups have been

[229] http://www.siesie.vot.pl/kurpiowskirbwr.html
[230] www.tpdw.pl.
[231] www.ekoszk.republika.pl
[232] http://www.podrb.pl
[233] Information of MADR, Warsaw 2011.
[234] http://www.minrol.gov.pl/pol/Jakosc-zywnosci/Rolnictwo-ekologiczne/
[235] http://www.minrol.gov.pl/pol/Informacje-branzowe/Produkcja-roslinna/Ochrona-roslin

provided. Most of the plant material (98.5%, i.e. 339 000) have been provided to domestic recipients. In this group, research institutions and companies have received the most samples (approximately 159 000 and 145 800 respectively). Out of the 145 800 samples provided to breeders, potato genetic material comprises more than 90%. Farmers, agricultural and self-government organisations have received nearly 35 000 samples.

As part of the implementation of tasks related to the accumulation of the pathotypes of the most significant potato pathogens, a total of 210 pathotypes have been provided, including 147 (70%) to domestic recipients. In this group, scientific institutions have received the most samples (139). Within the framework of activities related to the promotion of knowledge about plant genetic resources, a total of ca. 150 lectures, trainings and presentations have been carried out.

The trainings included topics such as the use of the EGISET IT system, the use of reclamation plants for agri-environment advisors and farmers, as well as the employees of the Main Inspectorate of Plant Health and Seed Inspection.

The implementation of tasks in another area of the Programme ("Preventing the depletion of genetic variability of low profitability agricultural plant forms and species") has enabled to restore the cultivation of species of minor commercial importance, e.g. in the group of meadow plants such as e.g. tall oat-grass, crested dog's-tail, reed canary grass, prairie grass, slough grass, weeping alkali grass, meadow foxtail, fowl bluegrass, flattened meadow grass, Common Bird's-foot Trefoil, and black medick. During the implementation of this area, self-employed farmers (ca. 50 persons) received information about the possibility to produce biomass and seeds of researched grass species.

In addition, the following were implemented:

- projects targeted to restore old, traditional animal breeds and plant varieties (combination of the purposes of the cited projects, with the adaptation of the breeds to habitat conditions present in Poland) – projects related to the restitution of the Polish pony;
- programmes on using biomass from peat bogs and meadows – protection of semi-natural habitats in low profitability conditions of farming on grasslands;
- regional initiatives – undertaken both by local self-government organisations and self-government authorities in order to protect species (birds – aquatic warbler, western capercaillie, Montagu's harrier, European roller; butterflies – Mountain Apollo, blues; plants – marsh saxifrage, fen orchid, marsh angelica; habitats (mosslands, grasslands), regions, practices, etc. – numerous examples from all over the country;
- measures undertaken in national parks, e.g. in order to protect certain habitats (thermophilous Pieniny meadow), species (Mountain Apollo, dunlin, crayfish), promotion of regional products, technological and organisational solutions, and services combining wildlife conservation priorities with agricultural production;
- revitalization of traditional agricultural practices, e.g. beekeeping, herding.

Operational Programme: Sustainable development of the fisheries sector and coastal fishing areas 2007-2013, supporting the adaptation of farms to environmental requirements, as well as *ex situ* conservation programmes under the Fish Genetic Resources Conservation Programme (e.g. creation of gene banks with cryopreserved sperm).

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

Table 22. Major practices that negatively impact associated biodiversity and/or wild foods in the country.

Types of practices	Major practice (Y/N)	Description	Reference
Over-use of artificial fertilizers or external inputs	N	In Poland, we are not dealing with excessive use of fertilizers and large scale intensification of production, a significant portion of agricultural land is used by small farms with low commercial production. Consumption of NPK fertilizers in agriculture as a whole in 2011. amounted to 126.4 kg/ha of agricultural land. Given the load of pollution from agricultural sources per unit of area and per capita, Poland takes the 4th and 7th spot, respectively, in terms of contaminating the Baltic Sea with general nitrogen, and the 3rd and 6th spot in terms of general phosphorus contamination (data source: IEP). However, it is observed that after Poland's admittance to the EU, consumption of fertilizers has increased by 31%, while crop production grew only by 5%. According to data from **The Plant Breeding and Acclimatization Institute (IHAR) - National Research Institute** in the 2012/2013 season mineral fertiliser consumption amounted to more than 2 million tons, and was higher by more than 6% in comparison to the previous season, including nitrogen fertiliser consumption increase by nearly 1.2 million tons. Nitrogen unused by plants contributes to the eutrophication of surface waters.	1,2,3
Over-use of chemical control mechanisms (e.g. disease control agents, pesticides, herbicides, veterinary drugs, etc.)	N	In Poland, we do not deal with excessive use of chemicals. In 2005-2009, the consumption of plant protection products increased (from 1.4 to 1.5 kg./ha) by 0.2 kg of active substance/ha of utilised agricultural area and orchards. The use of more and more effective measures for plant protection causes that numerous plant species are on the brink of disappearance. In the group of segetal weeds, aside from common species, there are dozens of endangered, threatened and almost extinct taxa. The State Environmental Monitoring (PMS) data indicate that pesticide use has a negative impact on butterflies present on permanent pastures. In regions with intensive agricultural production, there is a risk for wild animals. The estimated consumption of antibiotics to produce 1 kg of meat is quite high and ranks Poland at the 8th place among the 25 EU countries. To sum up, it must be recognised that in comparison to other countries, the use of chemicals in agriculture in Poland is not high. The growing interest in organic production system and integrated protection system currently in force both facilitate it.	4,5,6,7

Types of practices	Major practice (Y/N)	Description	Reference
Inappropriate water management	Y	In recent years, the drainage network is being rebuilt. Hydrotechnical works are aimed at accelerating water runoff result in the reduction of water resources in hydrogenic habitats, while in regions with particularly intensive farming, excessive water consumption for agricultural purposes can be observed, which results in water deficiency in natural habitats – the need for more effective resource distribution. Agriculture is one of the sources of surface water and groundwater contamination. Animal breeding (cattle, pigs, poultry) and improper storage of organic fertilizers and often incorrect field fertilization with mineral organic fertilizers are the main sources of biogenic compounds (nitrogen, phosphorus). In water catchment areas, water discharges from fish ponds can also have a significant impact on water quality. Successive release of nitrogen and phosphorus in the wake of increasing peat mineralization on dehydrated peat bogs may also be a potential threat to water quality. Accelerating surface runoff negatively affects water retention in partial catchment areas and deepens low flow rates in periods of drought.	8
Practices leading to soil and water degradation	Y	In the case of hydrogenic habitats we often have to deal with negative consequences of drainage, which leads to soil mineralization and in the case of intensive production areas there is a risk of soil and waters eutrophication. There are cases of excessive, at inappropriate times, improper mineral fertilization (particularly nitrogen and phosphorus) and using wrong proportions or natural fertilization, which can lead to significant biological, chemical and physical soil degradation and polluting water with biogenic compounds. Mining contributes to water and soil degradation. Groundwater from mines pollute surface waters (it is estimated that they can amount to several hundred thousand tonnes of salt). Progressing salinization of rivers leads to environmental degradation and loss of biodiversity. However, provisions included in the RDP and good agricultural practices protect against soil degradation – through the use of catch crops and successive secondary cropping.	9
Over-grazing	N	In Poland there is no excessive grazing animals. The threat occurs in Poland, however it is restricted to certain regions of livestock production concentration, mainly in regions of north-eastern Poland.	10
Uncontrolled forest clearing	N	Logging is controlled by forest services in order to avoid complete eradication of harvested species. Forest management could threaten biodiversity only through the use of inappropriate methods (clear-felling, deep ploughing, removal of fascine), fertilization, chemical protection measures and through improper afforestation (e.g. bogged areas).	11
Fishing in protected areas	N	It is occasionally recorded in National Parks, where rivers constitute an important part of the landscape. Poaching is sometimes a problem in protection zones established below dams, where fish gather during reproductive or hibernation migrations.	

Types of practices	Major practice (Y/N)	Description	Reference
Overharvesting	N	Harvesting from nature is controlled by forest services in order to avoid the total eradication of harvested species. Local risk associated with the use of select plant and animal species – mainly used traditionally in medicine or cuisine. Burgundy snail is an example. In 2014 harvesting this species in the Warmian-Masurian Voivodeship has been ceased. It was based on the fact that adverse weather conditions and harvesting specimens with small shell diameters caused a decline in the population of this snail.	12
Agricultural landscape changes and crop intensification	Y	Logging, liquidation of baulks, burying waterholes, merging agricultural parcels. Numerous processes accompanying agriculture intensification adversely affect the agricultural landscape. Harmonisation of agricultural area, liquidation habitats for biological diversity significantly impact its decline in large areas.	
Abandonment of grazing	Y	Due to the abandonment of grazing, a degradation of natural grasslands and a succession of forest communities has occurred. Valuable natural communities are exposed to disappearance (e.g. Biebrza and Narew Valleys). The abandonment of grazing stemmed from a decrease in the population of ruminants and horses, low affordability of production on weak soils and in small farms, and the ageing of rural population.	13
Biocenotic evolution and other natural processes.	Y	Overgrowing of set-aside or permanently excluded from use permanent grasslands leads to a succession of vegetation, loss of habitats and the disappearance of valuable plant species. The progressing eutrophication of lakes leads to the disappearance of spawning grounds of the *Coregonus* genus fish and leads to the dominance of the ichtiofauna by the cyprinidae.	14
Abandonment of particularly valuable ecosystems requiring active protection	Y	Many crop-related species lose their habitats due to the abandonment of areas, where agricultural production is unprofitable. Invasive species begin to dominate uncultivated lands, whereas valuable habitats subject to natural succession grow into forest communities.	

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zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski. IRŚ, Olsztyn.

Please describe the reasons for using these practices and related trade-offs.

In Poland the problem with excessive natural fertilisation occurs locally, especially in regions with highly concentrated livestock production (mainly in the Greater Poland Voivodeship and Podlaskie Voivodeship). In these areas, there is a high risk of polluting waters with biogenic compounds, which can lead to their eutrophication. The problem of excessive mineral fertilization is being limited by rising fertilizer prices, as well as the pressure associated with *cross compliance* requirements, conditioning direct payments. The use of synthetic mineral fertilizers and chemical plant protection products is limited by the provisions of the EU and is a serious threat to biodiversity only in cases of non-compliance with the provisions and recommendations.

Practices such as: inadequate water management, soil and water degradation, excessive grazing, deforestation, fishing in protected areas, excessive harvesting, do not occur in Poland on a large scale and they are not a major threat to biodiversity in our country.

The intensification of agricultural production and changes in the landscape are significant threats to biodiversity. An agri-environment programme is implemented in Poland since 2004 to encourage farmers to more extensive and environmentally friendly farming.

A major concern in many protected areas is the loss of biodiversity on uncultivated land. In the light of the above, in a number of nature reserves, active protection is in place, aiming to restore agricultural use.

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

In Poland there is no non-sustainable use of biodiversity in agriculture due to the most widely used mixed agricultural production system, where agricultural and animal production coexist in one farm. It is the most biologically effective management model, providing optimum resource use and positively influencing the agro-ecosystem and associated wild biodiversity.

The most important practices having a negative impact on associated biodiversity are primarily local and include: abandonment of grazing on permanent agricultural land, improper water management and practices leading to soil and water degradation. All of these practices are causing a change of habitats, in which wild organisms living in agro-ecosystems dwell.

It is generally accepted that the main source of wild food are sea fish, whose capture is limited by the provisions of the European Union. During the studied period, harvesting food from the wild in Poland was primarily based on harvesting wild products such as mushrooms and berries in their natural environments. It is limited by species protection and protective zones. The second form of acquiring food from the wild is hunting, which is the exclusive domain of fishing and hunting associations. Access to this food category is strictly limited and elitist. It requires membership in hunting and fishing associations and special permits. Harvesting wild plants and invertebrates for cooking, e.g. Burgundy snail, is a marginal phenomenon that does not have a large impact on biodiversity.

The Ministry of the Environment in cooperation with the National Fund for Environmental Protection and Water Management, within the framework of the „Biodiversity and ecosystem protection" programme has provided for the implementation of projects aimed at:

- increasing the potential for effective management of Natura 2000 sites and their monitoring;
- increasing the potential of local ecosystems against alien invasive species;
- increasing public awareness and education on biodiversity and measures for ecosystems, including efforts to increase public awareness and education on the ties between biodiversity, climate change and economic valuation of ecosystems;

- enhancing the potential of environmental non-governmental organisations promoting biodiversity.

The programme assumed the implementation of a predefined project „Biodiversity and measures for ecosystems – nationwide information campaign raising awareness on biological diversity", which will be implemented by one of the Ministry of the Environment's departments.

The wealth of biological diversity preserved in Poland is a point of reference for formulating policies that will protect existing valuable resources. Poland already executes this goal by implementing rural policy instruments, among others. Stronger incorporation of environmental objectives in CAP's range of instruments is of particular importance, both in direct support and in RDP measures. One can mention a number of measures that promote sustainable use of biodiversity in Poland.

A) Strategic measures

1. „EUROPE 2020 – A Strategy for Smart, Sustainable and Inclusive Growth". One of the main priorities of this strategy is sustainable development – support for a resource-effective and more environmentally friendly economy. Thanks to such an approach, Europe will be able to thrive in a low-carbon world of limiter resources, at the same time preventing environment degradation, biodiversity loss and unsustainable use of resources.

2. „Strategy for Energy Security and Environment – 2020 perspective". One of the development objectives of this strategy is to preserve the wealth of biological diversity. This is to be achieved through inhibition of biodiversity loss and by providing appropriate protection for as many species and natural habitats as possible by 2020 at the latest. In order to achieve this goal, it will be necessary to define, implement and designate a green infrastructure system that would include sites areas with a rich landscape structure, with a high proportion of natural / semi-natural ecosystems, river valleys with floodplains, areas with a high retention ratio, as well as biodiversity reserves.

3. „National Development Strategy 2020" One of the main objectives of this strategy is energy security and the environment. The key task, according to this strategy, will be to establish and implement an efficient and permanent legal and institutional system protecting environmentally valuable areas and species, as well as reducing the loss of – and increasing, where possible – biological diversity. It is especially important to address the issue of rational use of natural resources in school curricula from early school years. Activities will be carried out to counter the fragmentation of space and develop solutions conducive to the protection of natural resources, especially through the creation of ecological corridors allowing fauna and flora to migrate on regional, national and international levels.

4. „Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries 2012-2020". As part of this strategy, a number of specific objectives has been distinguished, such as: Objective 3: Food security, when talking about plant production genetic base optimisation and the need for its preservation due to values resulting from rural traditions and culture, but mainly due to the need to safeguard valuable agricultural plant varieties and crop-related plants. In turn, objective 5 („Environment protection and adaptation to climate change in rural areas") speaks of the important role played by fishing and agricultural activities in the context of protecting natural values of the country, in particular in areas that constitute reserves for rare plant and animal species and for the preservation of natural habitats (primarily grasslands, pastures, breeding habitats of birds and ponds), requiring the use of traditional or appropriately planned forms of management. It is therefore necessary to undertake measures in the field of biodiversity conservation, including unique ecosystems, flora and fauna associated with farming and fishing (including, among others, , Agri-environment payments consistent with previously implemented, both under RDP 2004-2006 and RDP 2007-2013, the measure supporting agricultural use of less-favoured areas – LFA and areas of high natural value – HNV). Effective biodiversity protection should involve the analysis of the effectiveness of implemented solutions. Therefore, in order to determine the impact of changes in farming and fishing on organisms / the environment, environmental monitoring should be carried out, which would be one of the intervention measures referred to as „development of knowledge on agricultural environment and biodiversity protection in rural areas and its promotion". Moreover, one should undertake measures serving to minimize the risks of introducing into the environment alien species threatening biological diversity or the genetic basis of plant, animal and fishing production. The development of knowledge on agricultural environment and biodiversity protection in rural areas and its dissemination is complementary to this type of measures. It is implemented, among others, through the improvement and development of the advisory system (including agri-environment advisory services, fertilizing advice, and trainings for farmers in the area of organic farming, promotion of Good Agricultural Practices and encouraging their use), the conservation of biodiversity and the environment, including water and soil.

B) Legislative measures Council Directive no. 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ EC L 206 of 27.07.1992, p. 7; OJ UE Polish Special Edition, chapt. 15, vol. 2, p. 102).

1. Council Directive no. 92/43/EEC of 21 May 1992. On the protection of natural habitats and wild fauna and flora (OJ EC L 206 of 27.07.1992, p. 7; OJ EU Polish special edition, chapt. 15, vol. 2, p. 102).
2. Council Regulation (EC) no. 870/2004 of 24 April 2004 establishing a Community programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture and repealing Council Regulation (EC) no. 1467/94 (OJ EU L no. 162 of 30.04.2003, p. 18; OJ EU Polish Special Edition, chapt. 3, vol. 45, p. 167).
3. The Act of 18 December 2003 on the protection of Plants (OJ of 2008, No. 133, item 842, as amended).
4. Convention on the Conservation of European Wildlife and Natural Habitats, signed in Bern on 19 September 1979 (OJ of 1996, No. 58, item 263).
5. The Act of 18 April 1985 on inland fishery (OJ 1985, no. 21, item 91).
6. The Ordinance of the Minister of Agriculture and Rural Development of 12 November 2001 on fishing and housing conditions, breeding and harvesting of other water-living animals (OJ 2001, no. 138, item 1559).
7. The Ordinance of the Minister of Agriculture and Rural Development of 12 February 2003 on the call for tenders related to the use permit of the fishery district (OJ 2003, no. 34, item 290).
8. The Ordinance of the Minister of Agriculture and Rural Development of 30 September 2003 on the evaluation of the fulfilment of the obligation to maintain rational management of fisheries (OJ 2003 no. 180, item 1765).
9. The Ordinance of the Minister of Agriculture and Rural Development of 6 July 2015 on the minimum sizes and protection periods of marine organisms due to recreational fishing and the detailed manner and conditions for recreational fishing (OJ 2015, item 1015).

C) Financial support measures

Rural Development Programme 2007-2013 and Rural Development Programme 2014-2020. These programmes are a system of subsidies and grants awarded to farmers for using traditional farming methods that are beneficial for the environment. Their main aim is to reduce the negative impact of agriculture on the environment and maximize its positive impact on biodiversity and the landscape of rural areas. The programmes included a number of measures like Agri-environment payments (RDP 2007-2013) and Agri-environment-climate payments (RDP 2014-2020) aimed at the protection of biodiversity in natural habitats and crops, such as the protection of endangered bird species and natural habitats in and outside Natura 2000 areas and the preservation of endangered plant and animal genetic resources in agriculture.

In the years 2007-2013, measures provided in Axis 2 of the Rural Development Programme 2007-2013 supported sustainable use of biological diversity, including measure:

211, 212. Support of management in mountain areas and in other less-favoured areas (LFA), which aims to:

- ensure the continuity of agricultural land use and thereby maintain the viability of rural areas;
- preserve landscape values of rural areas;
- maintain sustainable farming, taking into account environmental aspects.

This measure is a financial support instrument for agricultural holdings situated in areas where agricultural production is impeded due to adverse natural conditions. Payments to farms located in mountain areas and other less-favoured areas compensate existing difficulties in comparison to holdings situated outside LFA.

As part of the delimitation of mountain areas and other less-favoured areas the following have been distinguished: mountain areas, lowlands and areas with natural handicaps.

Aid is granted in the form of annual lump sum payments (top-up payments) per hectare of agricultural land in mountain areas and other less-favoured areas used in agriculture.

Payment rates for managing in mountain areas and other less-favoured areas are different depending on various types of LFAs.

214. Agri-environmental programme (Agri-environment payments)

The Agri-environmental programme is a financial incentive to farmers who voluntarily decide to commence agricultural activity in accordance with the principles established in it.

The main objective of the programme is to improve natural environment in rural areas and, in particular, maintain valuable habitats used for agriculture, or restore their value, and maintain biodiversity in rural areas by:

- promoting sustainable management systems;
- appropriate soil utilization and water protection;
- protection of local endangered breeds of livestock and local varieties of crops.

Farmers had a wide range of choices of agri-environment measures out of 9 packages: Sustainable farming, Organic farming, Extensive permanent grasslands, Protection of endangered bird species and natural habitats outside Natura 2000 areas, Protection of endangered species and natural habitats in Natura 2000 areas, Preservation of endangered plant genetic resources in agriculture, Preservation of endangered animal genetic resources in agriculture, Protection of soil and water, Buffer zones.

Variants of individual packages contained requirements beyond basic requirements. All packages of the Agri-environmental programme could be implemented throughout the country. Some limitation resulting from the Nitrates Directive related to farmers exercising agricultural activity in areas that are particularly endangered with nitrogen pollution, so-called OSN.

221, 223. Afforestation of agricultural land and afforestation of non-agricultural land, whose purpose is to:

- expand forest areas through reforestation.
- maintain and enhance ecological stability of forest areas by reducing the fragmentation of forest complexes and creating wildlife corridors.
- increase the share of forests in the global carbon balance and reduce climate change.

Measure 221, 223 include the following forms of aid:

1) support for afforestation, which covers the cost of establishing a planting, and if it is justified – protection against wild animals by fencing off the planting;
2) maintenance premium for cultivating a new forest planting and protecting individual tree seedlings against wild animals;
3) afforestation premium, which is the equivalent for excluding land from agricultural use.

1. Educational programmes carried out by non-governmental organisations and local authorities, agricultural counselling centres and scientific institutions. An information campaign about the principles of organic farming and other measures aimed at preserving biodiversity was possible thanks to a grant on conducting research (Ministry of Agriculture and Rural Development). An example of which was the development of principles integrated and environmental plant protection systems and their dissemination in the form of articles, lectures at conferences and meetings with producers.
2. The preventive measure taken to reduce unsustainable use of biodiversity and / or wild foods in Poland is the moment the principles of Integrated Pest Management (IPM) came into force. It was introduced in order to reduce the number of pests by first using methods other than chemical ones. In short, priority is given to non-chemical methods. These methods can protect crops against diseases, pests and weeds. Non-chemical methods that can be used include: agronomic methods (crop rotation, treatments related to plant cultivation, they are cheap, but their effectiveness may be limited), breeding methods (resistant or tolerant crop varieties, typically preventive measures, but it is an inexpensive method, as seeds always have to be used when starting production, one just has to choose resistant varieties and sow them). The aforementioned methods take into account the cultivation of various groups of plants in each year of cultivation, thus eliminating single-crop farming Institute of

Plant Protection – National Research Institute has conducted numerous training courses in order to disseminate the principles of integrated pest management, the implementation of the multi-annual plan, taking into account environmental and food safety. The introduction of integrated pest management, maintenance of organic and sustainable farming support in the RDP has influenced rational pesticide use, which will have a beneficial effect on biodiversity.

3. As part of the The Plant Breeding and Acclimatization Institute (IHAR) - National Research Institute Multi-annual Programme for 2008-2013, Area 1(„Gathering, protecting, evaluating, preserving in alive state and sharing for the needs of the national economy of agricultural plants' genetic resources and their pathogens") works have been carried out aiming at: gathering and preserving in alive state, while maintaining the integrity of the genetic makeup, agricultural plants and endangered companion plants' genetic resources, characteristics relating in particular to the performance value of gathered items, documenting this information and providing reproductive material of gathered items along with information about them.

4. The Research Institute of Horticulture's Multi-annual Programme for 2009-2014, Tasks 7.1 and 7.2 („Protection of biological diversity of fruit and ornamental plants for sustainable agriculture", „Protection of vegetable plants and related wild species' genetic resources against loss and securing them in a gene bank") allowed for collecting and storing in alive state and genetic purity, several thousand taxa of fruit, ornamental and vegetable plants, as well as related wild species. In addition, Methodologies for integrated pest management for 11 fruit plant species have been developed, which are available on the Web pages of the Research Institute of Horticulture and the Ministry of Agriculture and Rural Development.

5. Operational Programme: Sustainable Development of the Fisheries Sector and Coastal Fishing Areas 2007-2013 – supporting measures restructuring marine fishing, implementation of rational management of living aquatic resources, providing additional financing to measures that, among others, aim to modernise existing fish rearing and breeding farms (e.g. through the creation of recirculated systems for reproduction and seeing of stocking material) and adapt farms to environmental requirements.

57. Provide in Table 23 any information available that lack of biodiversity for food and agriculture is limiting food security and nutrition, and/or rural livelihoods in the different production systems in your country. Indicate the production systems affected together with any information on the extent of problem (significant lack (2), some lack (1)), describe the effects on livelihood, food security and nutrition, and the components of biodiversity for food and agriculture that are limited. The list of components of biodiversity for food and agriculture given in Annex 1 should be used where possible.

Table 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[242]	Extent of problem (2,1)	Effect on food security and nutrition	Effect on livelihood	Reference
L7 Livestock landless systems: Temperate	Domination of select species or breeds in animal production	1	The abandonment of traditional farming methods and the decline of native animal species in favour of common highly-productive breeds carries a risk of increased mortality among less resistant populations and the degradation of meat quality due to intensive treatment of	Breeding more efficient animal breeds affects the formation of larger farms, due to increasing competition, the situation of semi-subsistence producers worsens	

Production system	Biodiversity component for which diversity is lacking[242]	Extent of problem (2,1)	Effect on food security and nutrition	Effect on livelihood	Reference
			animals		
C7 Irrigated crops (other) : Temperate i C11 Rainfed crops : Temperate	Arable crops	2	The reduction of the number of species and varieties of cultivated agricultural plants in both production systems (C7 and C11) and the increase in the area of specie and variety monoculture, which leads to the restriction of the gene pool and negatively affects food safety and human nutrition	Declining yields are bringing ever-lower income	
A3 Self-recruiting capture fisheries: Temperate	Oligotrophic vendance-type lakes provide conditions for the reproduction of fish of the *Coregonus genus*	2	It leads to a loss of species related to oligotrophic waters, negative impact on food safety and human nutrition locally, it leads to the disappearance of traditional forms of use of vendance-type lakes	The loss of species yielding the largest fishing profit and thus the declining profitability of lake fishing	1

Poland has achieved food safety and in general there are no recorded cases of limits or the lack of elements of biodiversity for food and agriculture necessary from agricultural production standpoint, therefore in select expert's opinions no potentially negative impact of such phenomenon on food production has been noted. Locally one can, however, indicate some considerations for future threats for systems (Table 23).

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.

It should be noted that the ways in which biological diversity for food and agriculture is contributing to food security and nutrition, livelihoods, ecosystem services, sustainability, resilience and sustainable intensification are often intertwined. The answers to the following questions can 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.

Globalisation of agricultural production had the most significant impact on productivity increase, food security and livelihoods, that is, the possibility to use other countries' achievements in genetics, as well as the changes to nutrition systems based on the cultivation of new plants and changes in food technology.

The measure Organic Farming 2014-2020, along with the whole RDP 2014-2020 are conducive to the strengthening of measures promoting biological diversity and food in all items listed in the question.

The following describes other measures used to strengthen the contribution of biodiversity in improving:

Ad. a) productivity;

- promotion of native animal breeds and plant varieties better adapted to local geographical condition creates the potential to increase productivity;

Thanks to the many social initiatives agricultural biodiversity has been enhanced through the reintroduction and restoration of native animal breeds and local plant varieties. The Kurpie Model of Biodiversity can be an example, as the following native animal species (Greenleg and Yellowleg Partridge hens, Polish red cattle, Polish primitive horse, Hucul pony, Olkuska and Wrzosowka sheep, Bilgorajska and Pomeranian geese, Mini-duck and Polish Pekin P33 duck, Zlotnicka white pig) and local plant varieties (old varieties of apple trees; cereals; Fabaceae; potatoes). Payments under environmental packages encouraged farmers to maintain local animal breeds.

- the growth of biological diversity had an impact on the increase in the number of tourism and organic farms, in which local breeds are kept to increase attractiveness;

Thanks to this, the offer of traditional products mainly manufactured from raw materials obtained from native and locally adapted animal breeds has increased.

- farmers can increase the productivity of many agricultural plant species through the implementation of activities supporting ecosystem services.

Ad. b) food security and nutrition;

- measures in support of ecosystem services are one of the most important factors in ensuring food security;
- an increase in species diversity, crop diversification and the principle of organic agriculture improve crop health and reduce degradation;
- integrated pest management increases productivity and ensure food security.

Ad. c) livelihoods in rural areas;

- measures implemented under the agri-environment programme give the possibility to obtain compensation for lost revenue resulting from more environmentally friendly management or the creation of new, alternative sources of income using the national potential of the region;
- thanks to existing RDP tools, farmers can receive financial support for the area covered by the programme;

- through the implementation of measures in support of ecosystem services, farmers can significantly reduce production costs and increase crop productivity;
- the development of agro- and ecotourism using potential associated with biodiversity and natural values of rural areas;
- the development of local products and services using the potential of biodiversity and natural values of rural areas;
- thanks to the phytosanitary function of crop rotation using herbaceous and fibrous plants, the introduction of these groups of plants to crops results in a greater biological stability of agro-ecosystems and an increase in farms' production potential, and thus fulfils a unique role in the implementing the idea of sustainable agriculture development.

Ad. d) ecosystem services;

- restoration of water conditions;
- accumulation of carbon dioxide in organic soils;
- recreating or strengthening the functions related to the purification of surface water and groundwater – the creation of more effective buffer zones for migrant contaminants;
- maintaining or recreating biological diversity;
- restoring retention capacities of hydrogenic habitats.

Ad. g) sustainable intensification.

- thanks to protection programmes and payments for extensive farming, many areas remain in service despite low profitability;

Organic farming also includes the principles of Functional Agro-Biodiversity (FAB), for example, the use of scientifically prepared mixtures of wild flower seeds, which are perfectly adapted to the needs of bees and species that combat pests (natural enemies of pests). Functional agro-biodiversity refers to all components of biological diversity in the scale of fields or agricultural landscape that are useful for the ecosystem and support sustainable agricultural production, and may bring benefits to the environment and the population of a given region, or on a global scale. Functional agro-biodiversity uses strategies developed through research, and as an idea it can be included in organic and sustainable agriculture systems.

An example of a successful implementation of FAB is the development of mixtures of wild flower seeds that are sown along with crops, and constitute a source of pollen and nectar for bees. Seed mixtures that, when sown along with crops, support populations of natural enemies of pests have also been developed. The dual nature of the organic farming system is very often emphasised. First of all, it is a system that contributes positively to the environment, which allows to achieve widely understood environmental benefits. Biological diversity in organic farms is greater in comparison to conventional farms. On the other hand, organic farming is a response to the changing demand structure on the market. Consumers lean towards products, they want to buy them, and typically pay a higher price for them than for products that are not manufacture using such methods. In line with this approach, the system of organic farming is a market system. The rapid growth of the organic farming sector is reflected in an increase in the supply of high-quality products of organic farming. In 2004, 3 760 farms were subject to control, with an area of 82 730 ha, and in 2013 the number of organic farms amounted to 26 598, with an area of almost 669 970 ha. The number of ecological products processing plants has increased from 55 in 2004 to 407 in 2013. In Poland, the share of organic farming in the total area of agricultural crops in 2002 amounted to only approx. 0.3%, while the average in the EU-15 amounted to 3.3%. Currently, the share of organic areas in Poland increased to 4%.

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 t patterns of use, management and consumption of wild food, including data disaggregated by sex.

Wild foods are available in the form of fish caught at sea and are mostly imported. Hunting, collection and inland fishing are not significant. Mushrooms, forest fruits and herbs from the wild are used as additions to many products and serve only as a dietary supplement. Material collected from the wild is usually offered in processed form available in herbal and grocery stores. Wild animal meat, obtained by hunting, is also available in shops. It is considered to be an exclusive product. The population of wild animals and other natural resources are insufficient to provide food for the population in case of natural disasters.

No information is available on population regularly consuming food from the wild. It is thought that it may comprise approx. 2% of the total population living in Poland. There are no differences in access to wild foods between women and men.

A statistical Pole consumes approx. 14 kg of fish per person per year, which is approx. 8 kg less than the average level of consumption in the EU, of which freshwater fish constitute approx. 3.1 kg per person per year[236] This means that fish consumption is two times higher than total catch, which amounted to 245 800 tonnes in 2013[237], where 184.7 thousand tonnes have been acquired from Polish waters in various manners. In addition, approximately 1.5 million people individually obtain 2-3 kg of fish by angling[238].

The adoption of ecosystem approaches

60. Describe in Table 24 the extent to which you consider that ecosystem approaches have been adopted for the different production systems in your country (widely adopted (2), partially adopted (1), not adopted (0), not applicable (NA)) and indicate whether ecosystem approaches are considered of major importance (2), some importance (1), no importance (0), not applicable (NA). You may also want to describe landscape approaches[246] that have been adopted in your country.

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

Production system **Code or name**	**Ecosystem approach adopted (name)**	**Extent of adoption (2,1,0,NA)**	**Importance assigned to the ecosystem approach (2,1,0,NA)**
C11 Rainfed crops : Temperate	Weed protection from extinction – project co-financed by the EcoFund and the Plant Breeding and Acclimatization Institute, concluded in 2009. The adopted „idea" of protecting rare species of weeds among organic crops	1	2
C 11 Rainfed crops : Temperate	Agri-environment Programmes 2007-2013	1	2
C7 Irrigated crops (other) : Temperate and C11 Rainfed crops :	Integrated Pest Management	2	1

[236] Seremak-Bulge, J. 2010. Rynek i spożycie ryb w latach 2009-2010. [Fish market and consumption in 2009-2010.]. In: Zrównoważone korzystanie z zasobów rybackich na tle ich stanu w 2009 roku. (ed M. Mickiewicz) pp. 55-69. IRŚ, Olsztyn, [in Polish.]

[237] CSO (2014) *Concise Statistical Yearbook of Poland* Central Statistical Office, Warsaw.

[238] Chybowski Ł., Dobosz S., Kolman R., Lirski A., Pelczarski W., Szczepkowski M., Wąs A., Wiśniewolski W., Wolnicki J., Wołos A. 2015. Stan krajowej różnorodności biologicznej w zakresie zasobów genetycznych gatunków organizmów wodnych w wodach śródlądowych i akwakulturze oraz w morskich wodach wewnętrznych i wodach Morza Bałtyckiego podlegających jurysdykcji Polski. IRŚ, Olsztyn.

Production system Code or name	Ecosystem approach adopted (name)	Extent of adoption (2,1,0,NA)	Importance assigned to the ecosystem approach (2,1,0,NA)
Temperate			
C11 Rainfed crops : Temperate	Integrated Pest Management	2	2
	Strategy for sustainable development of rural areas, agriculture and fisheries 2012-2020	2	2
	IPM - Ecosystem	2	2
	Pollination management -Ecosystem	1	1
	Conservation agriculture - Ecosystem	1	1
	Organic agriculture - Ecosystem	2	2
L3 Livestock grassland-based systems: Temperate	1. Cross compliance	2	2
	2. Code of good agricultural practice	2	2
	ecosystem approach under the Convention on Biological Diversity, Habitats Directive, Birds Directive, Water Framework Directive.	1	2
L4 Livestock grassland-based systems: Boreal and /or highlands	ecosystem approach under the Convention on Biological Diversity, Habitats Directive, Birds Directive, Water Framework Directive.	1	2
L7 Livestock landless systems: Temperate	ecosystem approach under the Convention on Biological Diversity, Habitats Directive, Birds Directive, Water Framework Directive.	1	1
M3 Mixed systems (livestock, crop, forest and /or aquatic and fisheries): Temperate	1. Cross compliance	2	2
	2. Code of good agricultural practice	2	2
A3 Self-recruiting capture fisheries: Temperate	ecosystem approach under the Water Framework Directive, Water Law and implementing regulations, the Strategy for sustainable development of rural areas, agriculture and fisheries 2012-2020, as well as the Biodiversity Convention, Habitats Directive, Birds Directive	2	2
A7 Culture-based fisheries: Temperate	Water Law and implementing regulations, Strategy for sustainable development of rural areas, agriculture and fisheries 2012-2020	2	2
A11 Fed aquaculture: Temperate	Water Law and implementing regulations, Strategy for sustainable development of rural areas, agriculture and fisheries 2012-2020	1	1

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 most important ecosystem services from agricultural point of view is pollination of crops, biological plant protection against pests and soil quality protection.

For C11 production system

Ad. a) The specific actions that have been taken to ensure adoption;

Measures taken under the Strategy for sustainable development are consistent with the Action Plan for food and organic farming in Poland and the National Development Strategy 2010. One of the systemic tasks is to improve food quality and increase food security.

Within the framework of the ecosystem approach, organic farming and traditional methods of local resources production are supported. Legal provisions have been introduced, obliging all farmers and gardeners to use integrated pest management.

As a result of changes in EU implementing provisions (directives) for IMP, pollination management, conservation agriculture, organic agriculture, a rise in the number of cultivated plants and rationalization of the use of plant protection measures has been observed.

For L3, L4 and L7 production systems

Ad. a) The specific actions that have been taken to ensure adoption;

The implementation of CAP priorities in the context of preservation, restoration of natural resources associated with agricultural landscape through planning appropriate measures under the RDP,

- identification of semi-natural ecosystems associated with hay production and grazing in Poland's agricultural landscape,
- indication of bird species typical for permanent grasslands landscape, indicating high natural values, including rich biodiversity of semi-natural ecosystems,
- analysis of spatial variation of the aforementioned objects on a national scale,
- determination of the requirements to utilize the aforementioned ecosystems encompassing plant communities, but also populations of other organisms, including entomofauna and herpetofauna, and the specifities of abiotic conditions (water and soil),
- definition of rules and procedures for identifying the aforementioned natural habitats and nesting habitats,
- definition of financial mechanisms allowing to sustain production while conserving natural values,
- the development of a system of trainings and consulting on the identification of agricultural parcels covered by measures aimed at conserving or restoring natural values,
- development of a control and verification system allowing to check the implementation of the mechanism supporting the conservation of environmental values associated with agricultural landscape,
- identification of agricultural landscape elements determining biodiversity,
- the development of mechanisms allowing to conserve landscape structure supporting the conservation or restoration of rural biodiversity – including meadows and pastures (Agri-environmental programme, „greening", simple good agricultural practices),
- integration of measures undertaken on protected areas with the implementation of Agri-environment programme (adapting requirements to active conservation measures),
- development and implementation of protection programmes of individual species and habitats associated with agricultural landscape, conditional on maintaining extensive use.

Ad. All observed results of implementation;

- improving the assessment of natural resources in rural areas of the country,
- calibration of requirements and agricultural and technological measures in terms of adjusting them to the needs of semi-natural ecosystems of meadows and pastures,

- improving the effectiveness of the implementation of the agri-environmental programme indicating growing environmental awareness in rural communities, including an awareness of the need for sustainable use of natural resources in agriculture,
- changing agricultural practices towards those more adjusted to the needs of natural habitats and species,
- creation of local markets and services (e.g. biomass utilization, optimisation of works in difficult conditions – on highly moist terrains).

Ad. c) Plans for adoption or for further adoption in new or existing production areas;

- continuation of the aforementioned measures in future RDP programming periods,
- expansion of existing measures in the direction of shaping the biomass market, RES, etc.,
- greater use of ecosystem approach in terms of direct payments,

Ad. d) Conclusions.

- the need to develop a package of measures enabling a more rational shaping of water conditions affecting the conservation of biodiversity in rural areas dominated by grasslands and pastures,
- the need to take under greater consideration the ecosystem approach covering all groups of organisms that create an ecosystem, in particular herpetofauna and entomofauna,
- the need for more effective mechanisms supporting the creation of local and regional markets using the natural potential of the region,
- the need for a follow-up in the field of educating local communities aimed at the possibility of sustainable use of natural resources (currently, the recorded knowledge of various components of meadow and pasture ecosystems, the ties between them and effects of abusive practices has been considered to be too small).

Gaps and priorities

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

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

The main gaps in information and knowledge relate to the precise valuation of ecosystem services provided for the good of biodiversity. These include key information necessary to implement relevant measures for the protection of plant and animal species richness, caused by the lack of workshops and seminars, the lack of published and disseminated reports on undertaken measures and reports on the research, evaluation and monitoring of biodiversity utilization.

Insufficient awareness of the use of biodiversity translates to:

- the lack of universal inventory of natural resources on a national scale, being the basis for planning measures and managing production area,
- no valuation of permanent grasslands in the context of their natural potential,
- the lack of a sufficient number of studies focused on the development of optimal practices and requirements of using natural habitats in the context of fauna and flora – the need to verify currently adopted and functioning solutions, in particular in the context of particular species identified as key/priority species and specific natural habitats,
- the establishment and maintenance of an environmental monitoring network in rural areas,
- the recognition of the impact of agricultural landscape structure (its individual elements) – on the status of biodiversity – and related measures forming an optimal landscape structure to provide conservation / restoration of resources,
- the identification of mechanisms of the functioning of agricultural landscape in the context of conserving biodiversity in various geographical conditions,

- the identification of the means to manage adverse processes (including environmental ones) leading to a reduction in biodiversity in rural areas (e.g. expansion of invasive species),
- the lack of a universally accessible and complete information platform containing data on natural habitats, flora and fauna species, natural potential, recommendations regarding how to use them,
- the technocratic approach to flood protection: constructing reservoirs and regulating rivers as a way to control water in the environment, urbanization of waterside and riverside areas, the lack of ecoflood measures moving buildings or flood banks from rivers.

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

The main limitations include:

- a small quantity, limited availability and insufficient quality of tools supporting operators (mainly farmers) responsible for the implementation of measures for the conservation of ecosystem services.
- the lack of a sufficient number of advisers and experts duly prepared to conduct trainings for farmers on management or measures involving the use of biodiversity for food and agriculture,
- the lack of sufficient financial means or mechanisms that stimulate funding of the aforementioned measures,
- no effective communication platform that contains the basic source data, including mapping data for using the resource, has been developed.

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

The evaluation of main political and institutional constraints is difficult due to the lack of precise measurement scale. However, the following can be observed:

- the lack of stable funding; the position and role of coordination in the field of the protection of biodiversity should be strengthened,
- insufficient lobbing to promote biodiversity conservation,
- the lack of measures / the consistency of measures undertaken by various political factions within EU countries.

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

- funding research that allows to assess the value of various ecosystem services, as well as those assessing the impact of various agricultural practices on biological diversity,
- improvement of the information flow and the creation of a platform for information exchange and measure coordination,
- increasing the awareness of agrocenoses' users and increasing the coherence of measures undertaken within the EU. It is necessary to increase public awareness about environmental safety. The most effective method is to educate children and young people. Numerous TV advertisement campaigns funded by the Ministry of Agriculture or the Ministry of the Environment do not always fulfill their task.

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

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

- shortage of published and disseminated reports on undertaken measures and reports on the research, evaluation and monitoring of the use of biological diversity:
    - which species of wild plants and animals associated with semi-natural ecosystems of meadows and pastures are of key significance for food and agriculture in the context of e.g.

fodder quality, biomass production, resistance to external factors including diseases, diet supplementation, improvement of abiotic conditions (e.g. soil),

- whether there is regional disparity in terms of the utilization of the aforementioned species,

- insufficient awareness of the use of biodiversity.

b) What are the main capacity or resources limitations?

Too small farm area.

c) What are the main policy and institutional constraints?

- the lack of stable funding; the position and role of coordination in the field of the protection of biodiversity should be strengthened; insufficient lobbing to promote biodiversity conservation,
- the lack of measures / the consistency of measures undertaken by various political factions within EU countries.

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

- funding research that allows to assess the value of various ecosystem services, as well as those assessing the impact of various agricultural practices on biological diversity,
- improvement of the information flow and the creation of a platform for information exchange and measure coordination,
- increasing the awareness of agrocenoses' users and increasing the coherence of measures undertaken within the EU. It is necessary to increase public awareness about environmental safety. The most effective method is to educate children and young people. Numerous TV advertisement campaigns funded by the Ministry of Agriculture or the Ministry of the Environment do not always fulfill their task. Lack of knowledge among consumers, cultivation of small-scale plants requires greater financial support by the State.

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

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

- the lack of sufficient marketing and promotion,
- insufficient awareness of the use of biodiversity.

b) What are the main capacity or resources constraints?

Too small farm area.

c) What are the main policy and institutional constraints?

- the lack of financial resources and financial instruments supporting research and evaluation of plant genetic resources;
- the lack of measures/the consistency of measures undertaken by various political factions within EU countries.

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

- the increase of financial resources and financial instruments supporting research and evaluation of plant genetic resources;
- funding research that allows to assess the value of various ecosystem services, as well as those assessing the impact of various agricultural practices on biological diversity,
- increasing the awareness of agrocenoses' users and increasing the coherence of measures undertaken within the EU. It is necessary to increase public awareness about environmental safety. The most effective method is to educate children and young people. Numerous TV advertisement campaigns funded by the Ministry of Agriculture or the Ministry of the Environment do not always fulfill their task.

65. With respect ti the adoption of ecosystem approaches:

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

insufficient awareness of the use of biodiversity.

b) What are the main capacity or resources constraints?

Too small farm area.

c) What are the main policy and institutional constraints?

the lack of measures / the consistency of measures undertaken by various political factions within EU countries.

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

increasing the awareness of agrocenoses' users and increasing the coherence of measures undertaken within the EU. It is necessary to increase public awareness about environmental safety. The most effective method is to educate children and young people. Numerous TV advertisement campaigns funded by the Ministry of Agriculture or the Ministry of the Environment do not always fulfill their task.

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[239] programmes[240] and enabling frameworks that support or influence conservation and sustainable use of biodiversity for food and agriculture and the provision of ecosystem services

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

a) Support the integrated conservation and sustainable use of biodiversity for food and agriculture across sectors[241]

Strategy for sustainable development of rural areas, agriculture and fisheries

The strategy for sustainable development of rural areas, agriculture and fisheries is one of the 9 integrated strategies, developed in accordance with the document entitled „Development Strategy Organisation Plan" adopted by the Council of Ministers on 24 November 2009. The strategy specifies the basic conditions, objectives and development trends for the period 2012-2020 in the following areas identified in the Medium-term national development strategy: agriculture, fisheries and rural development. The document covers the following topics: the competitiveness of the agricultural sector; ensuring food security; the protection of the environment, biodiversity, climate change; business development and employment; fisheries; human capital; quality of life improvement; information and communication technologies. It also determines the long-term vision of rural areas and the main objective of the strategy is defined as: to improve the quality of life in rural

[239] 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.

[240] 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.

[241] 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.

areas and effective use of their resources and capabilities, including agriculture and fisheries, for the sustainable development of the country.

The national strategy for sustainable use and conservation of genetic resources of farm animals

The national strategy refers to the conservation and sustainable use of genetic resources of animals, both native/local, as well as international breeds. It takes into account a wide range of tasks faced by livestock production in terms of sustainable and multifunctional agricultural model, which requires the maintenance of farms that have particular relevance for possible maintenance of non-manufacturing functions, among others, ecosystem and cultural heritage protection. At the same time, it takes into account the needs of the sector to adapt to changing economic, production and environmental conditions, and the possibilities given by innovative methods and technologies. This strategy is consistent with the „Strategy for sustainable development of rural areas, agriculture and fisheries" 2012-2020 and constitutes its extension in the field of animal production.

The vision for the development of livestock breeding and farming in the perspective up to 2025 is based on the general objective of the Strategy: the effective use of genetic resources of farm animals and their conservation for sustainable development and agriculture.

b) Support the conservation and sustainable use for associated biodiversity;

The legal act defining the determination procedure, the supervision system and the conservation principles for the protection of protected areas and species of plants, animals and fungi, including associated biodiversity of agricultural areas is the Act of 16 April 2004 on Nature Conservation and its implementing regulations:

- Ordinance of the Minister of the Environment on: natural habitats and species of Community interest, as well as criteria for the selection of areas eligible for recognition or designation as Natura 2000 sites;
- Ordinance of the Minister of the Environment on: Natura 2000 special bird protection areas;
- Ordinance of the Minister of the Environment on: drafting a plan of protection tasks for the Natura 2000 area;
- Ordinance of the Minister of the Environment on: drafting a protection plan for the Natura 2000 area;
- Ordinance of the Minister of the Environment on: the species of wild animals under protection;
- Ordinance of the Minister of the Environment on: the species of wild plants under protection;

The conservation and restoration of biodiversity, including agricultural and forest areas is indicated by a number of national strategic documents (the degree of reference to the issue of biodiversity is given in brackets: high – in great depth, average – incompletely, low – in general terms):

1. National Development Strategy 2020, adopted by the Council of Ministers on 25 September 2012 (*high degree)*

2. Strategy for Wetland Conservation 2006-2013 (*high degree)*

3. National Programme for Conservation and Sustainable Utilization of Biodiversity, along with the Action Plan for 2014-2020, draft (*high degree)*

4. National Forest Policy, adopted by the Council of Minister on 22 April 1997 (*high degree)*

5. National Programme for the Augmentation of Forest Cover of 2003, adopted by the Council of Ministers on 23 June 1995 (*high degree)*

6. Strategy „Energy Security and the Environment" 2020 Perspective, adopted by the Council of Ministers on 15 April 2014 (Ministry of Economy (*average degree)*

7. Polish Climate Policy „Strategies to Reduce Greenhouse Gas Emissions in Poland by 2020", adopted by the Council of Ministers on 4 November 2003 (*average degree)*

8. National Environmental Policy for the years 2009-2012 with a timeframe until 2016 (*average degree)*

9. Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries 2012-2020, adopted by the Council of Ministers on 25 April 2012 (*high degree)*

10. National Regional Development Strategy 2010-2020: regions, cities, rural areas, document adopted by the Council of Ministers on 13 July 2010 (*high degree)*

11. Draft Water Policy until 2030 (taking into account stage 2016) (*high degree)*
12. National Spatial Development Concept 2030, adopted on 13 December 2011 (*high degree)*
13. Strategic Adaptation Plan for Sectors and Areas Vulnerable to Climate Change until 2020, with a timeframe until 2030, adopted by the Council of Ministers on 29 October 2013 (*average degree)*
14. National Transport Policy 2006-2025, adopted by the Council of Ministers on 29 June 2005 (*average degree)*
15. Transport Development Strategy until 2020 (with a timeframe until 2030), adopted by the Council of Ministers on 22 January 2013 (*average degree)*
16. Strategy of Socio-economic Development of Eastern Poland until 2020, updated version, adopted by the Council of Ministers on 11 July 2013 (*average degree)*
17. Directions of Tourism Development until 2015, adopted by the Council of Ministers on 26 September 2008 (*average degree)*
18. Poland's Energy Policy until 2030, adopted by the Council of Ministers on 10 November 2009 (*low degree)*
19. Strategy for the Innovativeness and Effectiveness of the Economy „Dynamic Poland 2020", adopted on 15 January 2013 (*low degree)*
20. Strategy for Operation of the Hard Coal Mining Sector in Poland in the Years 2007 – 2015, adopted by the Council of Ministers on 31 July 2007 (*low degree)*
21. National Strategy of Ecological Education (*low degree)*
22. Master Plan for Rail Transport in Poland until 2030, adopted on 19 December 2008 (*low degree)*

Rural Development Programme 2007-2013

Financial assistance from RDP 2007-2013 granted to: farmers, entrepreneurs and local self-governments, and forest owners is spent on the creation of a modern, competitive agri-food and forestry sector, farming according to environmental protection, the development of culture and preservation of traditions in rural areas and measures to improve the quality of life of countryside population and their economic activation.

Goals, whose achievement is facilitated by financial assistance granted under RDP 2007-2013 include:

- encouraging farmers to farm in an environmentally-friendly manner and to preserve native species and valuable plant habitats;
- support agriculture with LFA payments in mountain areas and other less favourable areas;
- improving the country's afforestation rate by providing financial aid for afforestation of lands with low agricultural usefulness;
- countryside renewal, activation of its inhabitants and the creation of social capital in the countryside;
- improving the qualification of farmers and forest owners and facilitating their access to advisory services;

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

Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries (see item a).

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

Rural Development Programme 2007-2013

Negative pressure on the environment is still very strong. For example, only 17% of natural habitats and 11% of ecosystems in the EU are in good state, in some bodies of water there is a surplus of nutrients (in spite of some progress in others), and 45% of EU soils have a problem with quality. These problems must be solved, and the positive contribution of agriculture and forestry in the environment should be strengthened. In view of

the above, guidelines have been developed within the framework of the RDP that aim to tie agriculture with ecosystem protection:

- restoration and conservation of biodiversity (including NATURA 2000 sites and high natural value agricultural areas) and landscape state in Europe;
- improvement of water management;
- improvement of soil management.

Financial assistance from RDP 2007-2013 isgranted to: farmers, entrepreneurs and local self-governments, and forest owners is spent on the creation of a modern, competitive agri-food and forestry sector, farming according to environmental protection, the development of culture and preservation of traditions in rural areas and measures to improve the quality of life of countryside population and their economic activation.

Operational Programme: Sustainable Development of the Fisheries Sector and Coastal Fishing Areas 2007-2013 and Operational Programme „Fisheries and the Sea" 2014-2020

These programmes are intended to support the restructuring of the fishing sector, taking into account the objective of sustainable use of natural resources. The aim is to enhance the improvement of the quality of life in fisheries-dependent areas, but with regard to rational management of living aquatic resources. For this purpose, measures involving, among others, the following actions are established:

- promoting sustainable, innovative and competent fishing;
- supporting a sustainable, innovative and competitive aquaculture (breeding and rearing of aquatic organisms);
- supporting the implementation of the Common Fisheries Policy;
- the development of an integrated maritime policy.

AQUACULTURE 2020 – Strategic Plan for the Development of Fish Farming in Poland in the years 2014-2020.

The strategy for aquaculture has been developed on the basis of a bottom-up initiative, that is, the Carp 2020 Strategy and the Strategy of the Developed of Sustainable Intensive Aquaculture 2020, developed by the fishing industry. Documents developed by the „carp" and „trout" industry are an integral part of the government strategy. The main objective of the AQUACULTURE 2020 strategy is for Poland to achieve and maintain a leading position in the EU in producing fish from inland aquaculture.[242]

e) Improve resilience and sustainability of production systems with explicit reference to biological diversity for food and agriculture, associated biological diversity and / or wild food;

Organic farming

The Act of 25 June 2009 on organic farming specifies the tasks and competence of public administration bodies and organisational units in organic agriculture in terms of implementing the provisions of Council Regulation (EC) no. 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) no. 2092/91 and EU provisions issued under this regulation.

The criteria of organic farming are not only the requirements for plant cultivation and animal breeding. The system also includes the processing of organic agricultural resources and the rules of labelling products intended for market circulation. The important role of the criteria is expressed by the fact that their implementation is subject to control and it is a condition for obtaining a certificate allowing to label and sell products as „organically farmed". Switching to an organic method is an integral part of production criteria, that is, the required period of using criteria in the farm prior to receiving the certificate for the first time. The switching period is generally 2 years (for perennial crops – 3 years), but it can be – depending on the preceding farming method – reduced to a year, or extended. The switching period aims to contribute to the breakdown of residues of previously used agro-chemicals and serve to achieve ecological balance on the farm.

Sustainable farming

[242] https://www.minrol.gov.pl/content/download/49857/274182/version/1/file/Za%C5%82%C4%85cznik%20nr%206%20Strategia%20AQ%202020.pdf

Sustainable agriculture is the effective production of safe, high-quality food in a manner that protects, or even improves, the environment, social and economic conditions of the farmer's life and their employees, as well as local communities. In such a production process, the health and well-being of all species used for production purposes should also be secured.

As part of the agri-environmentclimate commitments, Package 1. „Sustainable farming" figures in the new RDP 2014-2020. „The package is an equivalent to one of the agricultural practices favourable to the climate and the environment referred to in article 43 of the regulation of direct payments (regulation (EU) no 1306/2013 of the European Parliament and of the Council of 17 December 2013 *on the financing, management and monitoring of the common agricultural policy and repealing Council Regulations (EEC) No 352/78, (EC) No 165/94, (EC) No 2799/98, (EC) No 814/2000, (EC) No 1290/2005 and (EC) No 485/2008*), that is, the diversification of crops, by requiring the correct selection and sequence of crops in crop rotation" – as specified by the draft of RDP 2014-2020. Payments under the Package 1. are granted annually, for the period of a 5-year-long commitment, to farmers who voluntarily accept the agri-environment-climate commitments under this package. The payment is only granted for arable area. The payment under this package is granted to the beneficiary, if they possess a farm located within Polish territory, with a utilized agricultural area of not less than 3 ha. The payment rate is determined on the basis of a cost and benefit balance of the agricultural holding undertaking the commitment under Package 1. Costs associated with smaller yield due to fertilization restrictions, as well as soil testing costs and costs of the preparation of a nitrogen balance for a medium-sized farm have been included in total costs incurred, while savings on nitrogen fertilization are considered a benefit.

f) Support farmers, pastoralists, forest dwellers and fisher folk to adopt and maintain practices that strengthen the conservation and the use of biodiversity for food and agriculture.

Support in Poland is carried out with the participation of breeders' associations, Agricultural Advisory Centres and non-governmental institutions.

- Breeders' Associations are voluntary, independent, self-governing, socio-professional organisations representing and defending the rights and interests of breeders and other organisations operating for the benefit of breeding and rearing of select species.
- The task of Agricultural Advisory Centres is to provide agricultural advisory services covering activities in the field of agriculture, rural development, agricultural and household markets, intending to raise agricultural income and improve the market competitiveness of agricultural farms, support sustainable development of rural areas, as well as improve professional qualifications of farmers and other rural residents (the Act on agricultural advisory units of 22 October 2004).

  Non-governmental institutions include centres, foundations and associations gathering stakeholders and acting to improve the situation in agriculture. They often promote organic farming and ecological farming and fishing practices.

67. List up to 10 major policies, programmes and anabling frameworks in your country, that enhance the application of the ecosystem approach[243] or a landscape approach[244] and that contain an explicit reference to biodiversity for food and agriculture, associated biodiversity and / or wild food. Include a brief description of the policies, programmes and lanabling frameworks together with any information on the extent of their application (production system area) and observed effects. Where possible provide examples of best practices or lessons learned.

[243] 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.

[244] 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 68 and 69. Consider the following discussion points in your responses, where information is available:
a) extent of implementation;
b) production systems involved;
c) the extent of use of biodiversity for agriculture;
d) lessons learned;
e) evidence of indicators of vulnerability that have decreased as a result of these efforts;
f) describe the value added of mainstreaming gender in programmes, policies and enabling frameworks, providing sex-disaggregated data where possible.

The National Fund for Environmental Protection and Water Management (NFEP&WM) Priority Programmes

The „Nature and Landscape Protection (2010-2017)" and the „Protection of precious natural areas and species (2014-2020)" Programmes intending to halt the loss of biological and landscape diversity, the restoration and enrichment of natural resources, including:

- stopping the decline and restoration of the population of endangered plant, animal and fungi species, by:

  a) developing national protection programmes for species that are legally protected and listed on the red lists or in the red books of endangered species,

  b) restitution and reintroduction of species that are legally protected and listed on the red lists or in the red books of endangered species,

  c) ex-situ protection of species that are legally protected and listed on the red lists or in the red books of endangered species,

  d) monitoring of population status, threats and effects of implemented tasks,

  e) reconstruction of the vanishing populations of native small game species – hare and partridge;

- restoration of natural and landscape resources, as well as equipment and facilities used to protect these resources, damaged as a result of natural disasters.

Measures related to habitats and species associated with agriculture, mainly with L3 and M3 production systems, have been and will be financed under this programme.

The Operational Programme Infrastructure and Environment 2007-2013

Programme implemented on the basis of the EC's decision of 7 December 2007, which included Priority V related to environment protection and creating ecological attitudes, within the framework of which measures related to the restoration of natural habitats (ecosystems) and species' reserves in protected areas have been implemented, along with the preservation of endangered species and biological diversity of plants, animals and species, among others: restoration of degraded non-forest and water habitats, restoration of degraded forest habitats by adapting the species composition of stands for potential habitat conditions, restoration of appropriate water balance of wetland habitats, purchase of lands key to nature conservation and their denaturation. These measures have been implemented, among others, in the most valuable habitats used for agriculture, mainly associated with L3 and M3 production systems.

Multi-annual Programme „Protection and Management of National Genetic Resources of Farm Animals Under Conditions of Sustainable Use" (2011)

The measures included in the programme are the continuation and extension of the existing tasks in the field of zootechnical sciences in order to transfer and develop technologies and methods to support livestock breeding and production. The programme takes into account the current state of both Polish and global science, with a particular focus on biodiversity, livestock breeding, animal feeding science, and environment protection.

The programme aims to ensure the progress of biological farming and livestock production, and create conditions for the conduct of and universal access to the results of the evaluation of breeding and usefulness value of farm animals. Thanks to its implementation, it will also be possible to use information about the nutritional value of feed and monitor its quality.

It has been established that the programme will include measures relating to:

- Sustainable use and conservation of livestock biodiversity – this mainly refers to measures concerning the evaluation of breeding and performance value of cattle, pigs and sheep, maintenance of databases and

providing obtained information on-line, the development of a national programme for the protection of livestock genetic resources, development and verification of biological material sampling; the creation of a National Bank of Biological Materials.

- Genomic and biotechnological basis of livestock breeding and production – one of the priorities of this measure is the use of molecular genetic markers in breeding livestock biodiversity (e.g. matching DNA genetic profiles associated with the characteristics of dairy cattle breeds or the use of genomic analysis to increase the accuracy of the evaluation of the breeding value of dairy cattle breeds).
- Improvement of livestock welfare and monitoring of feed quality, as an element of food security and environmental protection – important in this measure will be tasks associated with, among others, the verification livestock welfare norms, monitoring the quality of feedingstuffs' materials of compounds, plant resources genetically modified due to their nutritional value or monitoring of feedingstuffs' materials and compounds, including by-products of agri-food processing and ecological feed in terms of their chemical composition, nutritional value, as well as undesirable and harmful substances.
- Personnel training and the dissemination of knowledge on sustainable livestock production. This task includes the training of specialists involved in livestock breeding and the dissemination of the latest achievements in the field of animal breeding and rearing.

Tasks included in the programme will support the development policy, RDP 2007-2013 and the National Development Strategy 2007-2015. In particular, this applies to supporting the development of the so-called integrated production, which is the basis of management in EU Member States. It's about sustainable utilization of biological and technical progress in cultivation, plant protection, fertilization, and livestock production.

Fish genetic resources protection programme

The programme has been developed by the Institute for Inland Fisheries within the framework of Operational Programme „Sustainable Development of the Fisheries Sector and Coastal Fishing Areas 2007-2013", it enabled the launch of financial support for breeding centres involved in the conservation of fish genetic resources since 2011. It was assumed that the following farmed species will be covered by the programme: rainbow trout and carp, as well as species of endangered wild fish populations and restored species such as: Atlantic sturgeon, Atlantic salmon, brown trout, lavaret, grayling, huchen, vimba.

Up until now, the legal frame to provide assistance was the Ordinance of the Minister of Agriculture and Rural Development of 7 September 2009 (OJ no. 147, item 1193, as amended; OJ of 2009 no.161, item 1287, as amended; OJ of 2012, item 751) on specific conditions and granting, payment and return of financial aid for the implementation of measures under priority axis 2 – Aquaculture, inland fishing, processing, marketing of fishery and aquaculture products.

National Development Strategy 2020 (adopted by the Council of Ministers on 25 September 2012)

National Development Strategy 2020 – it is the main development strategy in the medium term. It indicates strategic tasks of the state, which have to be addressed over the coming years in order to strengthen development processes (along with estimates of required financial resources).

National Development Strategy 2020 is based on a sustainable development strategy. The success of the implementation of all objectives of the Strategy will depend on a number of factors, both internal and external, which may affect the availability of financial resources for its implementation. The world economy, and the euro area in particular, will be of distinct significance.

The Strategy sets three strategic areas – Efficient and Effective State, Competitive Economy, Social and Territorial Cohesion, which will concentrate main measures and determine which interventions are necessary in the medium term in order to speed up development processes.

The main objective of the Strategy is to strengthen and use economic, social and institutional capabilities ensuring faster and more sustainable development of the country and improvement in the population's quality of life.

The Strategy provides the basis for 9 integrated strategies, which should contribute to the implementation of objectives established in in, whereas the measures designed within should develop and further refine the reforms it indicates. It is not addressed only to the public administration. It integrates all public bodies around strategic goals, as well as social and economic communities involved in development processes and can assist them both at a central and regional level. It indicates the necessary reforms to limit or eliminate socio-economic development barriers, the indicative timetable for their improvement and financing of designed measures.

National Programme for the Conservation and Sustainable Use of Biological Diversity along with the 2014-2020 Action Plan (draft under ministerial consultations)

In accordance with article 6 of the Convention on biological diversity, parties to the convention should develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity in line with their particular capabilities. So far, two National strategies for the years 2004-2006 and 2007-2013 have been developed and implemented in Poland, whereas the current Programme for the years 2014-2020 is under consultation.

The overarching goal of the Programme is to improve the state of biological diversity and tie its protection with the socio-economic development of the country. This goal, as well as the strategic objectives and tasks contained in the Action Plan, are the result of discussions and consultations with the representatives of parties that are institutionally interested in the obligations arising from the programme. Strategic objectives:

Objective A: Raising the level of knowledge and shaping social attitudes related with the inclusion to measures for biological diversity

Objective B: The inclusion of selected sectors of the economy in measures for biodiversity

Objective C: Preservation and restoration of endangered species and habitats

Objective D: Effective management of natural resources

Objective E: Conservation and reconstruction of ecosystems and their services

Objective F: Reducing the pressure of invasive and conflict species

Objective G: Reduction and mitigation of the effects of climate change

Objective H: Protection of biodiversity through the development of international cooperation

Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries (adopted by the Council of Ministers)

The strategy for sustainable development of rural areas, agriculture and fisheries is one of the 9 integrated strategies, developed in accordance with the document entitled „Development Strategy Organisation Plan" adopted by the Council of Ministers on 24 November 2009. The idea of creating the Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries (SSDRAAF) until 2020 is implemented simultaneously at the national and European level.

The main objective of developing SSDRAAF is to define key directions for the development of rural areas, agriculture and fishing in the 2020 perspective. The SSDRAAF defines a main objective, which is to improve the quality of life in rural areas and the effective use of their resources and capabilities, including agriculture and fishing, for the sustainable development of the country, which will be implemented on the basis of the following five specific objectives:

Target 1. Human, social, employment and entrepreneurship capital quality increase in rural areas

Target 2. Improvement of living conditions in rural areas and the improvement of their spatial availability

Target 3. Food security

Target 4. Increase in productivity and competitiveness of the agro-food sector

Target 5. Environmental protection and adaptation to climate change in rural areas

The fifth objective of the Strategy implements tasks that are designed to promote an ecosystem and landscape approach to nature conservation in rural areas and concerns the conservation and sustainable use of biological diversity for food and agriculture, associated biological diversity and wild species living in the in agro-ecosystems.

The national strategy for sustainable use and conservation of genetic resources of farm animals

The vision for the development of livestock breeding and farming in the perspective up to 2025 is based on the general objective of the Strategy: the effective use of genetic resources of farm animals and their conservation for sustainable development and agriculture.

Support for NATURA 2000 valuable natural sites

The main objective of the operation of the **NATURA 2000** European Ecological Network is to preserve certain types of natural habitats, plant and animal species that are considered valuable (significant for the conservation

of European natural heritage) and in danger of extinction across Europe. This objective is to be pursued through the identification and coverage of protected areas where these species and habitats occur. Many of these valuable natural areas are located in rural areas and include agro-ecosystems.

Activities in the field of the protection of natural habitats and of wild flora and fauna are intended to conserve or restore biological diversity of Europe, which is one of the priorities for the EU. In addition, Member States are obliged, if necessary, to preserve the ecological coherence of the NATURA 2000 network, in order to conserve the migration, dispersal and genetic exchange.

The idea of the NATURA 2000 network is assumed to increase the effectiveness of protective measures by creating an additional – complete and methodically consistent – protection system of European natural heritage, which overlays already functioning site and species protection systems, completing and decisively boosting them. It is a global phenomenon in the field of international area nature conservation. The basis for its functioning includes two EU directives – Directive 2009/147/EC of the EP and the Council of 30 November 2009 on the conservation of wild birds (called the Birds Directive) and Directive 92/43/EEC of the Council of 21 May 1992 on the conservation of natural habitats and wild fauna and flora (called the Habitats Directive). Under the Birds Directive and the Habitats Directive, each Member State of the European Union has a duty to ensure that the natural habitats and species of plants and animals, referred to in those directives, have proper conditions conducive to the protection or strive to recreate their good (proper) State, among others, by designating special protection areas (SPAs) and special areas of habitat conservation (SACs).

Poland, by signing the Treaty of Athens on 16 April 2003, which is the legal basis for admission to the EU, has committed to designate NATURA 2000 sites on its territory. EU provisions which constitute the basis for the creation of the NATURA 2000 network have been implemented into Polish legislation by the Act of 16 April 2004 on nature conservation, making NATURA 2000 the youngest legal form of nature protection in Poland. Currently, the Natura 2000 network takes up nearly 1/5 of the total land area of Poland. It includes: 849 habitat areas and 145 birds' areas. Almost 25% of Natura 2000 areas overlap with agricultural areas; 10% are grasslands and 50% are forest areas.

In RDP 2007-2013, 519 million euro have been designated for supporting NATURA 2000 areas. Financing covered measures such as: protection of endangered bird species and natural habitats in NATURA 2000 sites, and extensive management on grasslands and pastures. In accordance with the decisions that have been made so far on the Common Agricultural Policy for 2014-2020, Poland is the biggest beneficiary of funds allocated to agriculture. It is anticipated that 30% of the expenditure on RDP will go on activities related to environment and climate protection – as the Minister of Agriculture has underlined – Poland has obtained permission to pay premiums for unfavourable conditions of management (so-called LFA) as well as aid related to NATURA 2000 from this fund.

Support for less favourable areas (LFA)

Financial assistance within the framework of this measure include compensatory payments, which are intended to ensure the continuity of agricultural land use, thereby maintaining the vitality of rural areas, preservation of landscape values, promotion of environmentally friendly agriculture and prevent depopulation. LFA areas are areas where agricultural production is impeded due to natural conditions, but there is also the possibility of excessive depopulation.

Natural handicap payments in mountain areas or in other areas with handicaps should contribute to keep population in rural areas, they should contribute to continuous use of agricultural land, meadows and pastures, and therefore maintain and support sustainable farming systems and provide habitats for wild organisms associated with agrocenoses.

Support for LFA areas is governed by the Ordinance of the Minister of Agriculture and Rural Development of 11 March 2009 on the specific conditions and granting of financial aid under measure „Supporting management in mountain areas and other less-favoured areas" covered by RDP 2007-2013. LFA areas have been divided into three types 1) lowland (I lowland zone and II lowland zone); 2) mountain areas; 3) areas with specific handicaps. The division of types was based on their characteristics.

Promotion and support of organic farming

Organic farming is a specific farming system that involves balancing crop and livestock production while using natural measures. There has been a steady increase (882 in 2002 to 15.234 in 2011) in the number of certified organic farms and growing interest in the organic products market. The number of chain stores offering organic products is also increasing, which generates additional profits for those involved. Financial support for organic farms stems from tying social expectation with state policies.

Fundamental goals of organic farming:

- preservation of a high level of humus, which determines soil fertility;
- maintaining environmental balance in agricultural production;
- striving to close the circulation of matter in the farm by balancing plant and agricultural production.

In Poland, the detailed requirements for organic agriculture are governed by the Act of 20 April 2004 on organic farming, whereas the EU legal act, that Polish farmers also have to comply with is Council Regulation 2092/91/EEC of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs.

Fundamental principles of organic farming:

- fertilization with organic or natural fertilisers, manufactured in one's own farm or, in case there are no animals, obtained from other organic farms, as well as fertilizers and soil improvers qualified for use in organic agriculture;
- the use of organic seeds;
- proper crop rotation, taking into account catch crops and follow-up crops, allowing to maintain vegetation as long as possible;
- mechanical weeding, without chemical plant protection measures or by using protection measures qualified for use in organic agriculture.
- the use of biological preparations and plant extracts;
- appropriate livestock management – provision of adequate surface and access to paddocks and pastures;
- maintaining animal welfare;
- the maximum stocking density per 1 ha – no more than 1.5 LU;
- feeding animals using feeds from one's own farm or others, but organically produced;
- treating animals using natural methods, the use of allopathic veterinary medicinal products and antibiotics only with the approval of a certification body under the responsibility of the veterinarian.

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.

Biodiversity gives plants and animals a chance to adapt to changing environmental conditions. It constitutes a food safety net in case of a natural disaster or plague, which can suddenly affect some plant or animal varieties.

The Act of 26 April 2007 on crisis management does not refer to the concept of biodiversity.

In Poland there are documents governing procedures in the event of a disaster, such as floods. The Veterinary Inspection and Inspectorate for Environmental Protection often participate during natural disasters. The mechanisms of action are described, inter alia, in the National Crisis Management Plan.

The issue of the reduction of the risks associated with natural disasters is addressed by the Programme for Conservation and Sustainable Use of Biological Diversity and the Action Plan for 2014-2020.

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.[245]).

Polish legislation concerning greenhouse gas emissions does not refer to the subject of biodiversity:

[245] 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.

- The Act of 28 April 2011 on the Emissions Trading System for Greenhouse Gases
- The Act of 17 July 2009 on the System for the Management of Emissions of Greenhouse Gases and Other Substances
- The Act of 22 December 2004 on Trade in Rights to Emit Greenhouse Gases and Other Substances into the Atmosphere

The issue of biodiversity in the context of climate change appears in selected sectoral documents:

- Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries 2012-2020.
- State Environmental Policy in the years 2009-2012 with a timeframe until 2016
- Strategic Plan of Adaptation for Sectors and Areas Vulnerable to Climate Change until 2020 with a perspective until 2030, so-called SPA2020
- Strategy Energy Security and Environment, timeframe until 2020
- National Programme of Conservation and Sustainable Utilization of Biodiversity, along with the Action Programme for 2014-2020, draft.

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)?

Medium-term evaluation of the implementation status of the National Strategy of Conservation and Sustainable Utilization of Biodiversity, along with the Action Programme for 2007-2013.

- **Task no. 88: Approval, dissemination and adoption of a national strategy for agricultural biodiversity protection.**

  The Ministry of Agriculture and Rural Development has undertaken preliminary measures to develop a national strategy for the protection of agricultural biodiversity. The works on this strategy are closely tied to the ongoing discussion on the CAP after 2013. The representatives of academic communities participate in it.

- **Task no. 89: Inventory of crop, livestock and microorganism genetic resources used in agriculture, stored in existing gene banks ex situ and the launch of an on-going data update system.**

  In Poland, the Plant Breeding and Acclimatization Institute (IHAR) in Radzików serves as the central plant genetic resource bank, which coordinates the work of individual curators of the collections that are scattered across various scientific units and botanical gardens. In the years 2008-2011, the multi-annual programme under the name „Improvement of Plants for Sustainable AgroEcoSystems, High Quality Food and Plant Production for Non-food Purposes" has been carried out by IHAR. Under this programme, area 1 „Gathering, protecting, evaluating, preserving in alive state and sharing for the needs of the national economy of agricultural plants' genetic resources and their pathogens" is a measure aiming to maintain biological diversity of agricultural plants and their pathogens.

- **Task no. 90: Improvement and development of in-situ and ex-situ protection programmes for native breeds and varieties of livestock and insects (pollinators) important for agricultural production.**

  The National Research Institute of Animal Production (IZ PIB), in cooperation with other scientific units and breeders' associations has developed or verified and implemented protection programmes for a total of 87 populations, namely: 28 races, 34 families, 11 varieties, 12 lines and 2 strains.

- **Task no. 91: Development and implementation of legal and economic mechanisms allowing for ex-situ protection of crop and livestock genetic resources.**

  The Ministry of Agriculture and Rural Development is working on implementing the International Treaty on Plant Genetic Resources for Food and Agriculture.

There are two Packages implemented under measure Agri-environmental Programme RDP 2007-2013, directed at the protection of endangered agricultural plant and livestock genetic resources.

Package 6. Preservation of endangered plant genetic resources in agriculture allows to support farmers who actively participate in the protection and improvement of local or old varieties of agricultural plant species, as well as currently endangered agricultural plant species and species accompanying them. The package allows to preserve the existing genetic resources of plants cultivated by farmers, and the practical use of the best genotypes stored in gene banks. This package also protects traditional orchards.

Package 7. The preservation of the endangered animal genetic resources in agriculture aims at protecting particularly valuable breeds of livestock, where low numbers of breeding animals threatens their extinction. Preservation of genetic resources of farm animals in Poland is carried out on the basis of article 21 (a) of the Act of 20 August 1997 on raising and reproduction of livestock (consolidated text OJ 02.207.1762, as amended).

- **Task no. 92: Implementation of in-situ and ex-situ protection programmes of populations of native breeds and varieties of livestock and insects (pollinators) important for agricultural production.**

  Package 7. is implemented under the Agri-environmental programme under RDP 2007-2013. The preservation of the endangered animal genetic resources in agriculture aims at protecting in situ particularly valuable breeds of livestock, where low numbers of breeding animals threatens their extinction. Support covers selected breeds of pigs, sheep, horses and cattle.

  By the end of December 2014 within RDP 2007-2013 itself the support has covered 63 579 animals of which 8 237 units of cattle, 6 094 horses, 46 467 sheep and 2 781 pigs.

  Overall, until 2009, 4 375 mares, 5 813 cows, 30 383 sheep, 2 196 pigs, 8 968 laying hens, 4 208 geese, 3 945 ducks, 174 rabbits, 1 189 fur animals and 430 bee families have been included in various livestock genetic resources protection programmes in Poland.

- **Task no. 93: Inventory and collection of old and local agricultural plant varieties gene resources, as well as related species of wild plants, along with accompanying species of endangered weeds.**

  The analysis of the size of stored and inventoried genetic resources of old and local agricultural plant varieties (2008-2013) is performed within the IHAR PIB Multi-Annual Programme and the Research Institute of Pomology and Floriculture (ISiK) and IW multi-annual programme.

- **Task no. 94: Routine collection in ex situ gene banks of biological material belonging to agricultural plants, livestock and microorganisms used in agriculture, according to the needs of implemented protection programmes.**

  The scope of the assessment of maintained collections in ex situ banks is performed in the Research Institute for Horticulture in an on-going manner.

- **Task no. 95: Improvement and dissemination of the principles of good agricultural practice which takes into account the needs for conservation and sustainable use of biological diversity.**

- Direct payments and financial support under some of the RDP 2007-2013 measures (LFA, Agri-environmental programme, afforestation of agricultural land) are conditioned on the farmer complying with a number of requirements in the entirety of their farm. All of this constitutes a single mechanisms bearing the common name of the cross-compliance principle

- **Task no. 96: Improvement and development of the advisory system and training programmes for farmers in the area of organic farming, good agricultural practices and conservation of biodiversity.**

  There are numerous projects carried out within the Ministry of Agriculture and Rural Development. Among others, within the framework of the RDP 2007-2013, the measures „Vocational training for persons employed in agriculture and forestry" and „The use of farm advisory services by farmers and forest owners" are implemented. In 2008, the project „Promotion and information about the measures if Axis 2 – Agri-environment Programme under RDP 2007-2013" has been implemented. As part of the project, a series of trainings for all agricultural advisors in Poland has been carried out, and a „Guide to Life Sciences for Agri-environmental Consultants" has been published.

A number of publications in the form of brochures and flyers related to RDP measures aimed at the conservation of biodiversity have been created.

The documents a farmer who implements the Agri-environmental programme RDP 2007-2013 must have can also have an educational value, i.e. the agri-environmental plan and the documentation in case of Packages 4. and 5. aimed at protecting valuable natural habitats and habitats of endangered bird species.

- **Task no. 97: Development and dissemination of protection and mid-field afforestation programmes.**

  Under RDP 2007-2013 there is no support for mid-field afforestation – within the framework of the Agri-environmental programme there has been support for buffer strips and field baulks, under Package 9. Buffer zones. In addition, within the framework of this measure there is an obligation to preserve unused agricultural elements of the agricultural landscape, creating wildlife refuges, which can also include buffer strips and mid-field afforestation.

- **Task no. 98: Implementation of hydrological systems' restoration programmes in agricultural areas.**

  The project „Development of Methods to Restore the Original Water Conditions in the Kampinos National Park in Order to Stop Natural Degradation and Improve Biodiversity" (2008-2011) has been implemented.

- **Task no. 99: Dissemination of methods of utilizing riversides on floodplains in manners conducive to the protection of biological diversity, flood protection and erosion control.**

  In the Agri-environmental programme under 2007-2013, Packages 3., 4. and 5. concern extensive and valuable permanent grasslands.

- **Task no. 100: Implementations of mechanisms conducive to sales, leasing or otherwise imparting lands for nature conservation purposes.**

  Programmes allowing to finance land purchase, e.g. LIFE+, Axis V of the State Inspectorate for Environmental Protection, NFEPWM priority programme „Nature and Landscape Conservation, are mechanisms that promote the sale of land for nature conservation purposes. Moreover, the Agricultural Property Agency helps in implementing this task.

- **Task no. 101: Assessment of the current level of farmers' knowledge and attitude towards biodiversity conservation, as a basis for proper planning of educational activities.**

  The Ministry of Agriculture and Rural Development has undertaken measures aiming to assess farmers' approach to biological diversity by launching a study on the effectiveness of the packages included in the Agri-environmental programme for the conservation of rural landscape and biological diversity. As part of this project a survey has been conducted. Farmers were asked a series of questions regarding their knowledge and approach to the protection of biodiversity in rural areas. Cross-compliance includes, among others, environmental requirements that farmers have an obligation to use on farms, if they place requests for direct payments, LFA, afforestation of agricultural land and support under Agri-environmental programme. The study indicated that over 30% of the surveyed farmers declared that their care about the environment has increased since the cross-compliance principle became applicable, and that it improved farm management.

- **Task no. 102: Promoting environmental programs as tools for conservation and sustainable use of biological diversity.**

  There are many conferences, meetings, and seminars organised, there are many information and promotion materials published, there are several websites.

  Task no. 103: Assessing the impact of measures undertaken to reduce rabies on wildlife population and, where necessary, making appropriate modifications of these measures.

  In 2005-2009, the number of cases of rabies among foxes decreased from 138 (2005) to 8 (2009). In respect of other animals – no data are available.

- **Task no. 104: Developing measures to reduce the negative impacts of agriculture on the environment by extending the scope of funding under the Rural Development Programme.**

  Axis 2 of the RDP 2007-2013 envisages environment improvement in rural areas.

71. Has your country identified obstacles to the development and implementation of legislation aimed at protecting associated biodiversity? List and describe the initiatives in Table 25.

You should briefly describe the obstacles to the introduction of legal acts listed in Table 25 and, if possible, determine the proposed course of action to remedy this state of affairs. If possible, you should provide examples of best practices or conclusions.

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
Selective pesticides	The lack of a greater number of selective pesticides and a difficult registration system for selective plant protection products.
[if needed, please add rows]	

In Poland, no analysis was performed in order to identify obstacles to the development and implementation of legislation aimed at protecting associated biodiversity. It does not seem that such obstacles exist, because the development of new legal acts in Poland takes place in a smooth and efficient manner. Rather, it is a question of the complexity of the problem – biodiversity associated with agricultural land includes a huge number of species, from soil-dwelling organisms to numerous species of mammals and vascular plants, each of which has certain functions in the food chain and throughout the agro-ecosystem. Perhaps it is also a matter of priorities.

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).

In Poland genetic resources of crop plants are conserved in the framework of the International Treaty on Plant Genetic Resources for Food And Agriculture, by the Standard Material Transfer Agreement, which contains the terms of use and the distribution of the potential benefits.

In Poland no national legislation that implements article 15 of the Convention on Biological Diversity has yet been developed.

Poland, as a Member State of the European Union, is obliged to implement obligations arising out of the Nagoya Protocol to the Convention on Biological Diversity on access to genetic resources and fair and equitable sharing of benefits arising from their utilization, which entered into force on 12 October 2014, and whose EU is a contracting party.

At the same time, we have an obligation to directly implement the Regulation of the European Parliament and of the Council (EU) No. 511/2014 of 16 April 2014 on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, which entered into force at the same time as the Nagoya Protocol.

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)
Varieties resistant to plant diseases (HOR-IOR)	Integrated management	Y

Due to the fact that the Regulation governs mainly the obligations of the users of genetic resources and associated knowledge, it is necessary to develop national legislation to settle, above all, the matter of potential regulation of access to genetic resources occurring on our territory and associated traditional knowledge, and any conditions for granting access – or the lack of such requirements. At the same time, national legislation must resolve a number of administrative issues arising from the implementation of the Nagoya Protocol, such as the establishment of an appropriate national authority, contact points, control points, etc.

Works on the preparation of a national legislation proposal are in progress, their completion is planned for 2015; there is still no decision on whether to regulate access to genetic resources or not.

Currently, permissions for the acquisition of certain species of plants, animals and fungi under strict and partial protection, which are regulated by law, are required, among others, due to research and educational programmes or the implementation of repopulation goals, species reintroduction or reproductive measures, including artificial reproduction. These permissions must be necessary for the implementation of the aforementioned objectives and they may be issued in the absence of alternative solutions, if they are not detrimental to the conservation of protected populations.

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.

Poland has not taken measures to ensure access to genetic resources held by local communities.

Providing small-scale crops for farming, whose varieties are used locally by agricultural producers, will contribute to a better use of resources.

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.

There are no direct ties between sectoral systems for the exchange of information on biological diversity for food and agriculture at the national level.

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
Research Centre for Cultivar Testing (COBORU) in Słupia Wielka near Poznań	Plant protection	Susceptibility of varieties for diseases
Polish Red Data Book of Animals	Species hazard categories in the Polish Red Data Book of Animals	Register of endangered animal species in Poland. It was created based on the international Red List of Threatened Species. It contains a list of endangered animal species, along with detailed descriptions and placement maps. It also specifies the degree of risk of each species, its rarity, as well as applied and proposed ways of protection. For Poland, the Red Data Book of Animals is maintained by the PAS Institute of Nature Conservation in Krakow (formerly PAS Nature and Natural Resources Conservation Department), with the cooperation of dozens of scientists from across Poland.
The Chief Inspectorate For Environmental Protection	Monitoring studies are conducted at the level of sites, located primarily within proposed special habitat conservation areas of the Natura 2000 network, but also outside them, in accordance with the requirements of the Habitats Directive.	The task of the Chief Inspectorate for Environmental Protection is to monitor nature and determine the impact of environmental changes on organisms in order to prevent the negative effects of these changes on nature, thus – to acquire data for organising effective protection for species and ecological systems.

[if needed, please add rows]

In Poland, a dedicated national system of information about associated biodiversity has not been established, partial information on this topic are available through the information systems established for other purposes, e.g. the conservation of nature.

Species hazard categories in the Polish Red Data Book of Animals

1. EX – extinct species (2 species)
   tarpan, auroch, Atlantic sturgeon[246].
2. EXP – species extinct or nearly extinct in Poland (vertebrates – 14 species, invertebrates – 22 species), among others, great bustard, European green lizard, European sea sturgeon, Baillon's crake, European mink, lesser kestrel, griffon vulture, little bustard, European ground squirrel, salmon, huchen, speckled grasshopper, andlion, Acanthaclisis occitanica.
3. CR – critically endangered species (vertebrates – 22 species, invertebrates - 67 species), among others, Jack snipe, woodchat shrike, short-toed snake eagle, western capercaillie, chamois, European roller, Eurasian stone curlew, Ripart's Anomalous Blue, Mountain Apollo, greater spotted eagle, booted eagle, sandwich tern, arctic tern, peregrine falcon, Eurasian wigeon, Aesculapian snake, garden dormouse, harbour porpoise, alosa, sichel, vimba.
4. EN – endangered species, highly at risk (vertebrates – 23 species, invertebrates – 80 species),

[246] Witkowski, A., Kotusz, J., Przybylski, M. (2009) Stopień zagrożenia słodkowodnej ichtiofauny Polski: Czerwona lista minogów i ryb – stan 2009. [The degree of threat to the freshwater ichthyofauna of Poland: the Red list of fishes and lampreys – the status in 2009.] Chrońmy Przyrodę Ojczystą 65 (1), 33-52. [in Polish.]

among others, ruff, black grouse, lake minnow, brown trout, common nase, schneider, European river lamprey, pond bat, golden eagle, ferruginous duck, speckled ground squirrel, Alpine marmot, brown trout, mountain hare, European pond turtle, wildcat, European bison, Chequered Blue Butterfly, depressed river mussel

5. VU – vulnerable species, species facing a high risk of extinction (vertebrates – 15 species, invertebrates – 54 species)
   among others, smooth snake, lavaret, European cisco, smelt, golden spined loach, amur bitterling, weatherfish, European bullhead, alpine bullhead, Ukrainian brook lamprey, brook lamprey, short-eared owl, aquatic warbler, alcon blue, rattle grasshopper, clouded apollo.
6. NT – species of lower risk, however still close to extinction (vertebrates – 30 species, invertebrates – 14 species)
   among others, tiger barb, Laxmann's shrew, Eurasia lynx, grey wolf, brown bear.
7. LC – not endangered species, listed in the Red Book for a variety of reasons (vertebrates – 23 species, invertebrates – 1 species),
   among others, parti-coloured bat, greater horseshoe bat, Mediterranean water shrew, Carpathian newt.

Monitored plant and animal species

Information collected by monitoring run by the Chief Inspectorate for Environmental Protection apply to individual plant and animal species. They are the basis for the creation of an information system, which serves as a database regarding the impact of environmental changes on researched organisms.

In the case of plants, the monitoring area can range from a dozens of square meters (in the case of sites of species associated with small-scale habitats) to several hectares (in case of species occurring in larger ecosystem areas), when sites include whole meadows, forest complexes, mountain slopes or peat bogs, that may sometimes correspond to the NATURA 2000 areas, or constitute an individual area. In the case of animals, the monitoring site has been defined individually for each species.

The size of sites is varied and ranges from dozens of square metres (in the case of bats, some invertebrates and amphibians) to tens of thousands of hectares (in the case of species that have large requirements in terms of living space, such as the European bison, brown bear, grey wolf, lynx), when sites encompass whole forest complexes, and even mountain ranges, corresponding to Natura 2000 areas.

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 Poland the information exchange system aiming to maintain traditional knowledge on biodiversity for food and agriculture relates primarily to traditional knowledge on the culinary use of local agricultural products, and is disseminated and promoted by the National List of Traditional Products, published by the Ministry of Agriculture and Rural Development.

The National List of Traditional Products has been created under the Act of 17 December 2004 on registration and protection of names and symbols of agricultural products, foodstuffs, and traditional products. Products, whose quality or unique traits and characteristics are derived from the use of traditional production methods, are inscribed on the List. Methods used for at least 25 years are considered to be traditional. Product applying for such an inscription should also constitute an element of the local social identity and belong to the cultural heritage of the region it comes from.

One of the main objectives of this list is the promotion of information about products manufactured using traditional, historically established methods all over the country in order to promote them more efficiently abroad. This list also serves indirectly to prepare producers for registering names of inscribed products at EU level. In 2014, the list already includes more than 1,314 products (as of 31.10.2014), and applications for the registration of new ones constantly arrive at the Ministry of Agriculture and Rural Development.

In Poland there is also a System of Information Exchange about Biodiversity, whose main objective is to enable data exchange between people and institutions, both in the country and abroad, who are interested in information on biological diversity. This website is part of the worldwide system for the exchange of biodiversity information (CHM), established in order to facilitate the implementation of the Convention on Biological Diversity.

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

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

Polish Federation of Cattle Breeders and Dairy Farmers (PFCBDF)

The Polish Federation of Cattle Breeders and Dairy Farmerswas established in 1995 as a result of a bottom-up movement of cattle breeders and dairy farmers. It is an independent, self-governing and voluntary organization of members gathered in regional and breed unions. It is a member of the International Committee for Animal Recording (ICAR), The World Holstein Friesian Federation (WHFF), and the European Holstein and Red Holstein Confederation (EHRC).

Since 1 July 2004, PFCBDF implements breeding programmes and keeps herd books for dairy cattle. Since 1 July 2006, PFCBDF also implements tasks involved with the evaluation of cattle's performance value, and since 1 July 2007, tasks involved with the evaluation of type and build of primiparous cows and dairy cows, as well as those included in genetic resource protection programmes. PFCBDF's tasks also include publishing the results of performance value results, maintenance of an IT system for the purposes of this evaluation, as well as the maintenance of a milk testing laboratory. The PFCBDF cooperates with The National Research Institute of Animal Production on implementing cattle genetic resources protection programmes.

The Federation also conducts specialised vocational trainings for persons evaluating performance value, and issues the corresponding certificates in this regard. It implements modern methods in the fields of animal husbandry and milk production, develops and implements regional and national breeding programmes, organises exhibitions, shows and seminars.

Polish Association of Beef Cattle Breeders and Producers (PABCBP)

The association was established in 1994 and is a breeders' association. It operates under the Act of 8 October 1982 on social-professional farmer organizations. It is an independent and self-governing organisation gathering beef cattle breeders and fattening cattle breeders. PABCBP implements breeding programmes for beef cattle, keeps herd books and is authorised to evaluate performance value.

The objective of the Association is to representing needs, protecting the rights and interests of cattle breeders and producers, as well as supporting their actions in raising profitability, in particular: the organisation of trainings and advisory services, improving meat animals' quality and performance through the implementation of breeding programmes, cooperation with breeding and production organisations, meat and agricultural production activities, export and import of animals and biological material such as sperm and embryos, advertising and promotion of domestic and foreign products, among others, beef and veal, as well as new breeding and agricultural technologies.

Polish Pig Breeders and Producers Association „POLSUS"

The Polish Pig Breeders and Producers Association „POLSUS" is a voluntary, independent, self-governing, social-professional organisation representing farmers acting for the development of pig breeding and production. „POLSUS" operates under the Act of 8 October 1982 on social-professional farmer organizations.

It was established in 1958 and operates on a nationwide scale. It implements a nationwide breeding programme for pigs of the following breeds: Polish Large White (wbp), Polish landrace (pbz), Hampshire, duroc, pietrain, pulawska. Since 2000, the activity of TPPBPA „POLSUS" includes keeping herd books, and since 2002 breeding and performance value estimation of pigs. „POLSUS" cooperates with The National Research Institute of Animal Production in the implementation of a protection programme for the pulawski pig breed genetic resources.

It also keeps herd books and an IT system for the purposes of data registration. It organises specialized vocational training for persons carrying out performance valuation and artificial insemination. It also issues appropriate certificates in this regard, evaluates breeding material, conducts carcass valuation of slaughter animals, creates producer groups bound by agreements with slaughterhouses, feed producers and trade networks. Tasks implemented by „POLSUS" include also the improvement of pig production through the use of appropriate animal selection methods and the dissemination of pig breed crossing methods, creation of

breeding programmes; raising knowledge of pig producers in terms of rational breeding methods and improving farms profitability.

Polish Horse Breeders Association (PHBA)

The Polish Horse Breeders Association is a voluntary and self-governing social-professional organisation representing the interests of horse breeders – the members of this organisation. PHBA operates as a national association of agricultural trade associations, on the basis on the Act of social-professional farmer organisations. PHBA gathers Regional or Provincial Horse Breeders Associations and Breed or Utility Associations.

PHBA keeps stud books for the following horse breeds: wielkopolska, malopolska, polish half breed horse, Silesian, coldblood horse, Polish wild pony, Polish arden, hucul, Polish pony, as well as performance valuation for these breeds, as well as stud books for ponies and small horses. The Association is also responsible for maintaining a central database of equidae in Poland, identifies animals, issues passports for horse breeds it keeps records for and horses without pedigree. PHBA cooperates with The National Research Institute of Animal Production in implementing horse genetic resources protection programmes.

East Prussian Trakehner Breeders and Friends Association – Trakehner Association of Poland

„The East Prussian Trakehner Breeders and Friends Association – Trakehner Association of Poland" operates under the Act of 7 April 1989 – Law on Associations and an approved statute. The Polish Trakehner Association was registered on 25 June 1993, on the initiation of several people who wish to promote the trakehner race in Poland anew.

In 2005, the Minister of Agriculture and Rural Development gave permission to set up and maintain a Trakehner Stud Book. The Association also maintains a horse register and issues passports for horses of this breed. It also has powers regarding performance valuation, professional trainings in this field and the determination of the objectives of the national breeding programmes. The association is also involved in the organisation of International Championships and trakhener horse auctions, which contribute to the promotion of Polish trakheners on Western markets.

Trotter Breeders and Users' Association

The Association has been formalized in 1997 under the name „Trotter Breeders and Users' Association". By decision of the Minister of Agriculture of 1999, TBUA received permission to set up and maintain a stud book for Trotter horses. It is also authorized to evaluate horses of this breed.

In the years 1997-2004, many demonstration races have been organised in Szczecin, Mragowo, Warsaw and Wroclaw, among others. In 2004, thanks to the cooperation with the French Society to Encourage French Horse Breeding (SECF), trotter races have officially been approved in Poland, at the Partynice Horse Racing Track in Wroclaw. For the members of TBUA, the agreement with SECF has opened the opportunity to purchase race horses and breeding material in France. The year 2005 marked the inauguration of the first full season of trotter races at the Partynice race track, and in later years races began to be organised also on Warsaw's Sluzewiec.

Polish Shetland Pony Society

The origins of Polish Shetland ponies breeding dates back to 1990, when the stud farm in Imno received for the first time a number of valuable, thoroughbred Shetland mares and studs from Great Britain. In 1998, Imno became the seat of the Polish Shetland Pony Society. Since 1999, by the decision of the Minister of Agriculture and Rural Development, it maintains the Polish Shetland Pony Stud Book.

In accordance with applicable law, PSPS is the only organisation in Poland entitled to maintain a stud book and conduct performance valuation, as well as issue passports to Shetland ponies. PSPS is the member of the International Shetland Pony Committee and for this reason it is in direct contact with all of the organisations maintaining stud books of Shetland ponies in the EU, Norway, Switzerland and Australia.

Polish Union of Sheep-Farmers

The Polish Union of Sheep-Farmers is a voluntary, independent, self-governing, social-professional organisation representing and campaigning for the rights and the interests of breeders gathered in unions. The Polish Union of Sheep-Farmers operates under the Act of 8 October 1982 on social-professional farmer organizations. It was established in 1958 and gathers 11 regional associations, covering the whole country. Regional Associations work directly with sheep and goat breeders.

PUSF keeps herd books and conducts performance valuation of individual sheep and goat breeds, aside from the Carpathian goat, whose herd books are maintained by the National Research Institute of Animal

Production. The Association cooperates with the National Research Institute of Animal Production in the implementation of various protection programmes for sheep genetic resources.

The National Poultry Council – Chamber of Commerce

The National Poultry Council – Chamber of Commerce is a self-regulatory organization, representing the economic interests of entities belonging thereto. It has been established in Warsaw in 1998. Currently, 69 economic operators belong to the TNPC, representing breeding, reproduction, hatching, commercial production of poultry and eggs, poultry meat and eggs processing, poultry and poultry meat preparation sale and production of feeds for poultry. TNPC maintains books and records for all poultry breeds kept in selective breeding and for 17 preservation breeds. Performance valuation is also conducted with the cooperation of breeders.

The purpose of the The National Poultry Council – Chamber of Commerce's activities is the further development and modernisation of the Polish poultry farming, the protection of interests of farmers and poultry producers and processors of poultry meat, their integration, representing the national poultry farming in front of public authorities. Since 2005, TNPC is a member of A.V.E.C. – the European Producers, Importers and Exporters of Chicken Meat Association in Copenhagen.

Polish Fur Breeders' Association

PFBA is a federation of local organisations gathering breeders in Poland. The main objective of the Association's activities is to promote scientific knowledge and breeding of carnivorous fur animals in Poland, as well as specialized breeding aid (advice on breeding, nutrition, veterinary prophylaxis). PFBA conducts training activities, organises professional seminars to disseminate industry knowledge. It also participates in projects aimed at protecting the environment and promoting humane methods of animal breeding. It is also involved in the promotion of national scientific centres in research on fur animals. It promotes professional knowledge by publishing a specialized quarterly magazine.

Polish Angling Association

It is the biggest national association. It has been gathering Polish anglers for the past 135 years. It currently brings together 630 000 members, representing all communities and social groups. Administratively, this organization is composed of 44 districts, which are divided into 2 500 clubs, that is the smallest field units of the organisation. The basis for its functioning is the social activity of its members. The aim of the Association is to organize angling, recreation, sport angling, water use, as well as nature conservation and shaping angling ethics. The Polish Angling Association is a member of two international organisations, including The International Angling Confederation (CIPS) and the European Angling Federation (EAF).

PAA is also active in the field of water management and conservation, implementing the national ecological policy in accordance with international conventions and EU directives. The organisation manages over 218,000 hectares of water surface. Taking into account the surface of the national inland waters, PAA utilizes approximately 45% of their total area, including 66% of flowing waters, 84% of reservoirs and 26% of the total surface of lakes. PAA manages 48 breeding facilities, making it the country's largest producer of restocking material of reophilous, predatory and salmonid fish. The annual production of stocking material amounts to 405 tonnes and reaches values of 10,1 million PLN, whereas the volume of annual restocking of waters used by PAA amounts to 1 600 tonnes, with a value of 36 million PLN. Water conservation is implemented with the help of approx. 8.500 guards of the Social Fishing Guard, who cooperate with the National Fishing Guard, the police and the Border Guard. The organisation also cooperates with most research centres and universities in Poland which are involved in research for environment protection, as well as fishing and angling management. It periodically organises scientific conferences devoted to issues in the field of ichthyology and fisheries and publishes a scientific journal „PAA Scientific Yearbook" (Roczniki Naukowe PZW), which until recently was one of the main sources of information about the country's ichtiofauna.

The Polish Fishermen's Association

The beginning of the Polish Fishermen's Associations dates back to 1949, when the Wielkopolska Fishermen's Association in Bydgoszcz has been established in place of the liquidated Fisheries Organisations Association of the Republic of Poland. At first the organisation had 172 members, but as more and more fish breeders from all over the country joined it, it expanded its reach and consequently evolved into a nationwide organisation on 27 September 1993. Currently, the Association is composed of 9 regional branches and gathers 650 fish breeders, leaseholders, owners and fisheries workers. The main tasks include the creation of favourable conditions for the harmonious development of inland fisheries and represent their interests, inspiring and developing initiatives to improve technical progress, methods of breeding and production of fish, the prevention and control of diseases and the improvement of fishing regulations. In the field of the environment,

the organization engages in activities opposing to the process of aquatic environment degradation and develops know-how of enforcing compensation losses caused by it. The company cooperates with the authorities and the State administration, self-governments, civil society organisations, research and scientific units. Thanks to its bi-monthly magazine „Przegląd Rybacki", it is an opinion-former. It promotes the issue of improving and protecting water purity and facilitates the flow of information about the latest achievements of science and technology. Publishing also includes the preparation and issue of information, documentation and training materials. The organization offers services in the field of valuation of pond facilities, equipment, machinery and fishing equipment, expertise on fishing losses caused by water pollution and the preparation of water-specific legal plans for special use of waters, fishing plans and other studies from the scope of the pond and lake fishing and fish hatching.

Polish Fish Producers Association

The Polish Fish Producers Association in the form of a nationwide association of fish breeders was formed in 2001, but its origins date back to 1978, when the Greater Poland Fish Producers Association was established in Poznan. The organization brings together several hundred members managing approximately 16 404 ha of ponds and 15 771 ha of lakes. Currently more than 2 000 people find employment in the holdings of PFPA's members. The basic statutory objectives include organizing and intensifying fishing production, raising the professional level of its members, representing the interests of members in front of institutions governing fishing production, state authorities and administrations, as well as other agricultural bodies and institutions. These goals are implemented, inter alia, by organising trainings and the dissemination of advances in fishing production, coordination and supervision over fishing production of member holdings. It organises and supervises various forms of cooperation in production and trade of stocking material within the Association, as well as in cooperation with social bodies conducting fishing activities. In addition, it cooperates with scientific institutions and organisations, whose activity is connected with fishing production and cooperates with state bodies local self-governments in the field of environmental protection. The organization engages in the modernisation and recultivation of pond facilities, aiming to manage closed ponds and transform the uncultivated agricultural land into fishing facilities.

Polish Trout Breeders Association

The organization bringing together breeders of trouts has been registered at the end of 2007, and is based in Lębork. Currently it unites over a hundred members whose farms are responsible for almost the entire domestic production of trout. The Association represents the interests of the farmers at the level of national and international institutions, inter alia by means of membership in international organizations of salmonids' breeders, e.g. FEAP (Federation of European Aquaculture Producers). It actively participates in public consultations at the national and European level. PTBA annually organizes scientific conferences on topics related to the breeding of fish and its impact on the environment.

Fish Promotion Association „Mister Carp"

The inspiration for the establishment of the Fish Promotion Association was the desire to make better use of EU funds and more effectively promote fishery products. The Association, under the name of Fish and Fishery Product Promotion Association, in its final form was registered in the summer of 2005. The aim of the Association is the integration of the breeders' community, the promotion of fisheries and fishery products, the health value of a diet rich in fish and the promotion of environmental protection and education in fields related to fishing management. The society has been joined by 70 fish farms responsible for about 30 percent of carp production. The first completed task was the creation and execution of a carp promotion campaign. At the same time research began on breeding and processing technologies in order to obtain healthy, highly processed foods from this species. Five promotional campaigns have been carried out in the years 2005-2009.

Approximately 7 million PLN have been earmarked for this purpose already, refunded from EU fisheries programmes SOP Fish 2004-2006 and OP Fish 2007-2013. The promotion of the society is also carried out through participation in trade fairs, for example, in the years 2007-2009 it participated in national exhibitions (among others, Polfish 2007 and 2009, Polagra 2007-2009) and in international industry events (Brussels, 2007, Bremen, 2008 and 2009). One of the effects of these actions was winning the „Mercurius Gedanensis" medal for the carp smoked fillet in the „product" category at Polfish 2009. Promotional campaigns have also included young people, for example, in the period 2006-2009 there were 4 national competitions for primary school students, where the theme was the carp and its natural environment.

Polish Beekeeping Association

The Polish Beekeeping Association is a voluntary, independent, self-governing, social-professional and federative organization of entities working for the benefit of beekeeping, which operates on the basis of the Act of 8 October 1982 on social-professional farmer organisations.

The main tasks of the PBA include: representation of the interests of member organisations, integration of beekeeping communities and, above all, raising the qualifications of beekeepers, development of beekeeping as an integral part of agriculture and environmental protection, legal protection of the name ' honey ' and other bee products, promotion of Polish honey and other bee products.

Social Ecological Institute

SEI is a public interest organisation existing since 1990. Its statutory objectives include, among others, activities for the benefit of ecology and the creation of civic support for sustainable development and protection of biological diversity, especially in rural areas, protection of animals and natural heritage; actions for the creation of a civic society, conducting and supporting various forms of environmental education; dissemination and protection of consumers' rights and interest, as well as the development of contacts and cooperation between societies and nations. The Institute cooperates with Polish and foreign non-governmental organisations, universities, research institutes and research centres, especially in the field of conservation of biological diversity in agriculture and the risks arising from the use of GMOS and pesticides.

SEI is a member of the Alliance of Associations Polish Green Network, the Polish Coalition to Support Organic Agriculture, the Climate Coalition, Pan-Europe, WECF, The International Ecotourism Society. SEI cooperates with, among others, The Green Mazovia Association, The „EKOLAND" Association of Organic Food Producers, MROEE, Heifer Project International, Agricultural Advisory Centres, Polish Chamber of Regional and Local Products, The Institute of Plant Breeding and Acclimatization, The National Research Centre of Animal Production. It publishes a quarterly magazine „Biuletyn Niecodzienny Spraw Ekologicznych", thematic books from the „SEI Library" series, reports, posters, leaflets.

Foundation for Sustainable Development

The Foundation is a non-governmental organization existing since 1991. Its mission is to promote development in harmony with nature through active collaboration with other non-governmental organisations, national, regional and local government bodies, universities and other participants of widely-understood eco-activities. The Foundation stimulates and encourages free exchange of information and social participation in the decision-making process. Environmental information office is maintained by FSD from the mid-1990s. It works through free sharing of accumulated information resources on the widely-understood environment protection – also in the context of integration with the European Union, access to information, consumer rights, both in the form of libraries and computer access points. Activities in cooperation with local communities and other organizations.

Lower Vistula River Friends Society

The Lover Vistula River Friends Society was formed in the autumn of 1997, in order to promote the natural, historical and cultural values of the Lower Vistula River Valley. LVRFS works closely with the Complex of Chełmno and Vistula Landscape Parks, which results in the implementation of many projects. The main objectives of the Association is to promote the natural, historical and cultural values of the Lower Vistula River Valley, to promote the idea of sustainable development, protection of biological, landscape and cultural diversity of the Lower Vistula River Valley, inspiring, supporting and complementing government and local government activities in the area for the protection of nature, the environment and cultural goods, the strengthening of local and regional identity.

Social Readjustment Centre of „Plus" Association, Wandzin ECO „School of Life"

The Solidarni „PLUS" Association was founded in 1989, and it includes the Social Readjustment Centre ECO „School of Life" in Wandzin. The centre maintains and promotes old varieties and endangered animal species, which allows to preserve the most valuable genotypes, often limiting the risk of losing them. It uses widely-understood environmental activities, as a form of rehabilitation and social reintegration and reconstruction of the system of values. The main method of solving problems is the implementation of programmes such as: „Protection of endangered species genetic resources – Popielanski White Polish Rabbit", „Protection of old fruit tree varieties' biodiversity by local communities", „Preservation of the original native breed of the Greenleg Partridge", „Biodiversity and rural development", „Introduction of traditional methods of drying and processing of old, native fruit and high varieties of fruit plants in the ECO „School of Life" in Wandzin".

The beneficiaries of the programmes include organisations and institutions from all over Poland, e.g. The Barka Foundation for Mutual Help, „Domy Wspólnoty Chleb Życia" Foundation, „Wieś XXI wiek" Foundation, The Lower Vistula River Friends Society, Catholic Organisation engaged in the problems of disabled children, Starost's Offices, Forest Districts and others, which in turn have been transferred to others in need (the unemployed, individual farmers, socially excluded groups, etc.).

The Association for Old Varieties and Breeds

The Association was founded in 2008. Its main tasks include: the protection and promotion of the old plant varieties and animal breeds, representing the interests of producers, processors and distributors of products manufactured by the processing of old plant varieties and animal breeds, creating a platform for collaboration and exchange of information and experience for organizations and institutions which deal with the protection of the old plant varieties and animal breeds; the establishment and development of distribution networks for products manufactured from the processing of old plant varieties and animal breeds, as well as promotional activities (organisation of fairs, exhibitions, conferences, trainings, workshops) and databases of old plant varieties and animal breeds; the protection of natural heritage and environment of human health and life.

Rural Development Foundation

The Rural Development Foundation was established in 1999, following the merger between the Water Supply Foundation (established in 1987) and the Agricultural Foundation (established in 1991). The Foundation's mission is to support the development of rural areas, including economic, social and cultural initiatives of village and small towns residents and initiatives related to the improvement of technical infrastructure in rural areas. The Foundation also supports the development of non-conventional energy sources. The current activities of the Foundation include providing micro-loans to entrepreneurs developing non-agricultural activities (mainly from Eastern Poland). For several years, the Foundation has also been running the „ABC of entrepreneurship in the countryside" programme, raising the level of financial knowledge of farmers. In Podlasie, it promotes rural entrepreneurship and cultural heritage through the support of folk artists. Rural heritage is also a separate programme, under which conferences are held in various regions of the country. The Foundation also runs a series of programmes dedicated to educating leaders of rural organizations.

The Society of Nature Protection „Bocian"

It is a public benefit non-governmental organization whose mission is to protect wild species of plants and animals. It was formally established in 1994. Since the beginning of 2002, a Botanical Section operates in the Society, which has set itself the goal of monitoring and protecting rare species of plants in the Mazovia Lowland. Since 2005, it is a member of IUCN – The World Conservation Union. Funding for the projects comes from grants (awarded by foundations that finance nature conservation), donations and membership fees.

The aim of the Society is to raise public awareness about nature, its significance and threats to its existence, data collection documenting the status of and threats to nature, development and implementation of plans of protective measures, legal actions conducive to wildlife conservation.

Polish Chamber of Regional and Local Products

It was established in 2004, on the basis of the „Our Culinary Heritage" contest. Is an organization of producers of traditional, local and regional food and regional handicrafts, as well as institutions and entities supporting the market of traditional, regional and local products in Poland. Currently, it consists of 230 members.

The mission of the Chamber is to educate and change the awareness of food producers, processors, control institutions, self-governments and consumers on the social and economic role of traditional and regional products. The organization promotes these products, works to ensure their superior quality and systematic introduction of local and regional products into the market. It cooperates with Voivodeship governments in terms of creating regional policies to support the development of the local and traditional products market. An extremely important element of the Chamber's activities is to encourage people in rural areas and small local companies to produce local and regional products and sell them on a larger scale. It also conducts activities that will help prepare the Polish law and institutions of the Polish market to improve development of regional and traditional products market.

„Zielononozka" Association

It was created by the owners of farms involved in the project to preserve the green-legged partridge breed. The Association became a legal entity in 2013.

Its purpose is to protect and increase the population of the breed by promoting their breeding in traditional rural households. The green-legged partridge fowl is a Polish, native breed of hens. Historically, they were bred in Galicia. After regaining independence, as a natively Polish breed it has grown into „a symbol of Polishness" in rural areas. Since the 60s, the share of these hens in the hen stock declined sharply, mainly due to the failure of large herd breeding of these hens. Flocks of green-legged partridges, with their distinctive, colourful plumage, kept in organic and agro-tourism farms, are an additional attraction of the region. Eggs from these hens and their carcasses have been included on the ministerial list of traditional products.

78. Describe any incentives or benefits, to support activities for the conservation and sustainable use of biodiversity for food and agriculture and 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 the stakeholders involved (including provisions on gender balance if any). Indicate any lessons learned and planned development incentives.

The Agri-environmental programme under the RDP (Agri-environment payments) – a financial instrument of the European Union for encouraging farmers to use agricultural practices leading to the greening of agricultural production, which should be more than just good agricultural practices.

The system of environmentally-friendly agricultural production includes:

- reducing the negative effects on the environment resulting from the manufacturing process,
- attention to the cultural and natural values in the agricultural holding,
- the introduction of restrictions on the use of production means, in order to use natural production potential of the agrocenoses.

In Poland, agri-environmental programmes operate since our admission to the EU. They are part of the Rural Development Programme (former Rural Development Plan) and their cycle is associated with the RDP cycle, as well as EU budget cycle. Therefore, the first agri-environment programme was in force between 2004 and 2006, and subsequent one in the period 2007-2013, which, due to the implementation system, meant that, in practice, the measures of the 2004-2006 programme were provided until the first months of 2012. Between programs, in addition to the differences in the amounts of specific payments, there are substantive differences, for example, since 2007 there is a longer list of species and varieties (breeds), which are under protection of genetic resources.

The agri-environment program from the years 2004-2006 included 7 agri-environment measures (packages), divided into 40 variants:

- S01 – Sustainable agriculture
- S02 – Organic farming
- P01 – Conservation of extensive meadows
- P02 – Conservation of extensive pastures
- K01 – Soil and water conservation
- K02 – Buffer strips
- G01 – Protection of native livestock breeds.

In the 2007-2013 programme, the packages are similar, divided into 49 variants:

1. Sustainable agriculture
2. Organic farming
3. Extensive permanent grasslands
4. Protection of endangered bird species and natural habitats outside of Natura 2000 sites
5. Protection of endangered bird species and natural habitats within Natura 2000 sites
6. Preservation of endangered plant genetic resources in agriculture
7. Preservation of endangered animal genetic resources in agriculture
8. Water and soil conservation
9. Buffer strips

Under RDP 2014-2020 an Agri-environment-climate measure is planned, where most packages are continued after modifications resulting from the current programming period 2007-2013.

Operational Programme: Sustainable development of the fisheries sector and coastal fishing areas 2007-2013

This program was an instrument supporting the development and restructuring of national fisheries and as in the case of the RDP, it depends on EU budget cycle. Financial support, including for the purposes related to the conservation of biodiversity, was granted under the four priority axes:

Priority axis 1: Measures for the adaptation of the fishing fleet.

Priority axis 2: Aquaculture, inland fishing, processing and marketing of fishery and aquaculture products. Priority axis 3: Measures serving common interest.

Priority axis 4: Sustainable development of fisheries-dependent areas.

Direct payments to sheep and cattle

In accordance with the criteria laid down in Community rules, in Poland since 2010 special support shall be granted to farmers in respect of the conduct of specific types of farming which are important for the protection or improvement of the environment, as well as support targeted at specific disadvantages, which farmers in the dairy, beef and veal and sheep meat sector experience in economically and environmentally sensitive areas or in the same sectors in respect of economically sensitive types of farming.

Only animals present in the flock located in the lubelskie, małopolskie, podkarpackie, śląskie, , świętokrzyskie voivodeship are eligible to payments for cows.

Sensitive areas in terms of economic or environmental nature, eligible for subsidies to sheep include dolnośląskie, małopolskie, opolskie, podkarpackie, śląskie voivodeship, and since 2012 also łódzkie and świętokrzyskie voivodeship.

Biological progress measures for animal production

The budget laws provides grant amounts for the funding or financing of the tasks performed in support of agriculture. The grants include tasks in the field of biological progress in livestock and crop production, plant protection and organic farming.

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.

1. „Protection of species diversity of valuable natural habitats on agricultural lands on Natura 2000 areas in the Lublin Voivodeship".

Project Coordinator – IUNG-PIB. Cooperation: Institute of Technology and Life sciences in Falenty (ITP), Polish Society for the Protection of Birds (OTOP), University of Natural Sciences and Humanities in Siedlce (UPH).

Implementation period: 2011-2016. Source of funding: Swiss-Polish Cooperation Programme. Project budget: 8 147 439 PLN.

The main objectives of the project include:

- an assessment of the impact of different agricultural practices (including the agri-environmental programme) on biodiversity;
- the establishment of a network for monitoring biodiversity on the farm land on the example of Lublin Voivodeship;
- dissemination of knowledge about valuable natural habitats on the farm land in Lublin Voivodeship, as well as the importance of biological diversity in agro-ecosystems.

The basic element of the biodiversity monitoring network on agricultural land will be a 10-hectare square with 317 m sides. For the purposes of monitoring, 60 squares have been designated on permanent grasslands and 36 on utilised agricultural areas. Monitoring of nesting birds, plants, spiders and orthopera species diversity will

be carried out within the squares. As part of the project, a detailed analysis will be carried out of the monitoring results obtained from the monitoring of flora and fauna and of the surveys carried out in the holdings. This analysis should provide knowledge, whether evaluated practices (including the agri-environment programme) may be effective in the protecting and/or increasing biodiversity on agricultural lands. On this basis, the following will be developed: „The Code of Good Agricultural Practices Conducive to the Protection of Biodiversity", „Change Recommendations to the agri-environmental programme" and „The Methodology of Creating a Monitoring System for Biodiversity on the Agricultural Lands".

2. Improvement of Plants for Sustainable AgroEcoSystems, High Quality Food and Plant Production for Non-food Purposes Multiannual programme for the period 2008-2013 in IHAR-PIB.

Area 1: Gathering, protecting, evaluating, preserving in alive state and sharing for the needs of the national economy of agricultural plants' genetic resources and their pathogens. The production system is covered by the programme: naturally irrigated crops, moderate zone. The components of biodiversity – plants, covered area – Poland (the whole country), selected regions of Lithuania and Ukraine.

In the years 2008-2012, IHAR-PIB, InHort and other co-contractors of the programme organised 126 expeditions in Poland and 3 abroad (2 in Lithuania and one in Ukraine). The expeditions were devoted to the collection of local and old varieties of field, vegetable and fruit crops, as well as endangered plants associated with crops. In the course of implementing the harvest, particular attention was given to areas in the East and South, since these areas, due to the large number of small farms and traditional farming methods, are conducive to conserving old varieties. The collections in the country allowed to gather a total of over 5 000 unique objects, primarily fodder plants, fruit, vegetables, plants, a fewer number of field and industrial plants like flax, hemp, and hops. Abroad, a total of 1 243 objects have been collected, of which a large part includes local and old varieties of beans, wheat, rye, oats, peas, onions, pumpkin, cucumber, carrots, lettuce, cabbage, beets and garlic. Rootstocks of old apple, pear and plum trees have been obtained. Judging from the names and interviews, they are of Polish descent. In the years 2008-2012, 8 338 objects have been assessed and characterised. Data for 8 182 of them have been incorporated into the central database. The assessment covered morphological, phenological, yield-forming characteristics, resistance to pathogens, pests and stress factors, quality, technological characteristics, and other specific to the species, according to the adopted set of characteristics and taking into account the guidelines and current needs. A total of 32 991 food tests have been carried out. Of all stored objects, 95% maintained the vitality required by international standards. Objects with reduced vitality, i.e. below 80% (3 676 objects) have been regenerated. Passport data were collected in the central database for 74 129 objects, of which 36 126 objects have characterization and evaluation data. A new information system – EGISET has been developed in 2010 and implemented in later years, passport details, ratings and characteristics, expedition information on the state and herbarium collection, data on objects stored in the long-term seed storage concerning purity, vitality, the course of drying, place of storage, germination test results, time and quantity of regeneration and propagation cycles, distribution and quantity of seeds. Over 2 800 collected objects have been passed to long-term storage, the rest are under verification, evaluation and propagation. Other sources allowed to obtain 4 609 objects, out of which over 1 500 are vegetable plants.

Data collection and, to a limited extent, the assessment of endangered companion plant species found in agricultural crops has been continued, due to their role in maintaining ecological balance in agricultural systems. Currently, 83,464 objects are under long-term protection, out of which 69,584 are located in the long-term seed storage of the National Centre for Plant Genetic Resources in IHAR-PIB. As a result of the implementation of the programme, since 2007 their number increased by almost 5 thousand, which constitutes approx. 7% of the number of objects in the long-term storage in 2007.

3. The development of sustainable horticultural production methods in order to ensure high nutritional and biological quality of horticular products and the preservation of biodiversity, the environment and the protection of its resources. Multi-annual programme for the period 2008-2013, implemented by the Research Institute of Horticulture (InHort).

Area 7. Biodiversity.

Task 7.1. Protection of fruit and ornamental plants' biological diversity for sustainable agriculture.

The aim of the study was to collect and maintain genetic resources of fruit and ornamental plants, with a particular focus on local varieties, typical for the Polish landscape, as well as evaluation of collected objects. In total, all of InHort's *ex situ* field collections of ornamental and fruit plants collected 6 271 objects, including 4 713 fruit plants (3 516 genotypes of fruit trees and 1 197 – berry plants), 964 – ornamental plants in InHort's collections and 594 ornamental plants in the collection of the Experimental Station of Cultivar Testing in

Lisewo, belonging to COBORU in Slupnia Wielka. In the 2007-2013 period, 314 fruit plant and 346 ornamental plant genotypes have been evaluated.

Task 7.2. The protection of vegetable genetic resources and related wild species against loss and securing them in the gene bank.

The purpose of the national programme was the collection, documentation and securing of vegetable genetic resources against loss in a gene bank, in condition for the viability and genetic identity, as well as sharing them. InHort's collections of vegetable plant genetic resources gathered 13 357 objects representing 70 species of vegetable plants, including 589 objects of species related to crops and wild species. There are 11 693 objects stored as seeds in the National Centre for Plant Genetic Resources (KCRZG), IHAR-PIB Radzikow, whereas the InHort's field collections in Skierniewice and the University of Life Sciences in Poznan store 1 664 vegetatively propagated objects.

Task 7.3. Collection of melliferous plants.

The basic aim of the task was the maintenance of the collection of melliferous plants alive and dissemination of valuable melliferous plants for the benefits of bee nectar and the enrichment of melliferous flora biodiversity.

4. InHort's participation in the European Specialist of Traditional Orchards (ESTO) – Specialist in the field of traditional orchards international project. Leonardo da Vinci Transfer of Innovation Programme.

The aim of the project is to protect traditional orchards through the creation of an innovative curriculum on traditional horticulture. The programme will be based on the criteria of the European Credit System for Vocational Education and Training ECVET.

5. InHort's participation in The European Cooperative Programme for Plant Genetic Resources (ECPGR) – a European system of cooperation for the protection of plant genetic resources coordinated by Bioversity International, Rome, Italy.

The aim of the programme is the protection of European gene resources, mainly: the development of directories, classifiers, as well as the characteristics of the exchange of plant material and information, the development of common databases of different plant species, maintenance of European collections and their safe duplicates, valorisation of individual species, preparation and sharing of unified computer programmes for all gene banks in Europe, organising scientific expeditions, symposia, expertise, etc. Work groups are created within the programme. Researchers of the Research Institute of Horticulture participate in the works of: The Working Groups *Allium*, Umbelliferae, Cucurbitaceae, Solanaceae, Leafy Vegetables, *Malus/Pyrus*, *Prunus*.

6. Evaluation of the biological diversity of selected invertebrates in agricultural crops. Project implemented thanks to a grant for statutory activities for IUNG-PIB.

Implementation period: 2014-2017. Project budget: 351 231 PLN.

The aim of the research is to assess the biological diversity of selected groups of invertebrates and the evaluation of the quality of ecosystem benefits associated with different types of agricultural crops.

The main emphasis in the research will be placed on field crops, however, an additional element will be the perennials introduced in recent years on the agricultural areas for energy purposes. Due to the unknown effects of many species of these plants on the environment and biodiversity, there is a need for intensive research in this regard.

The main effect of the planned scientific research should be knowledge specifying how different agricultural schemes affect biodiversity levels of invertebrates. However, the most important practical effect of the planned study should be knowledge on what the potential of ecosystem benefits is (mainly related to the biological protection of plants and the improvement of soil quality) in compared agricultural systems.

Implementation of the theme, taking into account such a wide range of invertebrate groups and diverse types of crops is unique on a national scale. Information about the impact of different types of crops on biodiversity can be relevant for policy makers shaping the directions of development of the EU common agricultural policy and planning instruments for agriculture and rural development.

7. Kurpie Model of Biodiversity A Social Economic Institute Programme.

Subsidized by GEF/SGP and the ECOFUND Foundation (implementation – 2003-2006). The aim of the project was to boost agricultural biodiversity through reintroduction and restoration of native animal breeds and local plant varieties, as well as raising environmental awareness in the countryside.

Organic farmers possessing certification or in the process of switching their farms to organic production participated in the project. Livestock were provided to farmers who undertook to rear animals and crops according to the rules of organic farming and pass one descendant of the received animal, as well as a part of the harvested yield the next acceding farmer. The project included: native animal breeds – green-legged and yellow-legged partridges, Polish red cattle, Polish pony, Hucul pony, Olkuska and Wrzosowka sheep, Bilgorajska and Pomeranian duck, Mini-duck and Polish Pekin P33 duck, Zlotnicka white pig and local varieties of old apple trees; cereals: wheat among others, spelt, emmer wheat; barleys: Hanna, Lubicki; oats: Proporczyk, Tatrzański, Udycz; fabaceae: grass pea, vicia, field pea, bush bean, common bean, snap pea; potatoes: wyszoborski, Giewont, Amerykany, Bem, Fliska, Pierwiosnek, Dalia, Alma. An inventory has been carried out within the framework of the project in respect of old cultivars and orchards, as well as infrastructure was built in order to facilitate the success of livestock and plant reintroduction (biodiversity enrichment through, inter alia, buffer strips, landscaping gardens, bushes, ponds, meadow vegetation enrichment). Dozens of workshops and meetings of farmers, scientists, professionals, representatives of organisations, associations and formal and informal groups have been conducted.

8. The activities of the Foundation for Sustainable Development (FSD)

Foundation for Sustainable Development (until 2009 – Lower Silesian Foundation for Sustainable Development) – an environmental organisation located in Wroclaw, originally operating as the Olawa and Nysa Klodzka Foundation. Back then it focused on water protection and the restitution of river valleys. Later it extended its activities considerably. Over the last few years the Foundation for Sustainable Development implemented many projects aimed at the protection and sustainable use of biological diversity in agriculture. They included, among others:

- „Sustainable regional development in the rural areas of the Oder river basin", in which 6 Polish organisations participated as part of the „agricultural group" together with WWF Germany. The project started at the end of 2002 is aimed at – through the implementation and promotion of model-based solutions – preparing valuable natural areas of Nadodrze to such development over the course of the integration with the European Union, which will help to preserve these values.
- Programme Sustainable Development of the Barycz Valley, launched in 2000. Implementation – together with local governments and non-governmental organisations e.g. – Polish Society Of Wildlife Friends „pro Natura". As part of this programme, FSD is pursuing a programme of sustainable tourism and measures in the field economic activation of rural women in the Barycz Valley.
- Project „Preservation of the original breed of the Green-legged partridge hen. Biodiversity and sustainable development of rural areas" (2001-2003).
- The measures, in cooperation with the Marshal's Office of the Lower Silesian Voivodeship and self-governments in terms of the integration of farming and environmental protection (preparation for the implementation of agri-environmental programmes, promotion of regional products, ecological fairs) – since 2001.
- Measures in the field of rural tourism activation (since 1995 – implementation of tourist cycling trails „Sudety", „Oder River Valley", „the Barycz Valley").
- The establishment of an international coalition „Time for Oder" (active since 1997); Polish (13), Czech (8) and German (5) organisations participate in the coalition;
- The establishment and coordination of the activities of the Lower Silesia Non-governmental Environmental Organisations Forum (since 2000), in order to strengthen environmental organisations from Lower Silesia, especially on matters relevant to environmental protection in the region. Among others, selection of representatives of Non-governmental Environmental Organisations to the „Karta Smieciowa" (Junk Card), i.e. the initiative of the Lower Silesian Marshall's Office aimed at the creation of a waste management programme in Lower Silesia – in 2003 the project, after successive rounds of consultation, achieved the status of the Voivodeship waste management programme.

Currently the main directions of the Foundation for Sustainable Development's activities include: campaigns and measures in favour of informed consumption, campaign to promote the segregation of waste *Zamien odpady na kulturalne wypady* and education in schools in this respect, measures for the protection of endangered species such as Montagu's Apollo, promotion of Natura 2000 sites protection through trainings for officials and interventions. The organisation also runs a nationwide campaign promoting roadside tree stands *Roads for Nature*, as well as work for the benefit of environmentally friendly tourism in the Barycz Valley. The Foundation also conducts activities abroad – for example a concluded project in Georgia that concerned the development of rural areas.

9. Activities of the Lower Vistula River Friends Society

The society was founded in 1997, its projects include:

- „Preservation of native animal breeds and active protection of steppe reserves" The project consists in preserving two stocks of old sheep breeds: Wrzosowka and Swiniarka, which are grazed in xerothermic reserves and contribute to the protection of xerothermic vegetation and promotion of native livestock breeds subsided under the agri-environment programme for 2007-2013. Within the framework of the project, the following activities are implemented: mowing and felling of reserves, purchase and repairs of saws and brushcutters, the services of woodcutters from the Forestry Services Companies, clearing of sites, sheep grazing, employee salary – shepherd, sheep veterinary care, hay, straw and beet roots purchase for sheep, keeping a Border Collie shepherd dog, construction and on-going repairs of barns for sheep, natural monitoring of the pheasant's eye.
- Establishment of a beehive heritage park, protection of traditional beekeeping. The project is financed by the Global Environment Facility GEF/SGP, The Rural Development Foundation, Świecie City Hall, The Complex of Chełmno and Vistula Landscape Parks and from the Lower Vistula River Friends Society own resources. The creation of a heritage mini-park near the Old Mill in Gruczno is the first stage of a comprehensive project in the field of the protection of traditional beekeeping in the Lower Vistula River area. The project activities are focused on active protection of nature and native animal breeds, and therefore have an important role in the system of nature protection, and are an invaluable educational package addressed especially to naturalists, ecologists, students of all levels, teachers and researchers, tourists and farmers interested in subsidies from the agri-environmental programmes of Package 7. Preservation of endangered animal genetic resources in agriculture

10. Social Readjustment Centre of „Plus" Association, Wandzin ECO „School of Life"

Project: „Protection of Biological Diversity" is aimed at expanding ongoing activities for the conservation of biodiversity and to supplement the existing gaps by the inclusion of the society in work for the protection of agricultural plants and animal genetic resources, as well as the direct participation of its members in the work for their conservation. The primary method of solving the aforementioned problems is the implementation of the following programmes:

- The protection of endangered species genetic resources – Popielanski White Polish Rabbit.
- Protection of biodiversity of old fruit trees' varieties by local communities.
- Preservation of the original, native breed of the green-legged partridge. Biodiversity and rural development.
- Introduction of traditional methods of drying and processing fruit from old, native and high varieties of fruit trees in the ECO „School of Life" in Wandzin".

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[247]	Description of sites and their characteristics of relevance to biodiversity for food and agriculture	Extent (area)
381 protected landscape areas (IUCN category V)	The Institute of Environmental Protection possesses a detailed database of Polish protected landscape areas	Whole country
Polish objects on The UNESCO World Network of Biosphere Reserves	Bialowieza National Park – 809 species of vascular plants, over 3 thousand species of cryptogam and fungi, almost 200 species of mosses and 283 species of lichen; over 8 thousand species of vertebrates, approx. 120 species of nesting birds; The Bialowieza Primeval Forest is one of the most important fungi reserves in Poland and Europe. Babia Góra Biosphere Reserve (1976) Luknajno Lake (1975) – fauna reserve, 709.97 ha; It protects one of the largest mute swan refuges in Poland. Several hundred swans stay here constantly from spring to autumn (up to 2 500). Here you can observe more than 175 species of birds, of which 95 found their permanent habitat here. Słowiński Biosphere Reserve (1996) – implements the „Restitution and preservation of non-forest ecosystems in the Slowinski National Park" project, the aim of which is to restore the open nature of biocoenoses, thereby countering the decline in biodiversity and the effects of fragmentation of non-forest habitats essential for large aquatic and wetland birds. Tripartite Transboundary Eastern Carpathian Biosphere Reserve: Poland-Slovakia-Ukraine (1992/1998) – naturalization of ecological systems on pastures; biological predispositions of plants judge about the directions of succession, including East-Carpathian species and the effects of herbivore mammals such as the red deer and bison on vegetation. Karkonosze Biosphere Reserve (1992) – the wealth of the park's flora is manifested in the presence of species from various geographical regions in a relatively small area, including glacial relics, which have their isolated sites here, as well as plants that cannot be found anywhere else in the world, i.e. the so-called endemites. Tatra Biosphere Reserve (1992) – the scope and size of shepherding in this area varied. Large-scale grazing on the Polish side was present right after World War II. After the establishment of national parks, herding was abandoned. It did not return to the Slovak Tatra Mountains, but came back to the Polish side again in 1981 in the form of „cultural grazing". The Kampinos Forest Biosphere Reserve (2000) – it is one of the most important wildlife refuges in the Polish lowlands. It is estimated that a half of the native fauna can be found here, which amounts to 16 500 animal species. The presence of	Regional

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

Landscape based initiatives[247]	Description of sites and their characteristics of relevance to biodiversity for food and agriculture	Extent (area)
	many rare and endangered bird species, in particular the common grasshopper warbler and the corn crake, decided that in 1999 the EP declared this area a bird refuge of European importance. Since 2004, the Kampinos National Park is also a NATURA 2000 site, both because of the richness of birds species, as well as the diversity of plant communities. The Tripartite Transboundary West Polesie Biosphere Reserve: Poland-Ukraine-Belarus (2002/2011) – nature of the Polesie National Park is very rich, although the Park covers only approx. 10,000 hectares, and these are primarily wetlands. The diversity of habitats entails the existence of a vast number of plant and animal species, including those which can be found only in this region of Poland. Bory Tucholskie Biosphere Reserve (2010) – non-forest ecosystems dispersed close-knit pine forests are a valuable component of the Park's nature. The wealth of flora and fauna species of these ecosystems significantly increases the biodiversity of the whole area. Grassland and permanent pastures are treeless plant communities with a significant participation of perennial grasses and perennial plants. Their functioning depends on mowing and grazing.	
Wetlands included in the Ramsar Convention list	The list includes 13 Polish wetland areas with a total area of 145,075 ha: - National Parks: Biebrza, Wigry, Polesie, Slowinski, Narew; - Nature reserves: Luknajno Lake, Swidwie Lake, Karas Lake, Siedem Wysp Lake, Druzno Lake, Milicz Ponds, Slonsk (Warta River Mouth National Park); - Subalpine peat bogs in the Karkonosze National Park. Almost all wetlands that are important in a national and international scale have been included in the Natura 2000 network, which created a good base for future planning, protection implementation, restoration and renaturisation of these areas. Private farmers rent lands and receive Agri-environmental payments for proper farming, conducive to diversity preservation. Research on agricultural wetlands and interactions between wetlands and agriculture are carried out by universities and the Institute of Technology and Life Sciences in Falenty. Address of the National Secretariat of the Ramsar Convention sekretariat.ramsarska@gdos.gov.pl	
Economic Development and Preservation of the Beskids and the Kraków-Częstochowa Upland's Cultural Heritage – Owca Plus	The overall aim of the programme is to protect the natural environment and preserve biodiversity by restoring and maintaining sheep grazing on select mountain clearings and pastures, and xerothermic grasslands. The programme provides protection of the most valuable natural mountain pastures and meadows of Beskid Śląski and Żywiecki, as well as xerothermic grasslands indicated by the Landscape Park Complex of the Silesian Voivodeship through stopping forest succession on the basis of pasture management, and moreover cultivation of cultural identity related to shepherding, promoting folk culture traditions, development crafts and processing of sheep and goat products.	Silesian and Zywiec Beskids, Krakowsko-Czestochowa Upland
„The Carpathians connect" – consultation and cooperation mechanism for the	The aim of the project is the conservation and sustainable use of biological diversity and the landscape of the Polish Carpathians through the support of the implementation of the Carpathian Convention. The intended effect of the	Carpathians

Landscape based initiatives[247]	Description of sites and their characteristics of relevance to biodiversity for food and agriculture	Extent (area)
implementation of the Carpathian Convention	implementation of the project is the protection of biodiversity and the landscape of the Carpathian Mountains – by maintaining and developing traditional sheep grazing on mountain pastures and semi-natural meadows, the protection of the traditional breeds of farm animals and support for the rebirth of shepherding tradition; sustainable development of tourism in the Carpathians, in a manner conducive to reducing the negative impact of tourism on high natural value areas; to facilitate access to information about the Carpathians, their natural and cultural heritage, tourist infrastructure and the measures taken for the implementation of the Convention.	
Subcarpathian Natural Grazing	The overarching goal of the project is the economic and tourist stimulation of the Subcarpathian Voivodeship by promoting – unique in terms of nature and landscape – grazing areas while maintaining biodiversity based on natural grazing. An intermediate goal was the increase in cattle numbers and the restoration of extensive grazing of these animals on lands that were not used for agricultural purposes. The programme intends to revers the unfavourable trend of declining cattle numbers in Subcarpathia, and is treated as an incentive for farmers to restore bovine population.	Subcarpathia
Analysis of the use of small herbivorous animals for innovative, natural maintenance of flood embankments in the proper condition	The pilot programme intends to test the ability to replace mechanical flood embankments care with small herbivorous animal.	Małopolska

Cooperation between institutions and organisations

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.

All legal acts such as acts and ordinances are subjected to both a process of public consultations and cross-ministerial arrangements before approval. Each time, all ministries whose responsibility applies to a given legal act are engaged in the process of its establishing. Strategies, policies and other central strategic documents go through a similar process.

For the conservation and sustainable use of biological diversity for food and agriculture, the Ministry of Agriculture conducts a number of activities resulting from the implementation of the Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries (SSDRAAF). The purpose of the aforementioned strategy is to define the desired vision of rural areas in the social, economic and environmental plane, the priorities of the state policy in this area, and ensure their implementation through the instruments of community and national policies, particularly the Common Agricultural Policy and Cohesion Policy. At the same time, the document pays attention to the interaction between rural areas and cities, as well as new challenges for rural areas.

The scope of the SSDRAAF includes the following issues: the competitiveness of the agricultural sector; ensuring food security; environmental protection, preservation of biological diversity of rural areas, climate change; business and employment development; human capital, improving the availability and quality of education; diffusion of development processes; quality of life improvements; information and communication technologies.

The following priorities of Specific objective 5 „Environmental protection and adaptation to climate change in rural areas" of the aforementioned strategy are part of the measures for maintaining biodiversity: 5.1 „Environmental protection in the agricultural sector and biodiversity protection in rural areas" and 5.4 „Sustainable forest and hunting management in rural areas".

SSDRAAF priorities dedicated to the protection of biological diversity are implemented, among others, through measures in the following areas: the protection of unique flora and fauna ecosystems associated with farming and fishing, environmental monitoring, minimizing the risk of introducing alien species threatening biodiversity or the genetic base of plant, animal and fishing production, water quality protection (including rational management of fertilisers and plant protection products) and the protection of soils against erosion, acidification, decline in organic matter and heavy metals pollution. The development of knowledge on agricultural environment and biodiversity protection in rural areas are complementary to the aforementioned measures implementing the Strategy, implemented through, among others, the improvement and development of the advisory system (including agri-environment consulting and fertilization consulting, farmer trainings in the field of organic farming, dissemination of Good Agricultural Practices and encouraging their use), biodiversity and environment protection, including water and soils.

In accordance with the principle of complementarity of integrated development strategies, some of the objectives and priorities referred to in SSDRAAF shall be implemented by means of instruments reflected in the other strategies. In the case of Specific objective 5 „Environmental protection and climate adaptation in rural areas" the main role is played by Strategy Energy Security and Environment – 2020 perspective (BEiS), developed by the Ministry of Economy and the Ministry of the Environment, which covers two areas: energy and the environment, indicating, among others, key reforms and necessary measures to be taken in the short term until 2020. BEiS describes the links between the environment and energy. The purpose of the aforementioned strategy is to facilitate environmentally friendly economic growth by providing access to energy and modern, innovative technologies, as well as the elimination of administrative barriers impeding such growth. The matter of biodiversity protection under the implementation of BEiS has been described in Goal 1 „Sustainable management of the environment", which set out, among others, the direction of intervention: 1.3 „Conservation of biological diversity wealth, including multifunctional forest management". As part of the implementation of the aforementioned direction, measures have been envisioned serving to inventory and create a coherent information system on species and natural habitats of the country together with the valuation of environmental values, creation of conditions for the protection of ecological corridors and preventing fragmentation of natural space; conservation of proper protection of habitats and species, as well as the adaptation of multifunctional forest management to changing conditions.

Multiannual programme „Improvement of Plants for Sustainable AgroEcoSystems, High Quality Food and Plant Production for Non-food Purposes carried out by IHAR-PIB and the multiannual programme „The Development of Sustainable Horticultural Production Methods in Order to Ensure High Nutritional and Biological Quality of Horticular Products and the Preservation of Biodiversity, the Environment and the Protection of its Resources" carried out by the Research Institute of Horticulture. As part of the works carried out, field collections of fruit (InHort) and ornamental (InHort, COBORU) plants enriched, as well as field collections and genetic resources of vegetable plants (field collections: InHort Skierniewice, University of Life Sciences in Poznan, genetic resources: IHAR Radzikow). Valuation and inventory of fruit plant genotypes has also been carried out.

The Ministry of the Environment, The Ministry of Agriculture and Rural Development and the Ministry of Infrastructure and Development cooperate on land-use plans for the aquatic Natura 2000 sites. Maritime Authorities (reporting to the Ministry of Infrastructure and Development) are carrying out a tender to select a contractor to implement the plan, as well as conduct consultations with the local population and local authorities. Representatives of the Ministry of the Environment and the Ministry of Agriculture actively participate in the consultations. After the end of the preparatory stage, the Ministry of the Environment shall take over the work in order to approve the plans in the form an ordinance of the Minister of the Environment after government consultations. Plans lay down the rules of, among others, fishing economy in Natura 2000 sites so to reconcile environmental requirements with the development of sustainable fisheries to the greatest extent possible.

Issues related to the use of waters, including the provision of opportunities for the operation of various entities are regulated by water resources management plans in the area of river basins. They are developed by the President of the National Water Management Authority for 10 river basins: Oder, Vistula, Dniester, Danube, Jarft, Elbe, Nemen, Pregola, Swieza and Ücker. In accordance with the requirements of Directive 2000/60/EC, the so-called Framework Water Directive, the plans include 6 year planning cycles (2003-2009; 2009-2015; 2015-2021; 2021-2027) and form the basis for decision-making affecting the status of water resources and their management. Draft plans are subject to mandatory public consultations. In terms of biodiversity, the plans

establish environmental objectives for water bodies and protected areas and summarize the measures contained in the national water and environmental programme, taking into account the ways of achieving the environmental objectives laid down.

The Ministry of Sport and Tourism has developed a preliminary draft „Principles of Tourism Development in High Natural Value Areas". Works on this document are underway.

The Ministry of National Defense **(**MON) has developed an internal document entitled „Training Manual to ensure the requirements of animal and plant protection in the course of Polish Armed Forces training on the training grounds", which was implemented by the Polish Armed Forces by way of MON decision on 29 January 2008. This decision implemented the provisions of article 128 of the Act of 27 April 2001 – Environmental Protection Law. An example of the execution of this task is also the mandatory instruction for training subunits implemented by environmental protection inspectors appointed in each military unit (before the unit leaves for the training ground) and a repeated instruction implemented by environmental protection inspectors appointed at the training grounds headquarters.

In addition, the issue of the protection of biodiversity is one of the topics of the weekly „Environmental security training" organised jointly by MON's Department of Infrastructure and the Academy of National Defence, with the participation of MON lecturers and civilian lecturers invited, among others, from the Mazovian Voivodeship Inspectorate of Environmental Protection and the General Directorate of State Forests. Soldiers and army employees who deal with environmental issues in the organisational units of the Ministry of National Defence participate in the training course.

82. How are ministries working together to meet Aichi Targets33 as they may apply to the conservation and sustainable use of biodiversity for food and agriculture in your country?

Target 1. By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

In the years 2009-2013 a number of campaigns was carried out in Poland to raise awareness for the conservation of biodiversity, including broad nationwide measures – e.g. the campaign of the Ministry of the Environment „Biodiversity", or GDOŚ (General Directorate for Environmental Protection) campaigns: „Natura 2000 network - a path to development", „Nature and economy – the basics of dialogue", „Grab the balance - Discover Nature". In this field, non-governmental organisations displayed a lot of activity, for example, The Fish Promotion Association's campaigns „Nature of fish ponds" or „Mr. Carp restocks the Vistula River". The scale of the undertaken measures can be evidenced by the fact that since 2007 the total amount of public funding (EU and national) for projects on increasing public awareness in the field of conservation of biological diversity has exceeded 100 million PLN (more than US $ 32 million). The scale and variety of activities aimed at raising awareness of the values of and ways to protect biodiversity was far greater during the 2009-2013 period than in the preceding five years.

Target 2. By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems

Biodiversity is incorporated in declarative terms into many sectoral strategies and in the basic legal dimension to tools such as EIA, SEA, and land-use planning, although the effectiveness of these mechanisms requires further improvement. The problem lies in the lack of information and documents (inventory) that describe the natural resources of individual provinces and municipalities, especially at the local level, which could be used for planning. An even bigger challenge will be to incorporate the value of biodiversity to accounting systems. It is clear from the survey conducted among the Voivodeship governments (15 Marshall's Offices) that the assessment of the economic benefits arising from biodiversity has only been performed in 15 of the 15 regions.

Target 3. By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

Data on economic incentives that are harmful to biodiversity are incomplete. Most of the institutions do not perform this type of analysis.

As an example of negative subsidies, one can mention aid to the drainage of agricultural land, which is contrary to the state water and environmental policy and neutralizes other positive measures, for example, for the benefit of small water retention. From the point of view of the objectives of biodiversity conservation, the management of water in areas used for agriculture should primarily take into account the irrigation drainage systems and treatments to increase water retention. In 2010, out of 6 421 000 ha of reclaimed land in Poland, only 414 000 ha (6.4%) were equipped with water-stopping devices, and only 105 000 hectares were irrigated. In 2011, the situation has not changed. Under the RDP, numerous works for land improvement have been carried out, although for the most part they served draining, and not water retention.

On the other hand, there are significant financial incentives in Poland that have a positive influence on the sustainable use of biodiversity, such as direct payments and payments granted to farmers under the RDP Agri-environmental programme. The impact of the RDP Agri-environmental programme on the agricultural sector should be considered significant. One example of the effects of this impact is, e.g. a more than double increase in the area of organic crops over the last five years – from approx. 315 000 ha in 2008 to approx. 661 000 ha in 2012.

Target 4. By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits

Sustainable development, including sustainable production and consumption, in the case of companies, are associated with the social responsibility of business. In Poland, administrative reporting of sustainable development is a relatively new practice and is the domain of large companies. When it comes to other measures for safe environmental limits and their evaluation in terms of sustainable production and consumption, it should be noted that many of the mechanisms of this type are no longer used in Poland, such as catch quotas, plans for timber, utilization of hunting species. However, they require constant analysis, improvement and adaptation to the current level of knowledge. In most of the sectors a variety of mechanisms for sustainable management are implemented, the instances of overexploitation in relation to natural resources have been eliminated.

Numerous initiatives are taken at the governmental level that promote sustainable consumption models, such as using environmental criteria in public procurement (green public procurement). A study carried out by the Public Procurement Office shows that the share of green public procurements rose from 4% in 2006 to 12% in 2012. Green public procurement have also been identified in the proposed Strategy Energy Security and Environment (BEiŚ) - perspective until 2020 as one of the most efficient tools allowing to shape production and consumption models. The strategy foresees stimulating the growth of the level of green procurement so that by 2020, half of the awarded public procurement was eco-friendly. BEiS also points out the need to promote the use of environmental criteria in the private sector (green purchases).

In the years 2009-2013 there has been substantial intensification of information measures that promote sustainable consumption patterns. A special role was played by the Ministry of the Environment who carried out a number of national campaigns. Activities promoting sustainable patterns of consumption were also carried out by non-governmental organisations and public bodies (e.g. universities, local and regional authorities, institutes). The total amount of funding for projects of this type with public funding (national and EU) amounted PLN 30 million (more than US $ 10 million) in 2007-2012. The scale and reach (including media attention) of the undertaken tasks were significantly higher than before 2009.

Target 5. By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced

Ince 1995, the National Programme for the Augmentation of Forest Cover (KPZL) is being implemented in Poland. It envisages increasing the forest cover to 30% in 2020 and to 33% by 2050. In 2009-2012, the growth rate of forest cover was similar to the growth rate in the preceding four-year period 2004-2008 and amounted to approx. 0.075 percentage point per year. Assuming this growth dynamic is maintained, the level of approx. 29.9% will be reached in 2020. It should be emphasized that the lands situated in Natura 2000 areas are excluded from afforestation pending the development of protection tasks plans for these areas. As a result of distortions of species composition of Polish forests by conducting forest management favouring faster growing species coniferous tree species, they dominate over large areas of the country (70.8%), whereas in the forests' habitat structure, pine, spruce and fir forests only slightly exceed half of the total amount of habitats (52.1%). In accordance with the National Policy on Forests (1997), a reconstruction of stands is carried out in Poland, aimed at increasing the share of deciduous species and increasing the age and species diversity of the stands. In 2009-2012, the reconstruction area amounted to 40 900 hectares. In Poland, the use of wood resources in recent years is carried out at a level below natural capabilities defined in accordance with the forest sustainability and forest resources increasing principles. Since 2009, State Forests (approx. 78% of all forests)

are subject to certification in the PEFC system (alongside the already used FSC system). In comparison to other EU countries, Poland has the largest share of certified forests in the total forest area.

Moreover, the Agri-environmental programme under RDP 2007-2013, through Packages 4 and 5 aimed at the protection of valuable natural habitats both in NATURA 2000 areas and beyond them, contributes to achieving this objective.

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

Among the main species of the Baltic, cod catches are particularly important for Polish fishermen, as they are subject to restrictions resulting from the stocks rebuilding plan for this species (limiting the catch limits increase, closed seasons and restrictions in the use of certain fishing gear).

The state of commercial fish caught in the Baltic Sea is assessed by the International Council for the Exploration of the Sea (ICES) and the Scientific Technical and Economic Committee for Fisheries (STECF) every year. Since 2006, the Sea Fisheries Institute – National Research Institute implements the Incidental Catches of Cetaceans Monitoring Programme based on obligations resulting from Regulation (EC) No. 812/2004. Since 2011, the programme also included observations of incidental catches of seabirds and endangered fish species such as twait shad or fish from reintroducing programmes, such as the Atlantic sturgeon. As part of the implemented programme, since its inception, not a single incidental capture of cetaceans or other marine mammal has been recorded. In 2008-2011, with the support of the NFEPWM, a project has been implemented on the active protection of harbour porpoises against bycatch by installing a line pinger barrier in the Puck Bay in order to prevent porpoises from swimming into fisheries with a high density of nets.

Having this assessment of Baltic fish stocks in mind, it should be noted that currently the stocks of main fish species sourced by Polish fishermen, i.e. cods from the eastern stock and herrings from the central basin of the Baltic Sea are in good shape and these species are caught according to the maximal sustainable yield, whereas sprat stocks are on a level that allows to achieve this state in 2015.

Poland, as a member of the European Union, is obliged to comply with the rules of the Common Fisheries Policy, whose main objective is to achieve sustainable exploitation of fisheries. In the years 2009-2013, works have been undertaken on reforming CFP, which is due to come into force in 2015. The reform introduces an ecosystem approach in long-term management, determining fishing quotas strictly on scientific advice and an obligation to achieve MSY (maximum sustainable yield – an annual catch that does not reduce the herd below the level of biological safety), application of the precautionary principle where there is insufficient knowledge and a discard ban.

In inland waterways, the exploitation of stocks is determined in fishing plans. The rules regarding the exploitation levels and conservation measures are defined in fishing plans, and subsequently their legitimacy is evaluated by select research units. The implementation of the so-called rational management of fisheries by a fishing user is supervised by Marshal's Offices and Regional Water Management Boards performing the duties of the waters' owners.

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

In accordance with the Law on forests, the primarily focus of the State Forests is to conduct constant sustainable forest management, implemented on the basis of Forest Arrangement Plans, taking into account the following objectives: preservation of forests and their beneficial impact on the climate, air, water, soil, living conditions and human health and the natural balance; protection of forests, particularly forest ecosystems which constitute fragments of native nature or forests especially valuable because of the preservation of biological diversity, forest genetic resources, scenic and scientific needs; protection of soil and areas particularly vulnerable to destruction or damage and of special social importance; surface and deep water protection, as well as retention of river basins; production, based on sustainable management, timber and raw materials and by-products of forest use. Certification in the FSC system includes all Regional Directorates of the State Forests (RDLP) in Poland, with the exception of Krosno, and certification in the PEFC system – covers all RDLP.

The Agri-environmental programme RDP 2007-2013 plays an important role in the promotion of sustainable management in agriculture, in particular packages: Sustainable farming and Organic farming. RDP 2014-2020

schedules the implementation of the Agri-environment-climate measure and the Organic farming measure, which will also contribute to this objective.

The reform of the EU Common Agricultural Policy adopted in December 2013 introduced the so-called „greening" as one of its key elements – that is, dependence of 30% of direct payments under the first pillar of CAP on farmers' compliance with mandatory environmental practices: crop diversification, conservation of permanent pastures, maintaining ecological focus areas in farmlands or the use of other equivalent measures. The new regulations will apply form 2015. Additionally, 30% of funds from CAP's second pillar, that is – the RDP, are to be spent on environmental, ecological and climatic targets. Poland is already allocating nearly 30% of this pillars' funds for these goals.

In Poland, under the cross-compliance rule, the requirements in terms of good agricultural practices have been defined statutorily. The share of organic farms is steadily increasing, although their total participation is still small and amounts to 3.5% of the total agricultural area in Poland. The fragmented structure of agriculture is conducive to maintaining biodiversity. However, the developments and trends, increased fertilizer use, the intensification of agricultural production should be subject to ongoing monitoring.

Currently, nearly 70% of freshwater fish production comes from aquaculture in ponds, reservoirs and other devices. It is an extensive system that generated semi-natural landscapes of high aesthetic value and habitats of great importance for biodiversity conservation. Therefore, a part of Polish ponds has been included in the Natura 2000 Network. Aqua-environmental measures implemented under OP FISH 2007-2013 are an instrument serving to promote sustainable management of areas in aquaculture utilization, aiming to compensate producers for the use of traditional production methods enhancing protection and improvement of the environment and biodiversity conservation, as well as the promotion of ecological production practices in the Polish aquaculture sector. The amount of payments made as part of the aqua-environmental measures amounted to 276 million PLN (more than USD 93 million) since the beginning of the programme's implementation. Project OP Fisheries and the Sea for 2014-2020 provides for the „Aquaculture providing services in the field of environmental protection", which includes support for: aquaculture methods compatible with specific environmental needs and subject to specific requirements in terms of management, resulting from the designation of Natura 2000 sites; protection and reproduction of aquatic animals in the programmes of environmental protection and restoration of biodiversity; forms of extensive aquaculture including conservation and improvement of the environment, biodiversity and the management of the landscapes and traditional features of aquaculture sites.

Target 8. By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Poland take a multipronged effort to reduce pollution (mainly air and water) that may have an adverse impact on ecosystems and biodiversity. The most important measures in this regard from the point of view of the environmental effect are taken within the framework of the National Urban Wastewater Treatment Program (KPOSK) implemented since 2003. In addition, in 2008-2012, in Poland there were 19 designated areas particularly vulnerable to nitrates from agricultural sources (OSN), the area of which amounted to approx. 1.48% of the country, where action programmes have been implemented aimed at reducing the outflow of nitrogen from agricultural sources. In 2012, the OSN area was increased to 4.46% of the country. Measures aimed at preventing the degradation of agricultural soils (e.g. through the dissemination of good agricultural practices and organic farming) were carried out in the framework of Agri-environmental programme RDP 2007-2013, in particular Package 2. „Organic farming" (by the end of 2014 support covered a surface of 681 161 ha - 29 457 farms) and Package 8. "Protection of soil and water" (by the end of 2014 support covered 841 506 ha - 62 412 farms). In 2009-2013, Poland made significant changes in waste management (including reform of the system for the collection and recycling of municipal waste in the municipalities), which are essential to the protection of ecosystems, soil, and should have a positive impact on soil in the coming years.

Target 9. By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

In accordance with the Act of 16 April 2004 on Nature Conservation, the introduction to the environment and translocation within environment of alien plant, animal or fungi species is forbidden in Poland. Possession, breeding, propagation, offering for sale and selling exotic species that, if released to the environment, may threaten native species or natural habitats (invasive alien species) is possible only after obtaining permission from the appropriate regional director for environmental protection. On the other hand, importing invasive alien species and at the same time, possession, breeding, propagation, offering for sale and selling these imported specimen requires an approval from the General Director of Environmental Protection. The above provisions do not apply to fish species, whose introduction does not require the consent of the Minister

responsible for agriculture[248]. The Ordinance of the Minister of the Environment of 9 September 2011 on the list of alien plant and animal species whose release into the environment may threaten native species or natural habitats came into force on 5 April 2012. The list includes 16 plant species and 36 animal species.

Target 10. By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

The „Evaluation of the impact of climate change on biodiversity and the ensuing guidelines for the operations of nature protection administration until 2030" has been prepared in 2012 at the request of the General Directorate for Environmental Protection.

In October 2013, the Council of Ministers adopted the „Strategic Adaptation Plan for Sectors and Areas Vulnerable to Climate Change until 2020, with a timeframe until 2030" (SPA2020). The main objective of SPA2020 is to ensure sustainable development and efficient functioning of the economy and society in a changing climate. The document identifies priority areas of adaptation measures to be taken by 2020 in areas most vulnerable to climate change such as: water management, agriculture, forestry, biodiversity, health, energy, construction and spatial planning, urban areas, transport, mountain areas and coastal zones.

Target 11. By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Poland has developed and is currently implementing a National Strategy for Wetland Conservation, along with an action plan for the years 2006-2013 (in accordance with the recommendations arising from the Ramsar Convention (1978).

Target 12. By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Polish lists of protected plants and animals have a long history, during which both the number of listed species and rules for their protection have changed. The most recent legislation marked a clear shift from a conservatory approach towards active forms of protection.

In Poland, monitoring is conducted in respect of a number of species, including some endangered species, and a number of protection measures is undertaken.

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 minimizing genetic erosion and safeguarding their genetic diversity.

Poland is a special example of a Central European country, in which due to fragmented agriculture some local forms of agricultural plans survived to modern times. The regions where local materials of agricultural plants can be found are located mainly in the southern part of the country and include the mountainous region of the Beskids and Tatra Mountains, as well as Pogorze. Smaller refuges have been found in eastern and south-eastern parts of Poland, in Podlasie and the Sandomierz Basin. Geographical, ecological and sociological factors favour local varieties of crops in these regions. Relict crops are also characteristic for those regions e.g. camelina, oilseed radish, panicum. Examples of active farming are recorded, e.g. growing of a vicia population, weeds of this species selected from this population for animal feed purposes.

Ex-situ protection

The Polish Gene Bank is required to gather gene resources from the countries (ecotypes, populations, local varieties and native arable forms, registered varieties and valuable breeding materials produced in research institutions). A particularly important task for Polish Bank is the collection and preservation of still existing local cultivars and related species. Resources stored in the gene bank can be a source of plant material to reintroduce old varieties into cultivation. Approximately 70 000 plant genotypes, of which 62 000 are seed samples, representing 245 species are located in the storage of the long-term Gene Bank – IHAR in Radzikowo

[248] Regulation of the Minister of Agriculture and Rural Development dated 16 November 2012. On the list of fish species recognized as indigenous and list of species of fish considered native and conditions for introduction of species of fish considered non-indigenous, for which no permit is required for entry (OJ, item 1355).

under the Crop Genetic Resources Conservation Programme. Currently, the number of objects stored increases by about 1-2 thousand each year. Nearly half (41%) of the collected objects represent cereal samples, approx. 25% are grass samples. The remaining samples are legumes, oilseeds, industrial plants, vegetable plans, Fabacea, medicinal and segetal plants.

In situ protection

Under Package 6. of the Agri-environmental programme RDP 2007-2013 „Preservation of endangered plant genetic resources in agriculture", agri-environment payments in the amount of 87 729 thousand PLN have been carried out. The area of support, resulting from the issued decisions granting agri-environment payments amounted to 55 933 ha for 5 041 farms. Under this package, the most funds have been paid for variant 6.1 „Local crop varieties commercial production" – 72,74% of the total amount of payments made under the package.

Under Package 7. of the Agri-environmental programme RDP 2007-2013 „Preservation of endangered animal genetic resources in agriculture", by the end of 2014, agri-environment payments in the amount of 142 909 thousand PLN have been carried out. The number of supported farms, resulting from the issued decisions granting agri-environment payments amounted to 3 476 farms. The population size of each livestock species and breeds supported as part of Package 7. amounts to 63 579 (annual average). Under the package, the most funds have been paid for variant 7.3 „Preservation of local sheep breeds" – 41,91% of the total amount of payments made under the package.

IZ-PIB conducts an on-going inventory of livestock genetic resources. It has its own databases on native breeds involved in the biodiversity programme or has access databases maintained by entities keeping herd books. Moreover, IZ-PIB constantly updates the European EFABIS database, which is compatible with the FAO Global Information System (DAD-IS).

Target 14. By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable

The issue of the conservation and restoration of ecosystem services is a priority of the EU strategy „Biodiversity 2020", which will be nationwide. Thanks to it, biodiversity will gain the status of a development factor in the national development programmes, and will be more widely recognized by politicians.

The development and implementation of green infrastructure has also been planned, within which the functions of 15% of degraded ecosystems are to be restored by 2020. The design of ecological corridors, which already connect protected areas in a coherent spatial system, despite the lack of a clear anchor in Polish law, has already been developed and is included in the National Spatial Management Concept, spatial studies, as well as in environmental impact assessment procedures.

In Poland, there are also numerous research programmes and ecosystem restoration or renaturisation projects – particularly in respect of wetlands (mainly peat bogs, but also rivers and springs). The preservation of an ecological continuity of waters, as well as the priorities of its restoration are set out in the Voivodeship Programmes for Protecting and Developing Aquatic Resources. This type of measures are carried out both by government organisations and NGOs, as well as by scientific centres.

Target 15. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification

In October 2013, the Council of Ministers adopted the „Strategic Adaptation Plan for Sectors and Areas Vulnerable to Climate Change until 2020, with a timeframe until 2030" (SPA2020). The main objective of the plan in 2020 is to ensure the sustainable development and efficient functioning of the economy and society in changing climate conditions. The document indicates priority lines of adaptation action to be taken to by 2020. From the point of view of habitat protection, the most important measures are related to the preservation of wetlands and their restoration wherever possible and measures conducive to sustainable forest management in changing climate conditions, as well as the preparation of forest ecosystems to increased pressure resulting from severe weather events, e.g. periods of drought, heat waves, heavy rainfall, gale-force winds.

One can note two large projects to improve water retention in forest areas, implemented in the period 2007-2014 within State Forests: „Improving retention capacity and preventing floods and drought in lowland forest ecosystems", covering, among others, renaturisation of wetlands, and the project „Countering the effects of rainwater runoff in mountain areas. Enhancing retention and maintaining streams and their infrastructure in

proper condition", including, among others, retentioning and renaturisation of permanent watercourses and wetlands.

Target 16. By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation

The EU strategy on biodiversity conservation 2011-2020 foresees the implementation of the Nagoya Protocol in the EU by 2015 as one of its tasks. In 2012, the European Commission has prepared a Regulation draft, which has subsequently been the subject of works by the European Parliament and the Council of the EU. After the entry into force, the aforementioned Regulation will be a directly applicable law act in Poland. In 2013, the protocol has been published in Polish, broad consultations have been conducted with ministries and other stakeholders, as well as a conference on the implementation of the Nagoya protocol and proposed legal regulations has been organised.

Target 17. By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan

Works are currently underway on the Programme for the conservation and sustainable use of biological diversity, along with an Action Plan for 2014-2020, which is a continuation of the National strategy for the protection and sustainable use of biological diversity, along with the Action Plan for 2007-2014, adapted to the Strategic Plan and Aichi targets.

Target 18. By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

As part of the RDP, the project „Traditional and Local Product: Promotion, Brand, Distribution - Examples of Good Practices" has been implemented, among others, whose aim was to promote best practices in relation to traditional, local, regional, ecological products among producers and consumers on a nationwide level. The website http://www.produktytradycyjne-dobrepraktyki.pl/ has been created as one of the measures.

The Ministry of Agriculture and Rural Development also held patronage over the „Organic food as a guarantee of good taste" campaign. The aim of the campaign was to provide information and increase consumer awareness on the health and taste benefits of organic farming, as well as to increase the recognition of ecological products labelled with the „Euro Leaf".

The Ministry of Agriculture and Rural Development implemented project involved the following ambassadors: Ms. Magdalena Kumorek – film and stage actress and Mr. Artur Partyka – sportsman, high jumper, three-time Olympian, whose tasks was to jointly promote organic farming in all measures carried out within the campaign. As part of the campaign, an information and promotional activity was carried out involving the programme's ambassadors in nationwide press, information and promotion activities via the Internet using: blogs, fan pages and „Facebook" and „You Tube" websites. These measures had a wide reach, providing discussions, comments and guides on the organic farming sector, which included coverage of activities and presentations of organic products used for promotion within the framework of the campaign. During the campaign, feature stories involving a culinary expert have been presented, who showed the principles of organic production, while cooking delicious dishes and preserves.

Target 19. By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied

In Poland, a number of researches on nature conservation are being conducted, databases are created, important monitoring researches are being carried out. Several dozen scientific and research units operate in the country, which work on widely-understood biodiversity. They include, among others, The Institute of Nature Conservation (PAS) in Krakow, Institute of Environmental Protection in Warsaw, Wladyslaw Szafer Institute of Botany in Krakow, Forest Research Institute, Hel Marine Station of the Institute of Oceanography at the University of Gdansk, Mammal Research Institute (PAS) in Bialowieza, Ornithological Station of the Museum and Institute of Zoology (PAS) in Gdansk, Centre for Ecological Research PAS in Dziekanow, Maritime Institute in Gdansk, The Inland Fisheries Institute in Olsztyn, Institute of Plant Protection, Pathogen Gene Bank, Institute for Plant Breeding and Acclimatization in Radzikowo, Institute of Ichthyobiology and Aquaculture PAS in Golysz, The Institute of Dendrology PAS, The Institute of Soil Science and Plant

Cultivation in Pulawy, Institute of Technology and Life Sciences in Falenty, Forest Gene Bank in Kostrzyca, Research Institute of Horticulture.

The entry into force of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and on environmental impact assessment and the Act of March 4, 2010 on the infrastructure for spatial information (which transposes Directive 2007/2/EC - INSPIRE) contributed in the years 2009-2013 to a significant improvement in the methods of sharing information on the environment and its protection by public bodies, primarily through the creation of publicly available databases (including spatial databases) in electronic form, accessible through the Internet.

Target 20. By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

In the framework of the implementation of the strategy for the mobilization of resources for biodiversity in 2013, a draft methodology was developed in Poland for the collection and conversion of data on expenditure on the widely understood measures for biodiversity and those funds have been estimated in the years 2006-2010, in order to determine the base level, to which it would be possible to compare needs and expenditure in future years. Both the level of expenditure for supporting developing countries in regard to biodiversity (approx. 1.5 million USD annually), as well as national expenditure have been estimated, among others, from budgetary resources, EU funds, resources from environmental protection and water management funds, spent on activities directly and indirectly related to biodiversity in different sectors (approx. 560 million USD annually).

Funds from NFEPWM are spend in collaboration with and under the control of the Ministry of Finance. The Ministry of Infrastructure and Development supervises EU funds. In the years 2007-2012, almost 2.2 billion PLN (over 500 million EUR) have been committed for the implementation of nature conservation projects from the funds of NFEPWM, VFEPWM and EU programmes. EU funds granted under RDP (Agri-environment payments), OP FISH (mainly payments for temporary cessation of fishing activities) and OP Infrastructure and Environment, as well as national funds from NFEPWM were of key importance for the implementation of the target.

In subsequent years, an increase in the expenditure related to biodiversity protection is expected. According to current estimates, in the period 2014-2020 alone, the implementation of commitments related to Natura 2000 sites will require funds in the amount of approximately 70 million EUR. The implementation of active habitats and species protection amount to another 946 million EUR. For the years 2014-2020, Poland will have access to financial resources for biodiversity conservation under EU funds. NFEPWM has also planned priority programmes related to biological diversity protection – approx. 480 million PLN by 2015. The period after 2020 may pose a problem, as EU funding in the existing scale will no longer be available.

Poland supports the task to ensure ecological balance of the environment set out in the Millennium Development Goals by implementing sustainable development principles in national strategies and programmes and by providing assistance to developing countries, mainly countries of the Eastern Partnership. The Ministry of Foreign Affairs supervises help for developing countries. Implemented projects relate to different ministries, e.g. health, culture, education, but also the Ministry of the Environment and the Ministry of Agriculture and Rural Development. As part of foreign support, in the years 2009-2013, Poland implemented aid projects for Armenia, Georgia, Tajikistan and Ukraine, among others:

- Armenia – preparation and organisation of a series of trainings for specialists in the area of chemicals' management and environment protection in Armenia (i.a. improvement of environmental standards of municipal services, improvement of the waste management system, promotion and introduction of good practices in water management, raising environmental awareness among citizens through environmental education, increasing the number of environmental and energy-saving solutions in the residential sector and the industry, tackling environmental degradation and correcting negative effects of climate change);
- Georgia – development of the basics for complex forest management in the Georgian region of Racha, support for forest reform (forest protection by improving foresters' competences);
- Tajikistan – raising awareness for the protection of the environment and sustainable development among local communities in Tajikistan – the global refuge of biodiversity;
- Ukraine – developing the basics of nutrition biotechnology for immature fish dying for the needs of aquacultures.

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 new Programme for Conservation and Sustainable Use of Biodiversity, along with the Action Programme for 2014-2020 (hereafter referred to as the Programme for 2014-2020) is being developed. The Programme for 2014-2020 is a continuation of the National Strategy for Conservation and Sustainable Use of Biological Diversity and the Action Plan for 2007-2013. The overarching goal of the Programme is to improve the state of biological diversity and tie its protection with the socio-economic development of the country.

In the years 2014-2020, intense media and educational campaigns are planned, whose goal will be to raise awareness about the value of natural resources and their impact on social welfare. The draft Programme for 2014-2020 includes such measures, and also, among others, strengthening the participation of local communities in activities aimed at the protection of natural heritage and the integration of tourism activities with nature conservation objectives and creation of new tourist behaviours, as well as trainings for public officials involved in issuing decisions related to the protection of biodiversity.

The draft of national strategy for 2014-2020, among its partial goals, envisages the increase of effectiveness for biodiversity management and protection planning, placing social and economical value in ecosystems and implementation of green infrastructure as a tool to maintain and strengthen existing ecosystems and their services. These objectives will be accomplished through activities such as: development of a methodology to evaluate ecosystem functions, work on ways to incorporate the economic value of ecosystem functions to accounting and reporting systems at a national level, development of national guidelines allowing to give green infrastructure the status of a standard element of spatial planning and territorial development, incorporation of green infrastructure to planning works at a local level.

Financial incentives conducive to the protection of biological diversity in agriculture and fisheries will also be used in the framework of the Agri-environment-climate measure, the Organic farming measure under RDP 2014-2020 and in the individual axes of the Operational Programme „Fisheries and the Sea" for the period 2014-2020. RDP for 2014-2020 also includes the implementation of pilot support for biodiversity friendly companies, development and implementation of job creation programmes within services provided for the protection and sustainable use of biological diversity, development and implementation of instruments aimed at conserving traditional practices of sustainable use of biodiversity by local communities.

According to the RDP 2014-2020, the implementation of target 4 will be served by measures for sustainable sourcing of species from the wild, whereas the implementation of target 5 will be served by sustainable management in agriculture (including targeted spending of funds from the Agri-environment-climate measure), sustainable management in forestry and measures for the benefit of protection and restoration of valuable natural habitats and species, including the development and implementation of protection programmes.

Poland, as a member of the European Union, is obliged to comply with the rules of the Common Fisheries Policy, whose main objective is to achieve sustainable exploitation of fisheries. In the years 2009-2013 works have been undertaken in the EU on reforming the CFP, which is due to come into force in 2015 The reform introduces an ecosystem approach in long-term management, determining fishing quotas strictly on scientific advice and an obligation to achieve MSY (maximum sustainable yield – an annual catch that does not reduce the herd below the level of biological safety), application of the precautionary principle where there is insufficient knowledge and a discard ban. One of the partial objectives of the planned Programme for 2014-2020 is to support biodiversity through sustainable management of fisheries. This objective is to be implemented, among others, through the development of long-term management plans for all commercially harvested fish stocks, taking into account the environmental impact of their catching and restocking, the introduction of regulations aimed at reducing discards and the development and implementation of rules on environmental impact assessments for fisheries and aquaculture.

One of the strategic objectives of the planned Programme for 2014-2020 is the incorporation of sectors of the economy in measures for the benefit of diversity. The implementation of Aichi's target 7 is to focus on 3 core sectors – agriculture, forestry and fisheries, and it will include both financial support under the RDP Agri-environment-climate measure and the aqua-environment measures of OP Fish, as well as educational, regulatory and planning measures.

One of the strategic objectives of the planned Programme for 2014-2020 is the reduction of invasive and conflict species' pressure, and the planned measures for its implementations include improving knowledge, developing and implementing an action plan and creating a monitoring system for invasive alien species.

Partial objectives included in the draft Programme for 2014-2020, conducive to the implementation of Aichi's target 11, include the protection and restoration of valuable natural habitats, strengthening the system for managing protected areas and including high natural value areas in area protection. In order to implement this objectives, it will be necessary to implement protection plans or protection tasks plans, provide a consistent system for the management of Natura 2000 sites, the establishment of new and increasing the area of existing national parks, to supplement the network of nature reserves and establish a system of ecological corridors, along with determining their management system. A substantial increase of areas under strict protection (IUCN category I) on the Polish territory is also an important objective.

In accordance with the draft Programme for 2014-2020, in order to ensure the protection of species found within protected areas, it will be necessary to implement guidelines contained in protection plans. In order to be effective, lists of endangered habitats and species and their conservation needs will need to be updated.

RDP 2014-2020 provides further support for biodiversity protection on agricultural lands through targeted spending of funds from the Agri-environment-climate measure. The following measures have been planned: establishment of a system of ecological corridors, along with the designation of a management system, and an amendment of the Nature Conservation Act, taking into account the principles of managing ecological corridors. One of the partial objectives of the Programme is the restoration of degraded ecosystems and their services. This goal is to be implemented by identifying priorities for the restoration of ecosystems and the development and implementation of restoration programmes for degraded ecosystems and their services.

Table XIII. Targets summary of the national Program for conservation and sustainable use of biodiversity and the Action Plan for 2014-2020 and Aichi 2020's targets.

Targets of the national Programme for conservation and sustainable use of biodiversity and the Action Plan for 2014-2020 and Aichi 2020's targets.	Aichi targets	Addressing the underlying causes of biodiversity loss (mainstreaming biodiversity across government and society)				Reducing the direct pressures on biodiversity and promoting sustainable use						Improving the status of biodiversity (ecosystems, species and genetic diversity)			Enhancing the benefits to all from biodiversity and ecosystem services			Strengthening implementation (participatory planning, knowledge management, capacities)			
	X	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
Raising the level of knowledge and promoting appropriate attitudes in the society	A I																			+	
	A II																			+	
	A III	+																			
	B I			+		+		+	+					+					+		+
Inclusion of different sectors in activities for the benefit of biodiversity	B II			+		+		+													+
	B III						+	+													
	C I		+			+												+			
Conservation and restoration of populations of endangered species and habitats	C II				+	+						+									
	CIII					+							+								
	C IV				+			+													
	D I	+																			
	D II			+																	+
Effective management of natural resources	D III											+			+	+					
	D IV											+	+			+					
	D V																			+	
	E I		+																		
Conservation and restoration of ecosystems and their functions	E II		+																		
	E III															+					
Reducing pressure from invasive and conflicting species	F I									+											
	F II									+											
Reducing and mitigating the effects of climate change	G I																			+	
	G II	+	+																		
International cooperation	H I																+				

Source: Fifth national report on the implementation of the Convention on Biological Diversity, 2014.

Aichi's target 18 can be implemented in Poland through: maintaining the right for sustainable use of select forest resources by local communities (not limiting these rights above real needs arising from the need to protect species and habitats); allowing for traditional, sustainable grazing, matched to the capacity of habitats, especially in mountain areas, with its use to protect some of the anthropogenic habitats; the use of certain traditional methods for limiting damages caused by large predators (especially the promotion of using herding dogs from traditional breeds).

In 2014-2020, Poland will have access to financial resources for the conservation of biodiversity under EU funds. The most important financial contribution is projected from the Agri-environment -climate measure and the Organic farming measure under RDP 2014-2020.

Due to the CAP reform entering into force (greening), the financial instrument promoting biological diversity is to be found in the form of direct payments for farmers under the I pillar, whose granting is conditioned (in 30%) on fulfilling practices favourable to the climate and the environment: crop diversification, conservation of permanent pastures, maintenance of ecological focus areas or the use of other equivalent measures specified in the EP and the Council Regulation (EU) No. 1307/2013.

NFEPWM also has planned priority programmes related to the protection of biodiversity – approx. 150 million PLN for the years 2014-2015. Under the Operational Programme *Protection of biodiversity and ecosystems* of the European Economic Area Financial Mechanism 2009-2014, the amount of approx. 20 million EUR has been contributed for the years 2013-2016 for measures aiming to increase management and monitoring effectiveness of Natura 2000 sites, increasing the resilience of native ecosystems against the pressure by invasive alien species, raising public awareness on biological diversity and education in this regard in connection with climate change and the economical value of ecosystems, as well as increasing the potential of non-governmental organisations to promote biological diversity. As an innovative financing instrument, the draft of the national strategy for 2014-2020 provides for the launch of a pilot mechanism for financially supporting biodiversity friendly companies. The period after 2020, may pose a problem in terms of financing measures for biological diversity, as EU funding in the existing scale will no longer be available.

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

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

Initiatives	Scope (R: regional, I: international)	Description	References
Weed garden	R	Weed protection against extinction. Owczary – lubuskie Voivodeship (project implemented by a club of nature enthusiasts). Last 10 years and further on.	
Weed refuges	R	Weed refuges in the city of Opole and its vicinity (2011-2013). Weed protection against extinction – financed from the Opole Regional Operational Programme and the Voivodeship Fund for Environmental Protection, led by the Club of Nature-Lovers with the cooperation of The Opole Open-Air Museum of Rural Architecture.	
Weed refuges	R	„Niecka Nidzianska – agro-biodiversity refuge". Weed protection against extinction – project co-financed by the EcoFund and the Plant Breeding and Acclimatization Institute, concluded in 2009	
Agri-environment Payments 2007-2013	National	– Package 1. Sustainable farming - Package 2. Organic farming; variants 2.3 and 2.4. Permanent grasslands - Package 3. Extensive permanent grasslands; - Package 4. Protection of endangered birds species and natural habitats outside Natura 2000 areas;	

Initiatives	Scope (R: regional, I: international)	Description	References
		variants: 4.1. Protection of bird breeding habitats; 4.2. Small sedge-moss communities; 4.3. Tall sedge swamps; 4.4. Litter meadows Molinion and Cnidion; 4.5. Xerothermic grass; 4.6. Semi-natural wet meadows; 4.7. Semi-natural fresh meadows; 4.8. Species-rich Nardion grasslands; variant 4.9. Salt marshes; 4.10. Natural lands - Package 5. Protection of endangered birds species and natural habitats in Natura 2000 areas – (variants as in Package 4.) - Package 6., variant 6.3. Seed production at the request of gene bank – Package 9. Buffer strips	
Integrated Pest Management	European Union	National Action Plan	Whole country
RAMSAR Convention	I (worldwide)	The Convention for the Protection of Wetlands of International Importance especially as a habitat for aquatic birds. Protecting a broad spectrum of aquatic ecosystems, along with their flora and fauna.	Protecting water resources and quality, pollutant filtration, supporting the ecological stability of ecosystems
Network of Natura 2000 protected areas, the associated LIFE Nature Fund	I (Europe-wide)	Protection of habitats and species in accordance with the directives of the Council of Europe 92/43/EEC of 21 May 1992 and 79/409/EEC of 2 April 1979.Comprehensive protection of selected natural habitats and animal (birds, mammals, fish, invertebrates) and plant species through the creation of protected areas, and within the, – conservation plans and protective action plans with recommendations regarding sustainable management of habitats.	Protecting water resources and quality, pollutant filtration, supporting the ecological stability of ecosystems and sustainable management thereof.
National parks	R	Creation of protected areas that retain all the natural systems of the area, together with the conditions of their functioning, restoration of degraded or completely extinct links of the environment chains, serving research purposes, providing tourism and education. Creation of protection plans for these areas, specifying the recommended protective and ecosystem management measures.	Protecting water resources and quality, pollutant filtration, supporting the ecological stability of ecosystems and sustainable management thereof.
Landscape parks	R	Creation of protected areas conserving natural, historical, cultural and landscape values in order to preserve and promote them in conditions of sustainable management. Business activity with constrains resulting from the need to preserve the natural environment	Comprehensive approach to sustainable landscape management
Nature reserves	R	Creation of protected areas in terms of conservation of different elements of the natural environment: fauna, flora, landscape, forestry, inanimate nature, halophytes, steppe, peat, aquatic elements. Minor-uses protection of the whole environment in exceptionally valuable areas.	Supporting ecological stability at the regional level through the conservation of endangered elements of the natural

Initiatives	Scope (R: regional, I: international)	Description	References
			environment in selected areas
Ecological utility areas	R	Establishing point-based or area-based ecosystem protection forms for the conservation of biodiversity – natural water reservoirs, field and forest ponds, clumps of trees and shrubs, swamps, bogs, dunes, patches of not utilized vegetation, oxbow lakes, rock outcrops, slopes, quarries, natural habitats or sites of rare or protected plant, animal and fungi species, their refuges and breeding grounds or places of seasonal residence.	Supporting ecological stability at the regional level through the protection of key elements of the natural environment
Species protection	R	Endangered plant and animal protection in Poland. Protection covers rare species, threatened with extinction as a result of environmental changes caused by human activity or destruction directly through their actions, playing an important role in the functioning of ecosystems and showing a trend of declining population, particularly valuable for science, and also located (in a given country) at the border of its reach. Specification of species requiring the designation of protection zones and active protection	Supporting the ecological stability and sustainable management of ecosystems
National and regional red lists and books of plants and animals	R	Protection of endangered plants and animals in Poland and in its individual regions.	Supporting the ecological stability of ecosystems
The European Strategy for Plant Conservation (2008-2014): A sustainable future for Europe	I	Poland is a member of *Planta Europa*, a network of non-governmental, governmental and scientific organizations undertaking joint actions to protect species of plants and fungi in Europe.	
The International Union of Conservation of Nature and Natural Resources	I (worldwide)	Developing the principles of conservation and use of ecosystems and their plants and animals. The publication of the Red Book containing a list of species of plants and animals threatened with extinction	Supporting ecological stability in the world by preventing the decline of the gene pool
United Nations Environment Programme, UNEP	I (worldwide)	Determination of the laws relating to the use of the environment and abiding by the laws of nature in economic activity. Environmental balance as a condition for stable economic development of societies.	Encouraging the sustainable use of the environment in connection with nature protection
The Convention on Biological Diversity	I (worldwide)	Biodiversity protection, sustainable use of its elements, sharing benefits from the use of genetic resources, including appropriate access to those resources and appropriate technology transfer, including all the rights to those resources and technologies. Ensuring adequate funding. Within the framework of the Convention, Poland commits to develop national strategies, plans or programmes for conservation, identify and monitor biological diversity components, and to identify the processes and categories of activities, which will or may have a significant adverse impact on protection and sustainable use of biodiversity, and	Protection of intraspecific (gene pool wealth), inter-species (species diversity), and trans-species (landscape and ecosystem diversity) variability. A holistic approach to the need to preserve the

Initiatives	Scope (R: regional, I: international)	Description	References
		monitor their effects.	natural environment at all organisation levels
Framework Convention on the Protection and Sustainable Development of the Carpathians	R	„The Carpathians connect" – consultation and cooperation mechanism for the implementation of the Carpathian Convention – The project involves the conservation of biological and landscape diversity of the Carpathian region through maintaining and developing traditional sheep grazing in mountain pastures and semi-natural grasslands, protection of traditional livestock breeds; sustainable development of tourism in the Carpathians.	
Commission on Genetic Resources for Food and Agriculture	I	The Commission on Genetic Resources for Food and Agriculture is a permanent intergovernmental FAO forum, where countries discuss policies, as well as sectoral and cross-sectoral issues relating to the conservation and sustainable use of genetic resources for food and agriculture.	
Regional cooperation on the European black bee	R	Polish bee protection programmes work very well and efficiently, raising admiration among European beekeepers interested in the subject. In September 2002, the 5th International Conference of Black Bees took place in Poland, attended by representatives of the SICAMM organisation (Societas Internationalis pro Conservatione Apis mellifera mellifera). Organisations and beekeepers from many European countries maintain working contacts with Polish scientific institutions in the field of genetic research and the restoration of black bee population. This means that there is a growing interest in the Central European bee and that Poland, having a rich experience in this regard, may play a significant role in the efforts to protect it.	

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?

As part of agricultural advisory, local agricultural counselling centres and the Agricultural Advisory Centre perform tasks aimed at conservation and sustainable use of associated biological diversity.

Voivodeship agricultural advisory centres (ODRs) organize training courses for farmers, shows and seminars, publish articles on the aforementioned issues in publications for farmers. For instance, in 2013, the ODR in Lower Silesia has launched a publication entitled „Birds around us Agri-environmental Programme and biodiversity, Kuyavian-Pomeranian ODR – „On the border of the Noteć Valley, nature trail", Silesian ODR – „Man and animals – select historical, cultural and legal aspects", West Pomeranian ODR – „Crop production in organic farming". All ODRs carry out annual contests for the best organic farm and train farmers on management in accordance with the principles of cross-compliance. Cross-compliance trainings are financed under the measure „Vocational trainings for persons employed in agriculture and forestry" under RDP 2007-2013.

The Agricultural Advisory Centre (CDR) is tasked to train agricultural advisors. Agricultural school teachers and pupils – members of farming families participate in CDR's trainings.

The priorities of the Agricultural Advisory Centre supporting biodiversity conservation in rural areas include, among others:

- training counsellors on the minimum cross-compliance requirements – in terms of good agricultural and environmental conditions, as well as area A – the protection of wild birds and conservation of natural habitats;
- Organic farming and Agri-environment-climate measure in the new financial perspective;
- international programmes; including the flagship project of the Baltic Sea region – Baltic Deal (especially wetlands, biodiversity protection in agricultural farms, freshwater and Baltic protection against biogen pollution).

Types of work included:

- Publications. Print and distribution of a total of 7,300 copies of the following titles: „Protection of water against pollution from agricultural production. New OSN action programme", „Standards and cross-compliance requirements for farms applying for direct payments", „Balance of biogenic components in a farm, as a form of water protection", brochures on organic farming: 4 titles, „Valuable natural habitats in agricultural farms. Guidance for agri-environmental advisors". Distribution of the electronic version of „Recognition of natural habitats" (1,500 recipients).
- Organising trainings for employees of advisory centres. Trainings: „Minimal cross-compliance requirements in agricultural holdings (5 trainings / 138 participants),"Environmental measures in the new financial perspective" (1/29), training of candidates for experts on nature for the measure „Agri-environmental programme 2007-2013" (1/17), „Protection of endangered bird species and natural habitats, documentation on nature" postgraduate studies (1/17), „Biodiversity as an element of organic production system" together with CZD PAN in Powsin (1/36), Obligatory and optional measures in Conservation Tasks Plans, and the implementation of the Agri-environmental programme RDP 2007-2013, (2/45); seminar „Changes to the Agri-environmental Programme under RDP 2007-2013" (4/185); Good agri-environmental practices RDP 2007-2013" in Swietokrzyskie Voivodeship (1/35).

Other activities of the CDR include:

- Exams for agricultural (advising in the field of cross-compliance), agri-environmental and natural experts;
- a nationwide contest for the best organic farms, where one of the main criteria was biodiversity preservation;
- organising trainings for teachers and students: Green light for vocational education – improvement programme for teachers in the field related to green economy (1/734), Landscape architecture – postgraduate studies for teachers (1/19).

CDR participated in the Baltic Deal project, where biodiversity was one of the leading elements – on the one hand by protecting the aquatic environment from biogenic contamination of agricultural origin, on the other – through rational management on valuable areas – wetlands, flood areas, field borders etc. The project has been implemented in close cooperation with all agricultural advisory centres in Poland. As part of the project, the following has been organised: „Good agricultural practice in the Baltic Sea region" and „Managing aquatic resources and good agricultural practices preventing biogenic contamination in the Baltic Sea catchment area" conferences, a press conference combined with a visit to a demonstration farm and meetings in demonstration farms. In cooperation with the University of Uppsala, two seminars have been organised „Farm self-assessment and the analysis of the risk of losing fertilizer components and low-cost remedies" and „Investing in Natura 2000 sites". Competition organised under the aegis of the WWF for the Baltic Sea's farmer of the year – Mr. Marian Rak was the winner of the main prize in 2011, whose farm belongs to the Baltic Deal farm network.

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

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

Institution	Programme	Level	Enrolment		
			Total	Male	Female
[if needed, please add rows]					

Currently, higher education institutions in Poland are free to define fields of study and education programmes, therefore only individual institutions have such information. The answer to the question requires data collection and analysis, which has not yet been carried out.

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

87. List up 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.

Table XIV. Research units that can conduct research on the conservation and sustainable use of associated biological diversity in Poland.

Item	Name of research unit	Cat.	Description of scientific unit	Key research programmes (directions)	Number of persons employed in scientific research or development
Crop research					
1.	Research Institute of Horticulture.	A	A research institute that includes the following sections: horticulture, gardening and ornamental plants. The institute possesses many solutions that are innovative on a global scale. Research infrastructure is constantly improved. Laboratories of the Unit provide commercial services for domestic food producers and exporters. It is authorized to award doctoral and postdoctoral degrees and carries out the procedure for awarding the title of professor of agricultural sciences. The Institute organizes doctoral studies. It also has a Centre for Research and Training on Techniques for Plant Conservation. The Unit publishes two academic journals in English and one in Polish. It is actively involved in creating the European Research Area. It is actively cooperating both in the country and abroad. It is a member of many international organisations and associations.	The research programme of the Research Institute of Horticulture covers all issues related to horticultural production, ranging from studies on the biological bases of fruit, vegetable and ornamental plant production through biotechnology, genetics and creative breeding of ornamental plants, agronomical practices, plant pathology, nursery and protection of horticultural, vegetable and ornamental plants genetic resources, plant irrigation, cultivation of edible mushrooms, processing and preservation of fruits and vegetables, food safety, agricultural engineering, economics and marketing, up to beekeeping.	165.87
2.	Warsaw University of Life Sciences, Faculty of Horticulture, Biotechnology and Landscape Architecture	B	The faculty carries out research in agronomy, horticulture, organisation and management. It has doctoral and postgraduate studies, and the right to award academic degrees. The unit has published numerous scientific papers and disseminated research results at scientific conferences.	The scientific activity is closely related with the strategic research areas of the National Framework Programme: II. Environment and III. Agriculture and food, as well as priority directions of research: 2.1 Environmental management, 2.3. Biodiversity and its conservation, 2.4.	115

Item	Name of research unit	Cat.	Description of scientific unit	Key research programmes (directions)	Number of persons employed in scientific research or development
				Urban and regional development optimization, 2.5. Natural resources use optimization, 2.6. Recirculatory management and other technical measures to protect the environment, 3.1. Pro-health food, 3.2. biological progress in agriculture.	
3.	University of Warmia and Mazury in Olsztyn, Faculty of Environmental Management and Agriculture	A	The Faculty conducts research in the field of agricultural sciences in two disciplines: agronomy and the protection and management of environment, whereas its scientific specialization lies in areas such as: life sciences (ecology, biotechnology), forest sciences (forest ecology, forestry), chemical sciences (chemistry), technical sciences (architecture and urban planning, environmental engineering) and economics (economy, environmental economics). The faculty is focused in issues related to crop production, environmental basis for use, management and protection of agricultural production space and environment management. The Faculty manages the activity of the Renewable Energy Research Centre, whereas the University, represented by the Centre, is one of the 100 scientific, industrial and municipal partners of the Baltic Eco-Energy Cluster. The Faculty cooperates with European countries. It has doctoral and postgraduate studies, and the right to award academic degrees. It has a vast number of publications.	The Faculty coordinates 8 tasks, implemented by a consortium of scientific units, within the framework of the key project for Polish economy „Model agro-energetic complexes as an example of distributed generation based on local and renewable energy sources".	76,8
4.	Institute of Soil Science and Plant Cultivation – Polish Research Institute	B	The Institute operates in the following directions: soil science, protection and rehabilitation of land, tillage, crop-rotation issues, fertilization, microbiology, agrometeorology, cereal and fodder crops cultivation, hop breeding and cultivation, biochemistry and plant physiology, economics and plant production organisation, tobacco cultivation, ecology and weed control, soil erosion, management of sculptured areas. The Unit has doctoral and postgraduate studies, and the right to award academic degrees. It disseminates the results of its scientific activities through scientific conferences and has a vast number of publications.	The main objective of the Institute is the sustainability of crop production. In connection with the development programmes for specific fields of science, economy and social life, the Institute conducts research on the impact of fertiliser policies on broadly-understood environment, as well as climate change.	134,50

Item	Name of research unit	Cat.	Description of scientific unit	Key research programmes (directions)	Number of persons employed in scientific research or development
5.	Institute of Technology and Life Sciences	B	The Institute of Technology and Life Sciences was established in 2010, under the Minister's of Agriculture and Rural Development ordinance, by merging: Institute for Building, Mechanization and Electrification of Agriculture (established in 1948) with The Institute for Land Reclamation and Grassland Farming (established in 1953). Institute of Technology - Life Sciences conducts scientific research and development works and operational implementation, informing people, counselling, education, training, promotion in the field of natural sciences and technology. The Institute also carries out tasks of standardization, approval, control and verification, certification and homologation, together with maintaining accredited laboratories, certifying body and notified body. The Unit has doctoral studies, and the right to award academic degrees. It disseminates the results of its scientific activities through scientific conferences and has a vast number of publications.	The Institute carries out research mainly in the following areas: protection, use and environmental management and nature conservation, agro-ecosystems, water resources, sustainable grasslands and landscape and rural infrastructure; innovative, complex technologies in crop production, livestock and food processing, technical infrastructure in rural areas and obtaining energy from renewable sources; the safety of the implemented technology and the usage of machinery and equipment. The Institute coordinates the monitoring of the natural effects of Polish agri-environmental program.	135
Research in the field of livestock					
6.	Institute of Genetics and Animal Breeding of the Polish Academy of Sciences	A	The Institute's objective is to conduct research in animal sciences and related sciences. The Institute's tasks include, in particular, conducting research on: animal genetics, cytogenetics and immunogenetics and mapping of animal genome, embryology, biotechnology and embryo biotechnology, genetic and physiological bases for animal stress reactions, animal etiology, assessment of the effectiveness of different methods of selection and improvement of animals and optimization of animal rearing and utilization systems in terms of quality, as well as nutritional and technological value of animal products. It has doctoral and postgraduate studies, and the right to award academic degrees. Its scientific achievements are shared through numerous publications. The unit publishes academic journals (one in Polish, one in English).	The institute uses the results of basic research in programmes for livestock improvement and genotype determination, as well as their adaptation to the conditions and directions of use. The research carried out by the Institute is located under two priorities of the National Research Programme „Diseases of affluence, new medicines and regenerative medicine" and „Natural Environment, Agriculture and Forestry".	77
7.	University of Life Sciences in Poznan,	A	The Faculty of Animal Breeding and Biology at the University of Life Sciences in Poznan pursues research in animal genetics and breeding,	The Faculty pursues programmes related to: modern technique and technology of	106,5

Item	Name of research unit	Cat.	Description of scientific unit	Key research programmes (directions)	Number of persons employed in scientific research or development
	The Faculty of Animal Breeding and Biology		animal nutrition and animal feed science, animal physiology and endocrinology, reproductive biology of livestock animals, cytogenetics, angiology, animal ecology and ethology. The Faculty has received numerous awards and distinctions for its scientific activities. It carries our research within the framework of research projects. It undertakes national and international cooperation. It has doctoral and postgraduate studies, and the right to award academic degrees.	animal breeding and rearing, feed production and conservation, biology, breeding and reintroduction of endangered animal species, biology and biotechnology of animal reproduction, molecular and cytogenetic diagnostics, with particular reference to animal genetic diseases, population genetics, animal origin control, endocrinology and molecular and cellular neuroendocrinology, impact of exogenous and endogenous factors on the metabolism of animal organisms.	
8.	Wroclaw University of Environmental and Life Sciences, The Faculty of Biology and Animal Science	A	The Faculty of Biology and Animal Science of the Wroclaw University of Environmental and Life Sciences is an interdisciplinary unit. Its research is related to: bioengineering, the improvement of animals' breeding and usable value, as well as the welfare of cattle, poultry, swine, sheep and horses, the possibilities to control animals' immune system, health, animal product quality and minimisation of metabolite release to the environment through nutrition, the intensification of fisheries and beekeeping production in the Silesian macro-region – environmental, natural and economic considerations. It also deals with the issues of fauna taxonomy and environment. It conducts doctoral and postgraduate studies. It has the right to award scientific degrees.	Research programmes at the Faculty of Biology and Animal Science at the Wroclaw University of Environmental and Life Sciences cover many issues of modern animal husbandry, as well as human and animal biology, parasitology, anthropology, hydrobiology, palaeontology and ecology.	79,50
9.	National Research Institute of Animal Production – National Research Institute	A	The Institute operates in the direction of: genetics and livestock breeding, molecular genetics, cyto-and immunogenetics, physiology and biotechnology of animal reproduction, breeding and slaughter value of animals, animal physiology and nutrition, animal feed sciences, breeding technologies and animal welfare, ecology, quality of resources of animal origin, economics and organisation of animal production. The Institute participates in numerous scientific conferences. It has doctoral studies. It	The institute has focused its research tasks on comprehensive solution to the problem of animal production and breeding, production organisation and economics, quality of resources and products of animal origin.	122

Item	Name of research unit	Cat.	Description of scientific unit	Key research programmes (directions)	Number of persons employed in scientific research or development
			has the right to award the academic degree of doktor and doktor habilitowany and request to award the title of professor.		
Food research					
10.	Institute of Animal Reproduction and Food Research PAS	A+	The Institute carries out research in the areas of agriculture, veterinary, biological, chemical and medical sciences, which it disseminates using, among others, numerous publications or scientific conferences. It publishes two international journals. It has doctoral studies.	The unit carries out research in two areas key for agriculture – food and animal reproduction. The impact of environmental factors and food ingredients on the course of development processes of animals and humans are researched. Most of the research falls under priorities: „Diseases of affluence, new medicines and regenerative medicine" and „Natural Environment, Agriculture and Forestry" of the National Research Programme.	134,20

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?

Most information on national strategies, programmes and their legal frameworks are publicly available.

b. What are the main capacity or resources limitations?

There are no such constraints.

c. What are the main policy and institutional constraints?

There are no political and institutional constraints.

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

Currently, work is ongoing on the preparation of national legislation for the implementation of the Nagoya Protocol.

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?

There are no information and knowledge gaps.

b. What are the main capacity or resources limitations?

The flow of information between various stakeholders is too limited.

c. What are the main policy and institutional constraints?

There are no clear political and institutional constraints. State policy is directed at supporting institutions and other entities.

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

It is preferable to extend cooperation between stakeholders and improve the involvement of smaller entities of importance at the local level.

90. With respect to capacity development:

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

There are no information and knowledge gaps.

b. What are the main capacity or resources limitations?

There are no such constraints.

c. What are the main policy and institutional constraints?

Insufficient cooperation between institutions.

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

Contributing to the knowledge of the society in terms of sustainable use of biodiversity for food and agriculture by organising: trainings, seminars, exhibitions, promotions, theme events and publishing training and information materials.

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?

There are no information and knowledge gaps.

b. What are the main capacity or resources climitations?

The lack of sufficient resources for the purpose of gaining knowledge and learning.

c. What are the main policy and institutional constraints?

There are no clear political and institutional constraints in terms of acquiring knowledge and learning for the management and sustainable use of biological diversity for food and agriculture.

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

Intensifying efforts to acquire additional funds for the purpose of raising awareness, support for science and undertaking new research.

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 Targets34 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 Targets35 as well as to how they link to other related processes undertaken through the Convention on Biological Diversity.

Strengthening the conservation and management of associated biodiversity and wild foods

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

Farming and fishing in areas that constitute refuges for rare plant and animal species has a fundamental impact on the preservation of natural values. The decline of biodiversity in the world and global climate change are currently one of the most important problems of our civilization. The preservation of biodiversity will be an enormous challenge for the future CAP, influencing the directions of future changes. European Union's agricultural policy, both its first and second pillar should also make a significant contribution in preserving biological diversity in the future.

The following goal will be implemented under RDP 2014-2020: *Restoration, protection and enrichment of biological diversity, including the Nature 2000 areas and areas facing natural or other specific constraints, as well as high natural value agriculture, and the state of European landscapes*.

This specific objective will be implemented through supporting relevant systems of utilizing high natural value habitats, taking into account the processes and phenomena resulting from climate change (e.g. maintaining support for wetland habitats that are particularly sensitive to droughts) implemented in particular within the framework of enviromental packages (Package 4. and 5.) of the „Agri-environment-climate measure". This objective will also be implemented under the „Organic farming" and „Investments in forest area development and improvement of the viability of forests" measures. At the same time, bearing in mind that agricultural activity has a significant impact on the state of the environment, this objective will also by implemented through the promotion of activities fostering agricultural use of less-favoured areas (LFA). It is therefore necessary to maintain the agricultural use of less-favourable areas, which contribute to the conservation of biodiversity and landscape values of rural areas through extensive land use structure. The measure „Payments for areas facing natural or other specific constraints" will have a positive impact on biodiversity, landscape and climate.

Moreover, it is worth to mention that the National Centre for Research and Development has began the implementation of a strategic research and development programme *Natural environment, agriculture and forestry* – BIOSTRATEG[249] in 2014. The programme includes five strategic problem areas:

- food security and food safety;
- rational management of natural resources with a particular focus on water management;
- combating and adapting to climate change, with a particular focus on agriculture;
- protection of biodiversity;
- the sustainable development of the agricultural production area; forestry and wood industry.

The total estimated budget of the Programme, under which projects on research, development and implementation preparatory activities will be implemented in 2014-2019 amounts to approx. 500 million PLN (approx. 160 million USD).

Poland is committed to the conservation and sustainable use of biological diversity. Significant financial resources to directly or indirectly implement tasks related to the protection of biodiversity are allocated in the European funds for 2014-2020. Strategic documents, which relate to the conservation and sustainable use of biological diversity include:

[249] http://www.ncbir.pl/programy-strategiczne/srodowisko-naturalne-rolnictwo-i-lesnictwo---biostrateg/

- ✓ Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries 2012-2020[250]
- ✓ Operational Programme Infrastructure and Environment 2014-2020[251]
- ✓ Rural Development Programme 2014-2020[252]
- ✓ Operational Programme „Fisheries and the Sea" for 2014-2020[253]
- ✓ Operational Programme Intelligent Development 2014-2020[254]
- ✓ Operational Programme Education Knowledge Development for 2014-2020[255]
- ✓ Operational Programme Digital Poland for 2014-2020[256]
- ✓ Operational Programme Eastern Poland for 2014-2020[257]
- ✓ European Territorial Cooperation for 2014-2020[258]
- ✓ Operational Programme Technical Assistance for 2014-2020[259]
- ✓ Regional Operational Programmes 2014-2020[260]
- ✓ Programme for the conservation and sustainable use of biological diversity and the Action Plan for 2014-2020 – under consultation.[261]

In 2013, The National Strategy for Sustainable Use and Protection of Farm Animal Genetic Resources prepared by IZ-PIB has been published under the auspices of the Ministry of Agriculture and Rural Development as a tool implementing the Global Plan of Action for Animal Genetic Resources at the national level.

The overarching objective of the planned activities for the conservation and sustainable use of biological diversity for food and agriculture is strengthen the ties between agriculture, food production and forestry, augmented by research and implementation of innovative technologies in order to improve environment management and obtain better production results.

It seems necessary to strengthen rural development, including remote areas in particular, through investment in transport, telecommunications infrastructure and investment in education, culture, public services, local infrastructure, supporting entrepreneurship and competitiveness of the agro-food sector. Improving economic results of all farms and facilitating their restructuring and modernisation, particularly with a view to increase participation in the market and directing production at the market, as well as the diversification of of agricultural production. Sustainable production growth and improvements in the competitiveness of the agro-food sector are necessary in order to ensure food security and stimulate employment growth outside agriculture, as well as the development of entrepreneurship in rural areas. It is required to create conditions fostering the creation of non-agricultural jobs in rural areas and an increase in professional mobility between rural areas and cities. Improvement of agricultural producers' competitiveness may be realized by their better integration with the agri-

[250] http://bip.kprm.gov.pl/kpr/wykaz/r40,Strategia-zrownowazonego-rozwoju-wsi-rolnictwa-i-rybactwa.html
[251]https://www.mir.gov.pl/fundusze/Fundusze_Europejskie_2014_2020/Documents/POIS_2014_2020_08012014.pdf
[252] http://www.arimr.gov.pl/fileadmin/pliki/dokumenty/PROW2014-2020_wersja_skrocona.pdf
[253] http://www.lgropolszczyzna.pl/pobierz1/Projekt_Programu_Operacyjnego.pdf
[254]https://www.mir.gov.pl/fundusze/Fundusze_Europejskie_2014_2020/Documents/POIR_do_KE_10012014.pdf
[255]http://www.kiw-pokl.org.pl/index.php?option=com_k2&view=item&id=1402:projekt-programu-operacyjnego-wiedza-edukacja-rozw%C3%B3j-na-lata-2014-2020-po-wer-spotkania-konsultacyjne&Itemid=193&lang=pl
[256]https://www.mir.gov.pl/fundusze/Fundusze_Europejskie_2014_2020/Documents/POPC_4_0_8_01_14_ost_10012014.pdf
[257]https://www.mir.gov.pl/fundusze/Fundusze_Europejskie_2014_2020/Documents/POPW_po_RM_8_01_14.pdf
[258]http://www.funduszeeuropejskie.gov.pl/2014_2020/Strony/glowna.aspx?d=Europejska+Wsp%C3%B3%C5%82praca+Terytorialna
[259]https://www.mir.gov.pl/fundusze/Fundusze_Europejskie_2014_2020/Documents/POPT_2014-2020_ver_40_10012014.pdf
[260]https://rpo.slaskie.pl/zalaczniki/2014/04/11/1397213994.pdf;
http://dpr.pomorskie.eu/res/dpr/fundusze_2014_2020/rpo_wp_2014__projekt_270913.pdf
http://www.malopolskie.pl/Pliki/2014/v4_MRPO_final_1IV2014.pdf
[261] http://www.mos.gov.pl/g2/big/2014_05/ef8371fe47d9a9bb3be69f50e55019fd.pdf

food chain through guaranteed quality systems, adding value to agricultural products, promotion on local markets and short delivery cycles, groups and organisations of producers and interbranch organisations.

An equally important goal is the restoration, protection and enhancement of biological diversity in agricultural areas, including Natura 2000 sites and areas facing natural or other specific constraints and promoting agriculture fostering the preservation of high natural value agro-ecosystems, as well as the state of European landscapes.

a. improving food security and nutrition

The development of agriculture and related industries, including the agro-food sector stems from the need to ensure food security, which in Poland is understood as securing the demand for food, and food safety, which should ensure that the produced food meets quality requirement, contains no undesirable substances and is safe for the human body. The foundations of the concept of food security is the physical and economic availability of food, as well as its quality, health enhancing features and an optimal composition. Export opportunities for Polish food into European and global markets are an important factor in the development of agriculture and processing.

Polish food industry systematically reduces the distance to the most developed countries, and the Polish food producers successfully compete with reputable Western companies. To maintain such a high position in an increasingly globalised market is a major challenge for the whole of Polish agriculture, processing, food industry and other industries closely related to agricultural production and requires many changes and upgrades. In terms of food security, Poland follows the guidelines and standards of the EU, which has a very restrictive policy in this regard (it introduced very sharp standards for allowing food on the market).

b. improving livelihoods in rural areas

Activities aimed at stimulating economic growth and development will include raising the quality of the environment, which is the principle behind sustainable development and is associated with the concept of multi functionality of rural areas, including the creation of conditions for non-agricultural economic activity. In 2010, in rural areas only every twentieth farm drew income solely from agriculture. The reason for such situation may reside mainly in the declining income from agriculture, especially among small farms with poor-quality soil, situated in less-favoured areas. Therefore, the policy pursued by Poland concerning rural development[262] will in the coming years focus on:

- ✓ increasing the country's cohesion by aligning the differences between individual rural regions,
- ✓ improving the competitiveness of the agricultural sector,
- ✓ improving the state of the environment and the countryside,
- ✓ improving the quality of life in rural areas and encouraging diversification of the rural economy,
- ✓ financial support for small-scale entrepreneurship of great importance to the labour market in local communities,
- ✓ stimulating civil activity,
- ✓ improving the technical, sanitary, and social infrastructure, as well as the inefficiency of the energy system and inadequate sewage and water supply infrastructure, which do not provide proper adequate quality of life for residents of peripheral municipalities,
- ✓ greater promotion of agricultural insurance in connection with natural hazards, which in recent years in Poland take the form of natural disasters (floods, storms and tornadoes),
- ✓ improving the organisation of the agricultural markets through greater integration with the processing sector,
- ✓ improving alternative sales channels for local food produced on small farms (improving recognition) by supporting direct sales,
- ✓ improving the qualifications of rural population, giving the possibility of employment outside agriculture,
- ✓ improving the profitability of small farms by changing their direction into agriculture or non-agriculture,

[262] Hałasiewicz., A., 2013. Rozwój obszarów wiejskich w kontekście zróżnicowań przestrzennych w Polsce i budowania spójności terytorialnej kraju. http://www.mir.gov.pl/rozwoj_regionalny/Ewaluacja_i_analizy/Raporty_o_rozwoju/raporty_krajowe/Documents/Ekspertyza_Rozwoj_%20obszarow_wiejskich_09082011.pdf

- ✓ creating employment opportunities outside of agriculture, without changing the place of residence.

c. improving productivity

Productivity can be improved by:[263]

- ✓ an in-depth analysis of the dynamics of the relative productivity of resources involved in agriculture,
- ✓ increase in the size of agricultural holdings and their specialization, which allows to use the effects of large-scale activity,
- ✓ the creation of producer groups, as a way to increase profitability of small farms,
- ✓ development of organic farms, which allow to obtain higher quality of end products and thus – higher prices,
- ✓ implementation of innovative maintenance systems, with particular attention paid to the improvement of animal welfare,
- ✓ agricultural consultancy when changing the farms' sector of operation.

d. supporting the functioning of the ecosystem and the provision of ecosystem services;

By 2020, ecosystems and their services will be preserved and enhanced through the establishment of green infrastructure and reconstruction of at least 15% of degraded ecosystems[264]. Poland is committed to:

- ✓ identify and assess the state of ecosystems and their services on its territory,
- ✓ assess the economic value of these services and support the inclusion of their value to accounting and reporting systems at EU and national level by 2020,
- ✓ develop strategic frameworks for establishing priorities for the restoration of ecosystems at the regional, national and EU level,
- ✓ ensure zero net loss of biodiversity and ecosystem services, through the development of an impact assessment method for EU-funded projects, plans and programmes in the field of biodiversity. Work will be carried out in order to propose an initiative aimed at ensuring zero net loss of ecosystems and their services (e.g. through compensation systems) by 2015.

e. improve the sustainability and resilience of production systems;

In Poland, special attention is paid to improving the sustainability and resilience of production systems by[265]:

- ✓ supporting initiatives to ensure a zero net loss of ecosystems and their services (e.g. through compensation systems),
- ✓ contributing more financial resources for research on environmental management, rational use of natural resources and increasing food production,
- ✓ preventing and adapting to climate change, with a particular focus on agriculture, which increases climate change through greenhouse gases (8.8% of global greenhouse gas emissions in Poland), mainly methane (CH4) and nitrous oxide (N2O),
- ✓ researching the impact of various factors on the population of pollinating insects and improving their monitoring,

f. supporting sustainable intensification

Both the intensification of agricultural production and its excessive extensification (including the complete abandonment of agricultural practices) lead to the marginalisation of habitats. A number of plant communities, including wetlands and farmland bird species are endangered in Poland due to the manner of management, e.g. due to the drying of habitats, cessation of use, as well as intensification i.e. fertilization and excessive grazing

[263] Czyżewski, B., 2012. Produktywność zasobów w rolnictwie w Polsce wobec paradygmatu zrównoważonego rozwoju. Studia ekonomiczne, Economic studies no. 2 (LXXIII) 2012.
[264] Unijna strategia ochrony różnorodności biologicznej na okres do 2020 r. grudzień 2011. http://ec.europa.eu/environment/pubs/pdf/factsheets/biodiversity_2020/2020%20Biodiversity%20Factsheet_PL.pdf
[265] The EU's biodiversity strategy for the period up to 2020 . December, 2011. http://ec.europa.eu/environment/pubs/pdf/factsheets/biodiversity_2020/2020%20Biodiversity%20Factsheet_PL.pdf

causing mechanical destruction of the plant cover. This is also a result of inadequate environmental awareness among farmers, among others, in terms of adaptation to climate change, especially in the context of managing waters and soil protection. In addition, the status and condition of some natural habitats and plant and animal populations associated with agriculture-dependent ecosystems are not sufficiently inventoried. In particular, this applies to habitats outside the areas covered by various forms of nature protection. The weak side of the Natura 2000 network is the small progress in the preparation of plans of conservation tasks (PZO) and protection plans (PO). Therefore, the main priorities[266] include:

- ✓ support for balancing methods of agricultural production on the road of extensification,
- ✓ the promotion of precision farming based on a comprehensive set of solutions, in order to monitor,
- ✓ sustainable use of agricultural wastes for the production of bioenergy,
- ✓ support for organic farming, which will contribute to the protection of the environment, animal welfare, and sustainable development of rural areas,
- ✓ countering the total cessation of agricultural management in areas with adverse natural conditions
- ✓ the development of methods to protect the reproductive potential of endangered species and breeds of livestock,
  using the newest advancement in biotechnique and biotechnology,
- ✓ the development of modern methods of storage, monitoring and valuation of materials in gene banks, basing on cryobiology, biotechnology and bioinformatics.

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 achievement of target 1 of the EU's Biodiversity Conservation Strategy for 2020 will be a very large and major challenge in the coming years, which involves stopping the deterioration of species and habitats. The strategy assumes that by 2020, a significant and measurable improvement in their condition will have been reached, so as to achieve an increase of 100% in the number of habitat assessments, carried out under the Habitats Directive, showing improvement in the conservation status, as well as an increase of 50% in the number of species assessments carried out under the Birds Directive and showing a safe or better state of conservation for species covered by this directive.

In accordance with the provisions of the Programme for the protection and sustainable use of biological diversity and the Action plan for 2014-2020, the priorities in future measures will include further improvement and use of knowledge about the state of our fauna and flora by collecting results from field observations on the translocation of species in computer databases. The monitoring of plant communities and species in national parks and forests, along with individual monitoring (e.g. bison, wolf, lynx or bat shelters) will still be carried out.

[266] Strategic Environmental Assessment of the draft Rural Development Programme for 2014-2020. Pulawy 2014, https://www.minrol.gov.pl/pol/content/download/45684/251526/file/Prognoza%20oddzia%C5%82ywania%20na%20%C5%9Brodowisko%20PROW%202014-2020_v_1.pdf

Protection projects (including restoration) will be developed for selected species. The implementation of the commitments outlined in the Habitats Directive is of great importance in order to improve the knowledge on many species and habitats, including monitoring and the determination, every 6 years, of the state of protection for species and habitats considered threatened (in the case of natural habitats – also those that have been considered representative for highlighted biogeographical regions).

In 2006, the „Red list of plants and fungi in Poland" has been created, which contains 506 species of vascular plants that are endangered to a greater or lesser extent, extinct, or missing, which comprises 21% of the native flora in this group. The number of dying out – critically endangered vascular plant species is 144. The number of endangered vertebrate species is 130, including critically endangered – 22. Therefore, further actions will be aimed at monitoring and protecting endangered species.

Further priorities have been designated in the *National Strategy for the sustainable use and protection of farm animal genetic resources* developed by the National Research Institute of Animal Production – National Research Institute in 2013, with the participation of a wide range of experts. In light of the question, the most important should include: priority 11 „Monitoring of trends and risks relating to animal genetic resources and the development of an early warning system". This priority will be implemented taking into account threat countering mechanisms in protection programmes, and taking action for the establishment of an information exchange system about herds covered by the protection programme, especially about their health status. In addition,
in accordance with the provisions of the Strategy, central electronic databases for individual livestock species will be created and developed, and a monitoring programme will be run on the breed structure of individual livestock species, aimed at keeping regular quantitative and qualitative observations on the breed structure and their locations.

Until now, only the Central European honeybee *Apis mellifera mellifera* of the Kampinos, Augustow, Polnocna and Asta lines, as well as the Carniolan *Apis mellifera carnica* of the Dobra line are covered by programmes for livestock genetic resources protection. There is no information about the planned inclusion of other wild species belonging to associated biodiversity into the programmes. The Bumble bee protection programme should be one again included in the planned activities. It was conducted in Central Poland as part of the Small Grants Programme of the UN Global Environment Facility and the EcoFund Foundation.

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

Improving stakeholder involvement and awareness

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

There is a need to put more emphasis in the activities of the Member States and various organisations working in the area of biodiversity to protect pollinators. Currently there are no accurate, global data about the population and diversity of pollinating insects. Local and regional demand for ecosystem services, which is provided by pollinating insects is increasing faster that the supply, therefore in the future we can expect limitations in the capabilities of plant pollination. This is because the amount of high-quality pollination-dependent crops is increasing faster than the number of bee families maintained by man, while simultaneously the number and diversity of wild pollinators populations is declining. The study „Review of the factors threatening pollinating insects and agriculture in Europe. Greenpeace Research Laboratory Technical Report 01/2013" identifies the following priorities for the protection of pollinators' populations[267]:

- the adoption of national plans for the protection of pollinators and, consequently, the support and promotion of agricultural practices beneficial for the process of pollination in agricultural systems;
- an increase in protection of natural and semi-natural habitats around agricultural areas, as well as the strengthening of biodiversity of agricultural fields;

[267] http://www.greenpeace.org/poland/PageFiles/269578/Spadek_Populacji_Pszczol_RAPORT.pdf

- increasing the funding for research, development and ecological agricultural practices;
- recognition of the role of livestock as important elements of the ecosystem in farms on grasslands.

Effective protection of biodiversity is still very challenging: this applies in particular to the modern approach to its protection, which is to take into account the value of ecosystem services in decision-making and mainstreaming biodiversity in other economic sectors. It is advisable to focus further on the following problem areas:

- clarification of the the mechanisms of links between species, habitats, state of the environment and their potential for the provision of ecosystem services;
- shaping public awareness on the importance of biodiversity in economic terms, including its impact on public well-being;
- development and implementation of mechanisms for resource valuation of biodiversity and ecosystem services, so that they become an integral part of the valuation of prosperity and national statistics, as well as specific considerations in current economic decisions;
- improvement of spatial planning tools and a system of environmental impact assessment in terms of not only the issues of biodiversity, but wider protection of the environment and sustainable development;
- the inclusion of valuable objects and natural areas under protection, while preserving (restoring) the patency of ecological corridors;
- ecosystem services enhanced by incorporating ethical issues not only in terms of nature protection, but above all shaping the desired sustainable consumption patterns.

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.

All organizations and bodies for the protection of biodiversity for food and agriculture, including the protection of genetic resources used in agriculture and biodiversity associated with agricultural areas need effective communication tools for their operation at regional, national and local levels. It seems necessary to raise the level of knowledge and shape the attitudes of the society associated with the inclusion into actions for the benefit of biodiversity by:

- the development of scientific research aimed at improving the state of knowledge on biodiversity for food and agriculture;
- integration and increasing the availability of knowledge about biological diversity;
- increasing public awareness on biodiversity and its importance for economic and social development.

It is necessary to incorporate selected sectors of the economy in activities for biodiversity by:

- sustainable management of agriculture, particularly genetic resources of livestock and crops;
- the strengthening of planning tools in the efforts to protect biodiversity.

In Poland an agricultural advisory system is operating. It is a mixed system in which public and private entities operate in parallel. It is comprised of institutions providing counselling services to farmers i.e. 16 Voivodeship agricultural advisory centres (ODRs), under the management of respective Voivodeship Executive Boards, advisory entities accredited by the Minister of Agriculture and Rural Development, agricultural chambers of commerce. At the national level – the institution responsible for training the counselling staff, as well as developing and supporting the aforementioned institutions is the Agricultural Advisory Centre (CDR), subject to the Minister of Agriculture and Rural Development. The agricultural advisory system is universal, voluntary and easily accessible to farmers. Farmers can also apply for assistance and consultation to scientific institutions and professional institutes. Numerous non-governmental organisations also play a significant role in the field of conservation and sustainable use of biodiversity.

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. The responses should include information on the recognition and strengthening of the role of indigenous peoples. Provide a description of the main challenges to be met.

In Poland, no native or indigenous populations have been preserved. In the case of our country, one can only mention activities for the activation of local communities.

Support for the creation of new jobs in rural areas will be the largest challenge for the EU agricultural policy and cohesion policy, as well as the national economic and agricultural policy in the coming years. In Poland, there is a need for the proper utilization of cultural, environmental and tourism potentials of rural areas, with the full involvement of the local community, which will serve to accelerate local economic development and, above all, an increase the share of the inhabitants' income from non-agricultural activities. Strong social ties in local communities and their activation should be used to plan and undertake joint measures and develop the citizens' entrepreneurship.

In areas with potential for tourism development, it is necessary to support the restoration of villages in order to ensure the efficient use of existing opportunities. Due to the risk of poverty among the inhabitants of rural areas, there is a need to take action at the local level to stimulate creative attitudes and allowing to both participate in joint undertakings, as well as in the implementation of stand-alone projects. The implementation and the strengthening of local initiatives is fostered by the Leader programme, implemented as one of the RDP measures[268] (both in the years 2004-2006 and 2007-2013, and planned for subsequent years). The Leader programme aims to entrust local action groups (LAGs) with the development and direct implementation of local development strategies (LDSs). The Leader programme allows to enhance self-governments, formulate the needs and development goals by reference to local conditions and entrust organisations of non-governmental nature with the implementation of prepared strategies.

As part of measure 413 „Implementation of local development strategies" of the Leader programme, projects are implemented, corresponding to the criteria of granting aid under measure: „Village renewal and development", „Diversification into non-agricultural activities" and „Formation and development of micro-enterprises".

In addition, the so-called small projects are carried out, i.e. projects beyond the scope of the aforementioned measures, but in accordance with the main purpose of RDP's axis III, which is to improve life in rural areas and diversify the rural economy. Local action groups, both newly created, as well as those acting in earlier years, have developed local development strategies for their respective areas of operation.

As there are no indigenous communities in Poland, there is no need to identify planned activities and future priorities in the scope covered by the question. It seems that one can put more emphasis on strengthening local communities by:

- the establishment of advisory services for non-governmental organisations in order to utilize the potential of the inhabitants and help in the activation of local communities;
- supporting Local Action Groups (LAGs) through increased emphasis on the selection of such local development strategies (LDSs), which also serve the protection of biological diversity of the area and promoting sustainable use of its components;
- supporting the development of rural and nature tourism in rural areas – promoting nature as the flywheel in the development of local communities;
- supporting various forms of regional food production, conducted by local communities;
- supporting local initiatives aimed at preserving agricultural traditions and the region's culture.

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.

[268] https://www.minrol.gov.pl/pol/content/download/28455/.../Os_IV.pdf

This question does not apply to conditions found in Poland. Poland, as a member of the European Union, pursues a policy of equal treatment for men and women. Women are involved in all spheres of life/economy. Therefore, there is no need for special recognition of the role of women in the conservation and use of the various components of biodiversity for food and agriculture.

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