

Report

from Norsk genressurscenter, Skog og landskap

05/2015



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Norwegian Genetic  
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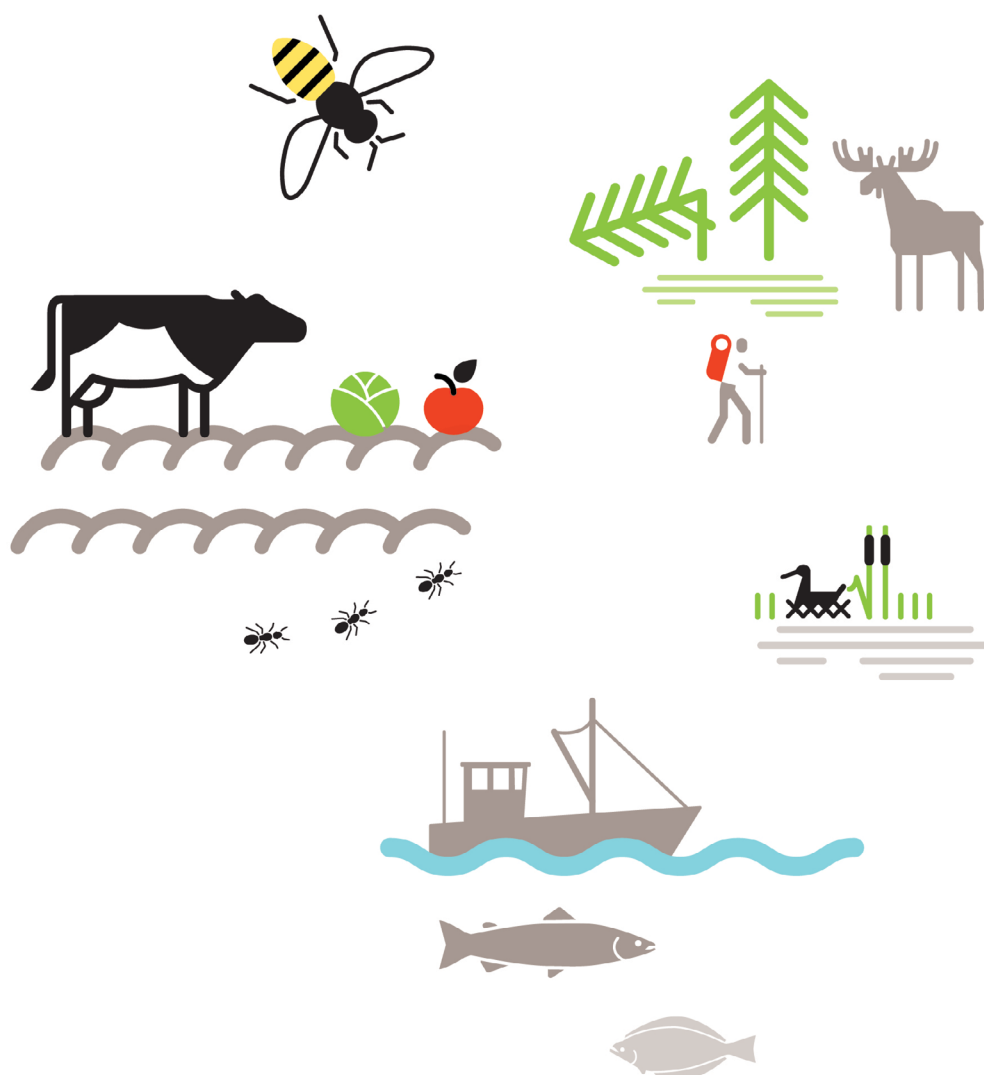
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# NORWAY'S COUNTRY REPORT ON THE STATE OF BIODIVERSITY FOR FOOD AND AGRICULTURE

Executive summary

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Kim-Anh Tempelman and Nina H. Sæther



Report from  
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## FOREWORD

Biodiversity underpins food security, ecosystem resilience, coping strategies for climate change, adequate nutritional requirements and the management of biological processes needed for sustainable agricultural production. To achieve sustainable food production and ensure environmental sustainability, agricultural, forest and marine production systems need to focus more on the effective conservation and management of biodiversity and ecosystem services. This requires a comprehensive understanding and enhanced use of the role of biodiversity, genetic resources and their ecosystem functions. Norway's country report on the state of biological diversity for food and agriculture addresses these issues, and by doing so, also contributes to the preparation of FAO's report on the state of the World's Biodiversity for Food and Agriculture.

**Nøkkelord:** FAO, biologisk mangfold, mat, landbruk, genressursser, økosystemtjenester, økosystembasert forvaltning, vill mat

**Key words:** FAO, biodiversity, food, agriculture, genetic resources, associated biodiversity, ecosystem services, ecosystem approach, wild food

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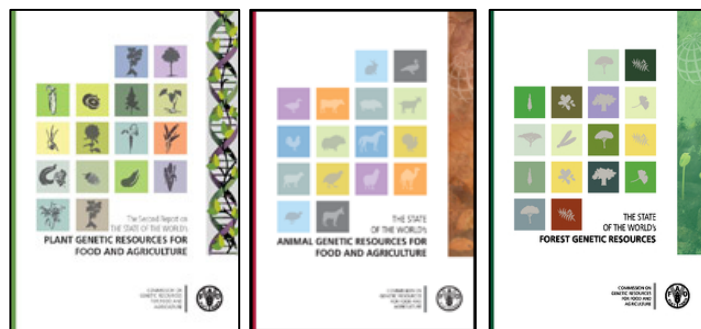
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# 1 BACKGROUND

In 2007, the Food and Agriculture Organization of the United Nations (FAO) initiated the preparation of the first ever global report on the state of the world's biodiversity for food and agriculture which should be ready by early 2017. This report will be based on information provided by countries and will also draw on thematic studies and on reports from relevant international organizations and centres of excellence.

The State of the World's Biodiversity for Food and Agriculture follows a series of sectoral global reports that have been undertaken by FAO since 1995. To date, FAO published assessments of the status and trends of plant (1995, 2008), animal (2002, 2014) and forest genetic resources (2012). A global report on aquatic genetic resources is currently under preparation. This report will be presented simultaneously with the global report on biodiversity for food and agriculture.



Global assessment reports on plant, animal and forest genetic resources

Norway has been heavily involved and continues to contribute to the preparation of reports like these by providing FAO with relevant national data and taking active part in the different review processes.

As a contribution to *The State of the World's Biodiversity for Food and Agriculture* Norway prepared a national report using the electronic questionnaire provided by FAO. This document is the country's first attempt to put together in a consistent way some - certainly not all – information on the status and trends of animals, plants and micro-organisms with a direct or indirect role in agriculture, forestry and/or fisheries.

Among others, the report draws attention to the use and conservation of the various components of biodiversity for food and agriculture and it recognizes their (potential) contribution to food and forestry systems. Particularly in areas for which there seems to be little or no empirical evidence (e.g. the functions of species in ecosystems of relevance to food and agriculture) the report's findings may be preliminary and incomplete.

## 2 STATUS, TRENDS AND DRIVERS OF CHANGE

### 2.1. Animal, plant and forest genetic resources

Overall, the status, trends and pressures are well documented with regard to Norway's animal, plant and forest genetic resources. Norway's commercial agricultural and forest production, as well as its breeding programmes, are based on a limited number of species, varieties and breeds. However, in contrast to most other parts of the world, most of the breeding companies are still Norwegian. Among others, Norwegian breeding programmes are known for the sustainable management of genetic variation within livestock breeds and forest tree species. With respect to plant breeding programmes there is extensive cooperation between the Nordic countries to meet the long-term needs of the region's agricultural and horticultural industries. More detailed information on animal, plant and forest genetic resources is presented in Norway's sectoral country reports on plant, animal and forest genetic resources.<sup>1</sup>

### 2.2. Associated biodiversity

The Norwegian Biodiversity Information Centre (Artsdatabanken) plays a crucial role in the assessment of the status and trends of and pressures on different species of associated biodiversity in the agricultural landscape, forests and marine environments. Since 2005, Artsdatabanken has worked on a series of periodically revised assessments that provide important tools for decision makers, such as the Norwegian Red List of Species<sup>2</sup>, the Red List for Ecosystems and Habitat types, and the risk assessment on alien and invasive species in Norway. The latter includes a "black list" of alien species that (could) pose a threat to biodiversity, including to biodiversity for food and agriculture.



Some of Artsdatabanken's key publications

Artsdatabanken's work has significantly contributed to increase the knowledge of the many "inhabitants" in the different ecosystems and habitats across Norway, including those of relevance to food and forestry production. In livestock grassland-based systems, changing livestock keeping practices over the past decades, involving less outfield grazing, have led to the disappearance of many open landscape dependent grass, wild plant and other associated biodiversity species.

In 2010, Artsdatabanken estimated that approximately 20% of the red-listed species occur in cultivated landscapes.

<sup>1</sup> [http://www.skogoglandskap.no/temaer/globalt\\_samarbeid](http://www.skogoglandskap.no/temaer/globalt_samarbeid)

<sup>2</sup> A revised and updated version of the Norwegian Red List for Species is expected to be published at the end of 2015.



Photographs taken on the same spot in Vanngrøftdalen in Os municipality (Hedmark) in 1970 and 2012 showing vegetation regrowth over a few decades as a result of changing land management practices (i.e. abandonment of outfield grazing).

With respect to forest-related biodiversity, while half of the threatened and near threatened red-listed species in Norway occur in forests, there is no indication that the status of these species has deteriorated between 2006 and 2010.

As to the state of vertebrates in capture fisheries, several sea birds show a severe negative trend, whereas most fish species seem in good or even excellent state.

Regarding micro-organisms, still little is known on how their status has evolved in the different production systems over the past ten years.

### 2.3. Ecosystem services

The importance and value of ecosystem services with respect to food and forestry production is widely acknowledged among the relevant stakeholder groups, as is the need to monitor their status and trends. To date, however, hardly any of the regulating or supporting ecosystem services (e.g. pollination, soil formation, etc.) essential to the country's production systems have systematically been studied or monitored. Neither have there been any regular assessments of species in relation to their functions in relevant ecosystem processes. In the opinion of an expert commission that reported on the value of ecosystem services in Norway<sup>3</sup>, the state of ecosystems in the country is relatively good, despite the commission's

<sup>3</sup> NOU (Official Norwegian Reports), 2013:10. Naturens goder-om verdier av økosystemtjenester, Ministry of Climate and Environment.



findings that the country's biological diversity and ecosystems are under a series of pressures (e.g. land use change, climate change, ocean acidification and invasive species).



Photo: Sebastian Eiter / Norwegian Forest and Landscape Institute

Topsoils are characterized by high microbial activity and diversity

#### **2.4. Wild foods**

A lot of data is available on the status and trends of an extensive number of wild food species. Many of these species tend to be monitored on a regular basis by different institutes, such as, for example, the Norwegian Institute for Nature Research, with its National monitoring programme for wild cervids, and the Institute of Marine Research, that is responsible for managing data on Norway's marine environment and fish. Generally speaking, the status of the country's wild food species has remained relatively stable over the past years and there is no evidence of a significant threat of extinction or of the loss of any important wild food species.

### **3. THE STATE OF USE OF BIODIVERSITY FOR FOOD AND AGRICULTURE**

The use of biodiversity for food and agriculture varies among sectors and production systems. For those where the application of an ecosystem approach is general practice (e.g. forestry and marine fisheries), several components of biodiversity, including those with an indirect role in the relevant production system - also referred to as associated biodiversity - tend to be given consideration. However, the focus with respect to associated biodiversity is on conservation rather than on use.

Several management practices favor the integrated use of different components of biodiversity in agricultural production, like for example organic farming (more than 5% of

Norway's total arable land is organically farmed) and integrated pest management (an estimated 30% of Norwegian growers followed the IPM principles in 2008).

Norway is conscious of the intrinsic value of biodiversity to food production and forestry and uses it quite optimally, particularly in terms of the country's animal, aquatic, forest and plant genetic resources. Between 1970 and 2005, the country's self-sufficiency rate in food remained stable at around 50%. During that period, Norway was for example more than 100% self-sufficient in dairy products and about 80% in potatoes using the native Norwegian Red dairy cattle and locally developed potato varieties (Norwegian Agricultural Economics Research Institute 2007). It should however be noted that the use of old traditional plant varieties and endangered native livestock breeds is still relatively low. Their potential contribution to the delivery of ecosystem services (e.g. management of low alpine cultural landscapes through livestock grazing) and to food security could thereby be exploited more optimally.

While very few components of associated biodiversity for food and agriculture are actively being used in Norway's main production systems, many wild food species are. Wild food species that are hunted, fished, harvested or picked, including wild animals, such as different types of deer, birds and fish and a broad variety of berries, edible fungi and wild fruit trees, are usually of marginal importance to the population's food supply and nutrition. However, this being said, both the non-herding and reindeer-herding Sámi, especially those who speak the traditional languages, tend to retain a traditional life style, still using wild foods like for example fresh water fish and wild berries in their daily diet (Nilsson et al., 2011).



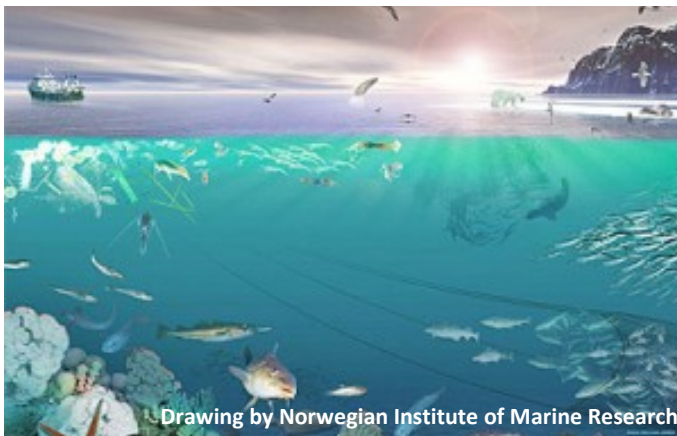
The Cloudberry (molter) also nicknamed "highland gold" (viddas gull)

## 4. STATE OF INTERVENTIONS ON CONSERVATION AND USE OF BIODIVERSITY FOR FOOD AND AGRICULTURE

With the 2009 Nature Diversity Act, Norway entered into a new era of biodiversity management. This Act aims to protect biological diversity and ecological processes through their conservation and sustainable use across all sectors. It also includes provisions on alien species and on access to (most) terrestrial components of biodiversity, including genetic resources for food and agriculture.

Norway has many national policies, programmes and enabling frameworks that support or influence the conservation and sustainable use of biodiversity for food and agriculture, one of the most effective being the Regional Environment Programme (RMP). In the RMP the priorities are set by the Agricultural Agreement (Jordbruksavtalen), like for example with respect to the species and habitats to conserve, while the decisions on the work programme are taken at county level. The RMP has particularly been successful with respect to the conservation of biodiverse meadows and grassland and to maintain associated biodiversity species, such as for example salamanders.

The wide adoption of ecosystem approaches in forestry and fisheries promotes sustainable production while also taking into account the environmental conditions. Tools such as the Forest Certification scheme (PEFC), whereby forest properties and forest products can be awarded with a sustainable forest management certification, significantly contribute to the conservation and sustainable use of biodiversity for food and agriculture.



Drawing extracted from the Joint Norwegian-Russian environmental status 2008 - Report on the Barents Sea Ecosystem

A large number of Norwegian organizations, institutes, associations, private companies and other groups are involved in the country's efforts to conserve biodiversity for food and agriculture on- farm and through in situ and ex situ conservation activities. Some of these actors collaborate on activities of mutual interest by: i) sharing information from their respective recording and monitoring systems to report on the status and distribution of species, breeds and varieties; ii) undertaking promotion and awareness raising initiatives; and iii) engaging into joint research projects.

Artsdatabanken's Species Map Service, for example, retrieves most information from the Species Observation System, a database that contains digital information from more than 30 Norwegian and foreign data providers working in different sectors on the presence of species in Norway. Data providers include Bioforsk, the Institute of Marine Research, the Norwegian Association of Fungi and Useful Plants, the Norwegian entomological society, the Norwegian Forest and Landscape Institute, the Norwegian Institute for Nature Research (NINA) and the Norwegian Institute for Water Research (NIVA).

Norway's educational system also puts a lot of attention on the conservation, and to a lesser extent on the sustainable use, of associated biodiversity, ranging from school projects focusing on the role of earthworms to higher education programmes on microbiology, sustainable breeding of animal and forest genetic resources and on the importance of the diversity of marine organisms in fisheries.

Finally, Norway is involved in the implementation of numerous regional and international initiatives targeting the conservation and sustainable use of biodiversity for food and agriculture. Many of these initiatives also undertake activities with respect to components of associated biodiversity. Among others, Norway is a Member country of the FAO Commission on Genetic Resources for Food and Agriculture, of the International Treaty on Plant Genetic Resources for Food and Agriculture and of the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES); and a contracting party both to the Convention on Biological Diversity and the OSPAR Convention.

## **5. FUTURE AGENDA'S**

### **5.1. Drawing up a national biodiversity action plan**

The Government is in the process of drawing up an action plan to halt the loss of biodiversity and to implement relevant national environmental goals and targets, including those that are of relevance to agriculture, forestry and fisheries. Most of these goals and targets are linked to the Strategic Plan for Biodiversity 2011-2020 (including the Aichi Biodiversity Targets) that provides the overarching framework on biodiversity for the entire United Nations system.

In the preparation of Norway's national biodiversity action plan, some of the provisions of the Nature Diversity Act are expected to be revised, including those with respect to the conservation and sustainable use of genetic resources for food and agriculture. Stakeholders with a role in food and agriculture, such as farmer unions, breeding associations, agricultural and forestry companies, research institutes and universities should also be involved in the development of the biodiversity action plan. Their involvement will strengthen the action plan's programme of work on issues relevant to the conservation and sustainable use of biodiversity for food and agriculture and enhance their commitment to implement the plan.

### **5.2. Increasing the production and consumption of organic food**

The Norwegian government is committed to increase the production and consumption of organic food to 15% by 2020 (White paper Nr.9 (2011-2012)). To reach this target, incentives, including in the form of subsidies will continue to be allocated to enhance both the number of organic farmers and the area under organic cultivation.

### **5.3. Bringing national laws and regulations in line with international commitments**

On 1 October 2013, Norway ratified the Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization to the Convention on Biological Diversity, which entered into force on 12 October 2014. Work to bring national legislation relevant to access and benefit-sharing of genetic resources, as laid out in the Nature Diversity Act, in line with the Nagoya Protocol is expected to be finalized in 2015.

Overall, efforts to raise public awareness on the importance of biodiversity for food and agriculture to food security and nutrition will be continued.

## 6. CONCLUSIONS AND RECOMMENDATIONS

### 6.1. Norway's national biodiversity action plan

In Norway there is high degree of awareness on the need to manage biodiversity in a sustainable manner. However, the coordination of work in this area between the different authorities and sectors is still quite a challenge with each sector addressing biodiversity related issues, including in relation to food and agriculture, quite differently in their sustainability strategies. Better collaboration between sectors on, for example, monitoring and documenting systems, would contribute to a broader involvement and a more coherent approach in the sustainable management of biodiversity for food and agriculture.

The preparation of Norway's national biodiversity action plan provides an excellent opportunity for stakeholders from different sectors to agree on and be jointly committed to the conservation and sustainable use of biodiversity in Norway.

### 6.2. Knowledge gaps and research needs

Strengthening the sustainable management of biodiversity for food and agriculture will require research and extensive monitoring, capacity building and awareness raising activities for which political commitment and additional resources are needed.

Particularly with respect to the functions and ecological roles of associated biodiversity and to the delivery of ecosystem services in production systems, there are significant research and knowledge gaps. Among others, monitoring activities of ecosystems, populations and species of relevance to food and agriculture, as well as data on the linkages between them, need to be strengthened.

At present, in view of the poor state of knowledge on associated biodiversity and ecosystem services, it's a difficult task to make any specific recommendations. However, a possible starting point could be to expand monitoring/surveying/mapping activities at the national, regional (counties) and local levels by including new groups of associated biodiversity species. In the selection of these species, priority could be given to functional groups<sup>4</sup> that are, for example, key to food production (e.g. a set of pollinating species or of soil fertility promoting micro-organisms). Where functional groups have similar ecological roles, those with a single or only a few species could be prioritized for future research activities, these groups being potentially more vulnerable to changes.

### 6.3. Using and conserving "local" biodiversity for food and agriculture

For decades, Norway's self-sufficiency rate in food has remained stable at around 50%. Most of the domestically produced and consumed food is based on local plant varieties and livestock breeds, poultry related products being among the few exceptions. Old traditional plant varieties and endangered native livestock breeds are however still underutilized. With countries increasingly depending on each other to meet domestic food demand and in light of changing climatic conditions, enhancing the use of these diversity rich and adapted varieties and breeds could contribute to strengthen Norway's food security strategy.

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<sup>4</sup> set of species co-existing in a given community with similar functional characteristics related to an ecosystem service