Ministry of Agriculture and Food
Environmental Strategy
2008 - 2015

CONTENTS

PREFACE

We are living in a world that is facing tremendous challenges. Whereas food used to be unequally divided, we are now experiencing an even more serious situation; there is no longer enough food to divide. At the same time, we face a number of considerable environmental challenges. The food security crisis and environmental problems are interconnected and reinforce each other. A healthy planet is the basis for safe food production, while famine prevention is essential if the world is to overcome the environmental crisis. Therefore, environmental policies must be a part of agricultural and food policies, and agricultural and food policies must be a part of environmental policies.

Norway has a responsibility with regard to strengthening domestic food production, and we must utilise the natural resources we have at our disposal. We must therefore protect the soil resources, food production, forests and the other resources we have been endowed with. In other words: conservation through use. The management of these fantastic resources must be sustainable if they are to be preserved for coming generations. Environmental considerations and long-term resource management are thus an integrated part of agricultural and food policies. All parts of the food value chain are individually responsible for taking the environment into consideration. This implies maintaining focus on the environment from the food's production on the farm, via processing, wholesale and transport to the food retail sector, where products reach the consumers.

Our efforts aimed at the sustainable use of resources in agriculture are already considerable. Our assets include good animal and plant health, stringent regulations for pesticide use and regulations for sustainability in forestry. I am proud of these efforts, and they will be further developed. However, there are still challenges to be met. Climate change adds an additional dimension to many of our current challenges. For these reasons, I would like to continue and further strengthen the environmental efforts in agriculture.

Agriculture is part of the climate solution. Carbon sequestration in forests and soils, bioenergy production and the use of environmentally friendly wood products are important measures for reducing greenhouse gas emissions. However, the agricultural sector itself can also take action to reduce emissions. All sectors have to take their share of the responsibility for mitigating climate change. In 2009 I will therefore present a Report to the Storting on agriculture and climate change.

For quite some time, agriculture has taken its environmental responsibility seriously. The good work must continue! The Environmental Strategy describes the environmental challenges faced by the sector and its contributions until 2015. Determination and cooperation give results. In this Environmental Strategy, the Ministry of Agriculture and Foods outlines how we will achieve these goals.

Keep up the good work!

Lars Peder Brekk
Minister of Agriculture and Food
16 October 2008

1. INTRODUCTION

1.1 Background for environmental policies in the agrifood sector

Agriculture, forestry and reindeer husbandry are natural resource-based industries. In addition to objectives linked to aspects of business and regional development and human settlement, agricultural and food policies thus also include important environmental goals related to such issues as biodiversity, climate change, water quality and toxic substances.

The government presents its environmental work every other year. The last time was in the parliamentary white paper Report No. 26 to the Storting[1] (2006 – 2007) *The Government's Environmental Policy and the State of the Environment in Norway* (the so-called "RM White Paper"). The government's climate policies presented in the Report No. 34 to the Storting (2006 -2007) *Norwegian Climate Policy* and the political agreement on climate policy reached in the Storting (*klimaforliket*) provide the framework for following up climate change mitigation measures.

To systemise and strengthen environmental efforts, a strategy and action plan for the environmental challenges facing the agrifood sector is presented. The environmental strategy of the Ministry of Agriculture and Food shall contribute to achieving the national goals. The strategy is therefore structured according to the key priority areas of the RM White Paper. These are the areas on which the ministries' annual environmental reports in connection with the budget process are based:

- Protection of biodiversity and outdoor recreation
- Protection and use of cultural monuments
- Clean waters and a non-toxic environment
- A stable climate and clean air

Norway has signed several international environmental agreements which provide the scope for following up national environmental challenges. One such major challenge is the goal of stopping the loss of biodiversity by 2010. The management of natural resources in agriculture is an important part of this work.

The environmental focus must be based on a long-term perspective, and thus the Environmental Strategy is valid until 2015. Changing framework conditions will make revisions necessary in the period. The Ministry of Agriculture and Food will follow up the strategy's ambitions in the annual parliamentary propositions, which are linked to the state budget and other processes in the work for a better environment.

The Ministry has also prepared strategic documents in research and business development, as well as a food policy strategy, which are discussed in the Environmental Strategy. The *Strategy for Research and Research-based Innovation 2007 – 2012* elaborates on the knowledge requirements within the areas covered by the Environmental Strategy, and mentions environmental and resource management as one of six prioritised research areas. The *Strategy for Business Development 2007 – 2000* deals with numerous business activities. The development of environmentally sound production and products is emphasised in three of

[1] The Storting is the Norwgian Parliament

the six food policy strategies presented in the report *Smaken av Norway ("Taste of Norway") 2008 - 2010*.

The agricultural sector will have to be a main supplier of raw materials if the goal of increasing the use of bioenergy to as much as 14 TWh by 2020 is to be achieved, as declared in the Report No. 34 (2006-2007) to the Storting *Norwegian Climate Policy*. The government's bioenergy strategy (*Strategy for Increased Use of Bioenergy*), which was prepared by the Ministry of Petroleum and Energy in spring 2008, discusses agriculture's role and how to achieve this goal.

The Ministry of Agriculture and Food has started its work on dealing with agriculture's climate challenges, and will present a parliamentary white paper on agriculture and climate change in spring 2009.

1.2 Agricultural and food policy goals

Agricultural and food policies shall enable the sustenance of a viable agriculture throughout the country. Policies are to enable increased value creation and welfare based on the sustainable management of agricultural and rural resources. The main features of the agricultural and food policies shall be maintained and further developed in order to secure food safety, value creation, rural employment and settlement, and sustainable resource utilisation.

The main goals of the agricultural and food policies are subdivided into the following subsidiary goals:

- Secure food safety
- Enhance diversity and other consumer considerations related to food production and marketing
- Promote good plant and animal health and good animal welfare
- Ensure sustainable resource management, incl. stringent land conservation measures, conservation and management of cultural landscapes and safeguarding biodiversity
- Develop sustainable forestry as a basis for increased value creation through use of wood, bioenergy and commercial utilisation of non-cultivated land
- Maintain a viable agriculture that contributes to employment and settlement throughout the country, and which enables increased value creation from innovative business activities
- Secure national food supply, a competitive food industry and innovative, sustainable production of goods and services
- Maintain a viable reindeer industry with sustainable use of grazing resources, and which contributes to maintaining the distinctive character of the Sami culture

Furthermore, the Ministry of Agriculture and Food has formulated strategies linked to the development of research at international standard, transparent and user-oriented public administration, leeway within the national agricultural and food policies, and strong import protection; issues that also affect agriculture's environmental protection efforts.

The Environmental Strategy assumes that these goals will be valid for the entire period from 2008 to 2015.

1.3 Cooperation

Environmental challenges are complex, and interaction and cooperation are required in order to find good solutions. Cooperation is therefore appropriate for solving environmental challenges and further developing the tasks facing the agricultural sector.

The annual Agricultural Agreement is based on mutual agreement between the state and the farmers' associations regarding such issues as safe food production and the management of biological resources. Equally, the Reindeer Management Agreement (*reindriftsavtalen*) and the new Reindeer Management Act (*reindriftsloven*) are based on a common understanding of the foundation for sustainable reindeer husbandry. Another example of successful cooperation is the scheme for voluntary forest protection (*Frivillig vern av skog*). This is a joint project between the Norwegian Forest Owners Federation and the Directorate for Nature Management under which forest owners offer the state to protect their own forest lands.

In the opinion of the Ministry for Agriculture and Food, such cooperation should be further developed as a tool beyond the direct policy instruments for which the Ministry is responsible. The Environmental Strategy invites binding cooperation through dialogue between the business sector, local authorities, special interest organisations and national and regional authorities. This is a necessity, recognising that environmental considerations shall be integrated within all sectors and at all levels, and that environmental challenges should be solved efficiently and cost-effectively. An integrated value-chain approach is one important aspect of such cooperation.

1.4 Third-party comments

In May 2008, a draft version of the Ministry's environmental strategy was sent to more than 50 different organisations, public authorities and businesses with the invitation to comment goals, strategies and measures. The parties were also invited to a meeting at which selected players were asked to present their views on the strategy and suggest changes.

The submitted comments emphasised such aspects as the overall, comprehensive presentation of a broad scope of environmental challenges in the Ministry's draft version of the strategy, the involved interests and areas of cooperation and the Ministry's invitation to dialogue. The "whole chain" and life cycle perspective, knowledge development, cooperation and partnerships were commented as being important measures. The Ministry of Agriculture and Food supports these viewpoints. Several of these comments have been included in the strategy, and other comments will be considered in the Ministry's continuation of this work.

Several comments dealt with the climate challenge, underlining the need for developing knowledge that can enable implementing appropriate solutions. These comments will be considered in the Ministry's work on formulating the parliamentary white paper on agriculture and climate change.

It was also pointed out that the strategy does not discuss Norway's commitments through international environmental agreements, and that the goal of stopping the loss of biodiversity by 2010 was notadequately discussed. The Ministry of Agriculture and Food bases its strategy on the assumption that Norwegian environmental policies and commitments provide the framework for environmental measures in the agricultural and food sector.

1.5 The environmental strategy in the context of agricultural and food policies

Agriculture produces and maintains important public goods such as safe food, viable rural communities, cultural landscapes, outdoor recreation, nature and culture experiences and habitats needed to maintain biodiversity. To secure the resource base for the future and to preserve important environmental features and functions, sustainable resource management must be a basic prerequisite for policy development.

The environmental strategy is based on a viable agriculture, which is maintained in all parts of the country to ensure the positive effects on the environment. The use of policy instruments that support this thus plays a central role in the environmental strategy.

Agriculture, food production and food trade are continually rationalised and modernised. It is a political challenge to ensure the sustainability of this development.

Knowledge and skills are necessary to ensure environmentally sound resource management and agriculture, and to promote environmental considerations in the food and fibre production value chains. An integrated research and development approach is formulated in a specific research strategy, under which various programmes are administrated by the Research Council of Norway and executed at Norwegian research institutions. The European Union's Seventh Framework Programme and cooperation with North America are further examples of international research cooperation. Important policy instruments regarding business development include the Agricultural Agreement and the value creation programmes for food production, forestry and reindeer husbandry.

Over the years, agriculture has developed a system for ensuring good communication between research, extension and practitioners. This facilitates the implementation of new knowledge and has resulted in a flexible agricultural sector, which is able to adjust to changing conditions and new challenges.

For quite some time, the Ministry of Agriculture and Food has placed considerable emphasis on adapting agricultural policies and practice to the needs of the environment. Knowledge about the resource base is required to ensure an active and environmentally-focused forestry sector, and the use of forest management plans including environmental inventories is thus an important measure.

Decentralised public administration, with policy instruments divided between different levels, ensures flexible administration and enables the differentiation of measures according to need. This makes it possible to accurately target measures according to specific and local environmental challenges.

This strategy describes the sector's environmental challenges and relevant measures to meet these challenges within the scope of a sustainable development, in which the resource base is maintained through sustainable utilisation and consumption. Sustainable development implies meeting the needs of the present generation without compromising the ability of future generations to meet their own needs (*World Commission on Environment and Development*, 1987).

The strategy is valid until and including 2015, with a planned revision in 2012.

1.5.1 Primary production; agriculture and horticulture

Only three percent of Norway's land area is cultivated, and the most valuable farming areas are threatened by development. Reduced grazing activities and climate changes have resulted in the overgrowing of open landscapes. The challenge of maintaining a sufficient food production potential involves limiting land development in the main urban areas and forest regrowth in rural areas. This requires new policy instruments for improved land protection and delegating more responsibility to local authorities in their follow-up of such measures.

Agricultural production is essential for maintaining the farming landscape and associated biodiversity. In addition, historical farming landscapes contain considerable rural heritage value , such as the unique cultural landscape that developed in the surroundings of the country's many seasonal mountain dairy farms. Both landscape qualities and biodiversity are threatened by changes in farming systems and the cessation of active farm operations. The reduced use of non-cultivated land resources also presents challenges regarding the maintenance of biodiversity.

The cultural landscape, and therewith also biodiversity, must be maintained through active farming activities in all parts of the country. More targeted policy instruments must be applied to preserve specific assets, which no longer are maintained as a natural part of modern farm operations. Also, the commercial exploitation of such cultural monuments must be improved, enabling the rural areas to benefit from values linked to their preservation.

It is estimated that agriculture is responsible for about nine percent of Norway's total greenhouse gas emissions. Growing plants and soil absorb large amounts of carbon, whereas carbon is released to the atmosphere from decomposing organic matter and the digestive tracts of livestock. The challenge is to maximise the positive effects and minimise the negative ones. We have enough knowledge to start formulating strategies and measures, but there is a considerable need for more research-based knowledge about the processes linked to carbon emissions.

Nutrient runoff and erosion are still a challenge with regard to water quality in areas with extensive farming activities. The use of policy instruments must be targeted and strengthened in areas with heavily affected watercourses. Additional measures must also be considered in connection with the increased focus on reducing greenhouse gas emissions, in cases for which these measures positively affect both objectives.

Challenges remain regarding the use of pesticides. Norwegian agriculture shall become less dependent on chemical pesticides, and the risk of human health and environmental damage related to the use of such substances shall be reduced. Another goal is to prevent pesticides from leaking into the groundwater and to minimise their occurrence in streams and surface water.

Climate change could lead to the establishment of new plant and animal diseases in Norway. Monitoring, surveying, international cooperation and research are, in addition to good disease preparedness, warning and control routines, important for securing the good plant and animal health status Norway currently has. Good animal welfare is essential for maintaining good animal health, while society is increasingly emphasising the ethical aspects of animal husbandry. Consumers are demanding products that have been produced in accordance with animal welfare and environmental considerations.

Organic wastes from agriculture, industry, trade and households constitute a waste and pollution problem. All parts of the value chain can contribute to solving this challenge by trying to minimise waste, and by using organic wastes as fertilisers and soil conditioners in agriculture, gardens, parks, and as a bioenergy source.

Having efficient farm units with short distances between fields benefits the environment. Legal measures such as concessions and land consolidation are important policy instruments for achieving rational farm operations.

1.5.2 Food

The basis for securing safe and environmentally sound food of good quality throughout the entire value chain from farm to table mainly lies with the market players. The Norwegian Food Safety Authority is the supervisory authority in the food sector, ensuring compliance with relevant rules and regulations. Food policies are mainly designed to secure safe and healthy food and good animal welfare, and to promote health, quality, environmental and consumer considerations throughout the entire production chain. Environmental challenges in the production and consumption of food are linked to energy consumption, use of inputs, production methods and organic residues or waste materials.

Food wastes represent an especially large challenge. Norwegian households, trade, food service industry and processing industry generate a total of about 1 million tonnes of food wastes per year. This represents an energy potential of 2.1 TWh biogas, which is equivalent to five percent of Norway's total fuel consumption in the road transport sector. Biogas is among the biofuels with the best environmental profiles.

The Ministry's food policy strategy for 2008-2010 *Taste of Norway* proposes measures that stimulate the development of new, environmentally friendly products, an assessment of policy instrument use with regard to food-policy related environmental goals and the coordination of labelling policies, e.g., in order to improve market visibility of eco-friendly food products. Other measures include informing, involving and influencing all value chain players to facilitate a shift towards environmentally sound food production, trade and consumption.

The e-Traceability project can contribute to promoting environmentally friendly food production and consumption. The project was initiated to ensure food safety and improve preparedness by enabling faster and more accurate withdrawal of unsafe food. However, an improved electronic tracing system in the food chain can also be used to rationalise logistics and to improve information and increase awareness regarding environmentally sound food among producers, wholesalers, retailers and consumers.

1.5.3 Forestry

Norway has considerable forest resources. Forests cover 38 percent of the country's land area, and the growing stock presently amounts to about 750 million m^3. The annual increment is approximately 25 million m^3, with an annual harvest volume of 10-12 million m^3, including firewood. Forestry and timber processing are major rural livelihoods, and represent a considerable potential for value creation. Forests are among our most important ecosystems, as they provide habitats for numerous plant and animal species, some of which are endangered and vulnerable. Thus, it is a goal to sustainably manage our forest resources to enable the preservation of important environmental assets, while at the same time utilising

forest resources for increased activity and value creation for the benefit of both local communities and the country as a whole.

Forests are the main local recreation area for a large part of Norway's population, and contribute considerably to many people's health and well-being. It is important to continue the work of finding good solutions and cooperation for the use of our forests. The Ministry of Agriculture and Food thus wishes to facilitate the improved access in such areas, thereby helping to meet the public need for outdoor recreation areas.

Forests help to mitigate climate change by absorbing and binding carbon in standing biomass and soils. Forestry is also a major supplier of raw materials for construction timber and other wood products, and is a source of CO_2-neutral energy in the form of firewood, fuel chips, pellets and increasingly also biofuel. With regard to climate change mitigation, it is therefore an aim to increase forest production by planting and active silvicultural measures, felling and timber use. Increasing the use of timber and bioenergy is an important part of achieving the goals of both climate and regional policies, see Chapter 2.4.1.

The environmental challenges in forestry require a balance between commercial activities and environmental considerations, especially when it comes to road construction and increased forest operations, afforestation and various environmental measures linked to outdoor recreation, biodiversity and cultural monuments.

It is possible to increase harvest volume while taking necessary environmental considerations. However, sustainable management requires knowledge and a good understanding of biodiversity and its development, in addition to verified information about important environmental features. Such information underlies the Forestry Act, the Regulations on Sustainable Forestry and the *Living Forests* standard.

Nowadays, logging usually implies removing the trunks from the forest, with lots of organic material in the form of logging slash remaining in the forest. Increased removal of such wastes, e.g., as a bioenergy source and for biofuel production, may require new logging and production methods. This in turn may revive the need for more knowledge about technical, economical and environmental effects.

1.5.4 Reindeer husbandry

On a national scale, reindeer husbandry is a small industry, but in a Sami and a local context it has considerable importance; economically, culturally and for employment. The reindeer industry involves many positive elements. It generally represents a useful and sensible way of utilising resources in marginal mountain and rangeland areas. Reindeer husbandry contributes to commercial diversity and is a mainstay of Sami culture. The overall goals for reindeer management policies are to secure economical, ecological and cultural sustainability in the reindeer industry.

Reindeer operations can be found in close to 140 of Norway's municipalities, on a total area of about 140,000 km^2, which amounts to approximately 40 percent of Norway's land area. From Finnmark in the far north to Sør-Trøndelag in central Norway, the gross area used for reindeer operations amounts to about 80 percent of the total land area. However, not all of this land can be directly used for grazing. Lakes, watercourses, non-productive land, farmland and

built-up areas have to be subtracted. The net area available for grazing is estimated at about 90,000 km^2 or slightly less than 30 percent of Norway's land area.

The main environmental challenges are linked to continuously adapting operations to available grazing resources, avoiding encroachment due to other interests which could have a considerable negative impact on reindeer husbandry, and reducing predator losses.

The new Reindeer Management Act provides an improved policy instrument for ensuring ecologically sustainable resource management, with herd sizes that are adapted to the available grazing resources.

An important aspect of the new law is the role of the reindeer industry. Various provisions provide the basis for the industry's involvement and commitment to establishing sustainable operations. However, considerations regarding the resource base and other public interests may also require the authorities to implement certain measures. In the follow-up of the new legislation, the Ministry of Agriculture and Food has established a positive and necessary dialogue with the reindeer industry. A working group with representatives from the authorities, the reindeer industry itself and the scientific community has developed a proposal for objective and scientific criteria for determining an ecologically sustainable reindeer population. The group's proposal has been submitted for comments. These criteria are meant to assist regional and national authorities in determining reindeer herd sizes. Previous experience with herd size determination has shown that cooperation and commitment by the industry is clearly necessary if one is to overcome the current challenges.

To secure a viable reindeer industry for the future, it is necessary to improve the protection of the grazing areas, and especially those areas that are needed for ensuring sustainable reindeer husbandry. Increased awareness and more knowledge about land use management related to reindeer herding are also required. As the responsible ministry for reindeer management, the Ministry of Agriculture and Food has therefore strengthened inter-ministerial cooperation to facilitate a more integrated approach to land-use management within the Sami reindeer herding areas.

Losses of reindeer can be caused by adverse weather and grazing conditions, predators, disease, accidents and theft. Predator losses have been increasing in all reindeer herding regions, but there is extra reason for concern in parts of Troms, Nordland and Nord-Trøndelag. Reindeer are especially prone to predator attacks because they graze the vast rangelands year-round. Thus, the reindeer industry is especially vulnerable when predator populations increase. If losses due to predators are high, production and profitability suffer. More knowledge about reindeer production and predator losses is needed, and preventive measures must be developed in order to secure a sustainable industry.

2. GOALS, STRATEGIES AND MEASURES UNTIL 2015

2.1 Maintaining nature's diversity and outdoor recreation

2.1.1 Farmland protection

Goal:
Strong and long-term land protection to safeguard the most valuable farm land resources

Soils, together with clean air and clean water, are the most important natural resource base for bioproduction and species diversity. Norway has unique advantages for the production of high-quality food, such as high light radiation intensity in the growing season and a sufficient and reliable supply of water. Only three percent of the country's land area is arable farmland, and bread grain can only be grown on 1/3 of this area due climatic and edaphic limitations. Norway's arable soil is therefore valuable, and the best farmland has been cultivated and utilised. However, more than 100,000 hectares of cultivated or tillable land have been reallocated due to development in the past 50 years. This is a large figure, considering that soil is a scarce and vulnerable resource. Increased cultivation of new farmland cannot compensate for developed land due to the effects on the climate and ecosystems, including cultural landscapes and biodiversity, and because new land is usually cultivated in more marginal areas.

Acerage suitable for cereal production belongs to the most valuable farmland there is. With today's global population growth and climate challenges, it is becoming increasingly important to regard food and the land needed for food production as a global issue.

In spring 2007, a land protection committee was appointed to assess the status and functionality of current policy instruments, and to make suggestions for possible new policy instruments. The group submitted its report "A change of climate in land protection" (*Klimaskifte for jordvernet*) on 8 January 2008, and the Ministry of Agriculture and Food will appropriately follow up the suggestions in order to strengthen the protection of farm and forest land.

Strategies and measures:

Sustainable resource management with strong land protection

- Continue to assign responsibility to the municipalities to avoid the loss of important farm land resources due to development, and maintain the extended objection rights
- Make efforts to avoid the loss of important cultural landscapes or land resources due to the development of transportation infrastructure
- Contribute to stricter enforcement of local authorities' dispensations from the prohibition against the division of agricultural property pursuant to the Land Act
- Assign responsibility to municipalities regarding land use reporting in the national information system KOSTRA

- Work on developing new national policy guidelines for farm and forest land protection
- Work on introducing legal authorisation for the protection of cultivated land with a significant potential for food production
- Continue active R&D efforts on the use and conservation of land resources
- Strengthen the decision-making basis for soil resource management by documenting land values and providing knowledge about land use trends
- Implement information programmes aimed at the general public and relevant parts of public administration

The Ministry of Agriculture and Food expects stricter enforcement of land protection by the local authorities. The new planning section of the Planning and Building Act enables farm land protection to be seen in a long-term perspective and to ensure that arable land protection considerations are incorporated in municipal land use plans. Regional agricultural authorities play an important role in advising municipalities, and have both the right of appeal and an authority to raise objection as instruments for securing local land protection policies. To further enhance land protection efforts, the Norwegian Agricultural Authority has as of 2006 been assigned authority to raise objections to plans pursuant to the Planning and Building Act. Municipalities are encouraged to focus on agriculture and farmland in their municipal planning by preparing agricultural plans. The *core areas for agriculture* in municipal planning contribute to safeguarding important land resources in land use planning. Numerous municipalities have addressed this issue and the Ministry will continue to encourage local authorities to put agriculture and farmland on the agenda.

The protection of farm land shall become a more pronounced aspect of large transportation projects, and the Ministry of Agriculture and Food will cooperate with Ministry of Transport and Communications to address the issue in connection with the preparation of the *National Transportation Plan 2010 - 2019.*

The partitioning of agricultural property can lead to the reallocation and loss of important land resources. Avoiding the fragmetation of agricultural properties would be an important measure for safeguarding important land resources. All of Norway's municipalities are requested to be stricter when dealing with land division cases.

It is extremely important to take a closer look at the reporting procedures from the municipalities to the state (KOSTRA). There is a lot of evidence that the quality of these data is not sufficient. The Ministry of Agriculture and Food will, in cooperation with other agencies such as the Ministry of the Environment, contribute to the improvement of reporting procedures.

The land protection group pointed out that today's *National policy guidelines for coordinated land use and transportation planning* are not sufficiently specific with regard to arable land protection interests, and thus proposed new national policy guidelines for the protection of farm land. The Ministry of Agriculture and Food will work on revitalising the national policy guidelines for land protection which were formulated in 1993.

The Ministry of Agriculture and Food will initiate a closer assessment of the land protection group's proposal of legally authorising the protection of valuable land and soil resources.

It is important to enhance knowledge about the effects of strategies and measures to avoid the reallocation and development of valuable land resources. There is a need for knowledge that can shed light upon the balance between long-term land protection and land development interests, taking into consideration the interests of both the general public and the agricultural industry. Research efforts in this field will be continued.

The decision-making basis for land-use management and land protection must be improved. The Ministry of Agriculture and Food will work on securing improved knowledge about land values, the distribution of our best soils and the value of land that is affected by the planning system. This will enhance local administrational procedures, and provides a basis for the improved follow up of land protection issues by national authorities.

The Ministry of Agriculture and Food will initiate the preparation of an information programme. The land protection group indicated several possible measures, such as using the press and the media, producing information material intended for schools and politicians, and pilot projects specifically designed for children and adolescents. As a part of this process, a land protection conference was held in April 2008.

2.1.2 The farming landscape

Goal:
Maintain the farming landscape throughout the country by sustaining active agriculture

Agriculture has been and is an important aspect of landscape formation. Agriculture produces landscapes and values linked to, e.g., biodiversity and cultural monuments. See Chapter 2.2.

Due to technological and economic developments, agriculture's land use and production methods have become much more efficient. Petroleum and hydropower have considerably reduced our dependence on forests as a source of energy. As a result, grazing pressure has decreased and less timber is being felled. These developments, in addition to the longer growing season due to climate change, have led to rural landscapes becoming increasingly overgrown. Furthermore, road construction, urban sprawl and other activities have led to fragmentation and detriment of the farming landscape in many parts of the country.

The farming landscape is home to many of Norway's vulnerable and endangered species. Some of these landscapes are based on farming systems from bygone days, such as mountain hayfields, pollard meadows and coastal heathlands. Farming landscapes are important and diversity in these landscapes must therefore be preserved and specifically managed as a contribution to achieving the goal of stopping the loss of biodiversity by 2010. A relevant measure for addressing this issue is maintaining a variety of farming landscapes, including some landscapes which are not part of modern-day, commercial farm operations.

Strategies and measures:

Maintain and further develop policy instruments that secure the farming landscape and valuable biological assets

- Continue and update national environmental programmes and increase grazing and rough grazing subsidies
- Introduce second generation regional environmental programmes from 2009, with further emphasis on such goals as securing specific management and/or grazing of valuable areas
- Evaluate the scheme for specific environmental measures in agriculture in the winter of 2008/09, focusing on environmental benefits
- Document selected farming landscapes and provide specific, long-term management to the 20 first areas during summer 2009
- Continue policy instruments that secure operations in landscapes formed by mountain dairy farming as part of the regional environmental programmes
- Award an annual national cultural landscape prize in cooperation with Norwegian Heritage
- Introduce specific measures for cultural landscapes included on the World Heritage List
- Stimulate municipalities to appoint core areas for agriculture, create awareness and establish cooperation with municipalities regarding the farming landscape as the ”aesthetic expression” of a rural area
- Contribute to project-oriented work on clearing roadside-adjacent and important cultural landscapes, combined with the utilisation of woody biomass for bioenergy under

consideration of biodiversity

- Map and accommodate alternative grazing land in outfields and cultural landscapes in prioritised predator areas
- Assess animal welfare measures in cattle farming in a broader environmental policy context
- Continue and further develop landscape monitoring and knowledge development
- Continue the Ministry's participation in the *National Programme for Surveying and Monitoring Biodiversity*

Policy instruments funded via the Agricultural Agreement are essential for maintaining the farming landscape, and many of the schemes are directly aimed at specific measures such as grazing or mowing certain areas. Via the national and regional environmental programmes (*Specific Environmental Measures in Agriculture*), which are administrated by the municipalities, and the compulsory environmental plans, a good platform has been established for maintaining cultural landscapes and associated assets. The Ministry of Agriculture and Food wishes to ensure the coordination of policy instruments, including those targeting the cultural landscape, and the environmental programmes will thus be evaluated and renewed between 2007-2009, both with regard to goal attainment and administrative costs.

The main goals of the national environmental programme are to secure open and varied farming and cultural landscapes, to ensure the preservation and management of a broad range of landscape types, especially valuable biotopes and heritage landscapes, and to contribute to the minimisation of pollution and nutrient loss from agricultural production. Rough grazing and general grazing subsidies will be increased, and are thus part of the national environmental programme, which also includes such support as the acreage and cultural landscape scheme, which aims to keep farmland in active agricultural use. Grazing is a very important factor for preserving open landscapes and species that depend on grazing. Incentives are provided to increase both the number of grazing livestock and the length of the grazing period.

The evaluation of the *Regional Environmental Programme*, which was presented in winter 2008, shows that the programme generally achieves the intended effects. Suggested improvements imply both harmonising and focusing the programme in relation to geography and measures. In this context, one could specifically mention the management of valuable areas and programmes linked to the use of old livestock breeds with regional ties. The counties shall renew their environmental programmes by mid-November 2008.

The policy instruments under the *Specific Environmental Measures in Agriculture* have existed as a municipal programme for four years and have covered a broad range of measures. A nation-wide assessment of this programme's environmental effects would be too costly. A few counties/municipalities will therefore be selected as case areas, preferably well-distributed among the various parts of the country and important farming areas.

In addition to generally maintaining the farming landscape, it is also necessary to implement specific measures aimed at the long-term management of valuable environmental features in a selection of cultural landscapes that are not maintained through ordinary policy instruments or farming patterns. The Ministry of Agriculture and Food and the Ministry of the Environment have jointly initiated work on selecting certain farming landscapes with considerable value regarding both cultural monuments and biodiversity. As a start, this will involve one area per

county[2]. Such selected landscapes are to secure variation in farming landscapes that require long-term management. The general public must be able to see and access these landscapes. Wildflower meadows and coastal heathlands are examples of farming landscapes that require specific landscape management measures. Consideration of valuable genetic resources must be emphasised in the management of farming landscapes and included in the continuation of the work on selected farming landscapes, see Chapter 2.1.8. The Ministry of Agriculture and Food and Norwegian Heritage are also cooperating on a national cultural landscape award in order to increase public awareness for farming landscapes.

The Ministry of Agriculture and Food will contribute to preserving the landscapes that developed in the surroundings of seasonal mountain dairy farms by developing the use of these environments and their potential for value creation.

Challenges are linked to the preservation of the farming landscapes that are included on the World Heritage List, i.e., the West Norwegian Fjords and the Vega Archipelago. The Ministry of Agriculture and Food will contribute to measures aimed at securing these cultural landscapes. A project has thus been initiated to specifically manage the farming landscapes in areas included on the World Heritage List. The project will be evaluated after three years.

The *core areas for agriculture* in municipal planning (see Chapter 2.1.1) also contribute to securing important cultural landscapes in connection with land-use planning. The Ministry of Agriculture and Food will increase the municipalities' awareness for the farming landscape's importance in landscape design, a rural area's "aesthetic expression" and biodiversity, and for this landscape's role in identity building, cf. the European Landscape Convention.

Increased use of bioenergy also helps to keep the farming landscape open, e.g., by clearing and recultivating overgrown land. Roadsides and roadside landscapes are often important habitats for grassland plants and the clearing of such areas would also contribute to preserving this biodiversity. The government's Bioenergy Programme is a considerable effort aimed at increasing agriculture's contribution to CO_2-neutral energy, which at the same time also benefits the cultural landscape, see Chapter 2.4.1.

The Ministry of Agriculture and Food emphasises rough grazing as an environmentally friendly way to utilise farm resources that cannot be harvested otherwise. This also contributes to maintaining the cultural landscape and has positive effects on biodiversity. In several areas, national goals concerning predator populations limit the extent of rough grazing. Geographically differentiated management that balances priorities between predator areas and rough grazing lands could make commercial grazing activities more predictable, while ensuring animal welfare, see Chapter 2.1.5. The Ministry will stimulate the utilisation of the overall grazing resources by increased emphasis on surveying the grazing capacity in alternative rough grazing areas and prioritised cultural landscape areas, and by actively facilitating the utilisation of these areas for viable commercial operations.

A working committee appointed by the Ministry of Agriculture and Food has assessed animal welfare measures in cattle farming in a broader environmental policy context. Among other things, the committee suggests to extend the deadline for required implementation of loose-housing from 2024 to 2034. The proposal is based on compensation measures such as

[2] Norway has 19 counties

requiring extended grazing periods for animals still kept in tie-stall barns. The Ministry will consider these suggestions and make necessary changes in the regulations accordingly.

Several international studies show that organic agriculture has documented environmental effects, such as benefiting biodiversity and the cultural landscape. The development of organic production is thus an important contribution to securing environmental qualities, see Chapter 2.3.4.

Increased knowledge about farming landscapes and social changes, including expansion and demand patterns in commercial, private and recreational development, is needed to implement measures aimed at maintaining and developing the farming landscape.

The Ministry of Agriculture and Food emphasises continuing and developing research and monitoring linked to land, landscapes and valuable environmental assets. This includes the *Norwegian Monitoring Programme for Agricultural Landscapes* (the so-called "3Q programme") and participation in the *National Programme for Surveying and Monitoring Biodiversity*.

The 3Q programme is designed as a sample-based monitoring programme on about 1400 1x1 km sample squares covering the entire country. Indicators are based on various aspects of landscape spatial structure, and reflect conditions for agriculture, biodiversity, cultural heritage and heritage landscapes, and accessibility. Data is collected from aerial photographs, available maps and inventories. Sample squares from all over Norway were surveyed from 1998 to 2003. The results of the survey were published by county. The second 5-year inventory cycle began in 2004, during which the same sites will be re-investigated to monitor changes.

2.1.3 Sustainable forestry

Goal:
Sustainable forestry as a basis for increased value creation and increased commitment to the use of bioenergy, timber and non-cultivated land resources

Norway has considerable forest resources. Forests cover 38 percent of the country's land area and help to mitigate climate change by absorbing and binding carbon in standing biomass and soils. Forests are among our most important ecosystems, as they provide habitats for numerous plant and animal species, some of which are endangered and vulnerable. Thus, it is a goal to sustainably manage our forest resources to enable the preservation of important environmental assets, while at the same time utilising forest resources for increased activity and value creation for the benefit of both local communities and the country as a whole. Forestry and timber processing are major rural livelihoods, and represent a considerable potential for value creation. Forests are the main local recreation area for a large part of Norway's population, and contribute considerably to many people's health and well-being.

Strategies and measures:

Secure an adequate level of knowledge on which to base a sustainable forestry sector

- Focus on research and development linked to the environmental aspects of forest resource management and development
- Strengthen and continue the contribution of the *National Forest Inventory* to monitoring long-term environmental and forest resource trends
- Use websites to process and present environmental knowledge from the *Environmental Inventories in Forests (MiS)*, the *National Forest Inventory* and other sources to the forest industry, public authorities and the general public
- Secure sustainable forestry through use of forest management plans that include environmental inventories on individual forest properties
- Contribute to improving the *Norwegian Red List* by 2010
- Continue the educational programme *Lære med skogen* ("Learning with the forest"), and other educational websites

Increase forestry activities and ensure sustainable forest operations

- Follow up the Regulations on Sustainable Forestry, which were passed in the summer of 2006
- Contribute to beneficial processes between the forest sector, the environmental movement and consumers in the continuation of the *Living Forests* standard and that the participating parties adequately include the issue of harvesting biomass for bioenergy purposes in the standard
- Improve regulations for forest road construction to ensure suitable access to forest resources in accordance with the principles of the Forestry Act and the Regulations on Sustainable Forestry
- Facilitate increased forest harvesting to increase the supply of bioenergy and the use of wood within the scope of sustainable forestry, by ensuring that this development is based on

sound environmental and forest resource information and that necessary environmental considerations are taken
- Facilitate increased harvesting of previously untapped forest resources, such as logging slash, as a source of bioenergy within an environmentally sound framework in periurban forests and other suitable areas, see Chapter 2.4.1
- Continue measures to promote coastal forestry
- Work on developing voluntary forest protection strategies

Contribute to sustainable forest management world-wide
- Work on achieving an international forest agreement and follow-up mechanisms which would result in increased commitment to sustainable forest management and measures needed to achieve global goals. To ensure the success of this goal, it is decisive that major forest nations endorse such an agreement, and support the results obtained via the United Nations Forum on Forests (UNFF, the UN intergovernmental policy forum on forestry)
- Actively work on developing European and other international forest policies, based on, among other things, Norway's leading role in the Ministerial Conference on the Protection of Forests in Europe (MCPFE) and use this leading role to actively raise awareness for the important commercial, environmental, climate and health effects of forests
- Play an active role in the implementation and follow-up of Norway's actions aimed at reducing deforestation and promoting the sustainable use of the world's forests, including efforts to reduce deforestation and forest deterioration in developing countries

Increased use of wood and bioenergy is important for achieving the goals of both climate and regional policies, see also Chapter 2.4.1. Enhanced efforts to produce wood-based bioenergy must be based on a precautionary approach, implying that one already now has to begin assessing the consequences resulting from new operating methods, utilisation forms or land use patterns, and discussing the need for guidelines. In its allocation letter to the Research Council of Norway for 2008, the Ministry of Agriculture and Food thus underlined the need for more knowledge about the effects on biodiversity and important environmental assets caused by the increase in logging activities and new operating methods resulting from the enhanced efforts to produce wood-based bioenergy.

Furthermore, such an approach implies that the harvesting of forest biomass must comply with the Regulations on Sustainable Forestry and the *Living Forests* standards. The current standards were developed while the focus on increased bioenergy production was still in its early phases. The Ministry of Agriculture and Food has therefore advised the contractual parties of the *Living Forests* standards to consider the changes that may be necessary to ensure the appropriate inclusion of bioenergy in the standards. Correspondingly, the Ministry will review its own regulations affecting the issue.

The Ministry of Agriculture and Food will continue to ensure knowledge development, e.g., linked to research on forest biodiversity. Furthermore, the Ministry will give priority to developing necessary knowledge about site-specific, local and national forest and environmental assets. The Ministry is thus investing considerable resources in monitoring the status and development of Norway's forests via the *National Forest Inventory* and the *Norwegian Monitoring Programme for Forest Damage*.

At property level, knowledge about forest and environmental assets is obtained from forest management plans that include environmental inventories. Equivalent registrations are also made in the *National Forest Inventory*, thus providing a representative survey of the extent and development of these habitats. So far, environmental inventories have been performed on nearly 2.5 million hectares, which represent 40-50 percent of Norway's productive forest area. Efforts to preserve the forests' cultural values include inventories of cultural heritage in forests, see Chapter 2.2.

Information about forests conditions in Norway is available via the website of the Norwegian Forest and Landscape Institute (www.skogoglandskap.no). Environmental inventories from forest management plans are also presented in a map application which presents the various environmental features associated with the surveyed areas.

The Ministry of Agriculture and Food will continue participation in the *National Programme for Surveying and Monitoring Biodiversity*, partly to contribute to the improvement of the *Norwegian Red List* until 2010. The *Norwegian Red List 2006* contains the species in Norway categorised as 'threatened'. It is important to improve the knowledge and data base for the next edition of the *Norwegian Red List*, to be published in 2010, so that it to a greater extent can be used for knowledge-based biodiversity management. The *National Programme for Surveying and Monitoring Biodiversity* is one of the measures that aim at increasing knowledge on species diversity in Norway, with emphasis on endangered species.

The Ministry of Agriculture and Food also plans to continue the educational programme *Lære med skogen* ("Learning with the forest"), which is a joint project between the Ministry and the forest and wood-processing industries, created to educate children and adolescents about forest and environmental issues. The same applies to other online educational services such as www.treveven.no and www.energiveven.no.

Forestry's overall environmental adaptations are ensured via forest owners' own environmental considerations and public forest polices. The public regulations specify and make demands on the individual forest owner regarding resource and environmental considerations in forestry. The new Forestry Act came into effect on 1 January 2006. Pursuant to the provisions of this act, the Ministry of Agriculture and Food passed the new Regulations on Sustainable Forestry in the summer of 2006. The regulations supplement and clarify the act regarding such issues as environmental considerations, forest regeneration and forest damage.

In this context, the *Living Forests* project and the extensive environmental forest inventories are especially important. Revision of *Living Forests* involves consensus on that forest owners are to manage at least five percent of their forest land as biologically important areas – often through non-felling on this land. This implies both significant restrictions on forest operations and considerable costs associated with documentation of such considerations. Forests that are classified as biologically important areas are vital for many forest species and are especially important for Norwegian Red List species classified as 'threatened'. Forest owners are increasingly taking on responsibility for ensuring that the biologically most valuable areas in productive forests are protected. The new standards are based on the current standards, experience from the implementation of these and new insights. In addition to the general agreement on the new standards, the *Living Forests Council* was established to foster communication and trust among the parties. The parties have initiated a process to obtain FSC certification based on the revised *Living Forests* standards.

Environmental Inventories in Forests (MiS) is a method for registration of important habitats for biodiversity in association with forest management planning. The Norwegian Forest and Landscape Institute established the method's scientific basis in, and developed the operational registration methodology (the Complementary Hotspot Inventory, CHI). The inventories have been included in ordinary forest management planning since 2001. A manual describing the registration scheme can be accessed via the website of the Norwegian Forest and Landscape Institute. (www.skogoglandskap.no)

All forest road construction, both construction of new roads and reconstruction of existing ones, requires special permits, pursuant to the Regulations on Agricultural Roads of 1996. Upon issuing such permits, emphasis shall be placed on comprehensive agronomic considerations and the avoidance of negative environmental impacts on the natural environment, the landscape, cultural monuments and outdoor recreation.

In 2008 the Ministry of Agriculture and Food will, in cooperation with the Ministry of the Environment, begin improving the quality of data on forest roads and areas without major infrastructure development, and review the forest sector's road construction needs. Furthermore, the Ministry will clarify the consequences and possibilities regarding a revision of the regulations for the construction of agricultural roads, with the aim of improving environmental considerations linked to, e.g., biodiversity, cultural monuments and areas without major infrastructure development.

The forest resources in the coastal regions are growing significantly. The Ministry of Agriculture and Food believes it is important for the various coastal forest stakeholders to cooperate on the efficient utilisation of the available resources. Through the use of policy instruments linked to forestry and bioenergy, the Ministry has in recent years increased funding for silvicultural measures in coastal forests. The Ministry plans to continue these efforts, with the aim of contributing to increasing the utilisation of forest resources while at the same time taking important environmental values into consideration.

In the opinion of the Ministry of Agriculture and Food, it is appropriate to continue to facilitate voluntary forest protection schemes, in accordance with the Soria Moria Declaration[3]. The scheme *Frivillig vern av skog* ("Voluntary Forest Protection") is a joint project between the Norwegian Forest Owners Federation and the Directorate for Nature Management, under which forest owners offer the state to protect their own forest lands. So far, 32 areas have been protected via the scheme, covering a total area of about 68 km^2 and including about 33.5 km^2 of productive forests. In addition, there are ongoing negotiations on voluntary protection of about another 100 areas that include approximately 250 km^2 of productive forests.

Norway participates actively in international cooperation on forest policies to contribute to a more sustainable management of global forest resources. Sustainable forest management is important for achieving the goals of international environmental cooperation linked to the conservation of biodiversity and as part of the efforts to reduce anthropogenic greenhouse gas emissions. By participating in international forest and environmental cooperation, Norway

[3] The document representing the political platform for the governing coalition of the Labour Party, the Socialist Left Party and the Centre Party, finalised in Oct 2005

shall work on ensuring forests' and forest management's contribution to an improved quality of life by securing the forest's social, economical and environmental functions.

As of 2008, Norway took over the Liaison Unit of the *Ministerial Conference on the Protection of Forests in Europe* (MCPFE), a pan-European process for the protection and sustainable management of forests throughout Europe. MCPFE is based on the ministerial conferences, which have been held at 3-4 year intervals since 1990. Participating members are 46 countries and the *European Union* (EU). While hosting the Liaison Unit, Norway's number of tasks and responsibilities will increase significantly, but so will the chance to influence the process. The MCPFE Liaison Unit is responsible for coordinating and planning the follow-up of decisions made at the Ministerial Conference in Warsaw in 2007, and for preparing the Ministerial Conference in Norway. Forests and climate will be major elements of Norway's work while hosting the MCPFE Liaison Unit, in addition to actively raising awareness for the important commercial, environmental, climate and health effects of forests.

The Ministry of Agriculture and Food will actively take part in the government's efforts to prevent deforestation in developing countries, thereby contributing to that these efforts lead to permanent protection and sustainable utilisation of the world's forest resources. These efforts must be seen in the context of ongoing international work for sustainable forest management, such as the global forest goals adopted by the UN, which also pull in the same direction.

2.1.4 Plant and animal health

Goal:
Maintain a good plant and animal health status

Norway has a favourable plant and animal health status. We shall maintain this situation through continued efforts and good cooperation between the general public, the agricultural sector and relevant authorities. Such efforts are based on a common understanding among all stakeholders of the importance of maintaining the good plant and animal health status. Our monitoring and inspection programmes for plant and animal health are to be evaluated, followed up more closely and become more distinguished. Involvement and cooperation with relevant partners and the development and transfer of knowledge are necessary.

New challenges to the plant and animal health situation can arise as a result of climate change, increasing/changing travel and trade activities, changes of growing conditions, new and altered plant and animal diseases, changing farming conditions or new environmental requirements and consumer demands.

Healthy plants and animals are important for food safety, as well as for economical, environmental and ethical reasons. By keeping such a leading position, we can also prevent serious livestock and crop diseases from infecting wild populations and thus posing a threat to biodiversity. A good plant health status can also contribute to reducing indirect negative effects, such as deteriorating growing conditions and an increasing need for pesticides.

Strategies and measures:

Prevent the introduction, spread and establishment of harmful organisms/infectious agents to plants and animals through active Norwegian participation in international fora, and by implementing national measures and international cooperation

- Secure effective and targeted inspection and contingency based on persistent research and knowledge development by closely following up the monitoring and inspection programmes in the field of plant and animal health
- Ensure appropriate information to increase knowledge about environmental aspects and regulations, and assign responsibility to and involve policy makers, organisations, consumers and commercial players
- Influence and follow up the European Union's new animal health strategy - Norway shall continue to be in the top division
- Introduce import regulations for wood packaging material to prevent the introduction of forest pests
- Work on providing aid to developing countries to increase plant and animal health status
- Ensure that the primary industry takes on responsibility through involvement and cooperation, e.g., via the Quality Assurance System in Agriculture (*Kvalitetssikringssystemet i landbruket, KSL*) and its focus on the environment
- Update relevant regulations if climate change should alter the risk status concerning the introduction of new species that are either harmful or pathogenic to plants, animals and humans

Together, the Ministry of Agriculture and Food and the Norwegian Food Safety Authority are working to prevent the introduction, spread and establishment of harmful animal diseases and plant pests, e.g., via their regulatory and strategic work. The Norwegian Food Safety Authority is also responsible for monitoring and inspection measures, surveillance of import and marketing, control measures and advisory services. Closely following up the monitoring and inspection programmes helps to ensure appropriate measures. Pursuant to public orders and restrictions, a compensation scheme has been established to contribute to the control of plant pests and animal diseases, help secure food safety and provide financial compensation to reduce the burden of various control measures. Such a scheme promotes active producer participation, as farmers issue early warnings as soon as they suspect an outbreak of harmful plant pests or animal disease, and implement measures in compliance with orders issued by the authorities.

Priority has been given to increased knowledge and improved contingency associated with increasing travel and trade activities through the *Strategy for Research and Research-based Innovation 2007-2012*. It is important to develop risk analysis, analysis tools and monitoring to prevent the introduction, spread and establishment of plant and animal diseases. It is a goal to strengthen animal health alert so that serious animal diseases can be detected as quickly as possible. Surveying and controlling livestock pathogens are also important with regard to the spreading to wild populations (cf., bird flu, tuberculosis, rabies, etc.). Strong international cooperation through common regulations and animal health contingency planning within the European Economic Area and through active participation in such organisations as the OIE (World Organisation for Animal Health), the United Nations, etc. is also vital.

It is necessary to increase public information and knowledge about regulations and the environmental consequences of illegally imported plants and animals. Raising public awareness, ensuring a common understanding and creating public responsibility are essential for maintaining the good plant and animal health status in Norway. The Ministry of Agriculture and Food will work on providing and utilising appropriate forms of dissemination and information channels. An example are the posters that were jointly developed by the Norwegian Food Safety Authority and customs authorities to inform travellers about the risks associated with illegal plant and animal imports. The posters are placed in clearly visible locations at customs offices in ports, airports and train stations.

In connection with the efforts to influence the EU's preparation of new animal health and welfare regulations, emphasis must be placed on providing leeway for the continuation of national management strategies. Norway shall remain one step ahead and defend its position in the "top division". At the same time, efforts must be made to assign more responsibility to policy makers, organisations, industry and consumers.

Forest pests can be introduced with wood packaging material (WPM) used in international shipments. Norway is therefore introducing import regulations on WPM in accordance with an International Standard for Phytosanitary Measures (ISPM 15) under the *International Plant Protection Convention* (IPPC).

Technical specifications regarding food, animal health, plant health and farm inputs (fertilizer, feedstuffs, pesticides etc.) frequently impede trade with developing countries. The Ministry of Agriculture and Food is actively participating in the development of international rules and standards for the trade with food, animals and plants. The Ministry can provide assistance on

issues covered by the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) in order to improve plant and animal health standards, and thereby also reducing local and global environmental impacts.

A responsible primary industry must ensure good routines through quality assurance requirements, involvement and cooperation. Compulsory environmental plans, required of all farms by public authorities and the KSL standards (Quality Assurance System in Agriculture), help to secure an environmentally sound agriculture. The plans include demands on correct and reasonable pesticide and fertilizer use. This ensures that the produced food is "pure" and that agricultural runoff is minimised. The KSL standards also include requirements to prevent the spread of plant diseases. Via KOORIMP (the Norwegian Livestock Industry's Biosecurity Unit) and KSL, the agricultural sector places strict demands on livestock imports. KSL also has a specific standard for the use of medicines in commercial livestock production. This standard aims to secure animal welfare and ensure the appropriate and restricted use of medicines, which are important factors for maintaining Norway's good animal health status and avoiding increasing antibiotic resistance in livestock and humans.

The Ministry of Agriculture and Food focuses strongly on climate change, and will make considerable efforts to assess the consequences of and challenges associated with plant production and livestock husbandry.

2.1.5 Animal welfare

Goal:
Maintain and develop high animal welfare standards

Society is increasingly emphasising the ethical aspect of animal husbandry. The moral responsibility increases with the degree of human encroachment on the lives of animals. Consumers are demanding products that have been produced in accordance with animal welfare and environmental considerations. The diversity of farming methods means that consumers can choose from a broader product portfolio, but also implies added challenges linked to specific animal husbandry regulations. The Ministry of Agriculture and Food is also responsible for taking the welfare of wild animals into consideration when human activity has an environmental impact in the form of encroachments that alter the animals' habitats and living conditions.

Strategies and measures:

Ensure ethically and environmentally sound animal husbandry

- Clarify a general, comprehensive regulation of animal welfare, also including wild animals
- Coordinate measures pursuant to the Animal Welfare Act, the Wildlife Act and the Planning and Building Act
- Emphasise the importance of breeding that enhances the traits needed for robust, functional and healthy animals
- Emphasise killing/slaughtering methods that minimise stress in animals, and energy-saving and environmentally friendly stunning methods
- Work on minimising journey times during transport to slaughter and improve routines for animal transport and treatment regarding both environmental and animal welfare considerations
- Consider the introduction of an explicit ban on the use of barbed wire
- Reduce the conflict level regarding the predator-grazing animal issue
- Work on reducing the suffering of animals due to grazing-related diseases and accidents
- Work on developing balanced predator management policies with preventive measures to reduce the suffering of reindeer and sheep

The Norwegian Food Safety Authority has the main responsibility for developing regulations and supervising legislation regulating domestic animal welfare. The Food Safety Authority also has a general responsibility for the welfare of wild animals. Regulations have been issued for most livestock species in recent years, pursuant to the provisions of the Animal Welfare Act. A new act on animal welfare has recently been sent out for comments, and is to be proposed to the Storting in autumn 2008. Both the Ministry of Agriculture and Food and the Ministry of Fisheries and Coastal Affairs will have a constitutional responsibility according to this act. The revised act shall ensure the general and comprehensive regulation of domestic and wild animal welfare in a more pronounced manner. The act is thus to be normative for the formulation of sectoral legislation involving animal welfare considerations.

It is essential to appropriately coordinate and harmonise animal welfare legislation and other legislation affecting the welfare of animals. Hunting and trapping, both regulated by wildlife legislation, are examples of activities for which such considerations apply. Another example are the many wild animals that each year are injured or killed on roads or railway lines that cross their migration routes. When planning landscape encroachments, installations, etc. that need approval, an assessment of the impacts on the environment, natural resources or communities is required, pursuant to the Planning and Building Act. In connection with planning such encroachments, the effects of the activities on the welfare of wild animals should also be considered, thus perhaps enabling the prevention of considerable suffering and animal losses.

The Ministry of Agriculture and Food will emphasise the importance of breeding that enhances the traits needed for robust, functional and healthy animals. This can be ensured by close cooperation between public administration, the livestock industry and organisations, as well as by having appropriate regulations.

For the slaughter/killing of livestock, it is important to use efficient methods that cause a minimum of discomfort, pain and stress to the animal. Various stress factors, which reduce the welfare of the animals being slaughtered, can eventually also affect meat quality. Slaughterhouses must optimise their routines for pre-slaughter handling of animals, in addition to using stunning and killing methods that are as humane as possible. The Ministry of Agriculture and Food will ensure updated and appropriate regulations regarding these issues.

Transportation of animals to slaughter is also a critical phase and can result in reduced meat quality. Minimising such quality loss is important with regard to animal welfare, but also to ensure maximum resource utilisation. Animals that die or are injured during transport or pre-slaughter handling at the slaughterhouse, and thus cannot be used as food, also pose a waste problem, see Chapter 2.3.3. It is important to have good routines for the loading and unloading of animals, and that the vehicles used ensure optimal animal welfare. This can be achieved through regulations for vehicle design, training of involved personnel and sufficient planning of transports. Furthermore, due to both environmental and animal welfare considerations, one should attempt to keep transport distances as short as possible. The Ministry of Agriculture and Food will ensure updated and appropriate regulations regarding these issues.

Fences, remains of fences and barbed wire also cause considerable suffering to animals. The proposal for a new animal welfare act suggests introducing an explicit ban on the use of barbed wire to regulate animal traffic.

The Ministry of Agriculture and Food wishes to ensure the welfare of animals grazing on non-cultivated and rough grazing land with regard to grazing-related diseases and accidents. The regulation on small livestock welfare places demands on the livestock keeper prior to and during the grazing period. Furthermore, the Ministry emphasises research on grazing-related diseases and on the development of subsidy schemes that contribute to increased supervision and the ability to take early action in order to prevent the escalation of diseases or injuries.

Achieving the objectives related to predator populations, biodiversity, cultural landscape management and commercial activities based on the utilisation of non-cultivated and rough grazing land involves administrative balancing of conflicting goals. Grazing is essential for ensuring animal welfare and maintaining the cultural landscape. The Animal Welfare Act

provides the legal authority to issue time-limited bans on the use of rangeland to protect grazing animals against predator attacks. To reduce the level of conflict between predator protection and grazing interests, animal owners have been granted the right to financial compensation when grazing bans are issued. The administration of these issues requires close cooperation and dialogue between the wildlife management and animal welfare authorities. The Ministry of Agriculture and Food will work on ensuring the efficient use of funds for preventive and conflict-easing measures, improved supervision and documentation of rangeland in general, and good communication between relevant stakeholders in order to maximise the welfare of grazing animals and improve predictability related to the commercial utilisation of grazing resources. This must be combined with specific predator culling, active efforts by the Norwegian Nature Inspectorate and predator hunting for payment, in addition to ensuring fast administrative procedures for issuing lethal control permits.

2.1.6 Agriculture and outdoor recreation

Goal:
Contribute to a diversity of outdoor recreation experiences and activities

Agricultural land accounts for a significant share of the land area in Norway that is associated with considerable natural and cultural heritage values. The Norwegian right of access to all open country enables everyone to share these public goods. Forests, outfield and wilderness areas, roads and trails in the cultural landscape are important for travelling through and experiencing the outdoors. Many farm owners and operators are now also providing organised outdoor recreation, such as hunting, fishing and guided activities. In addition to the obvious commercial aspect, this also helps to demonstrate the social value of cultural landscapes.

However, the trail and road systems in many farming areas are often not very coherent, often with poor links to the trails and roads in nearby forests. In urban and periurban areas, untilled and unplanted fields are also of considerable value as winter recreation areas. The Ministry of Agriculture and Food wishes to facilitate improved access to farming landscapes, thereby helping to meet society's need for outdoor recreation areas.

Forests are the main local recreation area for a large part of Norway's population, and contribute considerably to many people's health and well-being. It is important to continue the work of finding good solutions and cooperation for the use of our forests.

The overgrowth of previously open rough pastures is a challenge in heavily utilised areas, e.g., in holiday cabin settlements where the land no longer is grazed.

Strategies and measures:

Ensure variation, accessibility and increased use of farming landscapes for outdoor recreation

- Contribute to the *National Strategy for the Tourism Industry*
- Implement the *Development Programme for Green Tourism* and the *Strategy for Farm-based Business Development*, facilitate nature and culture experiences
- Work on increasing value, accessibility and recruitment related to outdoor recreation, nature experiences, hunting and fishing through public ownership of forest and wilderness areas in Statskog SF
- Support children's and adolescents' activities linked to agriculture and outdoor recreation
- Contribute to developing roads and trails, and to improving accessibility, especially in periurban areas
- Contribute to organised cooperation between agriculture, local authorities and voluntary organisations in the work on outdoor recreation, facilitating experiences and activities in cultural landscapes, forests and non-cultivated areas and the use of agricultural areas for recruitment and as a learning arena for children and adolescents
- Ensure cooperation with environmental authorities on the management of recreation areas, including the use of the large protected areas, and stimulate business development in the areas bordering the reserves
- Contribute to establishing competence networks for nature and culture parks

The Ministry of Agriculture and Food cooperates with the Ministry of Trade and Industry on the implementation of the *National Strategy for the Tourism Industry*. Tourism, nature experiences and local food are also an important part of the Strategy for Farm-based Business Development 2007 - 2009. Organised farm and nature experiences are a growing sector of the tourism industry. This also includes paying for access to outdoor recreation activities, e.g., guided walking, biking or horseback trips, fishing, hunting and helping out on farms.

A development programme for 'green tourism' has been initiated, funded via the Agricultural Agreement. The programme will focus on tourism in rural areas.

Via the Ministry's ownership of the Norwegian State Forest and Land Corporation (Statskog SF), recreational considerations are confirmed in the organisation's by-laws. The annual assignment to secure public services includes certain provisions regarding adaptations to increase the quality of and access to outdoor recreation on Statskog's land. There is a focus on recruitment, especially of children and adolescents. Statskog has numerous cabins for rent, in additions to cabins that can be used free of charge. These facilities enable people to enjoy the outdoors in most parts of the country.

The Ministry supports children's and adolescents' activities linked to agriculture and outdoor recreation through such organisations as 4H Norway, the Forest Extension Service Institute, the Norwegian Forest Museum and the Norwegian Forestry Society.

The municipal subsidy programme for specific environmental measures in agriculture enables the allocation of funds to road and trail development and the facilitation of improved accessibility. Such measures are especially important in regions with significant areas of contiguous farmland. Certain measures may also be funded via the *Regional Environmental Programme*, aimed at improving accessibility in the cultural landscape. Support can also be allocated to recreational measures within the framework of the business development and environmental subsidies in forestry. Municipalities can also stimulate local cooperation between agriculture, local authorities and voluntary organisations to keep the landscape open, increase and facilitate physical activity, outdoor recreation and nature experiences, and to use agricultural areas as a learning arena for children and adolescents. The Ministry of Agriculture and Food will initiate the development of organised cooperation between agriculture, municipalities and voluntary organisations.

The Ministry of Agriculture and Food will continue to cooperate with the Ministry of the Environment on the sustainable management, maintenance and use of protected areas. These efforts aim to, among other things, improve the management and maintenance of protected areas, and to clarify the framework conditions for commercial activities within and adjacent to the nature reserves. Policy instruments for business development along the edges of such reserves and in adjacent areas are available via various value creation programmes funded by the Agricultural Agreement.

Several projects based on nature and culture parks as a model for local community development have recently been initiated in Norway. This model involves creating added value from local assets linked to the cultural landscape and the natural and cultural heritage, and sustainable utilisation of these resources for community development, increased value creation and business development. Together with other ministries, the Ministry of

Agriculture and Food initiated the establishment of an experience and competence network of local and regional authorities who wish to test such nature and culture park projects.

2.1.7 Reindeer husbandry and the environment

Goal:
A viable reindeer industry that sustainably uses grazing resources and contributes to maintaining the distinctive character of the Sami culture

The reindeer industry is based on year-round grazing on natural mountain pastures and rangelands. One of the industry's main environmental challenges is the continuous adaptation of operations to available grazing resources. Ensuring the ecologically sustainable use of these resources will help to secure the future of reindeer husbandry as a continued mainstay of Sami culture.

Reindeer herding requires large tracts of land. The past decades have seen an increase of encroachments and disturbances within the grazing areas, thus resulting in even greater pressure on the remaining grazing resources. Finding ways to reduce this problem in the future is a major challenge.

Losses due to protected predators have been increasing in all reindeer herding regions, but there is extra reason for concern in parts of Troms, Nordland and Nord-Trøndelag. In certain *siidas* (Sami reindeer pasture districts), losses are so substantial that is difficult to maintain production herds. Poor grazing conditions lead to an increase of predator losses, and it is thus important to improve knowledge about the links between grazing management, land access, climate change and predator losses in reindeer husbandry.

Strategies and measures:

Secure the grazing resources necessary for sustainable reindeer operations, ensure sustainable management of grazing areas and reduce losses in the reindeer industry

- Implement the new Reindeer Management Act and ensure that necessary framework conditions for reindeer husbandry are determined, including district and *siida* borders, grazing periods and herd sizes
- Prepare guidelines, including indicators and criteria for determining herd sizes that ensure sustainable utilisation of grazing areas
- Emphasise the responsibilities of local and regional authorities regarding their role in securing reindeer herding areas through local and regional planning
- Increase awareness of reindeer husbandry when revising relevant regulations, with the aim of improving the protection of reindeer herding areas
- Increase the knowledge base related to production and causes of reindeer losses
- Increase the general knowledge of sustainable utilisation of grazing areas and commercial strategies

The new Reindeer Management Act was passed on 1 July 2007. The act places more responsibility on the reindeer industry for developing management rules, which include such aspects as maintaining ecological sustainability. Among other things, the management rules shall regulate the utilisation of grazing resources, herd sizes and the use of motorised vehicles. The act clarifies the reindeer industry's and authorities' involvement and responsibilities with

regard to adapting herd sizes to the available grazing resources, so that the goal of ecologically sustainable reindeer husbandry can be achieved. Also, a broad range of measures were introduced to ensure the efficiency of the reindeer industry in relation to other community interests.

A working group appointed by the Ministry of Agriculture and Food, consisting of researchers, reindeer owners, public administrators and public authorities, worked out a proposal for objective and scientifically based indicators for ecologically sustainable reindeer herd sizes. The reindeer industry's own assessment of grazing resources in relation to sustainable herd sizes shall also be emphasised. The proposal has been sent out for comments. The indicators are linked to the biological interaction between grazing resources, the animal's condition and reindeer yields. They are meant to function as a guideline and corrective for the management districts and authorities when determining reindeer herd sizes. The indicators are thus a common tool for the industry and authorities to help them assess the balance between herd sizes and available grazing resources. The Ministry of Agriculture and Food placed considerable emphasis on using the group's expertise on reindeer management, thus making sure that the indicators are accepted and ultimately applied by the reindeer industry.

The Ministry of Agriculture and Food will prioritise work on determining necessary framework conditions in all reindeer grazing areas. One of the challenges will be to clarify the boundaries between the spring, summer and autumn grazing areas of the various *siidas* in parts of Finnmark. In summer 2008, the pasture districts began formulating management rules pursuant to the new legislation. In late 2008 or early 2009, experience from this process will be able to uncover the possible need for other kinds of follow up, e.g., regarding the clarification of rights or privileges. The Ministry will address this issue when the implementation of the new act has made some progress.

Reindeer operations require a lot of land, partly due to the marginal quality of the grazing areas, but also due to the need for seasonal migration between different grazing regions. The Planning and Building Act is the most important policy instrument for securing the reindeer industry's resource base. Its new planning section provides new instruments that can be used in the work on protecting herding areas. Regional planning processes can determine regional provisions for securing core reindeer areas and prevent the encroachment on vulnerable areas. Especially vital areas for reindeer operations, such as calving grounds and migration routes can be shown as sensitive zones in land use plans. Coordinated and long-term land-use management is especially important for an industry that depends on using land across municipal and county borders. The inadequate geographical placement of measures results in negative multiplier effects, covering a larger area than necessary. Determining the correct geographical location as a result of good planning processes, however, could enable development without increasing the negative effects on the reindeer industry.

The Ministry of Agriculture and Food has considered it necessary to strengthen interministerial cooperation, thereby facilitating greater focus on an integrated approach to land-use management within the Sami reindeer herding areas. A project has been established in which the following ministries are involved: Agriculture and Food, Environment, Local Government and Regional Development, Labour and Social Inclusion, Petroleum and Energy, Defence, Trade and Industry, and Justice and the Police. In the project, the ministries shall elucidate and specify needs and possibilities, and also assign responsibilities regarding the follow up of regulations and improved communication and cooperation between the reindeer

industry and other land-use interests. Measures are to contribute to the fulfilment of national and international commitments concerning Sami reindeer herding operations.

Large losses to predators affect production in the reindeer industry. One of the consequences is that meat yields are reduced, since the losses prevent systematic selection and make it harder to optimise a herd's gender and age composition than before. The large gap between applications for predator compensation payments and actually compensated losses has raised the level of conflict between reindeer herders and the authorities. The efforts to document predator losses must thus be increased. It is also necessary to closely examine regional and local differences in the causes of losses. In contrast to parts of Finnmark, overgrazing is not a problem in Nord-Trøndelag, Nordland and Troms, but nevertheless these regions suffer considerable losses that affect yields and profitability. Extensive studies are being initiated to document production and losses in these areas. Knowledge generated by the project shall contribute to reducing losses, ensuring profitability and the implementation of predator prevention measures.

It is furthermore necessary to maintain a high standard of knowledge regarding sustainable reindeer husbandry, including research on the effects of policy instruments, various herding systems, operational organisation and adaptation, i.e., knowledge about ecological sustainability and commercial strategies. The effect of climate change is also a central issue. Another challenge for research is the issue of maintaining the balance between the reindeer industry, other commercial activities and the needs of society as a whole.

2.1.8 Conservation and use of genetic resources

Goal:
Maintain food security and sustainable agriculture through conservation and use of agriculture's genetic resources

Genetic resources are the basis for the perpetuation of life. Agricultural progress through plant and animal breeding depends on the access to genetic variation. Conserving genetic resources and ensuring their sustainable management are thus necessary for maintaining biodiversity and food safety, the quality of life and the welfare of future generations. Access to genetic resources is vital for being able to adapt plants and animals to new growing conditions, climate change, and new and altered plant and animal diseases. Genetic diversity also forms the basis for increasing yields and complying with new environmental requirements or consumer demands.

Norway is responsible for securing its genetic resources. This commitment is affirmed in the UN Convention on Biodiversity (CBD), the International Treaty on Plant Genetic Resources for Food and Agriculture and other international agreements. The issue is also pursued in the context of Nordic cooperation.

Genetic resource conservation in Norway is part of an international joint effort, through which we preserve our national genetic material and make it available to other countries, while at the same time gaining access to their genetic resources.

Strategies and measures:

Enhance the efforts to manage agriculture's genetic resources

- Strengthen the Norwegian Genetic Resource Centre and follow up action plans for the conservation and sustainable use of genetic resources of crops, livestock and forest trees
- Strengthen and maintain sustainable plant and animal breeding in agriculture
- Increase diversity of cultivated species and varieties, enhance the conservation and sustainable use of wild relatives and other variants of useful plants and implement operative national rules for marketing conservation varieties and non-registered varieties in 2009
- Include genetic resource considerations in the management of cultural landscapes and in management plans for nature protected areas
- Consider subsidy programmes for old livestock breeds with regional ties under the auspices of regional environmental programmes
- Enhance the knowledge base for sustainable use, management and improvement of genetic resources

Strengthen and renew Nordic genetic resource cooperation

- Participate actively in the development of strategies for Nordic environmental and genetic resource efforts and contribute to strengthening and developing NordGen

Strengthen international work and contribute to following up international commitments to ensure access to genetic resources and benefit sharing

- Participate in and contribute to strategy development in relevant international and national fora and processes
- Actively follow international processes on access and rights to genetic resources
- Implement the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Norwegian legislature
- Enhance and make visible farmers' involvement in the management of genetic diversity
- Establish, as of 2009, annual contributions to the ITPGRFA Benefit Sharing Fund equivalent to 0.1 % of the sales value of seedstock in Norway, and work on securing equivalent contributions internationally
- Follow up FAO's Global Action Plan for Farm Animal Genetic Resources
- Take on responsibility for the Svalbard Global Seed Vault

The Norwegian Genetic Resource Centre works on the conservation and sustainable use of genetic resources of livestock, crops and forest trees via national programmes and action plans. Major elements of the centre's activities include outreach, registration, monitoring and a broad range of cooperation with public institutions, the commercial sector and voluntary organisations. The centre shall promote the active use of genetic resources for business development by focusing on information, accessibility, labelling schemes and consulting. It is also the National Focal Point of the international network for genetic resources, and it coordinates reporting. The Ministry of Agriculture and Food shall strengthen several aspects of the centre. There will be increased focus on work linked to wild relatives and other variants of useful plants, fish genetic resources and Nordic cooperation.

Furthermore, the Ministry shall also work on ensuring that sustainability forms the basis of ongoing farm animal, plant and forest breeding activities.

The Norwegian seed regulations, formulated to comply with the EEA Agreement, make it difficult to use material from the Nordic Gene Bank and old varietal material from other collections. The regulations are now being revised and are scheduled to be completed in 2009. The revisions are to ensure that old varieties and non-registered material can also be used and marketed. Norway will also follow up the process within the EU regarding the revision of directives on the marketing of conservation varieties, amateur varieties and seed mixtures of wild species. The Ministry of Agriculture and Food also wishes to facilitate the development of appropriate regulations for such varieties.

The protection of cultivated plants and their wild relatives in their native habitats is an important contribution to the conservation of genetic resources. Genetic resources are also an aspect of the value of preserving cultural landscapes. Taking valuable genetic resources into consideration must be emphasised in the management of farming landscapes and included in the further work on maintaining specific cultural landscapes. Environmental authorities are working on a scheme for the surveillance of protected areas as a basis for landscape management and maintenance. Genetic resource considerations must be included and the Ministry of Agriculture and Food will help to ensure this.

Regional environmental programmes and associated subsidy schemes funded by the Agricultural Agreement help to focus the environmental efforts in agriculture, see Chapter

2.1.2. Subsidies linked to old livestock breeds with regional ties are to be assessed in connection with the renewal of the *Regional Environmental Programme*.

There is a need for cross-cutting, research-based knowledge about the sustainable use of agricultural genetic resources for both commercial use and conservation purposes, and about issues concerning rights and access to genetic resources. This applies especially to new technologies and new issues arising from the increasing value of genetic resources. Climate change will increase the need for utilising a broader range of genetic diversity, and thus boost the relevance of the before-mentioned issues.

Nordic genetic resource cooperation includes gene banks for plants and animals and collaboration in the field of forest genetic material. On 1 January 2008, all of these joint efforts were merged in the new Nordic institution, NordGen. The Ministry of Agriculture and Food will work to also enhance Nordic cooperation between NordGen and the respective national programmes.

Ensuring access to genetic resources and benefit-sharing is being actively followed up in relation to the Convention on Biodiversity (CBD), in the FAO and through the ITPGRFA – in the form of actions and policy development.

The International Treaty on Plant Genetic Resources became operational in 2006 with the ratification of the *Standard Material Transfer Agreement* (SMTA). The Ministry of Agriculture and Food will ensure that Norway implements the commitments made in the Treaty. The Norwegian Genetic Resource Centre is to monitor the introduction and use of the SMTAs and carry out necessary information responsibilities in this connection. The Ministry shall also contribute to following up international agreements under the auspices of the Nordic Council of Ministers, especially regarding plant genetic material which is under joint Nordic management.

Norway has initiated assessments of farmers' rights and their contributions to the sustainable conservation of plant genetic resources through active use. The initiative contributed to a resolution on farmers' rights at the autumn 2007 session of the Treaty's Governing Body. Norway will play a bridge-building role in the follow up of the International Treaty's provisions on this issue, including the 2009 Governing Body session. As part of the ITPGRFA, a Benefit Sharing Fund was established for the conservation and development of plant genetic resources in developing countries to support the work of farmers. Starting in 2009, Norway will make an annual contribution equivalent to 0.1 % of the gross sales value of seedstock, and work on securing equivalent contributions to the fund from other OECD countries.

The Ministry of Agriculture and Food is taking part in the implementation of the International Convention for the Protection of New Varieties of Plants (UPOV 1978). Such issues linked to UPOV and other intellectual property rights are a part of EFTA's negotiations with third countries on trade agreements. The Ministry shall continue to follow the interministerial cooperation on intellectual property rights, and focus on Norway's continued bridge-building role and the right of countries to maintain regulations that are adapted to farmers' needs regarding seed use and exchange.

Norway supported the FAO's development of a Global Plan of Action for Farm Animal Genetic Resources, which was adopted by the Interlaken Declaration in September 2007.

Norway will contribute to the implementation of the action plan by, among other things, propose capacity-building measures related to rights and access in connection with the exchange of animal genetic resources.

The Svalbard Global Seed Vault, which was opened in February 2008, is a significant contribution to the conservation of plant genetic resources for global agriculture and food security. The vault holds duplicate samples, or "spare" copies, as an ultimate backup for gene banks, and will be especially important for developing countries. The Ministry of Agriculture and Food has the overall responsibility for ensuring reliable, long-term operations of the Svalbard Global Seed Vault.

2.1.9 Invasive alien species

Goal:
Avoid the introduction and limit the spread of invasive alien species

Most plants and animals that have been introduced to Norway by human activity have been to our benefit and pleasure, as food crops, livestock and ornamentals. However, introduced species can have highly undesirable characteristics as pests, diseases or as competitors of native plants and animals. The introduction of invasive alien species can have considerable effects on Norway's agriculture with regard to plant and animal health and food security. The spread of insects and ticks that transmit plant and animal diseases may also increase. If this happens, the infection pressure on plants and animals will grow. Intentionally or unintentionally introduced invasive alien species could pose a threat to biodiversity, the cultural landscape and outdoor recreation. This in turn could result in the need for a revision of measures and contingency plans within the entire sector.

In Norway's *Cross-sectoral Strategy on Invasive Alien Species* (2007), introduction is defined as "the movement by human agency, direct or indirect, of an alien species outside its natural range. This movement may be either within a country or across national borders". Alien species can also be spread naturally, e.g., by own movements (animals) or seed dispersal (plants). Nevertheless, intentional or unintentional human actions obviously contribute to the spread of alien species. Trade and travel play a major role. Knowledge about the introduction of and measures against invasive species are key factors in the efforts to prevent introduction and limit the spread of already introduced invasive species.

The various sectors have different approaches to the issue of invasive alien species. It is thus necessary to identify responsibilities, regulations and grey zones between regulations. Such "holes" must be patched. In connection with infestations of the pest slug *Arion lusitanicus*, we recognise the need to identify and provide appropriate measures to reduce/prevent serious effects on the agricultural sector, home garden owners and biodiversity in general. There are also cases of introduced species where the effects on native plants and animals are not fully understood (such as the harlequin ladybird, *Harmonia axyridis*). In such cases, the Ministry of Agriculture and Food considers it appropriate to cooperate with the environmental and other relevant sectors regarding various measures.

Strategies and measures:

Follow up the national initiatives against invasive alien species

- Implement measures pursuant to the Norwegian *Cross-sectoral Strategy on Invasive Alien Species*
- Contribute to research on the effects of and countermeasures against alien organisms that are classified as plant pests or animal diseases
- Contribute to enhancing knowledge, assigning responsibility and improving the understanding of the consequences of importing alien and harmful species
- Participate in the work on identifying and providing appropriate measures to prevent serious effects on agriculture and biodiversity, including cooperation with the general public and various stakeholders

- Clarify the sector's responsibilities and stimulate cooperation on strategies for identifying and "patching holes" in the regulatory system
- Follow up the action plan and the nationwide voluntary efforts, and contribute to research aimed at controlling the pest slug *Arion lusitanicus*

To effectively reduce the threat of invasive alien species, a targeted and coordinated cross-sectoral effort is required. Norway's *Cross-sectoral Strategy on Invasive Alien Species* was presented in spring 2007. Among other things, the strategy includes a series of measures within the responsibilities of the agricultural sector, such as enhancing efforts to prevent the spread of alien pathogens from agriculture to wild species and ecosystems and the improved mapping and monitoring of alien tree species as part of the National Forest Inventory.

The research programme *Environment 2015* funds research on the effects of introducing alien species and genotypes on native species, production systems and ecosystems.

Increasing the general public's knowledge of the consequences of importing plants, animals or products that are carriers of harmful organisms will contribute to increased awareness and understanding. This in turn will influence people's behaviour and stimulate a sense of responsibility. Information campaigns (posters at important ports of entry) that aim to inform the general public as well as importers of plants and animals are relevant measures.

Invasive alien species often exhibit high rates of reproduction and dispersal and can represent both a health and an ecological problem. The giant hogweed (*Heracleum mantegazzianum*) is phototoxic, and also an ecological problem since the species displaces native plants wherever it becomes established, thus leading to a loss of biodiversity. Countermeasures can be carried out by municipalities in cooperation with farmers and other parties, such as the Norwegian Public Roads Administration and voluntary organisations. This shows that cooperation between the general public and various stakeholders can help to identify and provide appropriate measures to prevent serious consequences for both agriculture and biodiversity.

The Ministry of Agriculture and Food will contribute to coordinating regulations to avoid that necessary measures end up not being covered by any of the various sector regulations.

The Ministry of Agriculture and Food intensifies its efforts to control the pest slug *Arion lusitanicus* by allocating funds to strengthen research on the issue, and by following up the action plan for which Bioforsk, the Norwegian Food Safety Authority, the Norwegian Horticultural Society and the Norwegian Association of Horticultural Producers are jointly responsible. Major tasks in this connection include nationwide voluntary efforts, obtaining knowledge about effective measures and the exchange of information.

2.1.10 Genetically modified organisms (GMOs)

Goal:
Prevent unintentional GMO contamination of conventional and organic crops

So far, no genetically modified organisms (GMOs) have been approved for cultivation in Norway. Norwegian policies on this issue are restrictive. We thus have little experience with how GMOs affect biodiversity in Norway. However, we do depend on importing both feed and seeds. Unintentional GMO contamination is thus a possibility, and could lead to the unintentional spread of GMOs.

Strategies and measures:

Continue restrictive policies to avoid unintentional GMO contamination and ensure the right of producers and consumers to choose non-GMO products

- Establish restrictive national crop-growing and compensation regulations to prevent GMO contamination of conventional and organic feed crops
- Work nationally and internationally to prevent that the need for fuels results in using arable farmland to grow genetically modified energy crops
- Ensure the right of producers and consumers to choose non-GMO products
- Ensure the development of reliable analysis methods for detecting GMOs and reliable assessments of the risks associated with the use of GMO products, including knowledge about GMO coexistence
- Help Norwegian scientific communities maintain and develop knowledge about the detection and effects of GMOs
- Ensure that Norway works internationally to:
    - achieve zero tolerance of GM content in seeds labelled 'GMO-free'
    - maintain access to GMO-free food, seeds and feed
    - enable the organic food sector to continue non-GM production
- Support non-GM production of feed (e.g., soybeans) in countries receiving foreign aid

Farming areas that can be used to produce food, both nationally and internationally, are extremely valuable and should not be used for other purposes, such as growing crops for fuel production. Many producers see the potential for financial profits that can be achieved by growing genetically modified fuel and energy crops, as well as GM food and feed crops.

Most countries currently producing genetically modified crops lack rules to prevent GM crops from co-mingling with conventional and organic crops, i.e., so-called *coexistence regulations*. Internationally, the Ministry of Agriculture and Food is trying to secure Norwegian interests in this area, especially in connection with the implementation and development of EU regulations. The European Union has not determined the thresholds for unintentional GMO contamination in seeds. To enable consumers to choose non-GMO and organic food, Norwegian authorities are working on, among other things, achieving a zero tolerance of GM content in seeds labelled 'GMO-free'. Norway is also supporting the efforts of the Cartagena Protocol to prevent possible adverse effects resulting from transboundary movements of

living modified organisms (LMOs), and to establish international regulations for liability and compensation.

So far, the effects of genetically modified organisms are not sufficiently known. For this reason, Norwegian agrifood authorities wish to apply a precautionary and restrictive approach to the use of GMOs in Norway. Furthermore, consumer surveys have shown that the majority of consumers do not wish to eat GM-food. Based on such factors and due to environmental considerations, we will make efforts to enable consumers to maintain their right to choose non-GMO food in Norway.

Research shows that certain GM crops, such as rape, and their wild, native relatives can cross-pollinate, thus causing the spread of new/undesired genes among wild plants. This shows how important it is to ensure new knowledge about these issues based on a precautionary approach.

It is also necessary to reinforce national crop-growing regulations to prevent unintentional GMO contamination. The Norwegian Food Safety Authority has made a proposal for coexistence regulations, which are now being evaluated. The Norwegian Agricultural Authority proposed compensation rules for cases of GMO contamination in conventional crops. These regulations shall help to prevent unintentional contamination from GM material in both conventional and organic crops.

To avoid GMO contamination in conventional and organic products, it is vital that non-GMO seed stock is used. To assure the use of non-GMO seeds, it is important that product labels confirm that the seeds are GMO-free. Norway will thus make international efforts through EU bodies and other relevant fora (Cartagena Protocol, Codex) to gain acceptance for the labelling of seeds with detectable traces of GMOs. In addition, it is important to establish strict crop-growing regulations that can contribute to the clear separation of GM and conventional/organic crops. This will help maintain the access to non-GM food, seeds and feed, and enable the organic food sector to continue non-GM production.

Norway depends on imports of certain feedstuffs, including soya. With the increasing spread of genetically modified varieties, it is important that Norway plays a more active role to secure access to non-GM feedstuffs, e.g., by actively establishing or maintaining profitable production of non-GM feed crops in developing countries. This could involve that Norway must be willing to make financial contributions, either by paying more for the products or by allocating funds to specific projects.

2.2 Conservation and use of cultural heritage

2.2.1 Cultural monuments and cultural environments in agriculture

Goal:
Manage the diversity of cultural monuments and environments in agriculture as a basis for knowledge, recreation and value creation

Many of Norway's automatically protected cultural monuments, cultural monuments protected by order and other cultural monuments and environments are to be found on agricultural properties. Farm owners, farm operators and agricultural authorities are making considerable efforts to protect this cultural heritage. A lot of the work to protect cultural monuments in agriculture are part of the joint efforts and cooperation on the rural cultural landscapes between agricultural, nature conservation and cultural heritage authorities, see also Chapter 2.1.2.

Today's inventories of cultural monuments in agricultural areas are inadequate, regarding both quality and coverage. This can lead to, e.g., the destruction of vulnerable cultural monuments in forests due to lacking awareness of the sites. Archaeological heritage above and below the ground surface is susceptible to damage, e.g., in connection with changing land-use. To ensure that a larger share of cultural monuments are registered, the subsidy scheme for archaeological surveys in connection with small-scale private activities, which is funded by the Ministry of the Environment, has been expanded so that the State now to a greater degree than before covers expenses for archaeological investigations in agriculture as well.

Agriculture is continuously changing due to technological and economic developments. One of the challenges we are now facing are the large new farm buildings, which require additional considerations regarding their place within existing cultural environments and landscapes. At the same time, many old buildings are losing their function, and it is a challenge to find new uses for them so that they can be maintained and provide reasonable returns.

Strategies and measures:

Contribute to developing appropriate methods for surveying and monitoring cultural monuments in agriculture

- Implement a 5-year national programme for agricultural buildings and cultural landscapes to ensure information/knowledge about the design and use of old and new agricultural buildings, including a survey of the status of historically important buildings
- Contribute to developing the knowledge base and assess registration methods that could be relevant for cultural monuments in forest and non-cultivated areas
- Extend the cultural monument monitoring programme under the auspices of the Norwegian Forest and Landscape Institute

Maintain geographically diverse cultural monuments and environments in agriculture through active use of land resources and value creation based on the cultural heritage

- Continue and enhance efforts to protect cultural monuments and environments in agriculture in second-generation regional environmental programmes and municipal subsidy schemes
- Make it easier to conserve cultural monuments by using them as a part of agro and rural tourism operations
- Contribute to preparing a national protection plan and guidelines for the management of state-owned conservation properties
- Develop strategies for protecting buildings on mountain summer farms and develop their use and business opportunities linked to these environments, see Chap. 2.1.2

It is important to have sound knowledge of the location and condition of our cultural monuments. The Ministry of Agriculture and Food is conducting a 5-year national programme on agricultural buildings and cultural landscapes. The programme is studying how new buildings can be adapted to the cultural landscape, and how they can be accommodated to existing or new farmyard environments. The programme will also include finding ways to develop new functions for old and vacant agricultural buildings. The Ministry is thereby following up the intentions of the Report to the Storting No. 16 (2004 – 2005) on long-term maintenance of cultural monuments (*Leve med kulturminner*). This will enhance knowledge needed to target the efforts to maintain a representative selection of agricultural cultural monuments.

The Ministry of Agriculture and Food supports a project managed by the Norwegian Forest and Landscape Institute, *Environmental inventories in forest-cultural monuments*, which contributes to developing the knowledge base and evaluating the relevance of registration methods. An increasing number of forest planning projects are now also registering cultural monuments. The project also contributes to increasing the cultural heritage authorities' activities concerning the acquisition of sound knowledge about cultural monuments in forests and on non-cultivated land.

Farming landscapes are monitored via the *Norwegian Monitoring Programme for Agricultural Landscapes* (See Chapter 2.1.2), as well as the monitoring systems of the Directorate for Cultural Heritage.

The municipal environmental funds (SMIL) provide annual support to the repair of protected buildings and buildings with historical value. The agricultural sector also has access to several subsidies from the regional environmental programmes for the management and maintenance of cultural monuments and environments. The most significant of these is the subsidy for the operation of seasonal mountain dairy farms. Evaluation of the regional environmental programmes shows that the subsidies for maintenance of cultural monuments have been successful. The Ministry of Agriculture and Food will facilitate the enhancement of such programmes, and promote the establishment in more counties when the second generation of regional environmental programmes comes into operation in 2009.

Through the work on "green tourism", one wishes to maintain and develop agricultural cultural monuments as an asset for the Norwegian tourist industry. Farm buildings and farmyard environments with historical value can be utilised as a resource for business development and value creation. The Ministry of Agriculture and Food will facilitate a good dialogue between practitioners and environmental and agricultural authorities to ensure that

“protection by use” can contribute to economic growth as well as the appropriate protection of cultural monuments.

The Norwegian State Forest and Land Corporation (Statskog) owns numerous buildings and facilities that earlier were used for commercial operations. Statskog is going to prepare a national protection plan and guidelines for the management of its properties with historical value. The plan will be prepared in accordance with guidelines issued by the Directorate for Cultural Heritage. The Norwegian Institute for Agricultural and Environmental Research (Bioforsk), also in cooperation with the Directorate for Cultural Heritage, is currently finalising a national protection plan and an associated management plan for a selection of state-owned buildings/properties linked to crop research.

Transhumance, including the use of summer dairy farms in the mountains (Norweg. *seter*), is an important part of Norwegian cultural heritage. The landscapes that developed around these summer dairy farms show numerous unique characteristics. The number of summer dairy farms has been steadily declining, in the same way as farm numbers in general have decreased. However, extra measures funded by the regional environmental programmes contribute to maintaining summer farm localities. Thus, Norway has managed to preserve a culture that is rapidly disappearing elsewhere in Europe. The Ministry of Agriculture and Food will continue to develop strategies to protect buildings on the mountain summer farms and develop their use and business opportunities linked to these environments. A 5-year project in the counties of Hedmark, Oppland and Møre & Romsdal is focusing on developing business opportunities linked to the summer dairy farms. The continued use and conservation of these farms in adaptation to modern agriculture is a central issue. The regulations are therefore developed to accommodate future use, also within protected areas. In 2007, the Ministry made some changes to the regulations on summer dairy farms, etc. on state-owned common land regarding the expansion of user rights. It is thus permitted to combine agricultural and touristic utilisation of summer dairy farms and to renovate the farm buildings if they no longer are being used for their original purpose. This enables the mountain farm facilities to benefit the main farm in a different way, while also preserving the cultural heritage of the *seter* areas.

2.3 Clean waters and a non-toxic environment

2.3.1 Nutrient runoff and erosion

Goal:
Contribute to securing a good ecological status of aquatic ecosystems

Phosphorus and nitrogen runoff and soil particle erosion reduce the water quality in watercourses. Agriculture has implemented several extensive measures, such as stopping point source pollution from manure cellars and silos. There have also been efforts to reduce nutrient runoff and erosion from diffuse sources (nonpoint source pollution). These efforts have given good results, and the water quality in numerous lakes and watercourses has been significantly improved since the 1970s.

However, further reductions of nonpoint source phosphorus runoff in certain watercourses are necessary, cf. the water framework directive discussed below. Phosphorus is considered to be the main challenge regarding agriculture's effect on our freshwater resources. Efforts are therefore being directed at especially vulnerable areas, such as Vansjø (a lake) and watercourses in the south-western region of Jæren. According to recent knowledge, erosion control measures and optimised phosphorus fertilisation are extremely important. Soil P contents must be kept at normal levels to avoid considerable losses to watercourses. It is essential that new standard fertilisation recommendations are applied.

Another important part of the efforts has been to meet the requirements of the North Sea Declarations on a 50 percent reduction of Norwegian phosphorus and nitrogen discharges to the most vulnerable area in the North Sea and Skagerrak. The phosphorus reduction target has been achieved, but we have still not fulfilled Norway's commitments concerning nitrogen runoff to the most vulnerable area in the North Sea. Agriculture is the largest single source of nitrate runoff.

The main goal of Norway's water management regulations (*Vannforvaltningsforskriften*), a follow up of EU's water framework directive, is that all water resources shall achieve a "good ecological status" regarding both pollution and biodiversity by 2015 and 2021, respectively, see the Report No. 26 to the Storting (2006-2007). Several of the watercourses affected by agriculture do not have a good ecological status, and further actions are thus needed to reduce the nutrient load caused by agricultural runoff.

Strategies and measures:

Facilitate a reduction of erosion and nutrient runoff in watercourses polluted by agriculture

- Provide agricultural authorities with a legal basis for placing more stringent environmental demands on agriculture in heavily polluted watercourses and coastal areas
- Approve and implement second generation regional environmental programmes, additionally targeting vulnerable water resources and facilitating more administratively efficient schemes by cross-county harmonisation
- Evaluate the municipal environmental funds (SMIL scheme)

- Improve the focus of the SMIL funds on measures for mitigation of polluted watercourses

Facilitate a more efficient utilisation of fertiliser nutrients

- Continue research on the issue
- Revise the manure management regulations to increase utilisation of nutrients
- Contribute to improving fertilisation planning software
- Improve spreading methods and their employment

Work on keeping cadmium in phosphorous mineral fertilisers at a low level and not above approved threshold values

- Participate in and influence EU's regulatory process, thereby attempting to keep the Cd threshold value at a low level and maintaining current regulations

The water framework directive provides the basis for work that will be carried out in the counties. All those operating farm enterprises must become involved in order to take the steps that are required to reduce pollution. Measures will be initiated via regulations and through financial policy instruments in the regional environmental programmes in agriculture, e.g., by assigning the legal authority to prescribe measures in the most heavily polluted watercourses. The aim is to tailor-make measures to mitigate the most significant environmental challenges.

Several pollution-related financial instruments are available via the regional environmental programmes, with the subsidies under the *Changed soil tillage* scheme as the most substantial. The regional programmes have been revised and their continuation includes such changes as introducing more clear-cut geographic boundaries and implementing more stringent environmental requirements in order to increase goal attainment. This enables such strategies as combining different measures in areas with vulnerable water resources. The municipal environmental funds (SMIL) are to be evaluated in i 2009, and will also be seen in relation to the second generation regional environmental programmes.

Nutrients in farmyard manure are currently not being utilised well enough. The development of knowledge about nutrient utilisation will thus receive priority. Poor utilisation leads to a considerable nutrient surplus in livestock farming areas. This in turn results in the runoff of phosphorus and nitrates to lakes and watercourses and gaseous emissions of ammonia and nitrous oxide. More of the manure being applied should be spread using environment-friendly spreading technology and/or should be quickly incorporated into the soil. The national pilot project for eco-friendly manure management will be expanded to ensure a faster transition. To increase the utilisation of manure nutrients, the Ministry of Agriculture and Food will revise the regulations pertaining to the storage, spreading and management of farmyard manure. The Ministry will also contribute to the revision of fertilisation planning software to ensure that environmental and resource considerations make up part of the farmers' decision making process regarding manure management. This effort involves close cooperation between research, public authorities and farmers. One approach could be conducting projects to ensure the rapid implementation and testing of new knowledge and research results. Furthermore, the application of these tools by practitioners must be ensured through extension activities and by arranging courses.

In 2008, the Ministry of Agriculture and Food initiated a pilot project that subsidised farmland on which manure was applied with a band spreader, manure injection equipment or incorporated shortly after application. The project stimulates farmers to reduce ammonia

losses, thus reducing the need for mineral nitrogen fertilisers. These manure spreading methods also reduce the risk of phosphorus and nitrogen runoff.

The Ministry of Agriculture and Food is also working to avoid the contamination of farm soils with toxic substances contained in the applied fertilisers. In this context, the Ministry is making efforts to ensure that regulations, public administration and use of mineral and organic (sludge and compost) fertilisers are optimised at any given time. Currently, Norway accepts a maximum limit of 100 mg cadmium per kg phosphorus in mineral fertilisers, and wishes to continue such a restrictive approach.

2.3.2 Pesticides

Goal:
Maintain Norway's high health and environmental standards related to the use of pesticides

For a number of years, Norwegian agrifood authorities have been actively trying to reduce the use of pesticides and the risks associated with their use. The first action plan related to pesticide use was implemented in 1990. The EU is now focusing on the correct use of pesticides.

The Action Plan for Reducing Risks Associated with Pesticide Use (1998-2002) was evaluated in 2003. The evaluation committee concluded that overall assessment of the effects of the measures indicates that there was a reduction of both health and environmental risks of at least 25 percent in the course of the plan period. The plan's overall objective has thus been achieved. In spite of this positive trend, there is room, as well as a need, for improvements. Among other things, pesticide residues are being detected in aquatic environments. Also, several of the steps taken by the action plan are of long-term character, and thus depend on continuation if their effects are to be maintained. Based on these aspects, an extended action plan for 2004-2008 was drawn up. This plan determines goals and measures related to pesticide use. Norwegian agriculture aims to become less dependent on chemical pesticides and to further reduce the risk of negative effects on human health and the environment.

Strategies and measures:

Reduce risks associated with the use of chemical pesticides

- Ensure the accomplishment and evaluation of the *Action Plan for Reducing Risks Associated with Pesticide Use* for the period 2004-2008, and consider the preparation of a new action plan
- Ensure that regulations and public administration pertaining to pesticide use contribute to maintaining high health and environmental standards
- Maintain the possibility of having stringent pesticide regulations
- Enhance knowledge about health and environmental risks associated with pesticide use

Reduce the use of and dependence on chemical pesticides

- Transfer knowledge from organic agriculture to agriculture in general
- Stimulate the increased use of integrated plant protection and biological pest control
- Support research on biological pest control and integrated plant protection

The measures of the *Action Plan for Reducing Risks Associated with Pesticide Use* are based on the following main elements:

- Approved pesticides with as good an environmental profile as possible
- Improved knowledge among users
- Optimal framework conditions for reducing risks associated with pesticide use
- Pesticide residue monitoring
- Long-term knowledge development

The Ministry of Agriculture and Food will evaluate the current action plan. Based on this evaluation, the need for a new action plan will be assessed.

Regulations regarding the marketing of pesticides are included in the EEA agreement, but Norway and the other EFTA/EEA countries are exempted from these provisions. The reason for wanting to keep our national regulations was that we had an effective pesticide approval scheme that enabled having more stringent health and environmental standards than required by EU regulations.

Our restrictive regulations imply, e.g., that in order to approve a new pesticide, an overall assessment must show that the formulation has to better than, be equally suited as or have certain advantages over pesticides currently approved for the same use (substitution principle). Furthermore, Norway has a 5-year approval period. In this way, Norway has been able to make continuous improvements by withdrawing many old substances with harmful effects from use.

The Ministry of Agriculture and Food finds it essential to maintain restrictive regulations and administrative routines for pesticide use to ensure a high level of safety for the environment, users and consumers. This implies, among other things, that Norway must continue to be able to take specific national environmental conditions into consideration when assessing pesticides for use in Norway. Furthermore, the Ministry considers it significant to incorporate the substitution principle in the regulations. The Ministry also sees the importance of research on the environmental effects of pesticide use, including pesticide drift, transport, binding, degradation and ecological effects of fungicides, insecticides and herbicides in terrestrial and aquatic ecosystems, as well as combination effects.

Furthermore, the Ministry of Agriculture and Food will make efforts to increase the use of integrated plant protection. Integrated plant protection involves using pesticides in combination with other measures, such as various agronomic measures (crop rotation, seeding date, etc.), and biological pest control. Integrated plant protection, in addition to pest monitoring and warning systems, is thus an important measure for reducing pesticide use.

The increasing popularity of organic agriculture reduces the risk of pesticide residues in food and the environment, since the use of chemical pesticides is not permitted in organic farming, see Chapter 2.3.4. The knowledge gained from this production method plays an important role in reducing the use of pesticides in conventional agriculture.

In the opinion of the Ministry of Agriculture and Food, research on biological pest control and integrated plant protection is important and should be continued.

2.3.3 Recycling and utilising resources in organic by-products and wastes

Goal:
Contribute to reducing the amount of food waste and utilising valuable resources in organic waste materials

Within the agrifood sector, numerous sources of organic matter are generally seen as being useless (residues and wastes). An important environmental measure is thus finding ways to utilise such resources, e.g., as livestock feed or biogas substrates. It is also necessary to focus on minimizing food waste as a strategy for waste reduction. The increase in food waste is linked to increasing affluence in society, and represents an ethical as well as an environmental challenge.

The soil is the first part of the food chain and an important basis for securing safe food. The recycling of plant nutrients and organic material to farm soils must not have negative effects on human health and the environment.

Strategies and measures:

Facilitate improved utilisation of resources in organic waste materials

- Facilitate reduced waste production throughout the food chain in cooperation with the sectors and consumers
- Contribute to enhancing ethical and environmental awareness to reduce food waste throughout the entire food chain, including awareness campaigns directed at the general public, schools and kindergartens, in addition to cooperation with the Ministry of the Environment, the Norwegian Association of Local and Regional Authorities and commercial enterprises
- Ensure the environmental benefits of utilising food waste. The Ministry of Agriculture and Food will
  - contribute to increased control and knowledge about organic waste treatment and the contents of environmental toxic substances and the health and environmental effects of these substances
  - ensure that the utilisation of phosphorus resources as a plant nutrient in Norwegian agriculture is optimised
  - contribute to R&D and investment support for biogas-related projects
  - ensure that the regulations contribute to utilising valuable components in food resources (as food, feed, soil amendments and energy source)

A lot of the food waste is probably caused by food being unnecessarily thrown away. Ideally, however, all produced food that can be consumed should also be used as food. The food retail industry suggests that date marking could be one of the reasons why stores throw away consumable food. The relevant regulations are meant to ensure both food safety and quality, but it is mainly the market participants themselves who define the different limits. The Ministry of Agriculture and Food is positive about the food trade's initiative to evaluate the issue. All parts of the food value chain ought to be challenged, including producers and consumers. In this context, improvement can be considered in such areas as packaging,

treatment to extend shelf-life, labelling and logistics. The Ministry will challenge and cooperate with market participants to find more eco-friendly solutions to the waste problem.

Discarding food unnecessarily is both an ethical and an environmental problem, especially in a world in which food shortage and climate issues are on the agenda. The Ministry of Agriculture and Food will contribute to enhancing ethical and environmental awareness to reduce food waste, including awareness campaigns directed at the general public, schools and kindergartens. The Ministry will also request cooperation with the Ministry of the Environment, the Norwegian Association of Local and Regional Authorities and commercial enterprises to provide and implement measures to reduce food waste in the food-processing industry, the food wholesale and retail trade, the food service industry and consumers.

The environmental benefits of utilising food waste must be ensured. Animal by-products not intended for human consumption, such as wastes from slaughterhouses, the food service industry and the food-processing industry are valuable resources for the production of feed, fertilisers and soil amendments. Organic fertilisers and soil amendments marketed in Norway shall comply with the provisions of the Regulation on fertilisers etc. of organic origin.

Large amounts of sewage sludge and compost are annually produced in Norway. Compost and sewage sludge can be used as a soil amendment and fertiliser in agriculture. Sufficient knowledge and control of the substances that are recycled to farm soils are needed to avoid the accumulation of heavy metals and/or organic toxic substances in the soil. It is important to cooperate with the municipal waste-management sector on this issue. Via KOSTRA, the municipality-state reporting system, producers of sewage sludge are obliged to report to the Norwegian Food Safety Authority on produced and marketed quantities, mode of application and sludge composition. The municipality in which sludge will be used shall be notified prior to sludge application. The Ministry of Agriculture and Food will contribute to improving control and providing more knowledge about the contents and concentrations of possible environmental toxic substances in the organic material, and about any related health and environmental effects.

Phosphorus in plant-available forms with few contaminants is a limited global resource. At the same time, excess and unutilised phosphorus can lead to pollution of watercourses and lakes, see Chapter 2.3.1. Utilising phosphorus from sewage sludge and food-industry by-products is an example of recycling a non-renewable resource. Returning phosphorus from wastes and by-products to the soil completes the cycle. The Ministry of Agriculture and Food will ensure the best possible utilisation of non-renewable resources, such as phosphorus, through development and knowledge transfer.

Wastes can in many cases also be used as an energy source, see Chapter 2.4.2. The Ministry of Agriculture and Food presently contributes to R&D and investment support for biogas-related projects. There is a need for knowledge and effective solutions for the utilisation of organic by-products and wastes, and the Ministry will ensure increased research and knowledge development in this field.

2.3.4 Organic food production and consumption

Goal:
Fifteen percent of food production and consumption shall be organic by 2015

This goal implies that by 2015, 15 percent of Norway's total agricultural area shall have been converted to organic farming methods, and 15 percent of the country's food consumption, measured as market value in NOK, shall be based on organic products. 'Food consumption' in this context includes both domestic production and imported foods. However, the increased consumption of organic food shall be based on domestic products for those that can be grown in Norway.

The additional environmental considerations taken in organic production are one of the main reasons for this effort. For example, the use of chemical-synthetic pesticides and mineral fertilisers is not permitted. In addition, organic agriculture generates new knowledge and methods that can be applied to agricultural production in general. The same applies to animal welfare: knowledge about behaviour, breed development and practical solutions can be transferred from organic to conventional animal husbandry. Organic agriculture thus has a specially important role as a corrective and being at the forefront of transforming Norwegian agriculture into a more environment-friendly and sustainable industry.

Strategies and measures:

Maximise the share of Norway's organic food consumption that is based on domestic production

- Facilitate the achievement of financial results in organic production which are at least equal to agriculture in general
- Facilitate increased organic cereal production as a basis for providing feed concentrates to organic livestock producers and organic flour to the bakery industry
- Finalise an action plan for organic food production and consumption for 2008-2015
- Facilitate the development of more user-friendly regulations for organic production and marketing

Contribute to market development and increased consumption of organic food in the private and public sectors

- Implement and evaluate the project to promote organic agriculture in municipalities
- Cooperate with other parties to raise consumer awareness of organic production and organic labels, including the commitment of public institutions to use organic products
- Support research and knowledge development within organic production and consumption

The main challenge is to increase organic production sufficiently and fast enough to meet a rapidly growing demand. Measures to ensure goal attainment will be primarily funded through the Agricultural Agreement, which includes income support and extension services for organic producers and development funds for measures further down the values chain.

In order to increase organic production, the income support payments to organic primary producers have been substantially raised in the 2006-08 period. In addition, an increase in organic milk production has been specifically promoted by the allocation of additional milk quotas to organic dairy cattle farmers. A specific priority programme for organic sheep farming has also been established.

Price and availability of organic feed concentrates are currently the main bottleneck for the further development of organic primary production. Therefore, specific efforts have been initiated to increase domestic production of organic cereals. These efforts include financial instruments, such as acreage support and price markdown subsidies, and improved extension and information services.

In 2008, the Ministry of Agriculture and Food will finalise an action plan for organic food production and consumption for 2008-2015.

The new Council Regulation (EC) No 834/2007 on organic production and labelling of organic products will come into effect on 1 January 2009. This council regulation has a more user-friendly structure than the current Regulation (EEC) No 2092/91, with fewer exemptions and more pronounced principles and objectives for organic production. Detailed specifications for the various production types have not been formulated yet. The Ministry of Agriculture and Food has asked the Norwegian Food Safety Authority to set up a broadly composed committee, which shall contribute to developing and following up the regulations.

The Norwegian Agricultural Quality System and Food Branding Foundation (KSL) has developed a strategy for information and generic marketing related to organic food for the period 2008-2015.

The consumption of organic food has also been included in the government's *Action Plan for Environmental and Social Responsibility in Public Procurement*. As part of the follow-up of this plan, and in support of the *Økoløft i kommuner* project (promoting organic agriculture in municipalities, see description below), advisory services will be established for institutions and food service providers who are planning to include organic food on their menus.

In 2007 and 2008, the Ministry of Children and Equality, the Ministry of the Environment and the Ministry of Agriculture and Food supported cooperation between Nordic Ecolabelling (Swan label/EU flower logo), MaxHavelaar (Fairtrade) and Debio (Ø label, certifying organic production in Norway) concerning joint marketing and consumer information about the public ecolabels.

An arena for professional discussions has been established, with broad representation of authorities, public administrators, trade organisations and major commercial players. The arena is to give advice and make proposals to decision-makers and competent stakeholders. During 2007/2008, the arena has, among other things, prepared the background material for the development of the Ministry's forthcoming action plan, see above.

Development funds are used to support projects that contribute to developing the market for organic products, e.g., the project to promote organic agriculture in municipalities. This is a joint project between the Ministry of Agriculture and Food and the Ministry of Local Government and Regional Development, inviting local authorities to apply for status as pioneer municipalities – with the aim of leading the way regarding the consumption and

production of organic food. Such pioneer municipalities are to have specified goals for the percentage of organic production and consumption in the municipality by the end of 2009.

More knowledge is needed about the value chain for organic products, environmental and health aspects of organic production and products, agronomic challenges related to actual production and about factors affecting the market supply of organic products. Research activities within issues of relevance for organic production and consumption will be given priority within the research funding framework allocated by the Agricultural Agreement.

2.4 A stable climate and clean air

2.4.1 Forests

Goal:
Enhance and make visible forests' positive role as a climate mitigation measure

Forests play a major role in the mitigation of climate change, due to a number of different positive contributions. The main role of forests in this context is the assimilation and sequestration of carbon in the standing biomass. The National Pollution Control Authority's greenhouse gas balance shows that Norway's forests are absorbing about 25-30 million tonnes of CO_2 annually. This corresponds approximately to 50 percent of the total Norwegian greenhouse gas emissions. Furthermore, forestry plays an important role as provider of a CO_2–neutral energy source, construction timber and other wood products. The Storting underlined the importance of having a national strategy for increasing the timber harvest volume – a statement that is based on the before-mentioned contributions by forestry, in addition to the need for increased local value creation. Harvesting more timber can contribute to replacing fossil fuels with more eco-friendly alternatives or enhancing permanent carbon sequestration by increased use of wood products. The Ministry of Agriculture and Food shall, within the scope of the sustainable forestry principles (See Chapter 2.1.3), utilise the positive greenhouse gas effects already provided by the sector and enhance these actively. In general, measures that help to both mitigate climate change and maintain biodiversity and other environmental assets will be given priority.

Strategies and measures:

Maintain and develop forest resources with consistently high growth rates, high and increasing net CO_2 absorption in forests

- Facilitate a considerable increase in forest planting and young stand management with the aim of ensuring sustainable forestry. Increase planting of forest trees by 50 percent in the short term, and by 100 percent in the long term.
- Increase contributions to research and capacity building linked to forestry in a climate change context
- Facilitate increased use of wood and an increased supply of energy from forest biomass (see next item) by harvesting more timber. Studies show that annual timber yields can be increased to 15 million m^3 within the limits stipulated by the *Living Forests* standards, the Forestry Act and appurtenant provisions
- Facilitate improved access to forest resources
- Enable municipalities to implement local climate change mitigation measures linked to forest resources

Contribute to increased use of bioenergy

- Cooperate with other affected ministries on the follow-up of the government's strategy for the increased development of bioenergy
- Make an effort to increase the demand for bioenergy and bioheat

- Facilitate increasing supplies of farm and forest biomass for bioenergy and bioheat production
- Facilitate increased use of logging slash, thinnings, etc as a source of bioenergy, and since this implies developing new operating methods, finding new ways of biomass utilisation or altering land-use patterns, environmental impact assessments are to be performed in cooperation with the environmental authorities
- Ensure the continued build-up of new forest resources by increased planting, intensified silviculture, tree breeding, optimised selection of tree species and improved access to forest resources, see Chapter 2.1.3
- Increase the use of bioenergy in agriculture and forestry
- Make an effort to increase the share of biofuel-powered farm and forest machinery
- Strengthen research and technology development, also regarding second generation biofuels
- Actively participate in various intersectoral processes linked to renewable energy
- Work to enhance capacity building within all parts of the value chain

Contribute to increasing the use of wood

- Make an effort to increase the demand for wood products
- Extend the wood-promotion measures to contribute to product development and the increased use of wood products
- Continue research on energy use and greenhouse gas emissions in the value chain for forest and wood products

The high net carbon sequestration in forests is a result of several decades of active efforts to build up forest resources, both by increasing the production of existing forests (establishment of denser and more vigorous forests, and choice of tree species) and through reforestation. Based on existing policy instruments, including the forest development fund and the Regulations on Sustainable Forestry, the Ministry of Agriculture and Food shall facilitate active silvicultural measures and double annual forest planting in the long term in order to boost forest production. This involves increasing the current planting rate of 25-27 million plants per year by 50 percent in the short term, and up to 50-70 million plants in the long term.

The Ministry of Agriculture and Food will strengthen research and capacity building linked to forests in a climate change context. This includes effects of climate change and measures to maintain existing carbon sinks in forests and soils.

The Ministry of Agriculture and Food will facilitate the increased use of wood and an increased supply of energy from forest biomass by harvesting more timber. Studies show that annual timber yields can be increased to 15 million m^3 within the limits stipulated by the *Living Forests* standards, the Forestry Act and appurtenant provisions, see Chapter 2.1.3.

The increased utilisation of forest resources requires technical and financial efforts to increase forest access. The Ministry of Agriculture and Food will facilitate the development of a good road network to enable site-specific forest management. Cooperation with the transportation authorities is also needed to improve the general conditions for timber transports on public roads and railways, including the improvement of major bottlenecks, especially municipal and county roads.

The Ministry of Agriculture and Food must facilitate good cooperation between agriculture as an energy provider and potential local customer groups. This applies especially to areas suited for the establishment of small-scale heating plants (local heating), e.g., providing heating to municipal buildings and large cabin communities and holiday resorts. These efforts should be followed up through the Ministry's cooperation agreement with the Association of Local and Regional Authorities, which is a major partner for cooperation on these issues, and coordinated with the work on "Viable Municipalities" (*Livskraftige kommuner*) and "Green Energy Municipalities" (*Grønne energikommuner*).

Bioenergy as a fuel source for on-site heating will be one of the Ministry's priority areas in the years ahead. This shall help to achieve the government's goal of increasing the use of bioenergy to as much as 14 TWh by 2020, pursuant to the government's bioenergy strategy (April 2008) and the involved ministries' implementation thereof. The increased use of bioenergy shall be enabled by policy instruments ensuring a supply of bioenergy sources in the form of land-based biomass, especially from forests, and measures for developing agriculture and forestry as a bioheat provider. In 2008, the Ministry will initiate a pilot project to develop efficient logistics and profitable value chains related to the harvesting of biomass as a source of biofuel in forests, cultural landscapes and roadsides. As part of this project, an assessment shall be made of policy instruments that could possibly boost the production of wood fuel chips from logging slash, including branches and treetops, and other relevant biomass sources such as thinnings and small trees. In periurban forest areas, such measures will help to keep the landscape open and in some cases also reduce the hauling distance from the biomass source to the heat generation facility.

An assessment of how existing policy instruments could possibly stimulate increased harvesting of forest biofuels shall be performed, including the evaluation of how to obtain a more targeted use of the forest development funds for bioenergy investments.

The Bioenergy Programme, which was initiated in 2003, is the Ministry's most important bioenergy-related policy instrument. The programme is administrated by Innovation Norway. One of the goals of the Bioenergy Programme is to contribute to increased use of bioenergy within the sector. This includes energy used in agricultural production and to heat farmhouses. For example, energy consumption in the greenhouse industry amounts to a total of 1 TWh, of which about 35 percent are fossil fuels and only 1 percent is bioenergy. Here lies a considerable potential for reducing CO_2 emissions through conversion to bioenergy. The implementation of the Bioenergy Programme in this context will be coordinated with Enova's efforts to support alternative energy strategies in the greenhouse industry.

"Biofuels in agriculture and forestry" (*Biodrivstoff i landbruket*) is a study performed by the Bioenergy Information Centre (*Energigården*) in 2008 on assignment from the Ministry of Agriculture and Food. About 80 percent of agriculture's CO_2 emissions come from fuels used by tractors and other farm and forest machinery. There is thus a technical potential for emission reductions in the agricultural sector from increased biofuel use. However, the sector's CO_2 emissions only account for a modest share of total emissions from domestic transportation.

Another potential bioenergy source is biogas produced from animal manure. Biogas can be used directly, either by the agricultural sector itself or by others, see Chapter 2.4.2.

Agricultural and forest biomass represents a considerable potential as a source of biofuels. In the short term, so-called first-generation biofuels, made from fish and meat-processing wastes, are most relevant. The Ministry of Agriculture and Food shall actively contribute to the ongoing efforts to develop second-generation biofuels, based on the utilisation of woody biomass. Studies show that there is a technical potential for meeting 20-30 percent of Norway's fuel needs with fuels produced from agricultural and forest biomass.

There are considerable knowledge gaps concerning bioenergy and biofuels. While increasing support to development and market measures, the Ministry of Agriculture and Food also aims to considerably increase the funding of research on bioenergy and second-generation biofuels, i.e., synthetic biodiesel and bioethanol from woody biomass. Furthermore, the Ministry will contribute to various intersectoral processes linked to renewable energy.

One of the main obstacles to energy transition and the use of bioenergy throughout the entire value chain is a lack of competence. There is thus a considerable need for capacity building among a broad range of stakeholders, also as part of the specific efforts to promote bioenergy and enhance further market growth. Measures to ensure capacity building will thus continue to be prioritised within the scope of the Bioenergy Programme. Please also refer to the government's bioenergy strategy.

As a supplier of timber and wood products, the forestry sector contributes positively to climate change mitigation. One aspect of this is that the use of long-lasting wood products prolongs the effect of carbon assimilation that takes place in the forest, while another aspect is that wood products can replace other (non-wood) products that have higher greenhouse gas emissions during production or use. The Ministry will develop the wood promotion measures, including the value creation programme "Wood-based Innovation" (*Trebasert innovasjonsprogram*), so that innovation efforts concerning the use of wood support increased value creation and improved environmental benefits as much as possible.

The Ministry of Agriculture and Food will continue research on energy use and greenhouse gas emissions in the value chain for forest and wood products.

2.4.2 Agriculture, food production and food consumption

Goal:
Limit emissions to the atmosphere from the production, processing and consumption of food

Agriculture's emissions of CO_2 from the use of fossil fuels account for about 1 percent of Norway's total CO_2 emissions. Certain agricultural activities, however, give directly rise to emissions of the greenhouse gases methane (CH_4) and nitrous oxide (N_2O) - accounting for 49 and 48 percent, respectively, of Norway's total emissions of these gases. All in all, these agricultural emissions made up about 9 percent of Norway's total greenhouse gas emissions in 2006. There are uncertainties regarding some of agriculture's emissions, especially emissions of nitrous oxides, but also regarding the soil's emission and absorption of carbon dioxide. Soil carbon emission and sequestration are not included in the current national greenhouse gas balance.

Agriculture's emissions of ammonia (NH_3) account for 88 percent of Norway's total ammonia emissions, which are regulated by Norway's implementation of the UN Convention on Long-range Transboundary Air Pollution.

Nitrous oxide emissions are mainly caused by soil nitrification processes. These processes depend partly on the contents and form of soil nitrogen, and partly on the soil's physical properties. Thus, ammonia emissions are linked to such factors as application of mineral fertilisers and animal manure, decomposition of crop residues, cultivation of moorland, biological nitrogen fixation and ammonia deposition. So far, no measures or policy instruments have been introduced in agriculture to specifically reduce nitrous oxide emissions. However, several of the measures that have been implemented to reduce nitrate runoff have also helped to reduce nitrous oxide losses, see Chapter 2.3.1.

Fermentation in the digestive tracts of ruminants produces methane. Agriculture's total methane emissions are mainly determined by the number of animals, but also by feeding practice and feed type. Methane losses also occur in farmyard manure during storage and spreading. Optimised feeding is one strategy for potentially reducing methane emissions, but a lot of this potential is considered to be already utilised in Norway. One should also take a closer look at the overall balance, linking the methane emissions of ruminants to carbon sequestration on grassland areas. Such an integrated approach has so far not been sufficiently discussed, and there is a need for research on the issue.

As previously mentioned, there are uncertainties regarding carbon sequestration and emissions from agricultural soils that need further study. The Intergovernmental Panel on Climate Change (IPCC) has estimated that soil carbon sequestration could potentially be the largest climate change mitigation measure in agriculture on a global basis, but so far there is some uncertainty to the potential in Norway.

Ammonia emissions originate mainly from farmyard manure, but also from mineral fertilisers and ammoniated straw. Ammonia losses from manure occur throughout the entire handling process, starting inside the barn, via manure storage facilities and during spreading operations. Norway's reduction commitments regarding ammonia emissions, via the Gothenburg Protocol

under the Convention on Long-range Transboundary Air Pollution, are 23,000 t NH_3 in 2010. In 2006, the emissions amounted to 22,600 t NH_3. However, due to a possible increase in meat and milk production, emissions per livestock unit may have to be reduced.

There are also emissions from other agricultural and food-related activities, such as processing, trade, transport, consumption and wastes. Logistics and efficiency are important challenges linked to transportation. Another considerable challenge is the increasing volume of food waste, currently amounting to about 1 million tonnes per year. Food wastes pose a double challenge: the unnecessary emissions from the production of food that is discarded on one hand, and the methane emissions arising from the organic waste in landfills on the other. According to the regional research institution *Østfoldforskning*, these emissions would provide 2.1 TWh of biogas, which corresponds to 5 % of Norway's total fuel consumption in the road transport sector.

Even though there are no simple solutions, there are a series of individual measures, which in sum can contribute to reducing agriculture's greenhouse gas emissions. The main objective is to reduce the greenhouse gas load and the total environmental load per produced unit, under consideration of the varying nutritional value of different foods.

This issue will be more thoroughly discussed in the white paper on agriculture and climate change, which is to be presented to the Storting in the 2009 spring session.

Strategies and measures:

Facilitate reduction of emissions to the atmosphere (methane, nitrous oxide, ammonia, CO_2)

- Present the white paper on agriculture and climate change to the Storting
- Follow up the goals of the Agricultural Agreement of 2008:
    - Significantly reduce ordinary autumn ploughing by 2020
    - Significantly improve the utilisation of all farmyard manure by 2020
    - Reduce methane emissions from ruminants, combined with increased soil carbon sequestration
- Implement the development programme for climate change mitigation measures in agriculture, including a study of the potential for social-economically profitable biogas production, methane capture and the use of renewable energy
- Include policy instruments and measures that reduce greenhouse gas emissions in the second-generation regional environmental programmes
- Make efforts to include agriculture in municipal climate plans
- Ensure more efficient utilisation of manure nutrients, see Chapter 2.3.1
- Enhance knowledge and strengthen research on agriculture and climate change
- Contribute to consumer information about the link between food and climate change
- Influence, involve and raise awareness among all stakeholders in the entire food value chain to promote environment-friendly food production, processing, transport, trade and consumption, as well as reducing food wastes and optimising their treatment

Ambitious efforts to adapt agriculture to the challenges of climate change shall be implemented in cooperation with trade organisations. Substantially reducing autumn ploughing will reduce CO_2 emissions, and at the same time this would reduce nitrogen leaching and thereby also help to mitigate nitrous oxide emissions. Methods should be introduced to reduce ammonia emissions from all kinds of animal manure. It may also be possible to reduce greenhouse gas emissions from ruminants, and this must be considered in relation to increased soil carbon sequestration in fodder production systems.

A rapid transition to agricultural operations that reduce the greenhouse gas load will be based on moderate financial instruments. The environmental plan concept can be further developed, enabling agriculture to plan and document its climate change mitigation efforts.

The Ministry of Agriculture and Food has established a development programme for climate change mitigation measures in agriculture with funding via the Agricultural Agreement. The programme shall ensure the development and cost assessment of agriculture's climate change mitigation measures, as well as the testing of any new measures.

One of the priorities within the development programme is the production of biogas from farmyard manure. Utilising methane in this way will reduce losses of methane, ammonia and nitrous oxide during manure storage, and provides energy which in turn can reduce the use of petroleum. Relatively small amounts of methane are produced from manure in such a context, and it could thus be relevant to add food waste before digesting the manure. The Ministry of Agriculture and Food will facilitate cooperation between the municipal waste management sector and agriculture. Small-scale, on-farm biogas plants, producing methane only from manure, could be profitable. However, a considerable challenge regarding such small-scale plants is reducing investment requirements and cutting operating costs. To begin with, the focus will be on establishing biogas pilot plants for knowledge enhancement. This will be achieved with support from the Bioenergy Programme, see Chapter 2.4.1. There is a continued need for R&D activities in this field.

To contribute to further reductions of methane emissions, the development programme shall also assess the possibilities of capturing methane in the ventilation air from livestock housing.

Another priority of the development programme is the increased use of renewable energy in the production and transport of agricultural commodities. As a start, a specific focus on energy efficiency is planned for the greenhouse industry, with funding via the Agricultural Agreement. The possibilities of increasing the use of bioenergy in greenhouses will also be considered.

The regional environmental programmes included policy instruments and measures that directly addressed the reduction of pollution from agriculture in the form of nutrient runoff and acid rain, but which also have helped to reduce nitrous oxide losses. To enhance the efforts to reduce greenhouse gas emissions, the second generation regional environmental programmes shall also include measures to address the reduction of emissions to the atmosphere.

The Ministry of Agriculture and Food will endeavour to include agriculture in municipal climate change mitigation plans.

The Ministry's measures to improve the utilisation of manure nutrients, see Chapter 2.3.1, are also important climate change mitigation measures, as they reduce emissions of nitrous oxide and ammonia. Knowledge development in this field is supported by the development programme for climate change mitigation measures.

There is a need for generally accepted, scientific and reliable knowledge about issues concerning soil carbon sequestration, nitrous oxide losses and emissions from grazing livestock in a life cycle perspective. These challenges, however, are not specific to Norway. Only few countries, if any, have introduced significant measures to reduce emissions from agriculture, mainly because these emissions are diffuse and difficult to determine reliably, and because research so far has not developed measures that can significantly reduce emissions without considerably reducing food production at the same time. There is therefore a need for considerable research on this issue in the years ahead, also in Norway.

The Ministry of Food and Agriculture's food policy strategy 2008-2010 *Taste of Norway* aims to ensure comprehensive agrifood policies, with the various policy domains mutually supporting each other as far as possible. The results of appropriate, integrated agrifood policies will be characterised by increased value creation among primary producers and by food producers' ability to meet consumer demands regarding food safety, quality, diversity and eco-friendly production. Trends and consumer surveys underline that consumers are increasingly interested in information about production methods, as well as ethical and environmental issues. One of the goals of food policies is to emphasise long-term food security and eco-friendly production. The follow up of the environmental strategies in the Ministry's food policy strategy involves the following:

- Evaluate the use of policy instruments under consideration of food policy environmental goals
- Stimulate the development of new, environmentally friendly products
- Coordinate labelling policies to, among other things, increase market visibility of eco-friendly production
- Contribute to deliberately using consumer involvement and outreach as a food policy development strategy, including long-term food security and eco-friendly production.

It is necessary to obtain knowledge and to achieve an understanding of the complexity of resource utilisation throughout the value chain in order to reduce greenhouse gas emissions and energy use in food production and consumption. This also includes reducing food waste and optimising food waste management. To ensure environmentally sound food production, processing, trade and consumption, various measures can be implemented by informing, involving and influencing all stakeholders in the value chain. Consumer-oriented activities can be used to encourage consumers to adopting eco-friendly food habits. Such activities include various food-promotion projects (*Smakens uke*, *Matstreif*), educational programmes, consumer panels, attitude campaigns, projects for children and adolescents, and other general information activities.

Eco-friendly food consumption involves such measures as:

- Following environment-friendly nutritional advice issued by public agencies, e.g., eating lots of fruits and vegetables, fish and lowfat products
- Avoiding products that are excessively packaged
- Eating foods that are in season, especially vegetables

- Mainly avoiding air-freight food – generally air freight implies high emissions, although this does not apply to *all* products
- Eating local/regional food and products made from local raw materials
- Avoiding food waste, which would require information about date marking, recipes for leftovers and attitude campaigns to avoid over-buying of food
- Encouraging the agrifood sector to continue its efforts to optimise the use of raw materials, energy, technology, packaging and life cycle analyses with regard to the environment and functionality

In this context, the e-Traceability project can be used to promote eco-friendly food production and consumption. The project was initiated to ensure food safety and improve preparedness by enabling faster and more accurate withdrawal of unsafe food. However, an improved electronic tracing system in the food chain can also be used to rationalise logistics and to improve information and increase awareness regarding environmentally sound food among producers, wholesalers, retailers and consumers. The e-Traceability project started in 2007, based on a framework project carried out in 2006. The project aims to facilitate the establishment of a system for electronic tracing in the food chain by the end of 2010, including electronic basic data inventories for the food sector and food authorities.