منظمة الأغذية والزراعة للأمم المتحدة | 联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Продовольственная и сельскохозяйственная организация Объединенных Наций | Organización de las Naciones Unidas para la Alimentación y la Agricultura

# Country report

## supporting the preparation of *The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture*, including sector-specific data contributing to *The State of the World's Biodiversity for Food and Agriculture* - 2013 -

Country: Norway

## I. EXECUTIVE SUMMARY

Please provide an executive summary (not more than two pages) that will allow national and international stakeholders to gain a quick overview of the content of the country report.
The executive summary should contain information on:

- key trends and driving forces affecting animal genetic resources management in your country;
- strengths, weaknesses and gaps in capacity to manage animal genetic resources in your country;
- key constraints and challenges with respect to animal genetic resources management in your country;
- priorities and strategic directions for future action (focusing particularly on the next ten years).

**Structural characteristics and changes**
Only 3% of the land area in Norway is agricultural land. Most farms in Norway are run by the family who also owns the entity/farm. It is common to hire some labour. Combining farming with other business or work has long traditions. The income from other sources than from the farm is playing an increasing role in the Norwegian agricultural households. In addition rural or farming employees make only 1.9 % of total employees in 2012. This is a decrease from 3.5 % and 5.1 % in 1999 and 1990, respectively.

The structural change in agriculture in Norway is that the number of farms with livestock has decreased significantly the last decades and by 37 % during the last decade to 32 000 farms in 2010. The trend is that the total production volume is stable or increasing thus concentrated on fewer farms.

See also the attached documents with tables for introducing the country for additional figures and relevant statistics.

The strong position of agricultural cooperatives owned by the farmers is still a characteristic of Norwegian agriculture and animal production. Most breeding activities in the farm animal sector have been, and are still being, carried out by cooperative breeding organizations as Geno (dairy cattle), Norsvin (pigs) and NSG (sheep and goats).

**Changes in the population and herd sizes of the major livestock production systems 2004-2013**
The trend for the two most important productions systems within livestock production, dairy cattle and weaning pigs, is that the population sizes have been more or less stable whereas the herd sizes have increased by 48 % and 82 %, respectively. The poultry and suckler cow production have increased both in population and herd sizes. The populations of sheep and dairy goats have decreased whereas the herd sizes have increased. In addition the number of farms with sheep or dairy goats has also decreased by 20 % and 43 %, respectively.

The dairy cow population has had a steady decrease during the last decades, in 2004 there were 270 000 dairy cows,

whereas in 2013 it had decreased to 230 000 dairy cows. The decrease is explained by decline in milk consumption. The total milk production has been relatively stable whereas the annual milk yield per cow has increased by 15.7 % to 7 303 kg per cow in 2012. The demand for fresh milk and dairy products have been decreasing for many years, however, the demand for other dairy products than milk seems to slightly increase now. The milk market has been regulated by milk quotas since 1983 and through WTO agreements there are restrictions on export. The Norwegian dairy herds are still small compared to many other European countries, however the average dairy herd size has increased from 16,3 cows in 2004 to 24,1 cows in 2013.

Parallel to the decline in the dairy cow population there has been an increase in the suckler cow population by 40 % during the last decade, with 75 000 cows in 2013. Still, the demand for beef has been higher than the domestic supply and the undercoverage has been covered by import of beef.

The population of weaning pigs has been rather stable the last ten years, with only a slight increase of five percent to almost half a million pigs in 2013.

The breeding material in the poultry industry comes from international poultry breeding companies. Norway has had no commercial poultry breeding companie since 1995 when the European Economic Agreement opened for free import of animals to Norway. However, the consumption of egg and poultry meet has increased significantly during the last decades, from a total of 46.6 and 20.0 million kg of egg and poultry meat in 1990 respectively, to 46.2 and 39.7 million kg in 2000 and 58.1 and 81.8 million kg in 2010, respectively.

The production of pork and poultry has since 1975 been legally regulated by a concession act. This act aims to avoid the development of industrial-type animal production in the most concentrate-intencive production systems. The accepted upper limit of herd sizes within the concession act were increased in 1992, 1995, 2003 and 2013.

The sheep population is decreasing due to poor profitability and the conflict with the protected wolf and other predators. Most of the sheep farming in Norway is based on letting the sheep out in the outlying land and the mountain areas during the grazing season (approximately four months). With the return of and prohibition of hunting predators as bears, wolves, lynx and wolverine, many sheep farmers cannot or won't let their flock of sheep follow the tradition of letting the sheep graze the outlying land without herding the sheep. The areas where the sheep used to graze are enormous so herding is difficult and expensive. This is part of the explanation for the decrease in the number of sheep and sheep farmers during the last decade with 7 % and 20 %, respectively. The number of sheep farmers in 2013 was 14 000.

All figures are based on data from Statistics Norway, https://www.ssb.no/en/jord-skog-jakt-og-fiskeri?de=Agriculture+ Figures on livestock production can also be found in the annex at the end of this document.

***Key constraints and challenges with respect to AnGR in your country***

Norwegian livestock production is based on breeding material native to the country except for poultry. All poultry (egg layers and broilers) breeding material is imported from international poultry breeding companies. The Norwegian breeding organizations for cattle (Geno), pigs (Norsvin), sheep and dairy goats (NSG) publish in their annual reports the effective population sizes (NE) for their breeds, all in the range between 100 and 250 NE. The annual reports also publish data on genetic gain on functional traits in addition to traditional production traits. These figures indicate that the commercial breeding programmes in Norway are rather sustainable. The challenge is however to stay on this track as it is a rather expensive and resource demanding breeding work and the pressure on expected increase in traditional production traits might also seem to be increasing.

Especially Geno and Norsvin have experienced that there is an interest for their genetic resources on the international market. The income from export of breeding material is a welcome income to support the costs of running their breeding programmes. The international interest in Norwegian breeding material has not developed as a result of any adaptation of Norwegian breeding goals to external markets. The interest is rather based on the foreign breeders' perception of the Norwegian breeding material as being sustainable and an economically interesting alternative to the breeding material offered by other companies on the international market.

In addition to the commercial native breeds, Norway has 27 endangered native breeds of dairy cattle, sheep, goats, horses, rabbits, geese, hens, bees and dogs (farm dogs). Of the six endangered native dairy cattle breeds, three or four are critically endangered. This is the main challenge for the conservation work on AnGR in Norway today. These breeds have traditionally been kept on smaller farms with smaller herds. Data from Norwegian Agricultural Authority states that this is still the case today. When the farms and herds in Norway are increasing, as documented by Norwegian Agricultural Authority, and the agricultural policy is more and more rewarding high production the conservation work run by the government through Norwegian Genetic Resource Centre has a true challenge to facilitate or motivate farmers to continue to utilize these breeds in traditional dairy production.

## II. DATA FOR UPDATING THE PARTS AND SECTIONS OF *THE STATE OF THE WORLD'S ANIMAL GENETIC RESOURCES FOR FOOD AND AGRICULTURE*

### FLOWS OF ANIMAL GENETIC RESOURCES

1. Studies of gene flow in animal genetic resources have generally concluded that most gene flow occurs either between developed countries or from developed countries to developing countries. Does this correspond to the pattern of gene flow into and out of your country?

*For developed countries, exceptions to the usual pattern would include significant imports of genetic resources from developing countries. For developing countries, exceptions would include significant exports of genetic resources to developed countries, and/or significant imports and/or exports of genetic resources to/from other developing countries.*

- (●) yes
- ( ) no
- ( ) yes but with some significant exceptions

1.1. If you answer “no” or “yes but with some significant exceptions”, please provide further details. Please include information on: which species are exceptions and which regions of the world are the sources and/or destinations of the respective genetic material.

2. Have there been any significant changes in patterns of geneflow in and out of your country in the last ten years?

- (●) yes
- ( ) no

2.1. If yes, please indicate whether this view is based on quantified data (e.g. import and export statistics collected by the government).

- (●) yes
- ( ) no

2.2. If yes, please provide references (preferably including web links) (if relevant, indicate which types of animal genetic resources are covered).

The view is based on quantified data provided to NC by the Norsvin (pigs) and Geno (dairy cattle) breeding organisations.

2.3. Please also describe the changes, indicating the species involved, the direction of the changes, and the regions of the world to and from which the patterns of imports and exports have changed.

Norsvin and Geno have increased their export of semen for breeding with 94 % and 113 % during the last ten years, respectively. Norsvin's main export marked is Europe and US, as 63 % and 33 % of their export of boar semen is exported to these regions during the last ten years, making 4 800 and 2 500 doses of boar semen, respectively in 2013. Geno's main export marked is also Europe and US, as 69 % and 20 % of their export of bull semen is exported to these regions during the last ten years, making 166 000 and 49 000 doses of bull semen, respectively in 2013.

3. Please describe how the patterns of geneflow described under Questions 1 and 2 affect animal genetic resources and their management in your country.

*Note: Please answer this question even if the pattern of geneflow into and out of your country corresponds to the “usual” pattern described in the first sentence of Question 1 and/or has not changed significantly in the last ten years.*

Export of breeding material is an important contribution for the breeding organisations to cover the costs of running the breeding programmes in Norway. Traditionally the breeding programmes have been financed through the membership of farmers to the respective breeding organisation. The decline in livestock farmers leads to a decline in potential members

of the breeding cooperatives. Matching this decline and increase of the costs of running the breeding programmes is a challenge that is met with the income from the export of breeding material.

## LIVESTOCK SECTOR TRENDS

4. Please indicate the extent to which the following trends or drivers of change have affected or are predicted to affect animal genetic resources and their management in your country and describe these effects.

*Note: Relevant impacts on animal genetic resources and their management might include, for example, changes in the type of animal genetic resources kept (e.g. different breeds or species), changes in the uses to which animal genetic resources are put, changes in the geographical distribution of different types of animal genetic resources, increases or decreases in the number of breeds at risk of extinction, changes in the objectives of breeding programmes, changes in the number or type of conservation programmes being implemented, etc. In the text sections, please briefly describe the changes. If possible, provide some concrete examples of the challenges or opportunities presented by the respective drivers and the actions taken to address these challenges or opportunities. If relevant, you may also indicate why a given driver is not affecting animal genetic resources and their management in your country. For a general discussion of drivers of change, please see The State of the World's Animal Genetic Resources for Food and Agriculture (Part 2, Section A) (http://www.fao.org/docrep/010/a1250e/a1250e00.htm).*

| Drivers of change | Impact on animal genetic resources and their management over last ten years | Future impact on animal genetic resources and their management (predicted for the next ten years) | Describe the effects on animal genetic resources and their management |
|---|---|---|---|
| Changing demand for livestock products (quantity) | low | low | The demand of total amount is stable and we have relatively few national wholesalers on the market. |
| Changing demand for livestock products (quality) | high | high | Structure and demand for different product qualities will increase. This might lead to a diversification of the products produced in Norway or increase import. If import is the result, this will possibly result in lower AnGR production and livestock populations. |
| Changes in marketing infrastructure and access | low | low | |
| Changes in retailing | low | low | Niche products increase. Some niche products are based on special breeds, this might increase the breed diversity. |
| Changes in international trade in animal products (imports) | low | medium | Import might increase.If import is the result, this will possibly result in lower AnGR production and livestock populations. |
| Changes in international trade in animal products (exports) | none | none | Only niche products and exclusive products might increase in export since Norwegian labor is so expensive that our animal products are too expensive for other countries to import. |
| Climatic changes | none | none | If imported concentrates, due to international climate changes, gets scarce and more expensive, it might well have an influence on the management of AnGR. Ruminants might increase in numbers whereas poultry and pigs might decrease. And the ruminants might increase the share of roughage in their diet. |
| Degradation or improvement of grazing land | medium | high | Ruminants are grazing less, imported concentrates is cheaper forage than letting the animals graze outlying land, due to the high costs of labor needed for fencing and herding. |

| Drivers of change | Impact on animal genetic resources and their management over last ten years | Future impact on animal genetic resources and their management (predicted for the next ten years) | Describe the effects on animal genetic resources and their management |
|---|---|---|---|
| Loss of, or loss of access to, grazing land and other natural resources | medium | high | Our problem is loss of grazing animals, not loss of grazing land. Overgrowth of previous grazing land is a big problem and is changing the landscape dramatically. |
| Economic, livelihood or lifestyle factors affecting the popularity of livestock keeping | high | high | Labor is expensive in Norway and the profit from farming is rather low, the result is low recruitment of farmers in general and specially to livestock keeping. |
| Replacement of livestock functions | none | none | |
| Changing cultural roles of livestock | none | none | |
| Changes in technology | high | high | Genomic selection and the introduction of milking robots will lead to even higher need of financial resources for the management of AnGR. |
| Policy factors | high | high | Norwegian agriculture is very heavily regulated by the government by subsidies and other incitements. |
| Disease epidemics | high | high | Disease outbreaks after import of live animals have made us more aware of and keen on keeping our relatively high health standard with few diseases in general, specially experienced in sheep and honey bee production. |

## OVERVIEW OF ANIMAL GENETIC RESOURCES

### 5. Please provide the number of locally adapted and exotic breeds kept in your country.

*Data on the number of breeds is needed in order to calculate the percentage of breeds subject to the various management activities that are covered in this questionnaire. In line with the request of the Commission on Genetic Resources for Food and Agriculture at its Fourteenth Regular Session (CGRFA-14/13/Report, paragraph 31), FAO will implement the "locally adapted" vs. "exotic breed" classification system in the Domestic Animal Diversity Information System (DAD-IS). Once countries have fully updated their breed lists and classified all breeds in DAD-IS, it will be possible to use these data to obtain the numbers of breeds in each category.*

| Species | Locally adapted breeds | Exotic breeds |
|---|---|---|
| Cattle (specialized dairy) | 7 | 6 |
| Cattle (specialized beef) | 0 | 10 |
| Cattle (multipurpose) | 0 | 0 |
| Sheep | 13 | 6 |
| Goats | 2 | 3 |
| Pigs | 1 | 3 |
| Chickens | 11 | 5 |
| Ducks | 0 | 0 |
| Geese | 2 | 0 |

| Species | Locally adapted breeds | Exotic breeds |
|---|---|---|
| Horses | 4 | 16 |
| Rabbits | 2 | 0 |
| Turkeys | 0 | 0 |

## CHARACTERIZATION

*To provide further details of your country's activities in the field of characterization, surveying and monitoring, please go to Strategic Priority Area 1 of the "Progress report on the implementation of the Global Plan of Action for Animal Genetic Resources 2007–2013" (below).*

6. Please provide an overview of the current state of characterization in your country by indicating the extent to which the activities shown in the following table have been carried out.

*Note: Please focus on characterization studies that have been conducted within the last ten years (baseline surveys of population size may have been conducted in the more distant past). Recall that some types of characterization study on your country's breeds may have been conducted outside your country. For the first two columns, please insert the number of breeds; for columns 3 to 8 please choose one of the following categories: none; low (approximately <33%); medium (approximately 33–67%); high (approximately >67%).*

| Species | Baseline survey of population size | Regular monitoring of population size | Phenotypic characterization | Molecular genetic diversity studies – within breed | Genetic diversity studies based on pedigree | Molecular genetic diversity studies – between breed | Genetic variance component estimation | Molecular genetic evaluation |
|---|---|---|---|---|---|---|---|---|
| Cattle (specialized dairy) | 13 | 13 | high | high | high | high | high | high |
| Cattle (specialized beef) | 10 | 10 | high | none | none | none | high | none |
| Cattle (multipurpose) | 0 | 0 | none | none | none | none | none | none |
| Sheep | 19 | 19 | high | low | medium | none | high | none |
| Goats | 5 | 5 | high | none | medium | none | high | none |
| Pigs | 4 | 4 | high | high | high | none | high | high |
| Chickens | 16 | 16 | medium | none | none | low | none | none |
| Ducks | 0 | 0 | none | none | none | none | none | none |
| Geese | 2 | 2 | none | none | none | none | none | none |
| Horses | 20 | 20 | high | none | medium | medium | none | none |
| Rabbits | 2 | 1 | none | none | none | none | none | none |
| Turkeys | 0 | 0 | none | none | none | none | none | none |

## INSTITUTIONS AND STAKEHOLDERS

*To provide further details of your country's activities in the field of institutions and stakeholders, please go to Strategic Priority Area 4 of the "Progress report on the implementation of the Global Plan of Action for Animal Genetic Resources 2007–2013" (below).*

7. Please indicate the state of your country's capacities and provisions in the following areas of animal genetic resources management.

| | Score |
|---|---|
| Education | high |
| Research | high |
| Knowledge | high |
| Awareness | high |
| Infrastructure | high |
| Stakeholder participation | high |
| Policies | high |
| Policy implementation | high |
| Laws | high |
| Implementation of laws | high |

8. Please provide further information regarding your country's capacities in each of the above-mentioned areas of management. If relevant, please indicate what obstacles or constraints your country faces in each of these areas and what needs to be done to address these constraints. You may also provide information on any particular successes achieved in your country in any of these areas and on the reasons for these successes.

| | Description |
|---|---|
| Education | Education on Master level and PhD is in place, as well as agricultural colleges. |
| Research | High activity on research. |
| Knowledge | Farmers, researchers, agriculture advisers, bureaucrats have all high level of knowledge on AnGR. |
| Awareness | Not too bad, but could of course improve. |
| Infrastructure | Very well. |
| Stakeholder participation | High degree of participation from all relevant stakeholders. |
| Policies | The trend is to give preferential treatment to big farms instead of the traditional smaller and mixed farm systems. A decline in the diversity among production systems in Norwegian agriculture is expected to give less room for the endangered local/native breeds in traditional farming. |
| Policy implementation | Very efficient. |
| Laws | Well developed. |
| Implementation of laws | Very efficient. |

9. What steps have been taken in your country to engage or empower the various stakeholders in animal genetic resources management (e.g. establishment of livestock keepers' organizations, development of biocultural community protocols)?

*Note: Biocultural community protocol: a document that is developed after a community undertakes a consultative process to outline their core cultural and spiritual values and customary laws relating to their traditional knowledge and resources. For a discussion of the potential role of biocultural community protocols in the conservation of animal genetic resources, please see the guidelines In vivo conservation of animal genetic resources (http://www.fao.org/docrep/018/i3327e/i3327e.pdf).*

The Norwegian genetic resource centre supports the establishment and running (by financial support) of breed societies for all local (native) and endangered breeds. The Centre also gives breeding advice to individual farmers and to the breed societies when selecting bulls and rams for ai-production. The commercial breeding associations Geno and Norwegian sheep and goat breeders' association (NSG) give financial support to the production of AI- bulls and rams. When it comes to the management of the commercial native/local breeds, the respective breeding organisations manage this rather well by themselves. Se answer to question 2.2 and 2.3.

## BREEDING PROGRAMMES

*Note: Breeding programmes: systematic and structured programmes for changing the genetic composition of a population towards a defined breeding goal (objective) to realize genetic gain (response to selection), based on objective performance criteria. Breeding programmes typically contain the following elements: definition of breeding goal; identification of animals; performance testing; estimation of breeding values; selection; mating; genetic gain and transfer of genetic gain. Breeding programmes are usually operated either by a group of livestock breeders organized in a breeders' association, community-based entity or other collective body; by a large commercial breeding company; or by the government.*

*To provide further details of your country's activities in the field of breeding programmes, please go to Strategic Priority Area 2 of the "Progress report on the implementation of the Global Plan of Action for Animal Genetic Resources 2007–2013" (below).*

10. Who operates breeding programmes in your country?

*Note: the objective of this question is to identify which stakeholders lead or organize the breeding programmes that exist in your country. Stakeholder participation in the implementation of the various elements of breeding programmes is covered under Question 15. If you wish to provide further information on the activities of the various stakeholder groups (including collaborative activities on an international scale), please provide it in the text section of Question 15.*

| Species | Government | Livestock keepers organized at community level | Breeders' associations or cooperatives | National commercial companies | External commercial companies | Non-governmental organizations | Others |
|---|---|---|---|---|---|---|---|
| Cattle (specialized dairy) | no | no | yes | no | no | no | no |
| Cattle (specialized beef) | no | no | yes | no | no | no | no |
| Cattle (multipurpose) | no | no | no | no | no | no | no |
| Sheep | no | no | yes | no | no | no | no |

| Species | Government | Livestock keepers organized at community level | Breeders' associations or cooperatives | National commercial companies | External commercial companies | Non-governmental organizations | Others |
|---|---|---|---|---|---|---|---|
| Goats | no | no | yes | no | no | no | no |
| Pigs | no | no | yes | no | no | no | no |
| Chickens | no | no | no | no | yes | no | no |
| Ducks | no | no | no | no | no | no | no |
| Geese | no | no | no | no | no | no | no |
| Horses | no | no | yes | no | no | no | no |
| Rabbits | no | no | no | no | no | no | no |
| Turkeys | no | no | no | no | no | no | no |

10.1. If you choose the option "others", please indicate what kind of operator(s) this refers to.

11. For how many breeds in your country are the following activities undertaken?

*Note: Please do not include activities that are only undertaken for experimental purposes, i.e. include only activities that directly serve or involve livestock keepers. However, please include activities even if they do not at present form part of a breeding programme. The intention is to obtain an indication of whether the "building blocks" of a breeding programme are available or being developed in your country. Loc = Locally adapted breeds; Ex = Exotic breeds.*

| Species | Tools | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Animal identification | | Breeding goal defined | | Performance recording | | Pedigree recording | | Genetic evaluation (classic approach) | | Genetic evaluation including genomic information | | Management of genetic variation (by maximizing effective population size or minimizing rate of inbreeding) | | Artificial insemination | |
| | Loc | Ex | Loc | Ex | Loc | Ex | Loc | Ex | Loc | Ex | Loc | Ex | Loc | Ex | Loc | Ex |
| Cattle (specialized dairy) | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 1 | 5 | 1 | 0 | 7 | 16 | 7 | 16 |
| Cattle (specialized beef) | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 5 | 0 | 0 | 0 | 10 | 0 | 10 |
| Sheep | 12 | 7 | 12 | 5 | 12 | 7 | 12 | 7 | 4 | 1 | 0 | 0 | 12 | 7 | 12 | 7 |
| Goats | 2 | 3 | 2 | 3 | 1 | 3 | 1 | 3 | 1 | 0 | 1 | 0 | 2 | 3 | 2 | 3 |
| Pigs | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 0 | 1 | 3 | 1 | 3 |
| Chickens | 11 | 5 | 11 | 0 | 4 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 |
| Ducks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Geese | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Horses | 4 | 16 | 4 | 16 | 4 | 16 | 4 | 16 | 1 | 0 | 0 | 0 | 4 | 16 | 4 | 16 |
| Rabbits | 2 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Turkeys | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

12. Please indicate how many of the breeds in your country are subject to breeding programmes applying the following breeding methods.

*Note: Loc = Locally adapted breeds; Ex = Exotic breeds.*

| Species | Breeding method | | | |
|---|---|---|---|---|
| | Straight/pure-breeding only | | Straight/pure-breeding and cross-breeding | |
| | Loc | Ex | Loc | Ex |
| Cattle (specialized dairy) | 6 | 6 | 1 | 0 |
| Cattle (specialized beef) | 0 | 10 | 0 | 0 |
| Sheep | 11 | 6 | 1 | 1 |
| Goats | 1 | 3 | 1 | 0 |
| Pigs | 1 | 3 | 0 | 0 |
| Chickens | 11 | 0 | 0 | 0 |
| Ducks | 0 | 0 | 0 | 0 |
| Geese | 2 | 0 | 2 | 0 |
| Horses | 3 | 14 | 0 | 2 |
| Rabbits | 2 | 0 | 0 | 0 |
| Turkeys | 0 | 0 | 0 | 0 |

13. Please indicate the state of research and training in the field of animal breeding in your country.

| Species | Training | Research |
|---|---|---|
| Cattle (specialized dairy) | high | high |
| Cattle (specialized beef) | high | medium |
| Cattle (multipurpose) | none | none |
| Sheep | high | medium |
| Goats | high | medium |
| Pigs | high | high |
| Chickens | low | medium |
| Ducks | none | none |
| Geese | none | none |
| Horses | high | medium |
| Rabbits | none | none |
| Turkeys | none | none |

14. Please indicate the extent to which livestock keepers in your country are organized for the purposes of animal breeding.

| Species | Organization of livestock keepers |
|---|---|
| Cattle (specialized dairy) | high |
| Cattle (specialized beef) | high |
| Cattle (multipurpose) | none |
| Sheep | high |
| Goats | high |
| Pigs | high |

| Species | Organization of livestock keepers |
|---|---|
| Chickens | none |
| Ducks | none |
| Geese | medium |
| Horses | high |
| Rabbits | medium |
| Turkeys | none |

15. Please indicate the level of stakeholder involvement in the various elements of breeding programmes in your country.

*Note: If your country has different types of breeding programme, the level of involvement of the various stakeholders may vary from one type of programme to another. In answering this question please try to indicate the overall degree of involvement of the various stakeholder groups.*

| Cattle (specialized dairy) | Government | Research organizations | Breeders' associations or cooperatives | Individual breeders/livestock keepers | National commercial companies | External commercial companies | Non-governmental organizations | Others |
|---|---|---|---|---|---|---|---|---|
| Setting breeding goals | none | none | high | high | none | none | none | none |
| Animal identification | none | none | high | none | none | none | none | none |
| Recording | none | none | high | none | none | none | none | none |
| Provision of artificial insemination services | none | none | high | none | none | none | none | none |
| Genetic evaluation | none | none | high | none | none | none | none | none |

| Cattle (specialized beef) | Government | Research organizations | Breeders' associations or cooperatives | Individual breeders/livestock keepers | National commercial companies | External commercial companies | Non-governmental organizations | Others |
|---|---|---|---|---|---|---|---|---|
| Setting breeding goals | none | none | high | high | none | none | none | none |
| Animal identification | none | none | high | none | none | none | none | none |
| Recording | none | none | high | none | none | none | none | none |
| Provision of artificial insemination services | none | none | high | none | none | none | none | none |
| Genetic evaluation | none | none | high | none | none | none | none | none |

| Sheep | Government | Research organizations | Breeders' associations or cooperatives | Individual breeders/livestock keepers | National commercial companies | External commercial companies | Non-governmental organizations | Others |
|---|---|---|---|---|---|---|---|---|
| Setting breeding goals | none | none | high | high | none | none | none | none |
| Animal identification | none | none | high | none | none | none | none | none |
| Recording | none | none | high | none | none | none | none | none |
| Provision of artificial insemination services | none | none | high | none | none | none | none | none |
| Genetic evaluation | none | none | high | none | none | none | none | none |

| Goats | Government | Research organizations | Breeders' associations or cooperatives | Individual breeders/livestock keepers | National commercial companies | External commercial companies | Non-governmental organizations | Others |
|---|---|---|---|---|---|---|---|---|
| Setting breeding goals | none | none | high | high | none | none | none | none |
| Animal identification | none | none | high | none | none | none | none | none |
| Recording | none | none | high | none | none | none | none | none |
| Provision of artificial insemination services | none | none | high | none | none | none | none | none |
| Genetic evaluation | none | none | high | none | none | none | none | none |

| Chickens | Government | Research organizations | Breeders' associations or cooperatives | Individual breeders/livestock keepers | National commercial companies | External commercial companies | Non-governmental organizations | Others |
|---|---|---|---|---|---|---|---|---|
| Setting breeding goals | none | none | low | low | none | high | none | none |
| Animal identification | none | none | none | none | none | high | none | none |
| Recording | none | none | low | none | none | high | none | none |
| Provision of artificial insemination services | none | none | none | none | none | high | none | none |
| Genetic evaluation | none | none | none | none | none | high | none | none |

| Horses | Government | Research organizations | Breeders' associations or cooperatives | Individual breeders/livestock keepers | National commercial companies | External commercial companies | Non-governmental organizations | Others |
|---|---|---|---|---|---|---|---|---|
| Setting breeding goals | none | none | high | high | none | none | none | none |
| Animal identification | none | none | high | none | none | none | none | none |
| Recording | none | none | high | none | none | none | none | none |
| Provision of artificial insemination services | none | none | none | high | none | none | none | none |
| Genetic evaluation | none | none | low | none | none | none | none | none |

15.1. If you choose the option "others", please indicate what kind of operator(s) this refers to.

15.2. Please provide further information on the roles that the stakeholders identified in the table play in the implementation of the various activities. If relevant, please also provide further information on the organizational roles played by the stakeholders identified in Question 10.

Most breeding activities in the farm animal sector have been, and are still being, carried out by cooperative breeding organizations. The breeding organizations for the livestock species (cattle, pigs, sheep and goats) also have long traditions in close cooperation with researchers at university level. Today the government is hardly involved in any breeding programme or activity, the exception is the guidance on breeding given by the Norwegian Genetic Resource Centre to breed societies and organisations for endangered native farm animal breeds.

16. Does your country implement any policies or programmes aimed at supporting breeding programmes or influencing their objectives?

| Species | Policies or programmes |
|---|---|
| Cattle (specialized dairy) | yes |
| Cattle (specialized beef) | no |
| Cattle (multipurpose) | no |
| Sheep | yes |
| Goats | yes |
| Pigs | no |
| Chickens | yes |
| Ducks | no |
| Geese | no |

| Species | Policies or programmes |
|---|---|
| Horses | yes |
| Rabbits | no |
| Turkeys | no |

16.1. Please describe these policies or programmes, indicating whether or not they include any measures specifically aimed at supporting breeding programmes for locally adapted breeds or any measures specifically aimed at supporting breeding programmes for exotic breeds (including breed-replacement programmes). Please indicate whether different types of programme are promoted in different production systems (and describe the differences).

| Species | Description of policies or programmes |
|---|---|
| Cattle (specialized dairy) | The government (through Norwegian Genetic Resource Centre) supports breeding programmes for the endangered local breeds, independently of production system. |
| Cattle (specialized beef) | |
| Cattle (multipurpose) | |
| Sheep | The government supports breeding programmes for the endangered local breeds, independently of production system. |
| Goats | The government supports breeding programmes for the endangered local breeds, independently of production system. |
| Pigs | |
| Chickens | The government supports breeding programmes for the endangered local breeds, independently of production system. |
| Ducks | |
| Geese | |
| Horses | The government supports breeding programmes for the endangered local breeds, independently of production system. |
| Rabbits | |
| Turkeys | |

17. Please describe the consequences of your country's breeding policies and programmes, or lack of breeding policies and programmes, for your country's animal genetic resources and their management.

| Species | Description of consequences |
|---|---|
| Cattle (specialized dairy) | The breeding programme for this species is relatively sustainable with documented low rate of inbreeding (< 1% per generation) and documented gain for health and fertility traits. |
| Cattle (specialized beef) | The breeding programme for this species is relatively sustainable. |
| Cattle (multipurpose) | |
| Sheep | The breeding programme for this species is relatively sustainable with documented low rate of inbreeding (< 1% per generation). |
| Goats | The breeding programme for this species is relatively sustainable with documented low rate of inbreeding (< 1% per generation). |
| Pigs | The breeding programme for this species is relatively sustainable with documented low rate of inbreeding (< 1% per generation) and documented gain for health and fertility traits. |

| Species | Description of consequences |
|---|---|
| Chickens | The international breeding companies run the breeding programme for poultry. So even if we have no breeding programme for poultry in our country, it doesn't so far have any consequences for the commercial poultry population. |
| Ducks | |
| Geese | |
| Horses | |
| Rabbits | |
| Turkeys | |

18. Please describe the main constraints to the implementation of breeding programmes in your country and what needs to be done to address these constraints. You may also provide information on any particular successes achieved in your country with respect to the establishment and operation of breeding programmes and on the factors that have contributed to these successes.

no constrains

19. Please describe future objectives, priorities and plans for the establishment or further development of breeding programmes in your country.

| Species | Description of future objectives, priorities and plans |
|---|---|
| Cattle (specialized dairy) | Keep on the same track, high production, high health and fertility status and low rate of inbreeding. |
| Cattle (specialized beef) | Keep on the same track, high production, high health and fertility status and low rate of inbreeding. |
| Cattle (multipurpose) | |
| Sheep | Keep on the same track, high production, high health and fertility status and low rate of inbreeding. |
| Goats | Keep on the same track, high production, high health and fertility status and low rate of inbreeding. |
| Pigs | Keep on the same track, high production, high health and fertility status and low rate of inbreeding. |
| Chickens | Only the commercial breeding companies can answer this question. |

## CONSERVATION

*To provide further details of your country's activities in the field of conservation, please go to Strategic Priority Area 3 of the "Progress report on the implementation of the Global Plan of Action for Animal Genetic Resources 2007–2013" (below).*

20. Please provide an indication of the extent to which your country's breeds are covered by conservation programmes.

*Please focus on at-risk breeds and breeds for which there are serious grounds for concern about their potential to fall into the at-risk category in the near future. Countries should not reduce their scores because of a lack of conservation programmes for breeds that are clearly not at risk. The main purpose of this question is to obtain an indication of the extent to which your country's conservation programmes meet the objective of protecting breeds from extinction. If your country has no official national criteria for classifying breed risk status or lacks the relevant data for identifying which breeds are at risk, please base your answers on estimations. Please also note that Question 8 of the "Progress report on the implementation of the Global Plan of Action for Animal Genetic Resources – 2007 to 2013" (below) requests countries to provide information on the criteria they use to assess the risk status of animal genetic resources.*

*Note: n/a = no programmes implemented because all breeds of this species present in the country are secure.*

| Species | In situ conservation | Ex situ in vivo conservation | Ex situ in vitro conservation |
|---|---|---|---|
| Cattle (specialized dairy) | high | none | high |
| Cattle (specialized beef) | high | none | high |
| Cattle (multipurpose) | n/a | n/a | n/a |
| Sheep | high | none | medium |
| Goats | high | none | low |
| Pigs | high | none | high |
| Chickens | high | none | high |
| Ducks | n/a | n/a | n/a |
| Geese | n/a | n/a | n/a |
| Horses | medium | none | low |
| Rabbits | medium | none | none |
| Turkeys | n/a | n/a | n/a |

21. Does your country use formal approaches to prioritize breeds for conservation?

- (•) yes
- ( ) no

21.1. If so, which of the following factors are considered?

*Note: See Sections 2 and 3 of the FAO guidelines In vivo conservation of animal genetic resources (http://www.fao.org/docrep/018/i3327e/i3327e.pdf).*

| | Considered in formal prioritization approaches |
|---|---|
| Risk of extinction | yes |
| Genetic uniqueness | yes |
| Genetic variation within the breed | yes |
| Production traits | yes |
| Non-production traits | yes |
| Cultural or historical importance | yes |
| Probability of success | yes |

22. Please indicate which of the following methods are used as elements of in situ conservation programmes in your country and which operators are managing them.

*Note: Operators: the sector(s) that initiate(s) and manage(s) the respective activities. If both sectors undertake the respective activity, please answer "yes" in both rows. Please answer "yes" if the respective sector only works with some of the species targeted. If necessary, details of which sector addresses which species can be provided in the textual response. Information on what kinds of public- or private-sector organizations undertake the activities can also be provided, if necessary, in the textual response. Species targeted: Please answer "yes" if there are any such activities targeting the respective species, whether they are undertaken by the public sector, private sector or both.*

| Operators / Species targeted | Promotion of niche marketing or other market differentiation | Community-based conservation programmes | Incentive or subsidy payment schemes for keeping at-risk breeds | Development of biocultural community protocols | Recognition/award programmes for breeders | Conservation breeding programmes | Selection programmes for increased production or productivity in at-risk breeds | Promotion of at-risk breeds as tourist attractions | Use of at-risk breeds in the management of wildlife habitats and landscapes | Promotion of breed-related cultural activities | Extension programmes to improve the management of at-risk breeds | Awareness-raising activities providing information on the potential of specific at-risk breeds |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Public sector | yes | yes | yes | no | no | yes | yes | yes | yes | yes | yes | yes |
| Private sector | yes | no | no | no | yes | yes | yes | yes | yes | yes | yes | yes |
| Cattle (specialized dairy) | yes | yes | yes | no | yes | yes | yes | yes | yes | yes | yes | yes |
| Cattle (specialized beef) | yes | yes | yes | no | yes | yes | yes | yes | yes | yes | yes | yes |
| Cattle (multipurpose) | no | no | no | no | no | no | no | no | no | no | no | no |
| Sheep | yes | yes | yes | no | yes | yes | yes | yes | yes | yes | yes | yes |
| Goats | yes | yes | yes | no | yes | yes | yes | yes | yes | yes | yes | yes |
| Pigs | yes | yes | yes | no | yes | yes | no | no | no | no | no | yes |
| Chickens | no | no | no | no | no | yes | yes | no | no | yes | yes | yes |
| Ducks | no | no | no | no | no | no | no | no | no | no | no | no |
| Geese | yes | yes | no | no | no | yes | no | no | no | yes | yes | yes |
| Horses | yes | yes | yes | no | yes | yes | yes | yes | no | yes | yes | yes |
| Rabbits | no | no | no | no | no | yes | no | yes | no | no | yes | yes |
| Turkeys | no | no | no | no | no | no | no | no | no | no | no | no |

22.1. Please provide further details of the activities recorded in the table and any other in situ conservation activities or programmes being implemented in your country.

23. Does your country have an operational in vitro gene bank for animal genetic resources?

*In vitro gene bank: a collection of documented cryoconserved genetic material, primarily stored for the purpose of medium- to long-term conservation, with agreed protocols and procedures for acquisition and use of the genetic material.*

- (●) yes
- ( ) no

23.1. If your country has no in vitro gene bank for animal genetic resources, does it have plans to develop one?

- ( ) yes
- ( ) no

23.2. If yes, please describe the plans.

We have a collection of documented cryoconserved genetic material, stored for use today as well as stored for the purpose of medium to long term conservation with agreed practices and procedures for acquisition and use of the genetic material, but we are missing the formal agreed protocol.

24. If your country has an in vitro gene bank for animal genetic resources, please indicate what kind of material is stored there.

| | Stored in national genebank |
|---|---|
| Semen | yes |
| Embryos | yes |
| Oocytes | no |
| Somatic cells (tissue or cultured cells) | yes |
| Isolated DNA | yes |

25. If your country has an in vitro gene bank for animal genetic resources, please complete the following table.

| Species | Number of breeds for which material is stored | Number of breeds for which sufficient material is stored | Does the collection include material from not-at-risk breeds? | Have any extinct populations been reconstituted using material from the gene bank? | Have the gene bank collections been used to introduce genetic variability into an in situ population? | Have the gene bank collections been used to introduce genetic variability into an ex situ population? | Do livestock keepers or breeders' associations participate in the planning of the gene banking activities? |
|---|---|---|---|---|---|---|---|
| Cattle (specialized dairy) | 7 | 7 | yes | no | yes | no | yes |
| Cattle (specialized beef) | 5 | 5 | yes | no | no | no | yes |
| Cattle (multipurpose) | 0 | 0 | no | no | no | no | no |
| Sheep | 12 | 12 | yes | no | yes | no | yes |
| Goats | 2 | 1 | yes | no | yes | no | yes |
| Pigs | 4 | 4 | yes | no | no | no | yes |
| Chickens | 0 | 0 | no | no | no | no | no |
| Ducks | 0 | 0 | no | no | no | no | no |
| Geese | 0 | 0 | no | no | no | no | no |
| Horses | 0 | 0 | no | no | no | no | no |
| Rabbits | 0 | 0 | no | no | no | no | no |
| Turkeys | 0 | 0 | no | no | no | no | no |

25.1. Please provide further details of the activities recorded in the table (including any examples of the use of gene bank material to reconstitute populations or introduce genetic variability) and any other in vitro conservation activities or programmes being implemented in your country.

26. Does your country have plans to enter into collaboration with other countries to set up a regional or subregional in vitro gene bank for animal genetic resources?

- ○ yes
- ◉ no

26.1. If yes, please describe the plans, including a list of the countries involved.

27. If there have been any cases in your country in which breeds that were formerly classified as at risk of extinction have recovered to a position in which they are no longer at risk, please list the breeds and describe how the recovery was achieved.

Norse sheep was classified as at risk of extinction in the 1980s. Now the population is approximately 30 000 animals and is no longer classified as being at risk.
Five of the six endangered dairy cattle breeds native to Norway were classified as at risk of extinction in the 1980s. Today one of these, the Westland Fjord Cattle, is still at risk, but not critically endangered anymore.
A longer and more detailed story about the success of these breeds could be provided.

## REPRODUCTIVE AND MOLECULAR BIOTECHNOLOGIES

28. Please indicate the level of availability of reproductive and molecular biotechnologies for use in livestock production in your country.

*Note: low = at experimental level only; medium = available to livestock keepers in some locations or production systems; high = widely available to livestock keepers.*

| Species | Biotechnologies | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Artificial insemination | Embryo transfer | Multiple ovulation and embryo transfer | Semen sexing | In vitro fertilization | Cloning | Genetic modification | Molecular genetic or genomic information | Transplantation of gonadal tissue |
| Cattle (specialized dairy) | high | low | none | low | none | none | none | high | none |
| Cattle (specialized beef) | high | none | none | none | none | none | none | none | none |
| Sheep | high | none | none | none | none | none | none | none | none |
| Goats | medium | none | none | none | none | none | none | none | none |
| Pigs | high | none | none | none | none | none | none | none | none |
| Chickens | none | none | none | none | none | none | none | none | none |
| Ducks | none | none | none | none | none | none | none | none | none |
| Geese | none | none | none | none | none | none | none | none | none |
| Horses | low | none | none | none | none | none | none | none | none |
| Rabbits | none | none | none | none | none | none | none | none | none |
| Turkeys | none | none | none | none | none | none | none | none | none |

28.1. Please provide additional information on the use of these biotechnologies in your country.

29. If the reproductive and/or molecular technologies are available for use by livestock keepers in your country, please indicate which stakeholders are involved in providing the respective services to the livestock keepers.

| | Stakeholders | | | | | |
|---|---|---|---|---|---|---|
| | Public sector | Breeders' associations or cooperatives | National non-governmental organizations | Donors and development agencies | National commercial companies | External commercial companies |
| Artificial insemination | no | yes | no | no | no | no |
| Embryo transfer | no | yes | no | no | no | no |

29.1. Please provide additional information on the roles that the providers identified in the table play in the provision of biotechnology services in your country.

30. Please indicate which biotechnologies your country is undertaking research on.

| Biotechnologies | Public or private research at national level | Research undertaken as part of international collaboration |
|---|---|---|
| Artificial insemination | yes | yes |
| Embryo transfer or MOET | no | yes |
| Semen sexing | yes | yes |
| *In vitro* fertilization | no | no |
| Cloning | no | no |
| Genetic modification | no | no |
| Use of molecular genetic or genomic information for estimation of genetic diversity | yes | yes |
| Use of molecular genetic or genomic information for prediction of breeding values | yes | yes |
| Research on adaptedness based on molecular genetic or genomic information | no | no |

30.1. Please briefly describe the research.

31. Please estimate the extent to which artificial insemination (using semen from exotic and/or locally adapted breeds) and/or natural mating is used in your country's various production systems.

*Note: low = approximately <33% of matings; medium = approximately 33–67% of matings; high = approximately >67% of mating; n/a = production system not present in this country.*

| Cattle (specialized dairy) | Ranching or similar grassland -based production systems | Pastoralist systems | Mixed farming systems (rural areas) | Industrial systems | Small-scale urban or peri-urban systems |
|---|---|---|---|---|---|
| Artificial insemination using semen from locally adapted breeds | n/a | n/a | high | n/a | n/a |
| Artificial insemination using nationally produced semen from exotic breeds | n/a | n/a | none | n/a | n/a |
| Artificial insemination using imported semen from exotic breeds | n/a | n/a | low | n/a | n/a |
| Natural mating | n/a | n/a | low | n/a | n/a |

| Cattle (specialized beef) | Ranching or similar grassland -based production systems | Pastoralist systems | Mixed farming systems (rural areas) | Industrial systems | Small-scale urban or peri-urban systems |
|---|---|---|---|---|---|
| Artificial insemination using semen from locally adapted breeds | n/a | n/a | low | n/a | n/a |
| Artificial insemination using nationally produced semen from exotic breeds | n/a | n/a | medium | n/a | n/a |
| Artificial insemination using imported semen from exotic breeds | n/a | n/a | low | n/a | n/a |
| Natural mating | n/a | n/a | high | n/a | n/a |

| Sheep | Ranching or similar grassland -based production systems | Pastoralist systems | Mixed farming systems (rural areas) | Industrial systems | Small-scale urban or peri-urban systems |
|---|---|---|---|---|---|
| Artificial insemination using semen from locally adapted breeds | n/a | n/a | medium | n/a | n/a |
| Artificial insemination using nationally produced semen from exotic breeds | n/a | n/a | low | n/a | n/a |
| Artificial insemination using imported semen from exotic breeds | n/a | n/a | low | n/a | n/a |
| Natural mating | n/a | n/a | high | n/a | n/a |

| Goats | Ranching or similar grassland -based production systems | Pastoralist systems | Mixed farming systems (rural areas) | Industrial systems | Small-scale urban or peri-urban systems |
|---|---|---|---|---|---|
| Artificial insemination using semen from locally adapted breeds | n/a | n/a | medium | n/a | n/a |
| Artificial insemination using nationally produced semen from exotic breeds | n/a | n/a | low | n/a | n/a |
| Artificial insemination using imported semen from exotic breeds | n/a | n/a | low | n/a | n/a |
| Natural mating | n/a | n/a | high | n/a | n/a |

| Pigs | Ranching or similar grassland -based production systems | Pastoralist systems | Mixed farming systems (rural areas) | Industrial systems | Small-scale urban or peri-urban systems |
|---|---|---|---|---|---|
| Artificial insemination using semen from locally adapted breeds | n/a | n/a | medium | n/a | n/a |
| Artificial insemination using nationally produced semen from exotic breeds | n/a | n/a | medium | n/a | n/a |
| Artificial insemination using imported semen from exotic breeds | n/a | n/a | low | n/a | n/a |
| Natural mating | n/a | n/a | low | n/a | n/a |

32. Please provide further details on the use of reproductive and molecular biotechnologies in animal genetic resources management in your country. Please note any particular constraints to implementing these activities and any problems associated with their use. Please indicate what needs to be done to address these constraints and/or problems. You may also provide information on any particular successes achieved in your country in the use of biotechnologies in animal genetic resources management and on the factors that have contributed to these successes.

## III. DATA CONTRIBUTING TO THE PREPARATION OF *THE STATE OF THE WORLD'S BIODIVERSITY FOR FOOD AND AGRICULTURE*

### INTEGRATION OF THE MANAGEMENT OF ANIMAL GENETIC RESOURCES WITH THE MANAGEMENT OF PLANT, FORESTRY AND AQUATIC GENETIC RESOURCES

1. Please indicate the extent to which the management of animal genetic resources in your country is integrated with the management of plant, forestry and aquatic genetic resources. Please describe the collaboration, including, if relevant, a description of the benefits gained by pursuing a collaborative approach.

| | Extent of collaboration | Description |
|---|---|---|
| Development of joint national strategies or action plans | extensive | In 2013 we finalized and published a strategic plan for the Norwegian Genetic Resource Centre, covering the three sectors PGRFA, FGRFA and AnGRFA. |
| Collaboration in the characterization, surveying or monitoring of genetic resources, production environments or ecosystems | limited | Not so relevant, since the sectors are so different from each other. |

| | Extent of collaboration | Description |
|---|---|---|
| Collaboration related to genetic improvement | none | Not so relevant, since the sectors are so different from each other. |
| Collaboration related to product development and/or marketing | limited | This is emerging. |
| Collaboration in conservation strategies, programmes or projects | limited | This is part of the mentioned strategic plan for the Norwegian Genetic Resource Centre, but as this plan is general and superior, it can and will not replace the sectoral action plans. |
| Collaboration in awareness-raising on the roles and values of genetic resources | extensive | By establishing the Norwegian Genetic Resource Centre the three sectors increased activities on these issues. |
| Training activities and/or educational curricula that address genetic resources in an integrated manner | none | |
| Collaboration in the mobilization of resources for the management of genetic resources | extensive | By establishing the Norwegian Genetic Resource Centre the three sectors increased activities on these issues. |

2. Please describe any other types of collaboration.

The Norwegian Genetic Resource Centre has its' own web site, www.genressurser.no, covering all three sectors. This is an efficient way of publishing news about the work on the conservation work in Norway.

3. If relevant, please describe the benefits that could be achieved by strengthening collaboration in the management of genetic resources in the animal, plant, forest and aquatic sectors in your country. If specific plans to increase collaboration are in place, please describe them and the benefits foreseen

4. Please describe any factors that facilitate or constrain collaborative approaches to the management of genetic resources in your country.

5. If there are constraints, please indicate what needs to be done to overcome them.

## ANIMAL GENETIC RESOURCES MANAGEMENT AND THE PROVISION OF REGULATING AND SUPPORTING ECOSYSTEM SERVICES

6. Do your country's policies, plans or strategies for animal genetic resources management include measures specifically addressing the roles of livestock in the provision of regulating ecosystem services and/or supporting ecosystem services?

*Regulating ecosystem services: "Benefits obtained from the regulation of ecosystem processes" – Millennium Ecosystem Assessment. 2005. Ecosystems and human well-being: synthesis. Washington D.C., Island Press (available at http://millenniumassessment.org/documents/document.356.aspx.pdf), page 40. Supporting ecosystem services: "Services necessary for the production of all other ecosystem services" – Millennium Ecosystem Assessment. 2005. Ecosystems and human well-being: synthesis. Washington D.C., Island Press (available at http://millenniumassessment.org/documents/document.356.aspx.pdf), page 40.*

- (•) yes
- ( ) no

6.1. If yes, please describe these measures and indicate which supporting and/or regulating ecosystem services are targeted, and in which production systems.

*Examples of supporting and regulatory ecosystem services provided by livestock might include the following: provision or maintenance of wildlife habitats (e.g. via grazing); seed dispersal (e.g. in dung or on animals' coats); promoting plant growth (e.g. stimulating growth via grazing or browsing); soil formation (e.g. via the supply of manure); soil nutrient cycling (e.g. via supply of manure); soil quality regulation (e.g. affecting soil structure and water-holding capacity via trampling or dunging); control of weeds and invasive species (e.g. via grazing or browsing invasive plants); climate regulation (e.g. by promoting carbon sequestration through dunging); enhancing pollination levels (e.g. by creating habitats for pollinators); fire control (e.g. by removal of biomass that may fuel fires); avalanche control (e.g. grazing to keep vegetation short to reduce the probability that snow will slide); erosion regulation (e.g. indirect via fire control services); maintenance of water quality and quantity (e.g. indirect effect via erosion control); management of crop residues (e.g. consumption of unwanted crop residues by animals); pest regulation (e.g. by destruction of pests or pest habitats); disease regulation (e.g. by destruction of disease vectors or their habitats); buffering of water quantities – flood regulation (e.g. indirect effect via fire and erosion control).*

Grazing livestock is to some extent recognized when managing some cultural landscapes. However this can be much more recognized and utilized. Norway has a big challenge in the management of many types of traditional farming landscapes due to the decrease of grazing animals and thus severe regrowth.

6.1.1 Please describe what the outcome of these measures has been in terms of the supply of the respective ecosystem services (including an indication of the scale on which these outcomes have been obtained).

6.1.2 Please describe what the outcome of these measures has been in terms of the state of animal genetic resources and their management (including an indication of the scale on which these outcomes have been obtained).

7. Do your country's policies, plans or strategies for animal genetic resources management include measures specifically addressing environmental problems associated with livestock production?

*Examples might include choosing to use particular species or breeds because they are less environmentally damaging in a given ecosystem or adapting breeding goals to produce animals that have some characteristic that makes them more environmentally friendly.*

- (●) yes
- ( ) no

7.1. If yes, please describe these measures and indicate the environmental problems that are targeted, and in which production systems.

The Norse sheep has been recognized and utilized as grazing animals in the management of the coastal heathlands.

7.1.1 Please describe what the outcome of these measures has been in terms of the reduction of the respective environmental problem (including an indication of the scale on which these outcomes have been obtained).

7.1.2 Please describe what the outcome of these measures has been in terms of the state of animal genetic resources and their management (including an indication of the scale on which these outcomes have been obtained).

8. Please describe any constraints or problems encountered or foreseen in the implementation of measures in your country aimed at promoting the provision of regulating and supporting ecosystem services or reducing environmental problems.

9. Please provide examples of cases in which the role of livestock or specific animal genetic resources is particularly important in the provision of regulating and/or supporting ecosystem services in your country. Please also describe any examples in which diverse animal genetic resources are important in terms of reducing the adverse environmental effects of livestock production.

10. Please describe the potential steps that could be taken in your country to further expand or strengthen positive links between animal genetic resources management and the provision of regulating and/or supporting ecosystem services or the reduction of environmental problems. If your country has specific plans to take further action in this field, please describe them.

11. Please provide any further information on the links between animal genetic resources management in your country and the provision of supporting and/or regulating ecosystem services and/or the reduction of environmental problems.

## IV. PROGRESS REPORT ON THE IMPLEMENTATION OF THE *GLOBAL PLAN OF ACTION FOR ANIMAL GENETIC RESOURCES* – 2007 TO 2013

*Note: Please provide further details in the text boxes below each question, including, if relevant, information on why no action has been taken.*

### STRATEGIC PRIORITY AREA 1: CHARACTERIZATION, INVENTORY AND MONITORING OF TRENDS AND ASSOCIATED RISKS

- The state of inventory and characterization of animal genetic resources
- The state of monitoring programmes and country-based early warning and response systems
- The state of international technical standards and protocols for characterization, inventory, and monitoring

1. Which of the following options best describes your country's progress in building an inventory of its animal genetic resources covering all livestock species of economic importance (SP 1, Action 1)?
*Glossary: An inventory is a complete list of all the different breeds present in a country.*

- (●) a. Completed before the adoption of the GPA
- ( ) b. Completed after the adoption of the GPA
- ( ) c. Partially completed (further progress since the adoption of the GPA)
- ( ) d. Partially completed (no further progress since the adoption of the GPA)

Please provide further details:

2. Which of the following options best describes your country's progress in implementing phenotypic characterization studies covering morphology, performance, location, production environments and specific features in all livestock species of economic importance (SP 1, Actions 1 and 2)?

- (●) a. Comprehensive studies were undertaken before the adoption of the GPA
- ( ) b. Sufficient information has been generated because of progress made since the adoption of the GPA
- ( ) c. Some information has been generated (further progress since the adoption of the GPA)
- ( ) d. Some information has been generated (no further progress since the adoption of the GPA)
- ( ) e. None, but action is planned and funding identified
- ( ) f. None, but action is planned and funding is sought
- ( ) g. None

Please provide further details:

3. Which of the following options best describes your country's progress in molecular characterization of its animal genetic resources covering all livestock species of economic importance (SP 1)?

- (●) a. Comprehensive studies were undertaken before the adoption of the GPA
- ( ) b. Sufficient information has been generated because of progress made since the adoption of the GPA
- ( ) c. Some information has been generated (further progress since the adoption of the GPA)
- ( ) d. Some information has been generated (no further progress since the adoption of the GPA)
- ( ) e. None, but action is planned and funding identified
- ( ) f. None, but action is planned and funding is sought
- ( ) g. None

Please provide further details:

4. Has your country conducted a baseline survey of the population status of its animal genetic resources for all livestock species of economic importance (SP 1, Action 1)?

*Glossary: A baseline provides a reference point for monitoring population trends. Population status refers to the total size of a national breed population (ideally, also the proportion that is actively used for breeding and the number of male and female breeding animals).*

- (●) a. Yes, a baseline survey was undertaken before the adoption of the GPA
- ( ) b. Yes, a baseline survey has been undertaken or has commenced after the adoption of the GPA
- ( ) c. Yes, a baseline survey has been undertaken for some species (coverage increased since the adoption of the GPA)
- ( ) d. Yes, a baseline survey has been undertaken for some species (coverage not increased since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

5. Have institutional responsibilities for monitoring the status of animal genetic resources in your country been established (SP 1, Action 3)?

*Glossary: Monitoring is a systematic set of activities undertaken to document changes in the population size and structure of animal genetic resources over time.*

- (●) a. Yes, responsibilities established before the adoption of the GPA
- ( ) b. Yes, responsibilities established after the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details:

6. Have protocols (details of schedules, objectives and methods) been established for a programme to monitor the status of animal genetic resources in your country (SP 2)?

- (●) a. Yes, protocols established before the adoption of the GPA
- ( ) b. Yes, protocols established after the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details:

7. Are the population status and trends of your country's animal genetic resources being monitored regularly for all livestock species of economic importance (SP 1, Action 2)?

- (●) a. Yes, regular monitoring commenced before the adoption of the GPA
- ( ) b. Yes, regular monitoring commenced after the adoption of the GPA
- ( ) c. Yes, regular monitoring is being undertaken for some species (coverage increased since the adoption of the GPA)
- ( ) d. Yes, regular monitoring is being undertaken for some species (coverage not increased since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

8. Which criteria does your country use for assessing the risk status of its animal genetic resources (SP 1, Action 7)?

*Glossary: FAO has developed criteria that it uses to allocate breeds to risk-status categories based on the size and structure of their populations (http://www.fao.org/docrep/010/a1250e/a1250e00.htm).*

- (●) a. FAO criteria
- ( ) b. National criteria that differ from the FAO criteria
- ( ) c. Other criteria (e.g. defined by international body such as European Union)
- ( ) d. None

Please provide further details. If applicable, please describe (or provide a link to a web site that describes) your national criteria or those of the respective international body:

## Norwegian requirements to breeds worthy of conservation

To be regarded as a breed worthy of conservation, the breed must be classified as native to Norway with an endangered or critical endangered population size.

**Criteria for being regarded as a breed native to Norway**

1. The breed shall have been imported to or established in Norway before 1950
2. The breed shall have been bred in Norway without major import of breeding material, unless the import has been in line with breeding goals defined by Norwegian breeding associations.
3. The breed shall have or have had economic and cultural importance.

*Breeds established or imported after 1950*

Imported breeds with a breeding program run and defined by Norwegian breeding associations and established after 1950 are not regarded as native breeds worthy of conservation. However, the Norwegian Committee on Animal Genetic Resources appeals to the breeding associations with these breeds, and especially those breeds with documented breeding progress, to establish, where appropriate, long term genebanks with frozen semen. If the breeding program is closed, the Norwegian Committee on Animal Genetic Resources furthermore appeal to the respective breeding associations not to destroy their gene banks.

**Criteria for categorizing breeds as *endangered* or *critical***

In agreement with FAOs "Guidelines on *in vivo* conservation of animal genetic resources" the livestock species are classified as either species of high or low reproductive capacity. This classification is then being used when categorizing breeds in risk classification.

*Reproduction capacity*

The high reproductive species of relevance for Norway are:

- Chicken, goose, dog, rabbit and pig.

The low reproductive species of relevance for Norway are:

- Cattle, horse, goat and sheep

*Risk classification*

- A breed is categorized as *endangered* if the total number of breeding females is greater than 100 (300 for species with low reproductive capacity) and less than or

9. Has your country established an operational emergency response system (http://www.fao.org/docrep/meeting/021/K3812e.pdf) that provides for immediate action to safeguard breeds at risk in all important livestock species (SP 1, Action 7)?

- (●) a. Yes, a comprehensive system was established before the adoption of the GPA
- ( ) b. Yes, a comprehensive system has been established since the adoption of the GPA
- ( ) c. For some species and breeds (coverage expanded since the adoption of the GPA)
- ( ) d. For some species and breeds (coverage not expanded since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

10. Is your country conducting research to develop methods, technical standards or protocols for phenotypic or molecular characterization, or breed evaluation, valuation or comparison? (SP 2, Action 2)

- (●) a. Yes, research commenced before the adoption of the GPA
- ( ) b. Yes, research commenced after the adoption of the GPA

- ○ c. No, but action is planned and funding identified
- ○ d. No, but action is planned and funding is sought
- ○ e. No

Please provide further details:

11. Has your country identified the major barriers and obstacles to enhancing its inventory, characterization and monitoring programmes?

- ○ a. Yes
- ○ b. No
- ◉ c. No major barriers and obstacles exist. Comprehensive inventory, characterization and monitoring programmes are in place.

Please provide further details. If barriers and obstacles have been identified, please list them:

Lack of financial resources and relevant research programmes.

12. If applicable, please list and describe the measures that need to be taken to address these barriers and obstacles and to enhance your country's inventory, characterization and monitoring programmes:

13. Please provide further comments on your country's activities related to Strategic Priority Area 1: Characterization, inventory and monitoring of trends and associated risks (including regional and international cooperation)

*Note: It is not necessary to duplicate information provided in previous sections. Where relevant, please provide cross-references.*

## STRATEGIC PRIORITY AREA 2: SUSTAINABLE USE AND DEVELOPMENT

- The state of national sustainable use policies for animal genetic resources
- The state of national species and breed development strategies and programmes
- The state of efforts to promote agro-ecosystem approaches

14. Does your country have adequate national policies in place to promote the sustainable use of animal genetic resources (see also questions 46 and 54)?

- ◉ a. Yes, since before the adoption of the GPA
- ○ b. Yes, policies put in place or updated after the adoption of the GPA
- ○ c. No, but action is planned and funding identified
- ○ d. No, but action is planned and funding is sought
- ○ e. No

Please provide further details. If available, please provide the text of the policies or a web link to the text:

15. Do these policies address the integration of agro-ecosystem approaches into the management of animal genetic resources in your country (SP5) (see also questions 46 and 54)?

*Glossary: The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way (for further information see http://www.cbd.int/ecosystem/description.shtml).*

- (●) a. Yes
- ( ) b. No, but a policy update is planned and funding identified
- ( ) c. No, but action is planned and funding is sought
- ( ) d. No

Please provide further details:

Traditionally, Norwegian agriculture and livestock production have been assigned several public responsibilities in addition to just producing food. Such a multifunctional agriculture includes such issues as self-sufficiency and food security, rural policy, environmental pollution, cultural landscape and socio-economic aspects related to income developments and distribution within the sector, which might well be in line with an agro-ecosystem approach.

16. Do breeding programmes exist in your country for all major species and breeds, and are these programmes regularly reviewed, and if necessary revised, with the aim of meeting foreseeable economic and social needs and market demands (SP4, Action 2)?

- (●) a. Yes, since before the adoption of the GPA
- ( ) b. Yes, put in place after the adoption of the GPA
- ( ) c. For some species and breeds (coverage has increased since the adoption of the GPA)
- ( ) d. For some species and breeds (coverage has not increased since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

17. Is long-term sustainable use planning – including, if appropriate, strategic breeding programmes – in place for all major livestock species and breeds (SP4, Action 1)?

- (●) a. Yes, since before the adoption of the GPA
- ( ) b. Yes, put in place after the adoption of the GPA
- ( ) c. For some species and breeds (further progress made since the adoption of the GPA)
- ( ) d. For some species and breeds (no further progress made since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

18. Have the major barriers and obstacles to enhancing the sustainable use and development of animal genetic resources in your country been identified?

- ( ) a. Yes
- ( ) b. No
- (●) c. No major barriers and obstacles exist. Comprehensive sustainable use and development measures are in place.

Please provide further details. If barriers and obstacles have been identified, please list them:

The decrease in small farms with small herds is the main obstacle to maintaining the endangered breeds in traditional production systems.

19. Have the long-term impacts of the use of exotic breeds on locally adapted breeds (e.g. economic, environmental or genetic impacts) and on food security been assessed in your country (SP4, Action 1)?

*Glossary:*

*Exotic breeds are breeds that are maintained in a different area from the one in which they were developed. Exotic breeds comprise both recently introduced breeds and continually imported breeds.*

*Locally adapted breeds are breeds that have been in the country for a sufficient time to be genetically adapted to one or more of traditional production systems or environments in the country. The phrase "sufficient time" refers to time present in one or more of the country's traditional production systems or environments. Taking cultural, social and genetic aspects into account, a period of 40 years and six generations of the respective species might be considered as a guiding value for "sufficient time", subject to specific national circumstances.*

f. No

Please provide further details:

Only in poultry exotic breeds have replaced the local commercial breeds completely. This happened during 1994-1995. The long-term impacts of this situation on food security has not been assessed.

20. Have recording systems and organizational structures for breeding programmes been established or strengthened (SP4, Action 3)?

- a. Yes, sufficient recording systems and organizational structures for breeding programmes have existed since before the adoption of the GPA
- b. Yes, sufficient recording systems and organizational structures for breeding programmes exist because of progress made since the adoption of the GPA
- c. Yes, recording systems and organizational structures for breeding programmes are partially in place (and were established or strengthened after the adoption of the GPA)
- d. Yes, recording systems and organizational structures for breeding programmes are partially in place (but no progress has been made since the adoption of the GPA)
- e. No, but action is planned and funding identified
- f. No, but action is planned and funding is sought
- g. No

Please provide further details:

21. Are mechanisms in place in your country to facilitate interactions among stakeholders, scientific disciplines and sectors as part of sustainable use development planning (SP5, Action 3)?

- a. Yes, comprehensive mechanisms have existed since before the adoption of the GPA
- b. Yes, comprehensive mechanisms exist because of progress made since the adoption of the GPA
- c. Yes, mechanisms are partially in place (and were established or strengthened after the adoption of the GPA)
- d. Yes, mechanisms are partially in place (but no progress has been made since the adoption of the GPA)
- e. No, but action is planned and funding identified
- f. No, but action is planned and funding is sought
- g. No

Please provide further details:

22. Have measures been implemented in your country to provide farmers and livestock keepers with information that facilitates their access to animal genetic resources (SP 4, Action 7)?

- (●) a. Yes, comprehensive measures have existed since before the adoption of the GPA
- ( ) b. Yes, comprehensive measures exist because of progress made since the adoption of the GPA
- ( ) c. Yes, measures partially implemented (and were established or strengthened after the adoption of the GPA)
- ( ) d. Yes, measures partially implemented (but no progress has been made since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

23. Has your country developed a national policy or entered specific contractual agreements for access to and the equitable sharing of benefits resulting from the use and development of animal genetic resources and associated traditional knowledge (SP3, Action 2)?

- (●) a. Yes, sufficient measures (policy and/or agreements) have been in place since before the adoption of the GPA
- ( ) b. Yes, sufficient measures (policy and/or agreements) are in place because of progress made since the adoption of the GPA
- ( ) c. Yes, some measures (policy and/or agreements) are in place (progress has been made since the adoption of the GPA)
- ( ) d. Yes, some measures (policy and/or agreements) are in place (but no progress has been made since the adoption of the GPA)
- ( ) e. No, but a policy and/or agreements are in preparation
- ( ) f. No, but a policy and/or agreements are planned
- ( ) g. No

Please provide further details:

24. Have training and technical support programmes for the breeding activities of livestock-keepers been established or strengthened in your country (SP 4, Action 1)?

- (●) a. Yes, sufficient programmes have existed since before the adoption of the GPA
- ( ) b. Yes, sufficient programmes exist because of progress made since the adoption of the GPA
- ( ) c. Yes, some programmes exist (progress has been made since the adoption of the GPA)
- ( ) d. Yes, some programmes exist (but no progress has been made since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

25. Have priorities for future technical training and support programmes to enhance the use and development of animal genetic resources in your country been identified (SP 4, paragraph 42)?

- (●) a. Yes, priorities have been identified or updated since the adoption of the GPA
- ( ) b. Yes, priorities were identified before the adaption of the GPA but have not been updated
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details:

26. Have efforts been made in your country to assess and support indigenous or local production systems and associated traditional knowledge and practices related to animal genetic resources (SP 6, Action 1, 2)?

- (●) a. Yes, sufficient measures have been in place since before the adoption of the GPA
- ( ) b. Yes, sufficient measures are in place because of progress made since the adoption of the GPA
- ( ) c. Yes, some measures are in place (and were established or strengthened after the adoption of the GPA)
- ( ) d. Yes, some measures are in place (but no progress has been made since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

27. Have efforts been made in your country to promote products derived from indigenous and local species and locally adapted breeds, and facilitate access to markets (SP 6, Action 2, 4)?

- (●) a. Yes, sufficient measures have been in place since before the adoption of the GPA
- ( ) b. Yes, sufficient measures are in place because of progress made since the adoption of the GPA
- ( ) c. Yes, some measures are in place (and were established or strengthened after the adoption of the GPA)
- ( ) d. Yes, some measures are in place (but no progress has been made since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

28. If applicable, please list and describe priority requirements for enhancing the sustainable use and development of animal genetic resources in your country:

It must be profitable to run small farms based on endangered local breeds.

29. Please provide further comments on your country's activities related to Strategic Priority Area 2: Sustainable Use and Development (including regional and international cooperation)

*Note: It is not necessary to duplicate information provided in previous sections. Where relevant, please provide cross-references.*

## STRATEGIC PRIORITY AREA 3: CONSERVATION

- The state of national conservation policies
- The state of *in situ* and *ex situ* conservation programmes
- The state of regional and global long-term conservation strategies and agreement on technical standards for conservation

30. Does your country regularly assess factors leading to the erosion of its animal genetic resources (SP 7, Action 2)?

- ○ a. Erosion not occurring
- ◉ b. Yes, regular assessments have been implemented since before the adoption of the GPA
- ○ c. Yes, regular assessments have commenced since the adoption of the GPA
- ○ d. No, but action is planned and funding identified
- ○ e. No, but action is planned and funding is sought
- ○ f. No

Please provide further details:

31. What factors or drivers are leading to the erosion of animal genetic resources? Please describe the factors specifying which breeds or species are affected:

Small breeding populations of the endangered breeds.

32. Does your country have conservation policies and programmes in place to protect locally adapted breeds at risk in all important livestock species (SP 7, SP 8 and SP 9)?

*Glossary: Locally adapted breeds are breeds that have been in the country for a sufficient time to be genetically adapted to one or more of traditional production systems or environments in the country. The phrase "sufficient time" refers to time present in one or more of the country's traditional production systems or environments. Taking cultural, social and genetic aspects into account, a period of 40 years and six generations of the respective species might be considered as a guiding value for "sufficient time", subject to specific national circumstances.*

- ○ a. Country requires no policies and programmes because all locally adapted breeds are secure
- ◉ b. Yes, comprehensive policies and programmes have been in place since before the adoption of the GPA
- ○ c. Yes, comprehensive policies and programmes exist because of progress made since the adoption of the GPA
- ○ d. For some species and breeds (coverage expanded since the adoption of the GPA)
- ○ e. For some species and breeds (coverage not expanded since the adoption of the GPA)
- ○ f. No, but action is planned and funding identified
- ○ g. No, but action is planned and funding is sought
- ○ h. No

Please provide further details:

33. If conservation policies and programmes are in place, are they regularly evaluated or reviewed (SP 7, Action 1; SP 8, Action 1; and SP 9, Action 1)?

- ◉ a. Yes
- ○ b. No, but action is planned and funding identified
- ○ c. No, but action is planned and funding is sought

- ○ d. No

Please provide further details:

34. Does your country have in situ conservation measures in place for locally adapted breeds at risk of extinction and to prevent breeds from becoming at risk (SP 8 and SP 9)?

*Glossary: Locally adapted breeds are breeds that have been in the country for a sufficient time to be genetically adapted to one or more of traditional production systems or environments in the country. The phrase "sufficient time" refers to time present in one or more of the country's traditional production systems or environments. Taking cultural, social and genetic aspects into account, a period of 40 years and six generations of the respective species might be considered as a guiding value for "sufficient time", subject to specific national circumstances.*

- ○ a. Country requires no in situ conservation measures because all locally adapted breeds are secure
- ◉ b. Yes for all breeds
- ○ c. For some breeds (coverage expanded since the adoption of the GPA)
- ○ d. For some breeds (coverage not expanded since the adoption of the GPA)
- ○ e. No, but action is planned and funding identified
- ○ f. No, but action is planned and funding is sought
- ○ g. No

Please provide further details:

35. Does your country have ex situ in vivo conservation measures in place for locally adapted breeds at risk of extinction and to prevent breeds from becoming at risk (SP 8 and SP 9)?

*Glossary: Ex situ in vivo conservation - maintenance of live animal populations not kept under their normal management conditions - e.g. in zoological parks or governmental farms - and/or outside the area in which they evolved or are now normally found.*

- ○ a. Country requires no ex situ in vivo conservation measures because all locally adapted breeds are secure
- ○ b. Yes for all breeds
- ○ c. For some breeds (coverage expanded since the adoption of the GPA)
- ◉ d. For some breeds (coverage not expanded since the adoption of the GPA)
- ○ e. No, but action is planned and funding identified
- ○ f. No, but action is planned and funding is sought
- ○ g. No

Please provide further details:

It is in place for all relevant breeds, that is the local egg layer breeds are kept in a live gene bank, that should be recognized as ex situ in vivo conservation activity.

36. Does your country have ex situ in vitro conservation measures in place for locally adapted breeds at risk of extinction and to prevent breeds from becoming at risk (SP 8 and SP 9)?

*Glossary: Ex situ in vitro - conservation, under cryogenic conditions including, inter alia, the cryoconservation of embryos, semen, oocytes, somatic cells or tissues having the potential to reconstitute live animals at a later date.*

- ○ a. Country requires no ex situ in vitro conservation measures because all locally adapted breeds are secure
- ○ b. Yes for all breeds
- ○ c. For some breeds (coverage expanded since the adoption of the GPA)
- ◉ d. For some breeds (coverage not expanded since the adoption of the GPA)
- ○ e. No, but action is planned and funding identified

- ○ f. No, but action is planned and funding is sought
- ○ g. No

Please provide further details:

For all breeds except the native and endangered horse breeds.

37. Please describe the measures (indicating for each whether they were introduced before or after the adoption of the GPA) or provide a web link to a published document that provides further information:

Dairy cattle: Since 1985, one hundred semen doses of all Norwegian AI-bulls have been taken from all progeny-tested bulls and endangered native breeds for long-term storage.
Sheep and dairy goats: Since the early 1980s, one hundred semen doses of all Norwegian AI-rams have been taken for long-term storage.
Horses: No storage for horse semen for long-term storage.
Pigs: Since 1998, 20 doses from each elite boar have been frozen for long-term storage.
Poultry: Native genebank with live animals established in 1973.

38. If your country has not established any conservation programmes, is this a future priority?

- ◉ a. Yes
- ○ b. No

Please provide further details:

Sorry, I should not have clicked here. For sure we have established a conservation programme for our endangered local breeds.

39. Has your country identified the major barriers and obstacles to enhancing the conservation of its animal genetic resources?

- ○ a. Country requires no conservation programmes because all animal genetic resources are secure
- ◉ b. Yes
- ○ c. No
- ○ d. No major barriers and obstacles exist. Comprehensive conservation programmes are in place

Please provide further details. If barriers and obstacles have been identified, please list them:

Lack of financial resources to support the farmers keeping the endangered local breeds. The decrease in small farm entities is for sure an obstacle for in situ/on farm conservation of endangered local breeds.

40. If your country has existing ex situ collections of animal genetic resources, are there major gaps in these collections (SP 9, Action 5)?

- ◉ a. Yes
- ○ b. No

If yes, have priorities for filling the gaps been established?

- ○ a. Yes
- ○ b. No, but action is planned and funding identified
- ◉ c. No, but action is planned and funding is sought
- ○ d. No

Please provide further details:

The major gap is the lack of an ex situ collection of semen from our local and critically endangered horse breeds.

41. Are arrangements in place in your country to protect breeds and populations that are at risk from natural or human-induced disasters (SPA 3)?

- (●) a. Yes, arrangements have been in place since before the adoption of the GPA
- ( ) b. Yes, arrangements put in place after the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details:

42. Are arrangements in place in your country for extraction and use of conserved genetic material following loss of animal genetic resources (e.g. through disasters), including arrangements to enable restocking (SP 9, Action 3)?

- (●) a. Yes, arrangements have been in place since before the adoption of the GPA
- ( ) b. Yes, arrangements put in place after the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details:

43. Is your country conducting research to adapt existing, or develop new, methods and technologies for in situ and ex situ conservation of animal genetic resources (SP 11, Action 1)?

- (●) a. Yes, research commenced before the adoption of the GPA
- ( ) b. Yes, research commenced since the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details. If yes, please briefly describe the research:

44. Does your country implement programmes to promote documentation and dissemination of knowledge, technologies and best practices for conservation (SP 11, Action 2)?

- (●) a. Yes, programmes commenced before the adoption of the GPA
- ( ) b. Yes, programmes commenced since the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details:

45. What are your country's priority requirements for enhancing conservation measures for animal genetic resources? Please list and describe them:

Continue to develop the ex situ genebanks and support farmers keeping live animals on their farms.

46. Please provide further comments describing your country's activities related to Strategic Priority Area 3: Conservation (including regional and international cooperation)

*Note: It is not necessary to duplicate information provided in previous sections. Where relevant, please provide cross-references.*

## STRATEGIC PRIORITY AREA 4: POLICIES, INSTITUTIONS AND CAPACITY-BUILDING IMPLEMENTATION AND FINANCING OF THE GLOBAL PLAN OF ACTION FOR ANIMAL GENETIC RESOURCES

- The state of national institutions for planning and implementing animal genetic resources measures
- The state of information sharing
- The state of educational and research facilities capacity for characterization, inventory, and monitoring, sustainable use, development, and conservation
- The state of awareness of the roles and values of animal genetic resources
- The state of policies and legal frameworks for animal genetic resources

47. Does your country have sufficient institutional capacity to support holistic planning of the livestock sector (SP 12, Action1)?

- (●) a. Yes, sufficient capacity has been in place since before the adoption of the GPA
- ( ) b. Yes, sufficient capacity is in place because of progress made after the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details:

48. What is the current status of your country's national strategy and action plan for animal genetic resources (SP 20)?

*Glossary: National strategy and action plan for animal genetic resources: a strategy and plan, agreed by stakeholders and preferably government-endorsed, that translates the internationally agreed Global Plan of Action for Animal Genetic Resources into national actions, with the aim of ensuring a strategic and comprehensive approach to the sustainable use, development and conservation of animal genetic resources for food and agriculture.*

- (●) a. Previously endorsed national strategy and action plan is being updated (or new version has been endorsed)
- ( ) b. Completed and government-endorsed
- ( ) c. Completed and agreed by stakeholders
- ( ) d. In preparation
- ( ) e. Preparation is planned and funding identified
- ( ) f. Future priority activity
- ( ) g. Not planned

Please provide further details. If available, please provide a copy of your country's national strategy and action plan as a separate document or as a web link:

49. Are animal genetic resources addressed in your country's National Biodiversity Strategy and Action Plan (http://www.cbd.int/nbsap/)?

- (●) a. Yes
- ( ) b. No, but they will be addressed in forthcoming plan
- ( ) c. No

Please provide further details:

50. Are animal genetic resources addressed in your country's national livestock sector strategy, plan or policy (or equivalent instrument)?

- (●) a. Yes
- ( ) b. No, but they will be addressed in a forthcoming strategy, plan or policy
- ( ) c. No, animal genetic resources are not addressed
- ( ) d. No, the country does not have a national livestock sector strategy, plan or policy

Please provide further details. If available, please provide the text of the strategy, plan or policy or a web link to the text:

51. Has your country established or strengthened a national database for animal genetic resources (independent from DAD-IS) (SP 15, Action 4)?

- (●) a. Yes, a national database has been in place since before the adoption of the GPA
- ( ) b. Yes, a national database is in place because of progress made since the adoption of the GPA
- ( ) c. Yes, a national database is in place but still requires strengthening (progress since adoption of the GPA)
- ( ) d. Yes, a national database is in place but still requires strengthening (no progress since adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

52. Have your country's national data on animal genetic resources been regularly updated in DAD-IS?

*Note that the Commission on Genetic Resources for Food and Agriculture has requested FAO to produce global status and trends reports every two years.*

- (●) a. Yes, regular updates have been occurring since before the adoption of the GPA
- ( ) b. Yes, regular updates started after the adoption of the GPA
- ( ) c. No, but it is a future priority
- ( ) d. No

Please provide further details:

53. Has your country established a National Advisory Committee for Animal Genetic Resources (SP 12, Action 3)?

- (●) a. Yes, established before the adoption of the GPA
- ( ) b. Yes, established after the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details. If a National Advisory Committee has been established, please list its main functions:

Give advice to the operational work on AnGR performed by the Norwegian Genetic Resource Centre.
Give advice to the Ministry of Agriculture and Food and on the conservation work carried out by the Genetic Resource Centre.

54. Is there strong coordination and interaction between the National Focal Point and stakeholders involved with animal genetic resources, such as the breeding industry, livestock keepers, government agencies, research institutes and civil society organizations (SP 12, Action 3)?

- (●) a. Yes, strong coordination has been in place since before the adoption of the GPA
- ( ) b. Yes, strong coordination was established after the adoption of the GPA
- ( ) c. No, but action is planned and funding identified
- ( ) d. No, but action is planned and funding is sought
- ( ) e. No

Please provide further details:

55. Does the National Focal Point (or other institutions) undertake activities to increase public awareness of the roles and values of animal genetic resources (SP 18)?

- (●) a. Yes, activities commenced before the adoption of the GPA
- ( ) b. Yes, activities commenced after the adoption of the GPA
- ( ) c. No, but activities are planned and funding identified
- ( ) d. No, but activities are planned and funding is sought
- ( ) e. No

Please provide further details:

56. Does your country have national policies and legal frameworks for animal genetic resources management (SP 20)?

- (●) a. Yes, comprehensive national policies and legal frameworks were in place before the adoption of the GPA and are kept up to date
- ( ) b. Yes, comprehensive and up-to-date national policies and legal frameworks in place because of progress made since the adoption of the GPA
- ( ) c. Yes, some national policies and legislation in place (strengthened since the adoption of the GPA)
- ( ) d. Yes, some national policies and legislation in place (not strengthened since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

57. Which of the following options best describes the state of training and technology transfer programmes in your country related to inventory, characterization, monitoring, sustainable use, development and conservation of animal genetic resources (SP14, Action 1)?

- (●) a. Comprehensive programmes have been in place since before the adoption of the GPA
- ( ) b. Comprehensive programmes exist because of progress made since the adoption of the GPA
- ( ) c. Some programmes exist (further progress since the adoption of the GPA)
- ( ) d. Some programmes (no further progress since the adoption of the GPA)
- ( ) e. None, but action is planned and funding identified
- ( ) f. None, but action is planned and funding is sought
- ( ) g. None

Please provide further details:

58. Have organizations (including where relevant community-based organizations), networks and initiatives for sustainable use, breeding and conservation been established or strengthened (SP 14, Action 3)?

- (●) a. Yes, comprehensive organizations, networks and initiatives have existed since before the adoption of the GPA
- ( ) b. Yes, comprehensive organizations, networks and initiatives exist because of progress made since the adoption of the GPA
- ( ) c. Yes, some organizations, networks and initiatives exist (established or strengthened since adoption of the GPA)
- ( ) d. Yes, some organizations, networks and initiatives exist (but no progress made since adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

59. Are there any national NGOs active in your country in the fields of:

Characterization?

- (●) a. Yes
- ( ) b. No

Sustainable use and development?

- (●) c. Yes
- ( ) d. No

Conservation of breeds at risk?

- (●) e. Yes
- ( ) f. No

If yes, please list the national NGOs and provide links to their web sites:

If breed societies can be regarded as NGOs the question is answered adequately.
The breed societies and their corresponding web-sites are listed here:
Laget for dølafe, http://www.dolafe.no/
Laget for vestlandsk fjordfe, http://fjordfe.no/

Laget for vestlandsk raudkolle, http://www.vestlandsk-raudkolle.no/
Laget for østlandsk rødkolle, http://www.rodkollelaget.com/
Norsk bufe, http://www.norskbufe.no/
Landslaget for gammelnorsk spælsau, http://www.gammalnorskspelsau.org/57598726
Kystgeitlaget, No web-site
Norsk Villsaulag BA, http://www.villsau.no/

60. Has your country established or strengthened research or educational institutions in the field of animal genetic resources management (SP 13, Action 3)?

- (●) a. Yes, adequate research and education institutions have existed since before the adoption of the GPA
- ( ) b. Yes, adequate research and education institutions exist because of progress made since the adoption of the GPA
- ( ) c. Yes, research and education institutions exist but still require strengthening (progress made since the adoption of the GPA)
- ( ) d. Yes, research and education institutions exist but still require strengthening (no progress made since the adoption of the GPA)
- ( ) e. No, but action is planned and funding identified
- ( ) f. No, but action is planned and funding is sought
- ( ) g. No

Please provide further details:

61. Please provide further comments describing your country's activities related to Strategic Priority Area 4: Policies, Institutions and Capacity-building (including regional and international cooperation)

*Note: It is not necessary to duplicate information provided in previous sections. Where relevant, please provide cross-references.*

## IMPLEMENTATION AND FINANCING OF THE *GLOBAL PLAN OF ACTION FOR ANIMAL GENETIC RESOURCES*

- The state of international collaboration for planning and implementing animal genetic resources measures
- The state of financial resources for the conservation, sustainable use and development of animal genetic resources

62. Has your country established or strengthened international collaboration in (SP 16):

Characterization?

- (●) a. Yes
- ( ) b. No, but action is planned and funding identified
- ( ) c. No, but action is planned and funding is sought
- ( ) d. No

Sustainable use and development?

- (●) e. Yes
- ( ) f. No, but action is planned and funding identified
- ( ) g. No, but action is planned and funding is sought
- ( ) h. No

Conservation of breeds at risk?

- (●) i. Yes
- ( ) j. No, but action is planned and funding identified
- ( ) k. No, but action is planned and funding is sought
- ( ) l. No

Please provide further details:

63. Are there any international NGOs active in your country in the fields of:

Characterization?

- ( ) a. Yes
- (●) b. No

Sustainable use and development?

- ( ) c. Yes
- (●) d. No

Conservation of breeds at risk?

- ( ) e. Yes
- (●) f. No

If yes, please list the international NGOs:

64. Has national funding for animal genetic resources programmes increased since the adoption of the GPA?

- (●) a. Yes
- ( ) b. No

Please provide further details:

65. Has your country received external funding for implementation of the GPA?

- ( ) a. Yes
- ( ) b. No
- (●) c. No, because country generally does not receive external funding

Please provide further details:

66. Has your country supported or participated in international research and education programmes assisting developing countries and countries with economies in transition to better manage animal genetic resources (SP 15 and 16)?

- (●) a. Yes, support or participation in place before the adoption of the GPA and strengthened since
- ( ) b. Yes, support or participation in place before the adoption of the GPA but not strengthened since
- ( ) c. Yes, support or participation in place since the adoption of the GPA

- ○ d. No, but action is planned and funding identified
- ○ e. No, but action is planned and funding is sought
- ○ f. No

Please provide further details:

Dairy goats are exported from Norway to Tanzania. The mountain farmers' dairy goats in Tanzania is a result of a more than 30 year old cooperation between the Norwegian University of Life Sciences and Sokoine University of Agriculture (SUA) i Morogoro i Tanzania. The project has received support from NORAD (The Norwegian Agency for Development Cooperation). A presentation of the project is found here (in Norwegian): http://www.forskning.no/artikler/2013/april/353106
Dairy cattle of NRF has been exported to Madagascar, supported by NORAD, see: http://www.norad.no/no/resultater/publikasjoner/gjennomganger-fra-organisasjoner/publikasjon?key=117292
Norway also supports international research and education programmes through CIGAR.

67. Has your country supported or participated in programmes aimed at assisting developing countries and countries with economies in transition to obtain training and technologies and to build their information systems (SP 15 and 16)?

- ○ a. Yes, support or participation commenced before the adoption of the GPA and strengthened since
- ○ b. Yes, support or participation commenced before the adoption of the GPA but not strengthened since
- ◉ c. Yes, support or participation commenced since the adoption of the GPA
- ○ d. No, but action is planned and funding identified
- ○ e. No, but action is planned and funding is sought
- ○ f. No

Please provide further details:

Erling Fimland has assisted Sultanate of Oman in developing their conservation programme on AnGR.

68. Has your country provided funding to other countries for implementation of the Global Plan of Action?

- ◉ a. Yes
- ○ b. No, but action is planned and funding identified
- ○ c. No, but action is planned and funding is sought
- ○ d. No
- ○ e. No, because country is generally not a donor country

Please provide further details. If relevant, specify whether funding was bilateral or multilateral; research cooperation or aid; and to whom and for what it was given:

Through financial support to the FAO Trust Account for the Funding Strategy for the GPA AnGR.

69. Has your country contributed to international cooperative inventory, characterization and monitoring activities involving countries sharing transboundary breeds and similar production systems (SP 1, Action 5)?

- ○ a. Yes
- ○ b. No, but action is planned and funding identified
- ○ c. No, but action is planned and funding is sought
- ◉ d. No

Please provide further details:

70. Has your country contributed to establishing or strengthening global or regional information systems or networks related to inventory, monitoring and characterization of animal genetic resources (SP 1, Action 6)?

- (●) a. Yes
- ( ) b. No, but action is planned and funding identified
- ( ) c. No, but action is planned and funding is sought
- ( ) d. No

Please provide further details:

Through membership of the European Regional Focal Point for NC AnGR, ERFP.

71. Has your country contributed to the development of international technical standards and protocols for characterization, inventory and monitoring of animal genetic resources (SP2)?

- (●) a. Yes
- ( ) b. No, but action is planned and funding identified
- ( ) c. No, but action is planned and funding is sought
- ( ) d. No

Please provide further details:

Through the work in ERFP, e.g discussing standards for and European genebank network for AnGR.

72. Has your country contributed to the development and implementation of regional in situ conservation programmes for breeds that are at risk (SP 8, Action 2; SP 10, Action 1)?

- (●) a. Yes
- ( ) b. No, but action is planned and funding identified
- ( ) c. No, but action is planned and funding is sought
- ( ) d. No

Please provide further details:

There is a joint Nordic initiative, organized by NordGen, on a conservation programme for the nordic brown honey bees. As a member of NordGen, Norway has contributed in this work.

73. Has your country contributed to the development and implementation of regional ex situ conservation programmes for breeds that are at risk (SP 9, Action 2; SP 10, Action 3; SP 10, Action 4)?

- ( ) a. Yes
- ( ) b. No, but action is planned and funding identified
- ( ) c. No, but action is planned and funding is sought
- (●) d. No

Please provide further details:

74. Has your country contributed to the establishment of fair and equitable arrangements for the storage, access and use of genetic material stored in supra-national ex situ gene banks (SP9, Action 3)?

- (●) a. Yes

- ○ b. No, but action is planned and funding identified
- ○ c. No, but action is planned and funding is sought
- ○ d. No

Please provide further details:

75. Has your country participated in regional or international campaigns to raise awareness of the status of animal genetic resources (SP19)?

- ◉ a. Yes
- ○ b. No, but action is planned and funding identified
- ○ c. No, but action is planned and funding is sought
- ○ d. No

Please provide further details:

Through activities performed by NordGen and ERFP.

76. Has your country participated in reviewing or developing international policies and regulatory frameworks relevant to animal genetic resources (SP 21)?

- ◉ a. Yes
- ○ b. No, but action is planned and funding identified
- ○ c. No, but action is planned and funding is sought
- ○ d. No

Please provide further details:

Through the membership of Task force on ABS under ERFP.

## EMERGING ISSUES

77. In view of the possibility that at some point countries may wish to update the GPA, please list any aspects of animal genetic resources management that are not addressed in the current GPA but will be important to address in the future (approximately the next ten years). Please also describe why these issues are important and indicate what needs to be done to address them.
Issues to be addressed in future

| Issues to be addressed in future (next ten years) | Reasons | Actions required |
|---|---|---|

Submit by Email

These tables give a brief introduction to the country and are the same as the predefined tables in the FAO guidelines for the Country Report on Animal Genetic Resources 2002.

All data are provided by Statistics Norway

***Table 1.1 Importance of livestock to the gross domestic product in agriculture (millions of $US)***

| | 1990 | 2000 | 2010 |
|---|---|---|---|
| Livestock production $US (millions) | 2821 | 2354 | 3049 |
| Crop and forage production $US (millions) | 1272 | 925 | 1159 |
| *Data from Statistic Norway* | | | |

***Table 1.2 Land use and current trends (1000 ha)***

| | 1990 | 1999 | 2010 | Trend |
|---|---|---|---|---|
| Arable land | 8 802 | 8 835 | 8 271 | ÷ |
| Permanent crops | | 37 | 31 | ÷ |
| Permanent pastures | 1 139 | 1 511 | 1 758 | + or 0 |
| Agricultural area | 9 941 | 10 382 | 10 060 | ÷ |
| Land area | 365 268 | 365 268 | 365 268 | |
| Total area, including fresh water/lakes | 385 178 | 385 178 | 385 178 | |

***Table 1.3 Land use for livestock and current trends (1000 ha)***

| | 1989 | 1999 | 2012 | Trend |
|---|---|---|---|---|
| Cropping for food | 690 | 789 | 925 | ÷ |
| Cropping for feed | 7 933 | 7 941 | 7 402 | ÷ |
| Other agricultural land | 60 | 15 | 17 | 0 |
| Natural pastures | .. | .. | .. | .. |
| Improved pastures | 1 139 | 1 616 | 1 564 | 0 |
| fallow | 89 | 22 | 21 | 0 |
| Agricultural land not under production | 792 | .. | .. | .. |
| Forest | 70 361 | .. | .. | 0 |
| non-agricultural | 284 205 | .. | .. | 0 |
| Total land area | 365 268 | 365 268 | 365 268 | |

***Table 1.5a Farm structure and distribution 1999***

| Category | Number of farms/house holds | % | Number of farms/house holds with livestock | % |
|---|---|---|---|---|
| Landless | 398 | 1 | 398 | 1 |
| '> 0 to 2 ha | 3 206 | 5 | 1 459 | 3 |
| > 2 to 10 ha | 27 633 | 39 | 18 393 | 36 |
| > 10 to 50 ha | 37 926 | 54 | 29 821 | 58 |
| > 50 to 100 ha | 1 451 | 2 | 902 | 2 |
| > 100 to 500 ha | 126 | 0 | 85 | 0 |
| > 500 ha | 0 | 0 | 0 | 0 |
| Totalt | 70 740 | 100 | 51 058 | 100 |

***Table 1.5b Farm structure and distribution 2010***

| Category | Number of farms/house holds | % | Number of farms/house holds with livestock | % |
|---|---|---|---|---|
| Landless | 1 815 | 4 | 1 464 | 5 |
| '> 0 to 2 ha | 1 017 | 2 | 368 | 1 |
| > 2 to 10 ha | 11 527 | 25 | 7 101 | 22 |
| > 10 to 50 ha | 28 741 | 62 | 20 930 | 65 |
| > 50 to 100 ha | 3 020 | 6 | 2 124 | 7 |
| > 100 to 500 ha | 503 | 1 | 321 | 1 |
| > 500 ha | 1 | 0 | 1 | 0 |
| Totalt | 46 624 | 100 | 32 309 | 100 |

***Table 1.6 Livestock population, number of owners/house-holders by species.***

| | 1989 | | 1999 | | 2010 | | 2012 | |
|---|---|---|---|---|---|---|---|---|
| | Livestock population, 1000 | Number of owners/hous eholders | Livestock population, 1000 | Number of owners/hous eholders | Livestock population, 1000 | Number of owners/hous eholders | Livestock population, 1000 | Number of owners/hous eholders |
| Horses | 17 | 7 560 | 27 | 7 310 | 37 | 6 731 | 36 | 6 625 |
| Cattle | 949 | 37 584 | 1 033 | 30 130 | 875 | 16 904 | 862 | 15 607 |
| Sheep | 2 183 | 29 108 | 2 325 | 22 943 | 2 308 | 14 897 | 2 230 | 14 663 |
| Goats | .. | .. | 79 | 1 477 | 67 | 1 364 | 66 | 1 339 |
| Pigs | 657 | 8 272 | 738 | 5 876 | 850 | 2 467 | 856 | 2 294 |
| Hens | 3 442 | 5 930 | 3 181 | 4 064 | 3 953 | 1 847 | 4 019 | 1 809 |
| Chicken (broilers) | 3 229 | 402 | 4 834 | 424 | 11 854 | 432 | 14 406 | 507 |
| Fur-bearing animals | 1 319 | 2 324 | 810 | .. | 860 | .. | 1 065 | .. |
| Reideer | 258 | 678 | 188 | 559 | 254 | 548 | 253 | 545 |
| Fish | 95 699 | 1 201 | 173 170 | 1 041 | 375 259 | 1 207 | 395 348 | 1 206 |

***Table 1.7 Human population in the country***

| | Human population in millions | Rural or farming employees (%) | Aquaculture employees (%) | Urban or non-farming employees (%) |
|---|---|---|---|---|
| 1989 | 4,221 | 5,3 | 0,2 | 94,5 |
| 1990 | 4,233 | 5,1 | 0,2 | 94,7 |
| 1999 | 4,445 | 3,5 | 0,2 | 96,3 |
| 2010 | 4,858 | 2,1 | 0,2 | 97,7 |
| 2012 | 4,986 | 1,9 | 0,2 | 97,9 |

***Table 1.8 Major livestock production (1000 tonnes/numbers)***

| Product | Year | Cattle | Sheep | Goats | Horses | Pigs | Poultry | Reindeer | Fur-bearing animals | Aquaculture |
|---|---|---|---|---|---|---|---|---|---|---|
| Meat, 1000 (t) | 1989 | 75,4 | 23,1 | 0,3 | 0,8 | 84,1 | 20,0 | 2,6 | | 115,0 |
| | 1990 | 81,8 | 23,4 | 0,3 | 0,8 | 83,4 | 19,8 | 2,3 | | 149,8 |
| | 1999 | 95,6 | 22,9 | 0,3 | 0,6 | 109,3 | 36,5 | 1,6 | | 473,8 |
| | 2010 | 83,5 | 24,6 | 0,3 | 0,4 | 128,8 | 83,1 | 2,1 | | 1 019,7 |
| | 2012* | 78,0 | 22,9 | 0,3 | 0,4 | 131,5 | 91,2 | 1,7 | | 1 321,1 |
| Milk, 1000 (t) | 1989 | 1 914,3 | .. | 27,5 | .. | | | | | |
| | 1990 | 1 914,3 | .. | 28,2 | .. | | | | | |
| | 1999 | 1 707,8 | .. | 22,4 | .. | | | | | |
| | 2010 | 1 558,0 | .. | 21,4 | .. | | | | | |
| | 2012* | 1 584,9 | .. | 20,9 | .. | | | | | |
| Eggs, 1000 (t) | 1989 | | | | | | 51,9 | | | |
| | 1990 | | | | | | 49,8 | | | |
| | 1999 | | | | | | 47,7 | | | |
| | 2010 | | | | | | 59,6 | | | |
| | 2012* | | | | | | 61,8 | | | |
| Wool, 1000 (T) | 1989 | | 4,8 | .. | | | | | | |
| | 1990 | | 5,0 | .. | | | | | | |
| | 1999 | | 5,1 | .. | | | | | | |
| | 2010 | | 4,4 | .. | | | | | | |
| | 2012* | | 4,4 | .. | | | | | | |
| Skin, 1000 (No.) | 1989 | 330,3 | 1 137,5 | 26,9 | 3,2 | | | .. | 1 278,5 | |
| | 1990 | 352,2 | 1 140,9 | 26,3 | 3,3 | | | 78,1 | 1 065,9 | |
| | 1999 | 388,2 | 1 149,6 | 21,0 | 2,4 | | | 46,9 | 786,6 | |
| | 2010 | 306,8 | 1 203,8 | 24,3 | 1,5 | | | 91,8 | 725,4 | |
| | 2012* | 294,0 | 1 133,9 | 20,8 | 1,4 | | | .. | 738,7 | |

***Table 1.9 Major livestock primary product imports (1000 tonnes/numbers)***

| Product | Year | Cattle | Sheep | Goat | Horse | Pigs | Poultry | Reindeer | Fur-bearing animals | Aquaculture (salmon and trout) |
|---|---|---|---|---|---|---|---|---|---|---|
| Meat, 1000 (t) | 1989 | 1,2 | 0,4 | 0,0 | 0,0 | 2,1 | 0,3 | 0,0 | | 0,2 |
| | 1990 | 1,0 | 0,3 | 0,0 | 0,0 | 2,0 | 0,3 | 0,1 | | 0,2 |
| | 1999 | 2,9 | 0,5 | 0,0 | 0,0 | 2,0 | 0,3 | 0,6 | | 0,5 |
| | 2010 | 5,4 | 1,3 | 0,0 | 0,0 | 2,2 | 0,2 | 0,0 | | 0,3 |
| | 2012* | 17,7 | 2,7 | 0,0 | 0,0 | 2,1 | 1,7 | 0,0 | | 1,4 |
| Milk, 1000 (t) | 1989 | 0,7 | 0,0 | 0,0 | 0,0 | | | | | |
| | 1990 | 0,1 | 0,0 | 0,0 | 0,0 | | | | | |
| | 1999 | 0,1 | 0,0 | 0,0 | 0,0 | | | | | |
| | 2010 | 0,5 | 0,0 | 0,0 | 0,0 | | | | | |
| | 2012* | 0,7 | 0,0 | 0,0 | 0,0 | | | | | |
| Eggs, 1000 (t) | 1989 | | | | | | 0,3 | | | |
| | 1990 | | | | | | 0,8 | | | |
| | 1999 | | | | | | 0,4 | | | |
| | 2010 | | | | | | 0,1 | | | |
| | 2012* | | | | | | 1,2 | | | |
| Wool, 1000 (T) | 1989 | | 0,5 | .. | | | | | | |
| | 1990 | | 0,4 | .. | | | | | | |
| | 1999 | | 0,6 | .. | | | | | | |
| | 2010 | | 0,1 | .. | | | | | | |
| | 2012* | | 0,3 | .. | | | | | | |
| Skin, 1000 (No.) | 1989 | .. | .. | .. | .. | | | .. | .. | |
| | 1990 | .. | .. | .. | .. | | | .. | .. | |
| | 1999 | .. | .. | .. | .. | | | .. | .. | |
| | 2010 | .. | .. | .. | .. | | | .. | .. | |
| | 2012* | .. | .. | .. | .. | | | .. | .. | |
| Live animals, 1000 (No.) | 1989 | 0,0 | 0,0 | 0,0 | 0,6 | 0,0 | 5,3 | 0,2 | 0,3 | .. |
| | 1990 | 0,0 | 0,0 | 0,0 | 0,5 | 0,0 | 5,5 | 0,3 | 0,2 | .. |
| | 1999 | 0,0 | 0,0 | 0,0 | 1,3 | 0,0 | 145,1 | 5,5 | 0,2 | .. |
| | 2010 | 0,0 | 0,0 | 0,0 | 1,5 | 0,0 | 22,7 | 0,0 | 31,5 | .. |
| | 2012* | 0,0 | 0,0 | 0,0 | 1,6 | 0,0 | 22,4 | 0,1 | 8,7 | .. |

***Table 1.10 Major livestock primary product exports (1000 tonnes/numbers)***

| Product | Year | Cattle | Sheep | Goat | Horse | Pigs | Poultry | Reindeer | Fur-bearing animals | Aquaculture (salmon and trout) |
|---|---|---|---|---|---|---|---|---|---|---|
| Meat, 1000 (t) | 1989 | 0,2 | 2,0 | 0,0 | 0,0 | 5,7 | 0,0 | 0,0 | | 98,2 |
| | 1990 | 7,5 | 1,8 | 0,0 | 0,0 | 1,6 | 0,1 | 0,0 | | 133,6 |
| | 1999 | 9,2 | 0,5 | 0,0 | 0,0 | 11,5 | 0,0 | 0,0 | | 333,2 |
| | 2010 | 0,9 | 0,0 | 0,0 | 0,0 | 5,5 | 1,6 | 0,0 | | 709,6 |
| | 2012* | 0,9 | 0,0 | 0,0 | 0,0 | 5,7 | 0,8 | 0,0 | | 1 041,9 |
| Milk, 1000 (t) | 1989 | 1,4 | 0,0 | 0,0 | 0,0 | | | | | |
| | 1990 | 1,1 | 0,0 | 0,0 | 0,0 | | | | | |
| | 1999 | 0,4 | 0,0 | 0,0 | 0,0 | | | | | |
| | 2010 | 3,1 | 0,0 | 0,0 | 0,0 | | | | | |
| | 2012* | 4,2 | 0,0 | 0,0 | 0,0 | | | | | |
| Eggs, 1000 (t) | 1989 | | | | | | 1,5 | | | |
| | 1990 | | | | | | 0,3 | | | |
| | 1999 | | | | | | 0,2 | | | |
| | 2010 | | | | | | 0,3 | | | |
| | 2012* | | | | | | 0,3 | | | |
| Wool, 1000 (T) | 1989 | | 3,3 | .. | | | | | | |
| | 1990 | | 3,4 | .. | | | | | | |
| | 1999 | | 3,6 | .. | | | | | | |
| | 2010 | | 4,1 | .. | | | | | | |
| | 2012* | | 3,8 | .. | | | | | | |
| Skin, 1000 (No.) | 1989 | .. | .. | .. | .. | | | .. | 1 209,7 | |
| | 1990 | .. | .. | .. | .. | | | .. | 979,4 | |
| | 1999 | .. | .. | .. | .. | | | .. | 765,6 | |
| | 2010 | .. | .. | .. | .. | | | .. | 713,4 | |
| | 2012* | .. | .. | .. | .. | | | .. | 726,7 | |
| Live animals, 1000 (No.) | 1989 | 0,0 | 0,0 | 0,0 | 0,2 | 0,3 | 0,0 | 0,0 | 0,4 | .. |
| | 1990 | 0,0 | 0,0 | 0,0 | 0,2 | 0,1 | 0,0 | 0,0 | 0,0 | .. |
| | 1999 | 0,0 | 0,0 | 0,0 | 0,2 | 0,1 | 114,3 | 0,1 | 0,3 | .. |
| | 2010 | 0,0 | 0,0 | 0,0 | 0,5 | 0,4 | 0,0 | 0,0 | 1,0 | .. |
| | 2012* | 0,0 | 0,0 | 0,0 | 0,4 | 0,3 | 2,4 | 1,8 | 0,0 | .. |