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: Netherlands

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).

The updated Dutch national report on conservation and sustainable use of Animal Genetic Resources summarizes the state of national implementation of the Global Plan of Action for Animal Genetic Resources. Seven strategic priority areas have been identified, dealing with remaining or future challenges. At national level conservation strategies will be strengthened to halt the loss of farm animal genetic diversity and to protect our bio-cultural heritage. New technologies will be adopted and further developed for characterization, conservation and breeding purposes. The Netherlands will contribute to the global agenda by generating knowledge and development of improved breeding material for sustainable intensification of the livestock sector and future food security.

1. Introduction

The 1st national report on animal genetic resources of the Netherlands was presented to FAO in 2002 (Landenrapport Nederland over dierlijke genetische bronnen. Een strategisch beleidsdocument. http://edepot.wur.nl/30234). This national strategic policy document includes a set of national and international policy priorities, which have been implemented during the past 10 years. In 2013 FAO requested countries to update their national reports and to complete a country report questionnaire.

This executive summary of the updated information from the Netherlands will allow national and international stakeholders to gain a quick overview of the developments and current situation in the Netherlands and the national policy priorities in this area.

In this document the key trends and driving forces affecting AnGR management in the Netherlands will be discussed, followed by the state of national implementation of the four strategic priority areas of the FAO Global Plan of Action for AnGR. Finally, national strategic priorities for future action have been identified.

2. The livestock sector in the Netherlands

(Livestock, Meat and Eggs in the Netherlands (PVE, 2013), Dutch Dairy Board (PZ, 2013))
The Netherlands is well known for its efficient animal production sectors, and as a global supplier of high quality animal products. The agricultural sector is an important component of the Dutch national economy. The Netherlands is one of the largest exporters of agricultural products.

The economic value of livestock production is a substantial part of the total production value of the agricultural sector. The specialized dairy cattle, pig and poultry sectors are considered as the main livestock production sectors in the Netherlands. But sheep, goats and horses are also among the key farm animal species in the country.

Productivity and efficiency per animal has gradually increased during the past decades, in particular for dairy cattle, pigs, broilers and laying hens. For example, the productivity per milking cow has further increased by 10% over the last decade.

The Netherlands has a long history in animal breeding and has been a source of improved genetics for the global livestock sector over the past century. Major Dutch breeding companies are global players and Dutch genetic material and breeding stock are being distributed globally.

3. Key trends and driving forces affecting AnGR management in the Netherlands

The following *national* and *international* trends are particularly relevant for conservation and sustainable use of AnGR in the Netherlands.

Global food security. The demand for animal products at global level is expected to increase substantially, with the rising global human population and increasing incomes. At the same time we expect an increasing scarcity of resources. Global food security and increasing demand for animal products requires improvement of resource efficiency, also in the context of the global feed-food-fuel competition.

The Dutch livestock and breeding sector can play an important role dealing with this global challenge. Further exploitation of germplasm of high productive and efficient breeds is a key component of the global food security ambitions. Sustainable intensification has already been a key objective for the Dutch livestock sector during the past decades and is also relevant from a global perspective (`two times higher production, two times less use of resources'). The Netherlands will further contribute to development of the global livestock sector, through gaining and exchanging knowledge, capacity building, and development and trade of germplasm, breeding stock, equipment and other supply materials.

We realize that there is a large diversity of production systems at global level, ranging from pastoralists, smallholders and back yard farming to large scale, intensive or extensive production systems. *One size does not fit all*; specific development strategies are needed for the diversity of production systems and agro-ecosystems at national, European and global level. This underlines the importance of farm animal genetic diversity and targeted breeding programmes.

Specialization and scale enlargement. The Dutch livestock sector went already through a process of specialization which is not expected to stop in due time. The dominant animal production systems work with a limited number of specialized breeds. As a result of ongoing and accelerating scale enlargement in the livestock sector, the number of farms has decreased and is expected to decrease further.

Sustainable breeding programs and breeding for sustainability. Societal concerns about animal health and welfare have had and will have further impact on breeding programs in the Netherlands. The Dutch government promotes breeding for sustainability (National initiative to promote sustainable breeding http://www.uitvoeringsagendaduurzameveehouderij.nl/werken-aan-verduurzaming/initiatieven/initiatiefgroep-duurzame-fokkerij/), that is implemented by breeders associations and private breeders. Dutch breeding organisations are member of the European Forum of Animal Breeders, that recently launched an updated `Code EFABAR' (Code-EFABAR. European Forum of Farm Animal Breeders. www.responsiblebreeding.eu).

Technology revolution. Genomic selection already had and will have further impact on efficiency and organisation of the animal breeding sector. In particular commercial breeds and sufficiently large populations can benefit from genomic selection, and breeds that have smaller population size will further lag behind. However, local breeds that have smaller population size may also benefit in the future from further development of genomics selection methodology across breeds or may be used for the introgression of `lost' traits. Next to the genomic revolution, reproductive technologies are also

developing rapidly. Genomic and reproductive technologies provide new opportunities for breeding and conservation of genetic diversity.

Quality of livestock products. We notice the continuing trend of increased uniformity of products at global level and more interest of consumers and citizens in sustainability issues. As a result of changing consumer demands and societal concerns about animal welfare, retailers have also become more demanding and the power of retailers is increasing. At the same time, we also notice that consumer preferences are changing and there is a trend towards diversification of food products. There is an increasing interest in regional products, `l*ocal to local'*, and typical, quality products. This may provide new opportunities to further exploit farm animal genetic diversity, to support the conservation of our bio-cultural heritage, and to promote diversification of breed and agro-ecosystem related food products and services.

4. State of implementation of Global Plan of Action on Animal Genetic Resources

Characterization, Inventory and Monitoring of Trends and Associated Risks

Regular breed inventories and updates of the European and global database have been undertaken in the Netherlands during the past decades. These inventories include farm animal species of economic importance and/or of bio-cultural value. The Centre for Genetic Resources, the Netherlands (CGN) of Wageningen University and Research Centre is responsible for updating (inter)national breed databases. Baseline breed survey data about status and trends has been collected by CGN, in close collaboration with breed societies, breeding industry, and with the Dutch Rare Breeds Society (SZH). In addition, SZH has developed a database tool to provide information to the national authorities about the exact location of rare breeds. This information can be used immediately in case of disease outbreaks in order to take appropriate emergency response measures.

Breed societies and breeding organisations are responsible for phenotypic characterization and pedigree registration. All breeds have been phenotypically characterized, however for many breeds phenotypic information of individual animals is limited, which is not the case for the mainstream breeds. In addition, for many breeds there is also genetic characterization data available. Continuation of efforts is needed to collect, analyse and use phenotypic and genetic characterization for breeding purposes.

The major species of economic importance in the Netherlands are cattle (dairy and dual purpose milk and beef), pigs (pork), poultry (meat and eggs), sheep (meat and also milk), goat (milk) and horses (sports). In addition there are breeds identified, which we recognize as valuable bio-cultural agricultural heritage (species: duck, geese, pigeon, rabbit, dog). There is a large variation of breeds and breeding lines in the Netherlands. Part of the breeds have been bred for a long time in the Netherlands. Other breeds have been created or introduced in the country more recently. Although from a use perspective all breeds and all genetic diversity are equally relevant, the Dutch government plays an active role in promoting conservation and sustainable use of the Dutch native/locally adapted breeds.

There is large number of locally adapted/native breeds which have a small population size. This was already the case at the end of the 20th century. The contribution of locally adapted/native breeds to total livestock production in the Netherlands did not substantially change during the last decade. The major specialization already happened during the last decades of the 20th century. Currently, part of the breeds which have small population size show increasing number of breeding animals, while others are (still) decreasing in numbers.

Particularly in the pig and poultry breeding industry a major consolidation has taken place. The number of breeding companies decreased and breeding lines were merged.

Besides information about the number of breeds, the number of breeding animals per breed, the genetic and phenotypic differences between breeds, and the within breed genetic diversity are important indicators. In recent years officially recognized (National implementation of EU Zootechnical legislation by Product Board for Livestock and Meat http://www.pve.nl/pve?waxtrapp=hwtFsHsuOnbPTEcBPPqB) breed associations became obliged to monitor inbreeding rates and within breed genetic diversity. Moreover breeding industry adopted a voluntary Code-EFABAR (Code-EFABAR. European Forum of Farm Animal Breeders. The voluntary code of good practice for responsible farm animal breeding. www.responsiblebreeding.eu), which also includes their responsibility to maintain genetic variation.

Sustainable use and Development

The Netherlands has a well-developed animal breeding infrastructure. All necessary capacities and infrastructure to develop and implement efficient breeding programs are available. In the previous century, organised breeding activities first started within the existing breeding associations. Breeding associations and breeding organisations are officially

recognized by the national government, based on EU zootechnical legislation.

Leading internationally operating breeding companies in dairy cattle, pigs and poultry have their head offices in the Netherlands. These private actors are commercially driven by national ánd global market developments. They exchange germplasm and breeding stock `within company' between countries and regions, they distribute genetic material globally and contribute to global food security, efficiency and sustainability of the livestock sector.

The involvement of the government in animal breeding is very limited. The Dutch government is primarily responsible for the national identification and registration system for farm animals. Through its policies the government promotes sustainable breeding programs and sustainable development of breeds.

During the past decade breeding organisations clearly have put more emphasis on sustainability traits in their breeding goals, such as feed-efficiency, robustness, longevity and health traits. Both market developments and societal concerns are expected to have further impact on the breeding goals of breeding organisations, e.g. to contribute to better health and welfare, improved resource efficiency and reduction of the use of antibiotics.

In particular breeding associations and NGO networks are active in supporting the *in situ* conservation of locally adapted/ native breeds. For them, development of market oriented strategies for products derived from local breeds is an important priority.

Technology development already had influence on animal breeding in the past, but genomic selection is expected to have a further major impact on animal breeding. In particular mainstream breeds will benefit from this development and local breeds are lagging behind. On the other hand, genomics also provides opportunities for characterization, more effective conservation strategies and genomic selection across breeds. This was already a priority research area for Wageningen University and Research Centre in the last decade.

Conservation

The state of between and within breed diversity in the Netherlands has been regularly assessed. Information about breed population size is collected from breed societies and breeding organisations, for updating the EFABIS and DAD-IS databases. Officially recognized breed societies and breeding organisations also have to report about inbreeding rates. Moreover, targeted research projects provided information to breeding organisations about within breed genetic diversity and the sustainability of their breeding programs.

There is a large number of locally adapted/native breeds in the Netherlands which have status `critical', `endangered' or `vulnerable'. The contribution of this group of breeds to total livestock production became already `'marginal' in the last 30 years of the 20th century. There are no breeds which got extinct, but there are still threats to some locally adapted/native breeds. For example, small populations are threatened by potential outbreak of diseases. Another important trend is that for many breeds, hobby breeding became dominant, which will finally change the breed characteristics and does not guarantee sustainable conservation. Moreover, the average age of farmers is high. There is a need to involve a new generation of farmers in breeding of locally adapted/native breeds.

Maintenance of farm animal genetic diversity is influenced by a variety of stakeholders. Breeders, breed associations and breeding industry are responsible for sustainable development and conservation of their breeds or lines. Breeders/ farmers in the Netherlands do not receive direct subsidies from the national government to financially support the *in situ* conservation of breeds. Some breeds, in particular herds of `heath sheep' benefit from short-term subsidies from regional governments and/or nature/landscape protection organisations.

CGN and SZH receive public funding to support *in situ* and *ex situ* conservation. CGN is responsible for long term conservation of farm animal genetic diversity and development/maintenance of the national gene bank (*ex situ in vitro* conservation). In good co-operation SZH and CGN support breed associations and networks of breeders to develop their breeding programmes and *in situ* conservation strategies. In particular, promoting market oriented strategies to conserve and sustainably use farm animal genetic resources has a high priority. It is considered to be crucial to exploit and to add value to the variety of functions, products and services of locally adapted/native breeds. There is a need to raise further awareness and interest in society and among farmers about the values of these breeds. As a result of more awareness and interest in society and among consumers, new opportunities will arise for diversification of food and for maintaining our bio-cultural heritage and living environment. In recent years, many initiatives have been taken to add value to locally adapted/native breeds through development of specific supply chains and niche products and through better valuation of different functions.

The Netherlands has a well-established gene bank infrastructure (*ex situ in vitro* conservation). The Dutch national gene

bank has been developed in close collaboration with breed associations, breeding industry and SZH. The Dutch national gene bank is hosted by CGN, that has state of the art infrastructure and knowledge about conservation genetics, genomics, cryobiology and reproductive technologies.

There are substantial semen collections for locally adapted/native breeds *at risk* and also for mainstream breeds and commercial lines. For a few breeds there are also some embryo's (cattle) or oocytes (horse) stored in the national gene bank collection. The collections are stored at two separate locations.

Use of gene bank collections is gradually increasing. On the one hand gene bank collections are an important source of genetic variation to support *in situ* conservation of endangered (cattle) breeds. And there is an increasing number of requests to use gene bank material for research and characterization purposes.

The Dutch national gene bank for animal genetic resources collaborates in EUGENA, the European Gene Bank Network for Animal Genetic Resources. The objective of this platform is a rational, efficient, regional, integrated *ex situ* conservation approach in Europe across countries.

Policies, Institutions and Capacity-building

The Netherlands has a national strategy for genetic resources (Sources of Existence. https://www.wageningenur.nl/en/Expertise-Services/Statutory-research-tasks/Centre-for-Genetic-Resources-the-Netherlands-1/Centre-for-Genetic-Resources-the-Netherlands-1/ABS-Focal-Point/Netherlands-policy-on-Access-and-BenefitSharing.htm), including animal genetic resources, but there is no specific national law on genetic resources. On the other hand, there is European Union zootechnical (including animal breeding) legislation that is implemented in the EU Member States. The Union zootechnical legislation is currently in the process of updating. The aim of the legislation is the promotion of free trade in breeding animals and their genetic material, considering the sustainability of breeding programs and preservation of genetic resources. Other relevant policies at EU level which have impact on animal genetic resources conservation and sustainable use are for example the EU Biodiversity Strategy, the EU Common Agricultural and Rural Development Policies. Moreover, the Nagoya Protocol on Access and Benefit Sharing will be implemented nationally following EU ABS legislation.

The Netherlands has a world class research and education system and an active graduate program. The Animal Breeding and Genomic Centre (ABGC) of Wageningen University and Research Centre offers a strong international training program for capacity building in the domain of animal breeding and conservation, including international cooperation in joint/double degree programs at MSc and PhD level. As a result of initiatives of CGN education programs for primary schools, secondary schools and professional training all include biodiversity and genetic resources issues. Sustainable conservation methods for farm animal populations are an integral part of animal breeding courses in agricultural (high) schools and in Wageningen University.

The Netherlands also has a long track record regarding international cooperation, including the assistance of developing countries and countries with economies in transition.

There is a good cooperation between the breeding sector, NGO's and the research community. Leading internationally operating breeding companies and Wageningen UR have created a public-private-partnership program `Breed4Food' to enhance innovations and capacity building in animal breeding programs.

5. Priorities and strategic directions for future action.

Key principles

For the Netherlands, the following strategic principles are leading for the identification and implementation of priorities for future action:

- Conservation through utilization is the preferred conservation strategy;
- Joint responsibility of a variety of actors and stakeholders for conservation and sustainable use of animal genetic resources;
- Public responsibility to secure long term conservation of farm animal genetic diversity;
- Promote sustainable breeding programs and breeding for sustainability, at national and international level;
- Adopt the latest genomic and reproductive technologies for better characterization and to enhance efficiency of conservation and breeding;
- Contribute to global challenges through capacity building, knowledge development and exchange and strategic public and/or private partnerships

Strategic priority 1 - Implementation of `national plan in situ'

The aim of the national plan (National plan for *in situ* conservation and for stimulating the use of Dutch cultural living heritage. Stichting de Oerakker (DOA), Stichting Zeldzame Huisdierrassen (SZH), Vereniging van bos- en natuurterreineigenaren (VBNE), supported by the Centre for Genetic Resources, the Netherlands (CGN)) for *in situ* conservation is to reduce the risk of losing traditional Dutch breeds and varieties (animals, plants, trees) and to promote their use. The main components of the national plan *in situ* are: i) development and implementation of market-oriented strategies, promoting traditional breed related products and (ecosystem) services, ii) to better characterize traditional breeds and varieties, and iii) to disseminate and exchange knowledge. Key challenge is to turn the societal value of bio-cultural heritage into economic profitability through better valuation and marketing by combining different functions, products and services. Although there is increasing awareness in society about the value of traditional resources and bio-cultural heritage, continuous education and awareness raising are still needed, e.g. about the values of traditional breeds in relation to food diversity and attractive landscapes.

Strategic priority 2 - Conserve what we still have, in *ex situ in vitro* collections

Further development and maintenance of the national gene bank is important to guarantee long term conservation of farm animal genetic diversity, for future breeding or research purposes. Gene bank collections are important for future food security, considering the challenge to adapt to changes in climate, production systems and markets. Secondly, *ex situ in vitro* collections are important to secure our national bio-cultural heritage. Core gene bank collections will be established and updated, for all locally adapted/native breeds and for other national strategic breeding populations, in close collaboration with breed societies and private breeders. Besides semen collections, other types of germplasm or tissue will be stored in the national genebank in order to efficiently capture both male and female genetic diversity within populations.

The Netherlands will continue to support the development of EUGENA, the European network of animal genetic resources, in order to increase efficiency at European level.

The use of gene bank collections to support in situ conservation of endangered breeds (e.g. cattle breeds) and for scientific research purposes will be stimulated.

Strategic priority 3 - Application of genomic and reproductive technologies

The genomic revolution offers opportunities for both conservation and breeding. Genomic selection created already a revolution in the commercial animal breeding sector. Currently, small populations do not benefit from genomic selection, but this may change when genomic selection across breeds will become feasible. Introgression of unique characteristics from a local breed to a high productive breed could also be facilitated by genomic selection.

In addition, genomic technology will be used for i) rationalization of gene bank collections, ii) to better balance short term and long term genetic gain in breeding programs, and iii) to analyse and conserve genetic diversity within and between animal populations. Genomic characterization and the use of novel reproductive technologies will make the management of gene bank collections more efficient, and will contribute to the efficiency of breeding and management of genetic variation within populations.

New developments in cryobiology and reproductive technologies offer opportunities to store genetic material in many different forms and for regeneration of individuals from cryopreserved material. The national gene bank and the private breeding sector will mutually benefit from these developments.

Research is needed to analyse opportunities and risks of new technologies in the context of conservation and sustainable use of animal genetic resources.

Strategic priority 4 - Better characterization of between and within breed genetic diversity

There is a need to better (phenotypically and genetically) characterize gene bank collections and breeding populations, in particular locally adapted/native breeds. Genomics will provide new opportunities to identify genomic regions across breeds, which will result in better exploitation of genetic diversity and better use of genetic potential of breeds. Between and within breed diversity are important for characterization and genomic analysis, which is important for the commercial breeding sector ánd for breeders of locally adapted/native breeds.

International (European and global) collaboration is needed to characterize and to prioritize breeds in the context of food security and adaptation to the changing climate and changing production systems and markets.

Strategic priority 5 - Sustainable breeding programs and sustainable development of breeds

The principle “conservation by utilization” requires long term sustainability of breeding programs and sustainable development of breeds. Sustainability of the livestock sector and sustainable breeding goals are important policy issues in Netherlands (National initiative to promote sustainable breeding http://www.uitvoeringsagendaduurzameveehouderij.nl/werken-aan-verduurzaming/initiatieven/initiatiefgroep-duurzame-fokkerij/). In comparison to 10 years ago, breeding goals of Dutch breeding industry are much broader. On the other hand, welfare, health and sustainability traits seem to be less important at global scale. Nevertheless, sustainability is seen as an opportunity for Dutch livestock sector and for export.

Zootechnical legislation is also considered as an important framework to stimulate and monitor the sustainability of breeding and conservation programs, carried out by breed societies and breeding organisations.

In this context of sustainable breeding it is also important to note that four Netherlands based breeding companies collaborate with the ABGC in `Breed4Food', a public-private-partnership programme for pre-competitive research in the livestock breeding sector. This will contribute to the development of sustainable breeding programs.

Strategic priority 6 - International capacity building and knowledge exchange

The Netherlands will support other countries and global regions to conserve and sustainably use farm animal genetic diversity, in the light of livestock sector challenges and continuing threats to lose farm animal genetic resources in less developed countries or regions. It is recognized that capacity building through development of research, training and education is the most effective contribution of the Netherlands to support implementation of the Global Plan of Action for AnGR at European and global level. Initiatives have been and will be further taken by the Animal Breeding and Genomics Centre of Wageningen University and Research Centre (ABGC) to develop and implement joint Master and Graduate Programs together with European partner universities.

The Dutch breeding sector will also contribute to global livestock sector development, through distribution of breeding stock and genetic material and knowledge. The aim of the Dutch breeding sector is to develop long term relationships with other countries, including with less developed countries. Both the Netherlands and developing countries will benefit from knowledge exchange, including local knowledge. Joint investment in local breeding programs anticipating local needs and production environments is also one of the options to contribute to local livestock breeding and sustainable livestock sector development.

Strategic priority 7 - Development and implementation of policies and regulations

In 2002, the Netherlands' Parliament adopted a government policy on genetic resources: `Sources of Existence'. Until now, no new national legislation has been deemed necessary, specifically for genetic resources, to implement this policy.

Both animal breeding and research in the Netherlands benefit from smooth international exchange of animal genetic resources. Proper implementation of the Nagoya Protocol on Access and Benefit Sharing (ABS) and EU ABS legislation is very important to regulate global exchange. In this context, we also consider that genomic and phenotypic information about breeding populations and gene bank collections are of strategic importance for the breeding and livestock sector in the Netherlands. Conservation of farm animal genetic resources is a potential benefit for the future, and a reason for the Netherlands to strategically invest in long term conservation of between and within breed genetic variation for future breeding or research.

The Global Plan of Action for Animal Genetic Resources will be further implemented nationally through a national policy and regulatory framework. Among many other relevant livestock related policies, regulations and institutions, this framework includes ABS legislation, zootechnical (animal breeding) legislation and Statutory Research Tasks of the Centre for Genetic Resources, the Netherlands (CGN).

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).

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.

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.

The Netherlands is a major exporter of agricultural products ánd breeding material. Dairy, pig and poultry breeding industry are global players and their breeding goals are based on developments in the global market. There is substantial exchange of genetic resources between the Netherlands and other European and OECD countries, including exchange within company between countries.
There is increasing awareness of the values of local breeds in society. However, the use of local breeds, compared to widely used, commercial breeds, has been marginalized already for a long time. The main reason for continued replacement of local breeds by mainstream breeds is the lower productivity/efficiency of local breeds. On the other hand, local breeds have recognized cultural and environmental values and they often produce high quality niche products.

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)	none	none	
Changing demand for livestock products (quality)	medium	medium	Increased attention to product quality in breeding programmes of major breeds. Potential positive effect on farm animal genetic diversity through diversification and promotion of local/traditional production systems. Negative effect on farm animal genetic diversity through global use of limited number of breeds, reduced diversity in food products, higher and globally harmonized quality standards, horizontal and vertical integration.
Changes in marketing infrastructure and access	none	low	Potential positive impact of marketing of regional products and labelled products through specific supply chains. We expect an increasing power of large retailers.
Changes in retailing	low	medium	Attention for animal welfare increased due to increased power of retailers (value chain). We expect an increasing power of large retailers, but at the same time development of niche markets for typical products and specific production chains.
Changes in international trade in animal products (imports)	low	low	
Changes in international trade in animal products (exports)	low	medium	Important role of NL in global market share of breeding material.
Climatic changes	none	low	Impact of climate change expected to be limited at national level. However, increasing attention to GHG mitigation resulting in changes in breeding objectives (higher resource efficiency).
Degradation or improvement of grazing land	none	none	
Loss of, or loss of access to, grazing land and other natural resources	none	none	

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
Economic, livelihood or lifestyle factors affecting the popularity of livestock keeping	medium	medium	Number of farmers is decreasing and size of farms is increasing. Increased need for robust animals that can do well without asking lot of attention from farmers. Little interest of younger generation to continue farming.
Replacement of livestock functions	low	low	
Changing cultural roles of livestock	low	low	Increasing interest for cultural and environmental values and roles of livestock breeds, also associated with specific products.
Changes in technology	high	high	Increasing interest for cultural and environmental values and roles of livestock breeds, also associated with specific produ High investments in technology and data collection (e.g. genomic selection) only possible for larger breeding companies and largest impact expected for mainstream breeds. This will contribute to an increasing gap between traditional breeds and commercial mainstream breeds.
Policy factors	low	low	Reference to separate FAO survey on legal and policy frameworks.
Disease epidemics	low	low	

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)	2	2
Cattle (specialized beef)	1	11
Cattle (multipurpose)	7	18
Sheep	12	58
Goats	5	9
Pigs	14	7
Chickens	70	150
Horses	7	33
Geese	1	17

Species	Locally adapted breeds	Exotic breeds
Ducks	5	25
Pigeons	19	230
Rabbits	10	40

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)	2	2	high	high	high	high	high	high
Cattle (specialized beef)	1	11	high	medium	high	medium	medium	low
Cattle (multipurpose)	7	18	high	medium	high	medium	medium	low
Sheep	12	58	high	low	high	medium	medium	low
Goats	5	9	high	low	high	medium	medium	low
Pigs	14	7	high	high	high	high	high	high
Chickens	70	0	high	medium	medium	medium	medium	medium
Horses	7	33	high	medium	high	medium	medium	medium

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	medium
Infrastructure	high
Stakeholder participation	high
Policies	high
Policy implementation	high
Laws	medium
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	World class university and education system, with strong international training program in domain of animal breeding and conservation. Long term commitment and strong collaboration with breeding industry. Education program for primary schools, secondary schools and professional training include biodiversity and genetic resources issues.
Research	Good cooperation between breeding sector, NGOs and international collaboration. Strong research program including active graduate program.
Knowledge	Strong interaction between actors.
Awareness	Awareness among politicians/citizens/consumers about the values of farm animal genetic diversity.
Infrastructure	Infrastructure is well developed.
Stakeholder participation	Good collaboration between stakeholders.
Policies	
Policy implementation	
Laws	No specific laws on genetic resources.
Implementation of laws	

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).

Official recognition of herd books/breed associations
Farming sector is well organised
Breeders/Farmers networks and NGOs play an important role

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	yes	yes	yes	yes	yes	no
Cattle (specialized beef)	no	yes	yes	yes	yes	yes	no
Cattle (multipurpose)	no	yes	yes	yes	yes	yes	no
Sheep	no	yes	yes	no	no	yes	no
Goats	no	yes	yes	no	no	yes	no
Pigs	no	yes	yes	yes	yes	yes	no
Chickens	no	yes	no	yes	yes	yes	no
Horses	no	yes	yes	no	no	yes	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)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Cattle (specialized beef)	1	11	1	11	1	11	1	11	1	11	1	11	1	11	1	11
Cattle (multipurpose)	7	18	7	18	7	18	7	18	7	18	7	18	7	18	7	18
Sheep	12	58	12	58	12	0	12	58	5	0	0	0	12	58	5	0
Goats	5	9	4	9	5	9	5	9	1	0	0	0	4	0	1	2
Pigs	14	5	14	7	14	0	14	5	14	0	8	0	12	0	14	2
Chickens	70	150	70	150	30	0	30	0	30	0	10	0	10	0	0	0
Horses	7	33	7	33	7	33	7	33	3	0	0	0	7	33	7	20

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)	0	0	2	2
Cattle (specialized beef)	0	0	1	11
Cattle (multipurpose)	2	0	5	18
Sheep	6	29	6	29
Goats	4	4	1	5
Pigs	0	0	14	7
Chickens	35	75	35	75
Horses	2	22	5	11

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)	low	low
Cattle (multipurpose)	medium	medium
Sheep	medium	medium
Goats	medium	medium
Pigs	high	high
Chickens	high	high
Horses	medium	medium

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)	high
Sheep	high
Goats	high
Pigs	high
Chickens	high
Horses	high

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	low	high	high	high	high	high	medium	none
Animal identification	high	none	high	high	high	none	low	none
Recording	low	none	high	high	high	low	none	none
Provision of artificial insemination services	low	low	high	medium	high	medium	none	none
Genetic evaluation	low	high	high	low	high	medium	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	low	medium	high	high	medium	medium	low	none
Animal identification	high	none	high	high	medium	none	low	none
Recording	low	none	high	high	medium	low	none	none
Provision of artificial insemination services	low	low	high	medium	high	medium	none	none
Genetic evaluation	low	medium	high	low	high	medium	none	none

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

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

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)	yes
Cattle (multipurpose)	yes
Sheep	yes
Goats	yes
Pigs	yes
Chickens	yes
Horses	yes

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)	Recognition of herd books + specific issues, e.g. reduction of methane emission, e.g. improving product quality, e.g. polled cattle, e.g. reduction of inbreeding Public Private Partnership Breed4Food - pre-competitive research program
Cattle (specialized beef)	Recognition of herd books + specific issues, e.g. reduction caesarean sections for double muscled breeds.
Cattle (multipurpose)	Recognition of herd books + specific issues, e.g. reduction of inbreeding
Sheep	Recognition of herd books + specific issues, e.g. scrapie genotype selection
Goats	Recognition of herd books
Pigs	ecognition of herd books + specific issues, e.g. boar taint reduction, e.g. improving animal welfare Public Private Partnership Breed4Food - pre-competitive research program
Chickens	No herd books, but attention for specific issues, e.g. welfare commercial poultry, e.g. improving resource efficiency Public Private Partnership Breed4Food - pre-competive research program
Horses	Recognition of herd books.

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)	Highly competitive (commercial) breeding sector. Most emphasis on mainstream breeds, including Public Private Partnership. Traditional breeds lag behind.

Species	Description of consequences
Cattle (specialized beef)	Highly competitive (commercial) breeding sector. Most emphasis on mainstream breeds, including Public Private Partnership. Traditional breeds lag behind.
Cattle (multipurpose)	Highly competitive (commercial) breeding sector. Most emphasis on mainstream breeds, including Public Private Partnership. Traditional breeds lag behind.
Sheep	Highly competitive (commercial) breeding sector. Most emphasis on mainstream breeds, including Public Private Partnership. Traditional breeds lag behind.
Goats	Highly competitive (commercial) breeding sector. Most emphasis on mainstream breeds, including Public Private Partnership. Traditional breeds lag behind.
Pigs	Highly competitive (commercial) breeding sector. Most emphasis on mainstream breeds, including Public Private Partnership. Traditional breeds lag behind.
Chickens	Highly competitive (commercial) breeding sector. Most emphasis on mainstream breeds, including Public Private Partnership. Traditional breeds lag behind.
Horses	Highly competitive (commercial) breeding sector. Most emphasis on mainstream breeds, including Public Private Partnership. Traditional breeds lag behind.

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.

Constraints: Decreasing number of farmers participate in registration and/or performance recording
Successes: Breeding sector is well organized in breed associations and breeding industry

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)	Promoting sustainable breeding programs, aimed at sustainable development of the breed.
Cattle (specialized beef)	Promoting sustainable breeding programs, aimed at sustainable development of the breed.
Cattle (multipurpose)	Promoting sustainable breeding programs, aimed at sustainable development of the breed.
Sheep	Promoting sustainable breeding programs, aimed at sustainable development of the breed.
Goats	Promoting sustainable breeding programs, aimed at sustainable development of the breed.
Pigs	Promoting sustainable breeding programs, aimed at sustainable development of the breed.
Chickens	Promoting sustainable breeding programs, aimed at sustainable development of the breed.
Horses	Promoting sustainable breeding programs, aimed at sustainable development of the breed.

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	low
Cattle (multipurpose)	high	none	high
Sheep	high	none	medium
Goats	high	none	medium
Pigs	high	none	high
Chickens	high	none	medium
Horses	high	none	medium

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	no
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	no	no	no	no	no	yes	no	no	no	no	yes	yes
Private sector	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Cattle (specialized dairy)	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Cattle (specialized beef)	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Cattle (multipurpose)	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Sheep	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Goats	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Pigs	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Chickens	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes

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.

Breed societies and networks of farmers are primarily responsible for in situ conservation of breeds. Breeds societies are supported by the national NGO (SZH: Dutch Foundation for Rare Domestic Breeds) and other actors, including the Centre for Genetic Resources, the Netherlands, and Wageningen University. There is an increasing number of initiatives to add value to native breeds through development of specific supply chains and niche products. Moreover, rare native breeds also play a role in management of nature and landscape.

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.

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	yes
Somatic cells (tissue or cultured cells)	no
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)	1	1	yes	no	no	no	yes
Cattle (specialized beef)	1	1	yes	no	no	no	yes
Cattle (multipurpose)	7	7	yes	no	yes	no	yes
Sheep	9	1	yes	no	no	no	yes
Goats	4	1	yes	no	no	no	yes
Pigs	21	15	yes	no	no	no	yes
Chickens	31	15	no	no	no	no	yes
Horses	8	0	yes	no	no	no	yes
Ducks	3	2	no	no	no	no	yes

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.

The following cattle breeds and their breeding programs have been supported by distribution of genetic material from the gene bank: Dutch Friesian Red and White, Groningen Whiteheaded, Deep Red.

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.

Some exploratory bilateral talks with Belgium
EUGENA project at European level (European Gene Bank Network for Animal Genetic Resources)

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.

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.

	Biotechnologies								
Species	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	high	high	high	high	none	none	high	none
Cattle (specialized beef)	high	high	high	high	high	none	none	high	none
Cattle (multipurpose)	high	high	high	high	high	none	none	high	none
Sheep	low	high	none	none	none	none	none	medium	none
Goats	medium	low	none	none	none	none	none	medium	none
Pigs	high	high	none	none	none	none	none	high	none
Chickens	low	none	none	none	none	none	none	high	none
Horses	medium	medium	high	none	none	none	none	medium	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	yes	yes
Embryo transfer	no	yes	no	no	yes	yes

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	no
Embryo transfer or MOET	yes	no
Semen sexing	yes	no
In vitro fertilization	yes	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	yes	yes

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	low	high	n/a
Artificial insemination using nationally produced semen from exotic breeds	n/a	n/a	low	high	n/a
Artificial insemination using imported semen from exotic breeds	n/a	n/a	low	high	n/a
Natural mating	n/a	n/a	medium	low	n/a

Cattle (multipurpose)	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	medium	n/a
Artificial insemination using nationally produced semen from exotic breeds	n/a	n/a	medium	medium	n/a
Artificial insemination using imported semen from exotic breeds	n/a	n/a	medium	medium	n/a
Natural mating	n/a	n/a	medium	medium	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	CGN Statutory Research Task on genetic resources + Joint in situ strategy and NGO collaboration for forest, plant and animal genetic resources.
Collaboration in the characterization, surveying or monitoring of genetic resources, production environments or ecosystems	none	
Collaboration related to genetic improvement	none	
Collaboration related to product development and/or marketing	limited	
Collaboration in conservation strategies, programmes or projects	limited	
Collaboration in awareness-raising on the roles and values of genetic resources	limited	
Training activities and/or educational curricula that address genetic resources in an integrated manner	limited	
Collaboration in the mobilization of resources for the management of genetic resources	extensive	CGN Statutory Research Task on genetic resources + Joint in situ strategy and NGO collaboration for forest, plant and animal genetic resources.

2. Please describe any other types of collaboration.

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

Joint *in situ* strategy for forest, plant and animal genetic resources, developed by NGOs and the Centre for Genetic Resources, the Netherlands.

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).

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.

Yes, but not directly AnGR management related.

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.

Integrated approach is sometimes lacking.

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:

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:

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.

Number of locally adapted breeds indicated in previous form is including breeding populations or breeding lines of major breeding companies Topigs/Hypor (pig breeding lines), Hendrix Genetics (layer breeding lines), CRV (Holstein Friesian) and KWPN (warm blood riding and jumping horses). The breeding companies are global players and the breeding material is not only located in the Netherlands, however the head-offices of the companies are in the Netherlands. Regular monitoring of the status of all breeds in the Netherlands under the responsibility of the National Coordinator, including updating of EFABIS/DAD-IS database. Furthermore, breed societies and herd books are primarily responsible for their breed(s) including characterization and monitoring of trends and associated risks. This all is supported by a variety of institutions, including the Centre for Genetic Resources, the Netherlands (CGN), the Dutch Rare Breeds Society (SZH), and research partners such as Wageningen University and Research Centre (Wageningen UR).

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:

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:

Maintenance of breeds that have lower productivity levels requires targeted strategies to add value to the breeds, and to raise awareness among citizens and consumers about the biocultural value and functions of breeds.

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.

b. Yes, assessments were introduced before the adoption of the GPA

Please provide further details:

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:

- Promoting sustainable breeding programs and sustainable development of breeds
- Establishment and development of national gene bank for AnGR
- Supporting NGO and breeders networks for in situ conservation
- Promoting market oriented strategies to conserve farm animal genetic resources
- Strong research infrastructure, including through public-private-partnership programs

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:

Replacement of dual purpose/local breeds by specialized breeds; inbreeding within populations; changing/intensification of production systems.

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:

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:

Promoting better valuation of services, functions and products of local breeds by a variety of stakeholders. *In situ* conservation is supported by the Dutch Rare Breeds Society (SZH) and the Centre for Genetic Resources, the Netherlands (CGN) and other actors.

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:

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:

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:

www.cgn.wur.nl
www.szh.nl

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

- ○ a. Yes
- ○ b. No

Please provide further details:

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:

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:

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:

Research includes genomics research for characterization, breeding and conservation, developments of methods to support genetic management of populations, and strategies and methods for cryoconservation.

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:

- Promoting sustainable breeding programs and sustainable development of breeds
- Establishment and development of national gene bank for AnGR
- Supporting NGO and breeders networks for in situ conservation
- Promoting market oriented strategies to conserve farm animal genetic resources
- Strong research infrastructure, including through public-private-partnership programs

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.

International cooperation, e.g. through European Regional Focal Point for Animal Genetic Resources (ERFP) and European Federation of Animal Science (EAAP) networks

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)?

- [x] 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:

Guidance of the work and priorities of the Centre for Genetic Resources, the Netherlands (CGN) and the Dutch Rare Breeds Society (SZH).

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)?

- [x] 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)?

- [x] 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)
- [x] 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:

www.szh.nl
Dutch Rare Breeds Society (SZH), and a large number of breed societies and interest groups.

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.

Strong and internationally oriented program for capacity building, including international cooperation in joint/double degree programs at MSc and PhD level.

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:

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:

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:

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:

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:

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:

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:

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:

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