



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: South Africa

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).

South Africa has a total land area of 122 million Ha of which 100.6 million ha is suitable for agriculture. Over 80% of the agricultural land is semi arid and is only suitable for some form of animal agriculture. This includes farmed wildlife.

Natural Rangelands (largely grassland and savanna) support most of the 13.9 million cattle, and 21 427 sheep and goats in the country and most livestock breeders, producers owners and keepers of farm animals are essentially rangeland farmers - using the available resources to produce breeding stock, feeder stock, meat, milk, fibre, hides and skins for local use and for sale to regional and international markets.

South Africa has a wide range of locally adapted and indigenous farm animal breeds that include 42 cattle, 25 sheep, 11 goat, 12 pig, 9 chicken and 23 horse breeds. These are used in a range of production systems from extensive rangelands to modern intensive factory farming. Animal agriculture is a key contributor to food security in the country and animals still play an important role in the daily lives of many communities and individuals in South Africa.

Well established producer and marketing organizations play a key role in the economic stability of the sector and a well established animal breeding, recording and evaluation infrastructure (72 breed societies and 10 registering authorities) provides information and services to the entire sector. This is supported by sector specific Policy (National animal improvement policy - AIP) Strategy (National Livestock development strategy- NLDS) and legislation (Animal Improvement Act, 1998 (Act 62 of 1998).

While the National policy and strategy were introduced a decade ago, progress as far as the management of FAnGR has not been as planned and both are currently under review to make both more relevant and effective - taking recent developments in animal breeding as well as global environmental issues such as climate change and initiatives such as the global agenda into consideration.

Over the past decade, there has also been a move towards wildlife ranching and there are approximately 10 000 game

farms using 24% of the available grazing land. Most of these farms are concentrated in the Limpopo and Northern Cape provinces with the largest concentration of indigenous livestock genetic resources (locally adapted breeds). In future the expansion of the commercial game industry may result in a substantial loss of grazing land and other natural resources.

Key trends and driving forces affecting AnG management in SA

Rising costs of stock remedies (dips, acaricides, feed additives, etc) over the past decade has increased the use of locally adapted breeds of cattle sheep and goats in sustainable rangeland - livestock farming systems. Information on adaptive traits such as heat tolerance, tick and internal parasite tolerance and resistance to tick borne diseases (Cowdria) in indigenous goats - is also starting to stimulate interest in locally adapted breeds as mother lines for industrial crossbreeding.

An increasing demand for grass fed beef / mutton is also starting to have a positive impact on the management of indigenous and locally developed breeds. An increasing demand for free range poultry products is having a positive impact on interest in locally developed breeds such as the Boschveld chicken.

Global concerns on animal welfare - as well as growing consumer needs to have more information on the animals and the products (traceability) has had an influence on farming systems with more emphasis on adapted breeds and relevant information.

Strengths and weaknesses (capacity) gaps to manage FAnGR

The existing legislation (the Animal Improvement Act, 1998 (Act 62 of 1998) has been effective in supporting the maintenance of a viable seed stock industry with an internationally accredited recording and information system for most breeds in the Country. It also supports and accredits a viable assisted reproduction industry with the potential to provide services to all levels.

South Africa has an accredited (ICAR) animal recording infrastructure and the ARC Animal Improvement Institute is contracted to manage the National Livestock Data Bank (INTERGIS) that includes the National animal recording and improvement schemes. 72 Breed societies set standards and assist with evaluations; 10 registering authorities do recording, evaluation and breed profiles. Five institutions do DNA profiles and work on genomic values is increasing.

While there is sufficient variation in South Africa's cattle, sheep and goat genetic resources, (including indigenous genotypes) to facilitate breeding for improved production efficiency and for adaptation to climate change in support of climate smart agriculture, there still needs to be more emphasis on adapted breeds of livestock in sustainable farming systems.

Functional gene banks (ARC, Grootfontein Agricultural Development Institute (GADI) and National Zoological Gardens (NZG) have been established and a limited amount of genetic material is being stored. There are also 32 registered reproduction centres that provide semen and embryo collection services - as well as insemination, embryo transfer (Cattle, sheep, goats, horses) services.

There is a growing awareness of the importance of sound grazing management systems and this has led to an increase in holistic farming systems in a number of bioregions. This includes a growing interest in farming with locally adapted breeds.

Key constraints and challenges

Funding for research and development and funding for the implementation of the National Livestock Development Strategy is limited and there is a need for incentives to encourage farmer participation in the National Livestock recording and improvement schemes; Incentives are also needed to encourage owners and keepers of indigenous (locally adapted) breeds to maintain pure populations for commercial use .

Mining - particularly in Mpumalanga, Limpopo and North West Provinces is reducing the available grazing and is also affecting water quality. Wildlife ranching is also encroaching on grazing in the Savanna and grassland biomes in particular.

Stock theft and predation remain a major challenge and some farmers have moved from conventional livestock to wildlife ranching as a result. Predation is currently the subject of an in depth scientific evaluation to develop more acceptable controls methods.

While the flow of genes into the Country has been largely limited to semen from global exotic breeds such as the Holstein and Jersey, these needs to be constantly monitored as it could impact on locally adapted breeds as well as the local semen industry. In addition, it is important to maintain vigilance by ensuring that any new breeds are subjected to a

biological impact study prior to importation.

There is still a perception in some sectors that AI can solve fertility problems caused by under nutrition and sub standard animal husbandry practices. This has led to the failure of interventions to introduce assisted reproduction technology and these issues need to be dealt with before such applications have any chance of expanding. Application of technology is also restricted by the fact that a most of the commercial beef and small stock production is on extensive ranching systems.

Priorities and strategic directions for future action

Priorities and strategic directions include a review of the AIP and NLDS, a Livestock census (2015).

Individual animal identification and traceability , the revival of the National Advisory committee on FAnGR, the revival of the Farm Animal Conservation Trust (FACT) and closer collaboration with the Department of Environmental Affairs (DEA) to increase focus on holistic farming systems.

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.

Exports of landrace (locally adapted) breeds to developed and developing countries - SA Boer goat, Dorper sheep; Bonsmara cattle; SA Angora; SA Black ostrich.

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).

An increase in the flow of genes into the country by way of semen. Holstein and jersey genes enter the country through the importation of semen of international donors. Effectively, the Holstein and jersey (to a lesser extent) have become extensions of global herds. Imports have not affected other breeds as much (see table below).
Semen imported from 2009 to 2013.

Semen imported (doses) from 2009 to 2013 . Source :official import statistics

Breed	2009	2010	2011	2012	2013
Holstein	1022045	953555	1432844	963118	1519367
Jersey	412692	388691	620194	445927	513184
Ayrshire	22524	48230	52912	72250	53400
Angus	10421	13335	31365	21450	50195
Simmentaler	4870	5037	15220	9225	9850

The importation of pig semen for commercial purposes has seen a move towards international trends where hybrid semen is used but this is irregular and needs driven. The only regular inflow of purebred genes is from Large White pools - to broaden the local gene pool as the breed is still in demand as a mother line for terminal crossing and for the development of hybrid sires for the local industry.

Pig semen imported over the past five years

Breed	2009	2010	2011	2012	2013
Large white	0	124	56	320	0
Chester white/ Duroc/ Yorkshire	0	21	0	0	0
Large white/ Landrace	0	32	0	0	0
Yorkshire/ Duroc/Hampshire	0	82	0	0	0

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.

The only changes have been in the frequency of exports to developed and developing countries with regard to locally adapted breeds. This would include the export of SA Holstein and SA Jersey cattle to countries such as Mozambique , (See 2.2)

A limited quantity of genetic material (Semen and embryos) of new breeds has been imported - some to add to existing gene pools (in cases where these breeds have now been registered (Completed biological impact studies)) and some to enable on site testing as part of a biological impact study

The following table shows imports of semen over the past five years

Breed	2009	2010	2011	2012	2013
Ankole	0	150	0	0	0
Senepol	0	295	0	0	50
Wagyu	208	565	400	700	6370

While these numbers may not appear significant, This has contributed to the establishment of viable populations of the three breeds in the Country. The Senepol is now a well established breed with a recently registered breed society.

The Senepol may also have an impact on locally adapted breeds such as the Bonsmara in future as it is closely related to the one line (Wesselsvlei) that was developed by crossing Afrikaner and Red Poll cattle.

Local Senepol herds are also using Afrikaner and Tuli genetics in basic herds to broaden the current limited gene pool of the breed.

Breeds currently being evaluated and listed as such in the recently published regulations of the Animal Improvement Act, 1998 (Act 62 of 1998) are listed below.

Beef Cattle

Afrigus (Locally developed breed - Afrikaner - Angus) Afrisim (Afrikaner - Simmental) Ankole (Africa exotic) Pinzyl (Pinzgauer - Nguni)

Dairy cattle

Swedish red

Horse

Standard bred and Trouter Francais horse

Sheep

SA Milking sheep (Local composite)

At this stage none of these breeds is having any impact on local gene pools

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.

Global breed genetic material - largely dairy breeds such as Holstein and Jersey are continually imported. New breeds are subject to a biological impact study to ensure that this gene flow will not compromise local FAnGR. Impact studies are also currently under way to evaluate a limited number of breeds that were imported for this purpose under the previous legislation (Livestock improvement Act) where incomplete impact studies were carried out. The flow of Holstein and Jersey genetics is having an impact on the local AI industry and may be reason for concern.

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)	medium	medium	<p>Increasing demand for grass fed beef / mutton is starting to have an effect on the management of indigenous and locally developed genetic resources; demand for poultry as an affordable source of animal protein is increasing. There is also an increasing demand for free range poultry products and this is having a positive impact on interest in locally developed breeds such as the Boschveld chicken that was developed from crossing three indigenous breeds.</p> <p>A pilot project in Limpopo Province uses Nguni mothers and Angus bulls for terminal crossbreeding (Black Angus used as a dominant colour influence). Processed meat is marketed by a local supermarket chain and a premium is paid for the Nguni x Angus crosses. Using Nguni females in terminal crossbreeding will help conserve the breed in areas where it is currently threatened by indiscriminate crossing with a range of bull- breeds such as the Brahman. Positive impact on the number of pure Nguni females.</p>

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 (quality)	medium	medium	This will impact on farming systems to make more use of indigenous and locally developed breeds of cattle, sheep and goats. It will also impact on farming systems - production off natural resources using adapted breeds - for example, grass fed beef. A number of retailers are marketing free range / grass fed products and this requires certification as well as information on the origin and welfare
Changes in marketing infrastructure and access	medium	medium	Broadened access to markets in the communal grazing sector in the Esatern Cape and Limpopo Provinces; Developing market for indigenous goats in Kwa Zulu Natal; Developing market for grass fed beef in the Grassland biome.
Changes in retailing	medium	medium	More information on packaging - some retail outlets are selling labelled products - grass fed beef; free range mutton; karoo lamb; Klein Karoo ostrich.
Changes in international trade in animal products (imports)	low	low	More genomic information is making it easier for breed societies to identify specific genetic material that will have a positive impact on exotic international breeds such as the Holstein and Jersey. Easier access to this genetic material (semen) is having an impact on the local AI industry where the majority of the donor bulls at stations are related to global donors. Trade in local genetics is also affected by the easier trade in global semen.
Changes in international trade in animal products (exports)	high	high	More emphasis on animal welfare - adapted animals in sustainable farming systems will be easier to certify.
Climatic changes	medium	medium	Livestock is not only influenced by climate changes, but it also contributes to climate change through the emission of greenhouse gases. Mitigation and adaptation strategies are therefore needed and an effective way to reduce the numbers and increase the production per animal, thereby improving their productivity. There is sufficient genetic variation in South Africa's cattle genetic resources, including indigenous genotypes, to facilitate breeding for improved production efficiency and for adaptation to climate change in support of climate smart agriculture. There needs to be more emphasis on adapted breeds of livestock in sustainable farming systems - climate smart animal agriculture. This would include indigenous breeds of cattle (Nguni, Afrikaner, Drakensberger) sheep (Afrikaner, Bapedi, Persian) and goats (Boer, Kalahari red, Veld goats).

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
Degradation or improvement of grazing land	high	high	<p>Renewed attempts to improve the management of grazing land in the communal areas where locally adapted breeds such as the Nguni are prominent. The impact of nutrition on reproduction is also a factor in degraded areas.</p> <p>The small to medium framed Nguni is a non selective grazer and s selective browser and is also able to walk longer distances to water and grazing than less adapted and larger framed exotics. An average Nguni cow weighs 350 Kg (Mature livestock unit = 450 kg). There is less trampling and better distribution of dung. Medium to large framed Exotic breeds tend to be selective grazers and are unable to walk as far to get sufficient grass. This results in zonal overgrazing and is far more harmful to the environment (See paper on climate smart animal agriculture in Southern Africa - farming with indigenous breeds in sustainable veld - livestock systems).</p>
Loss of, or loss of access to, grazing land and other natural resources	medium	medium	<p>There is a move in many areas away from farm animals towards wildlife. This is predominantly in the commercial farming sector but it is having an impact on the land area available for extensive farm animal agriculture.</p> <p>Commercial game farming has increased drastically over the last 10 years. The current estimate is that there are approximately 10 000 game farms in South Africa that utilize 24% of South Africa's grazing land. Most of these farms are concentrated in the Limpopo and Northern Cape provinces, which are also the provinces with the largest concentration of indigenous livestock genetic resources. In future the expansion of the commercial game industry may result in a substantial loss of grazing land and other natural resources.</p> <p>Mining - particularly in Mpumalanga, Limpopo and North West Provinces is reducing the available grazing. Water quality and dust from mining in these areas is also a problem.</p>
Economic, livelihood or lifestyle factors affecting the popularity of livestock keeping	low	low	<p>About 80% of the land available for agriculture can only be used for some form of animal agriculture. This includes the use of wildlife species in some areas. Animal agriculture remains one of the most important agricultural activities in the country.</p>
Replacement of livestock functions	low	low	<p>Less animals used for draught.</p>
Changing cultural roles of livestock	low	low	<p>Animals are still important in the daily lives of most rural communities. Socio - cultural and socio economic values.</p>

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
Changes in technology	medium	medium	AI and MOET technology is being introduced Changes in characterisation technology, landscape genetics and genomics.
Policy factors	medium	medium	Roll out of the National Animal Improvement policy and the National Livestock Development Strategy. Both refer to the use of locally adapted breeds in sustainable grassland - livestock farming systems. Policy also refers to incentives for using and maintaining herds and flocks of national importance.
Disease epidemics	high	high	Largely due to trade embargoes as a result of outbreaks of notifiable diseases such as FMD, ASF (Slaughter out), RVH, Avian influenza (Slaughter out). The slaughter out policy in the case of diseases such as Avian influenza and African Swine fever led to the diseases such as scrapie and Mad cow disease limit the importation of genetic material of exotic breeds that have an economic role to play in the country. This limits sources to Australia and New Zealand.
Economic drivers as a result of tolerance and resistance to diseases and conditions	high	high	The impact of climate change on external and internal parasites and diseases and conditions has highlighted the importance of tolerant and resistant traits. For example, tick tolerance in Nguni cattle; internal parasite resistance and Cowdria resistance in indigenous goats.

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)	0	7
Cattle (specialized beef)	8	21
Cattle (multipurpose)	0	6
Sheep	16	9
Goats	5	6
Pigs	2	10
Chickens	9	0

Species	Locally adapted breeds	Exotic breeds
Ostriches	1	0
Buffaloes	0	1
Alpacas	0	1
Asses	1	0
Dromedaries	1	0
Guinea fowls	1	0
Horses	4	19
Turkeys	2	0
Geese	1	0
Rabbits	6	0
Ducks	2	0
Muscovy ducks	1	0

CHARACTERIZATION

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

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

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

Species	Baseline survey of population size	Regular monitoring of population size	Phenotypic characterization	Molecular genetic diversity studies – within breed	Genetic diversity studies based on pedigree	Molecular genetic diversity studies – between breed	Genetic variance component estimation	Molecular genetic evaluation
Cattle (specialized dairy)	7	7	medium	low	medium	none	low	medium
Cattle (specialized beef)	8	8	high	high	medium	medium	medium	medium
Cattle (multipurpose)	2	2	high	medium	low	low	low	medium
Sheep	15	15	high	medium	medium	medium	medium	high
Goats	5	5	high	medium	low	medium	medium	medium

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
Pigs	2	2	high	high	low	medium	low	low
Chickens	4	4	high	low	low	medium	low	medium
Ostriches	1	1	high	high	high	medium	medium	medium
Horses	4	4	medium	low	medium	low	low	low
Alpacas	1	1	low	none	none	none	none	none
Asses	1	0	low	none	none	none	none	none
Dromedaries	1	0	low	none	none	none	none	none
Buffaloes	1	0	none	none	none	none	none	none
Ducks	2	0	none	none	none	none	none	none
Turkeys	2	0	low	none	none	none	none	none
Muscovy ducks	1	0	none	none	none	none	none	none
Rabbits	0	0	none	none	none	none	none	none

INSTITUTIONS AND STAKEHOLDERS

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

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

	Score
Education	high
Research	medium
Knowledge	high
Awareness	medium
Infrastructure	medium
Stakeholder participation	medium

	Score
Policies	high
Policy implementation	medium
Laws	high
Implementation of laws	high

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

	Description
Education	This is a subject in most curricula at tertiary institutions that offer training in animal production. FAnGR is often the subject of tasks given to students at a number of faculties in the land.
Research	The Agricultural Research Council (ARC - Animal Improvement Institute, Biotech Platform, Veterinary Research Institute) is a well established institute used to initiate and maintain research, development and technology transfer; Agricultural Research Stations in Provinces (EC; FS; Gauteng; KZN; Limpopo; Mpumalanga; NW; NC and WC) and GADI. More funding is needed for FAnGR reserach - including funds for gene banks.
Knowledge	Sufficient knowledge exists and this is linked to National policy and strategy. The Department of Agriculture Forestry and Fisheries (DAFF) also has a Sub directorate: Animal genetic resources that is responsible for the conservation of FAnGR and the collection of information on breeds at risk including centres where such breeds are kept This activity is linked to the DAFF strategic plan.
Awareness	Awareness of animal genetic resources has been intensified to reach the developing farmer and communal sector. As a result, additional breeds at risk have been characterized and conserved. (Zulu sheep, Tankwa goat, Afrikaner cattle); Exhibitions at Agricultural shows have been scaled down but there is an annual exhibit of landrace breeds at the Royal show in Pietermaritzburg (ARC). Efforts are currently under way to revive the dormant Farm Animal Conservation Trust (FACT) that used to create awareness throughout the Country. A publication on Landrace Breeds is also being revised as this was used as a reference by some teaching institutions.
Infrastructure	There is sufficient infrastructure but funds for maintaining this as well as viable populations of FAnGR are limited. A survey is currently under way to establish the current status of the infrastructure as well as herds and flocks of national importance.
Stakeholder participation	The relevant breeders Societies participate in the management of FAnGR. Some private individuals have small populations of endangered breeds (Afrikaner sheep, Zulu sheep Kolbroek and Windsnyer pigs). On average, stakeholder participation is not as active as it was during the previous reporting period (SOW AnGR -1)
Policies	There is a National Animal Improvement policy (AIP) and a National livestock Development Strategy - (NLDS). Both promote the sustainable use of FAnGR and link to Legislation (Animal Improvement Act, 1998 (Act 62 of 1998). Both are currently being revised as a parallel process to the SOW report to ensure consistency as well as relevance under changing circumstances (including climate change and climate smart animal agriculture).
Policy implementation	The AIP supported the first survey of FAnGR as well as initiatives to record herds and flocks of National importance. Policy also links to legislation that controls the exportation of landrace breeds and also calls for biological impact studies to evaluate the potential impact of new breeds on local FAnGR. Implementation of the AIP has been hampered by a lack of funds and institutional support at Provincial level.
Laws	The Animal Improvement Act, 1998 (Act 62 of 1998) makes provision for: " the breeding, identification and utilisation of genetically superior animals in order to improve the production and performance of animals in the interest of the Republic and to provide for matters connected therewith'

	Description
	Animal Identification Act. This Act registers all breed Societies, provides for the National animal improvement schemes and also registers all reproduction centres and reproduction operators. It also regulates the collection, certification and storage of genetic material.
Implementation of laws	This Act is implemented and protects the sovereignty of locally adapted breeds by regulating exports and enforcing impact studies prior to any introduction of a new exotic breed. Current studies include: Swedish red cattle and the Stabdard Breed and Troutier Francais horse.

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

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

The commercial and emerging South African farmers participate in the activities of their respective farmers organisations. These all have legal status in the country. This includes farmers associations and more organised agriculture - including the Red Meat Producers Organisation, The Natinal Emergent Red Meat producers Organisation, The National wool growers association (NWGA) the SA Pork Producers Organisation (SAPPO) the Southern African Poultry producers Organisation with a Developing Poultry Farmers Organisation (DPFO) Mohair SA and the Ostrich Business Chamber.

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)	yes	no	yes	yes	no	no	no
Cattle (specialized beef)	yes	no	yes	yes	no	no	no
Cattle (multipurpose)	yes	no	yes	yes	no	no	no
Sheep	yes	no	yes	yes	no	no	no
Goats	yes	no	yes	yes	no	no	no
Pigs	yes	no	yes	yes	no	no	no
Chickens	yes	no	yes	yes	no	no	no
Ostriches	yes	no	yes	yes	no	no	no
Horses	no	no	yes	no	no	no	no
Alpacas	no	no	yes	no	no	no	no
Rabbits	no	no	yes	no	no	no	no

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

N/A

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)	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7
Cattle (specialized beef)	8	21	8	21	8	21	8	21	8	21	8	21	8	21	8	21
Cattle (multipurpose)	0	6	0	6	0	6	0	6	0	6	0	6	0	6	0	6
Sheep	16	9	16	9	16	9	16	9	16	9	16	9	16	9	16	9
Goats	5	6	5	6	3	6	3	6	3	6	3	6	3	6	4	6
Pigs	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
Chickens	0	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0
Ostriches	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Horses	4	19	4	19	0	0	4	19	1	19	1	1	1	1	1	19
Alpacas	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0
Asses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buffaloes	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Dromedaries	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Ducks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geese	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Guinea fowls	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muscovy ducks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabbits	6	0	6	0	6	0	6	0	0	0	0	0	0	0	0	0
Turkeys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Species	Breeding method			
	Straight/pure-breeding only		Straight/pure-breeding and cross-breeding	
	Loc	Ex	Loc	Ex
Cattle (specialized dairy)	0	7	0	0
Cattle (specialized beef)	8	21	8	21
Cattle (multipurpose)	0	6	0	0
Sheep	16	11	0	0
Goats	6	10	0	0
Pigs	2	5	0	5
Chickens	5	0	1	0
Alpacas	0	1	0	0
Horses	4	19	0	0
Buffaloes	0	1	0	0
Ostriches	1	0	0	0
Rabbits	6	0	6	0

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

Species	Training	Research
Cattle (specialized dairy)	medium	medium
Cattle (specialized beef)	high	medium
Cattle (multipurpose)	low	low
Sheep	medium	medium
Goats	low	low
Pigs	medium	medium
Chickens	low	low
Ostriches	low	low
Horses	low	low

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)	low
Cattle (specialized beef)	low
Cattle (multipurpose)	none
Sheep	medium
Goats	low
Pigs	none
Chickens	low

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

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

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

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

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

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

The ARC Animal Improvement Institute is contracted to manage the National animal recording and improvement schemes. This currently includes beef cattle, dairy, sheep; 72 Breed societies set standards and assist with evaluations; 10 Registering authorities do recording , evaluation and breed profiles; The ARC, UP vet faculty, OVI, Tygerberg hospital and the National Zoological Gardens (NZG) do DNA profiles. Some are now doing genomic work as well. A degree of international collaboration on genomics exists because of the costs (Angora genomics - collaborating with Argentina).

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)	National Animal Improvement policy ; National Livestock Development Strategy (NLDS) Breed Society strategic plans; Intensive (TMR) systems; semi intensive - pasture based systems.
Cattle (specialized beef)	National Animal Improvement policy; NLDS; Breed Society strategic plans; Largely extensive production systems.
Cattle (multipurpose)	National Animal Improvement policy; NLDS; Breed Society strategic plans.
Sheep	National Animal Improvement policy; NLDS; Breed Society strategic plans; largely extensive farming systems.
Goats	National Animal Improvement policy; NLDS.
Pigs	National Animal Improvement policy;NLDS; Breed Society strategic plans; intensive farming systems.
Chickens	National Animal Improvement policy; NLDS; intensive farming systems.

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)	Higher milk production and quality in recorded herds; High use of imported semen does compromise the local AI industry.
Cattle (specialized beef)	The initial development of composite breeds such as the Bonsmara; Higher fertility in recorded herds; More effective selection in recorded herds; use of indigenous cattle breeds in terminal crossbreeding programs has highlighted the need to have a regular supply of purebred mothers.
Cattle (multipurpose)	Improved production efficiency in recorded herds.
Sheep	Improved wool quality in commercial and rural farmer flocks (recording and the supply of rams to the developing wool farmer sector; The development of the Dohne Merino , the Dorper and the Dorper sheep. Policy on indigenous breeds also led to the characterisation of all the indigenous sheep breeds in South Africa. A lack of support to maintain flocks of national importance is jeopardising the viability of some breeds.
Goats	Improved Mohair quality; the development of the SA Boer goat ; Commercialisation of indigenous goats is starting to have a positive impact in some communal areas.
Pigs	Positive impact on the pork industry in South Africa; there has been a move towards the use of hybrids in commercial pig production. This has reduced the number of purebred herds in the country - this is a global trend in modern pig breeding.
Chickens	Positive impact on the poultry industry - egg layer trials ; grandparent and parent evaluation . This is now largely privatised.
Horses	Government programs assisted with the establishment of a viable nucleus of Nootgedacht horses. Government also assisted with the strengthening of the Percheron gene pool - but a lack of support for other conservation initiatives has led to a reduction in numbers of breeds such as the Morgan horse (endangered in SA) and the Clydesdale.

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.

Funding for research and development and funding for the implementation of the National Livestock Development Strategy; Need incentives to encourage participation in the National Livestock recording and improvement schemes; Incentives are needed to encourage owners and keepers of indigenous (locally adapted) breeds to maintain pure populations for commercial production. Recent initiatives to market indigenous goats in the Tugela Ferry area of Kwa Zulu Natal have been very positive. A terminal crossbreeding program in the Limpopo Province using the Nguni as a mother line is encouraging owners and keepers to maintain and source pure Nguni cattle for this purpose.

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)	The introduction and sensible use of genomic information as a selection tool; the possible development of a hardy composite breed for smallholder milk production using locally adapted breeds and selected exotic sire lines.
Cattle (specialized beef)	The introduction and sensible use of genomic information as a selection tool; breeding programs for owners and keepers of locally adapted breeds on communal rangeland.
Cattle (multipurpose)	The introduction and sensible use of genomic information as a selection tool.
Sheep	Additional characterisation of locally adapted breeds and the introduction and sensible use of genomic information as a selection tool; the further development of a South African milking sheep.
Goats	Additional characterisation; breeding programs for communal owners and keepers of unimproved indigenous goats; the introduction and sensible use of genomic information as a tool in Angora and milk goat breeding programs.
Pigs	The introduction and sensible use of genomic information as a tool - looking at production efficiency traits; additional characterisation of the the two locally adapted breeds - focusing on adaptive traits of potential economic importance.
Chickens	Not applicable.

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	low	low
Cattle (specialized beef)	high	low	medium
Cattle (multipurpose)	n/a	n/a	n/a
Sheep	medium	low	low

Species	In situ conservation	Ex situ in vivo conservation	Ex situ in vitro conservation
Goats	medium	low	low
Pigs	medium	low	low
Chickens	medium	low	none
Horses	medium	low	low
Ostriches	high	n/a	n/a

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

- yes
 no

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

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

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

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

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

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

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

Exhibition of rare breeds at agricultural shows (Royal show) marketing of niche products (Kolbroek crackling; grass fed mutton and beef) Bapedi sheep incorporation of the established and developing owner/keeper sector as one breed society; organisation of indigenous goat owners in Kwa Zulu Natal to sell goats on a commercial market (conservation through sustainable use); Household / backyard chicken book published in Kwa Zulu Natal; Conservation of the Nooitgedacht horse; Book published on the Kolbroek pig incorporating scientific and cultural information; Landrace breeds book currently being revised; National breed conservation NGO (Farm Animal Conservation Trust - FACT) currently being revived.

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.

Government (DAFF) has been collaborating with the ARC to develop a functional National gene bank. This links to the gene bank at Grootfontein Agricultural Development Institute (GADI) and there are plans to expand this to include other gene banks such as the Biobank at the National Zoological Gardens where the genetic material of a recently characterised goat breed, the Tankwa goat, is being stored. Current genetic material stored:

1. ARC Animal Improvement institute (semen)

Nguni - 6078 straws
 Bonsmara - 556 straws
 Hereford - 148
 Jersey - 50 straws
 Frieshtland - 50 straws

Kolbroek pig - 60 straws
 indigenous bucks - 416 straws
 Venda cockerels - 61 straws

2. Grootfontein : (Embryos)

307 Namakwa Afrikaner sheep embryos

3. NZG Biobank

Tankwa goat - hair follicles 94 individuals; semen 13 individuals; blood derivatives from 143 individuals; extracted DNA from 143 individuals

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

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

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

Species	Number of breeds for which material is stored	Number of breeds for which sufficient material is stored	Does the collection include material from not-at-risk breeds?	Have any extinct populations been reconstituted using material from the gene bank?	Have the gene bank collections been used to introduce genetic variability into an in situ population?	Have the gene bank collections been used to introduce genetic variability into an ex situ population?	Do livestock keepers or breeders' associations participate in the planning of the gene banking activities?
Cattle (specialized dairy)	0	0	yes	no	no	no	no

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 beef)	10	0	yes	no	yes	yes	no
Cattle (multipurpose)	0	0	no	no	no	no	no
Sheep	3	3	yes	no	no	no	yes
Goats	3	3	yes	yes	yes	yes	yes
Pigs	2	2	yes	yes	no	no	yes
Chickens	5	5	yes	no	yes	yes	yes
Ostriches	1	1	yes	no	no	no	yes
Horses	4	4	yes	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 gene banks used in the country are the ARC-Irene, National Zoological Gardens (Bio-Bank), Grootfontein Agricultural Development Institute. Private individuals (semen and embryo collection centres) have banks of semen and embryos.

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.

To establish gene banks in SADC countries that are linked to Regional Focal point. Namibia, Zimbabwe, Botswana, Mozambique and Zambia.

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.

Nguni Cattle breed. Publication of information on the breed led to interest and the establishment of a breed Society. There are now 45164 registered females, 14908 registered males (total 60072 registered Ngunis). Achieved through the commercialisation of the breed (Conservation through sustainable use).
The Nooitgedacht horse - Government support established a breeding unit at the Nooitgedacht Research Station in Mpumalanga; A breed Society was established and the breed is now a popular sport horse; A recent breed profile was also completed by SA Stud Book to assist with future breeding programs.

REPRODUCTIVE AND MOLECULAR BIOTECHNOLOGIES

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

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

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

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

There are currently 32 registered reproduction centres that provide semen and embryo collection services - as well as insemination, embryo transfer (cattle, sheep, goats, horses) services. There are over 300 reproduction operators (mainly AI) that re register on an annual basis. Those that do not re register are balanced by new registrations. A number number provide insemination services to the smallholder sector but most are either employed by farmers or do own inseminations as owners of commercial dairy farms. Limited semen sexing and in vitro fertilisation is done by a few registered service providers (Veterinarians). Cloning - Somatic Cell Nuclear Transfer - has been limited to research and one successful clone (Futhi) of a dairy cow. Molecular / genomic information is increasing and a number of service providers are actively involved - Beef cattle, Dairy cattle, Angora goats and Wool sheep. Pig AI has increased and two companies provide services on a regular basis. The pig industry is moving towards the use of hybrid genetics for all commercial production.

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	yes	yes	no	no	yes	no
Embryo transfer	yes	no	no	no	no	no

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

The ARC has a program looking at providing AI and embryo collection services to livestock keepers; Registered collectors and inseminators provide services but this is largely in the smallholder sector. Natural mating is more the norm with livestock keepers.
Also see 28.1

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	yes
Semen sexing	yes	no
<i>In vitro</i> fertilization	yes	no
Cloning	yes	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.

Research to improve in field collection of semen and MOET - ARC animal improvement institute - with possible application in the livestock owner/ keeper / communal farming sector; Limited research into cloning - largely one private embryo and semen company; Genomic work largely at two universities and one registering authority - this includes work on Angora, dairy cattle, beef cattle and merino sheep genomics - including the identification of adaptive traits.

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

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

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

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

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

Horses	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	low	n/a	none	n/a	low
Artificial insemination using nationally produced semen from exotic breeds	low	n/a	none	n/a	medium
Artificial insemination using imported semen from exotic breeds	low	n/a	none	n/a	medium
Natural mating	high	high	high	n/a	high
Ostriches	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	n/a	n/a	n/a
Artificial insemination using nationally produced semen from exotic breeds	n/a	n/a	n/a	n/a	n/a
Artificial insemination using imported semen from exotic breeds	n/a	n/a	n/a	n/a	n/a
Natural mating	high	n/a	n/a	high	high

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.

There is still a perception in some sectors that AI can solve fertility problems caused by under nutrition and sub standard animal husbandry practices. This has led to the failure of interventions to introduce assisted reproduction technology and

these issues need to be dealt with before such applications have any chance of expanding. Application of technology is also restricted by the fact that a most of the of the commercial beef and small stock production is on extensive ranching systems. The commercial dairy sector is the largest user of assisted reproduction technology (largely AI) with a high use of imported exotic semen (largely Holstein). This is having an impact on the use of locally collected semen of the same breeds - particularly when the cost of imported semen is below the processing cost of the local product. Both local and imported semen is subject to genetic evaluation by the respective breed Societies to ensure that a high standard is maintained. This also enables these organisations to have a measure of control over the breeding value of the genetic material available to breeders - particularly should a genetic defect be detected in progeny. This includes surveillance of local and international information on a regular basis.

Over the past ten years, commercial milk producers have been making more use of breeding values for milk quality traits as well and this has been an encouraging development.

Imported embryos have been used to increase the numbers of Boran and Senepol cattle in the Country with a varying degree of success as the source of this genetic material is limited to Countries with the necessary disease free certification and to the development of bilateral veterinary protocols.

Over the past ten years, the pig industry has continued to move towards the use of hybrid genetics and AI.

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	limited	The National Livestock Development Strategy includes the sustainable management of rangeland resources and more attention to forage resources - particularly indigenous legumes; The National Range and Forage policy links to the NLDS and promotes the use of adapted breeds of livestock in sustainable farming systems. Aquaculture and Inland fisheries was under animal production until recently and activities included policy development and research into sustainable fish farming systems.
Collaboration in the characterization, surveying or monitoring of genetic resources, production environments or ecosystems	limited	The National Rangeland Forage policy includes the monitoring of rangeland resources and livestock farmers are encouraged to do assessments and identify key grass and natural forage species This would include production systems using locally adapted breeds. Aquatic species for fish farming were listed and work was done on suitable production environments Aquatic environments where the local Tilapia (mossambicus) is being threatened by Tilapia niloticus are being monitored (Mainly the Limpopo river system).

	Extent of collaboration	Description
Collaboration related to genetic improvement	limited	The NLDS includes action on research and development of plant resources suitable for livestock. Indigenous aquatic species have been identified and listed for publication as breeds in terms of the animal improvement Act, 1998 (Act 62 of 1998) - Sharp tooth catfish (<i>Clarias gariepinus</i>) and Tilapia (<i>mossambicus</i> and <i>rendalii</i>).
Collaboration related to product development and/or marketing	limited	Increased interest in grass fed beef/ mutton using adapted breeds (for example, the SANBI initiative)
Collaboration in conservation strategies, programmes or projects	limited	National rangeland monitoring and improvement policy links to the National livestock development strategy through the sustainable use of natural resources (grazing)
Collaboration in awareness-raising on the roles and values of genetic resources	limited	Publications; Joint programs/ sessions at the annual congress of the Grassland Society of Southern Africa - this includes special sessions on communal rangeland resources that are normally used by locally adapted breeds.
Training activities and/or educational curricula that address genetic resources in an integrated manner	limited	Some tertiary institutions have livestock ecology as a subject. This includes the sustainable use of natural resources for extensive grassland based production systems using locally adapted breeds of livestock.
Collaboration in the mobilization of resources for the management of genetic resources	limited	National policy on rangeland and forages - links to the NLDS. There are also links to the use of rangeland resources (National range and forage policy) and a National Wildlife policy (draft).

2. Please describe any other types of collaboration.

The SANBI grasslands program; Collaboration with the Department of Environmental Affairs on farmed wildlife species.

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

Collaboration will lead to more effective management of plant and animal genetic resources - including aquatic genetic resources. A holistic approach to climate smart animal agriculture. By definition: climate smart animal agriculture refers to farming systems that are based on sound animal and veld husbandry principles that take current and projected climatic and vegetation conditions into consideration to ensure long term sustainability. This includes farming with indigenous, locally developed and locally adapted breeds and species capable of surviving and producing under conditions such as higher temperatures, less rainfall, an increase in animal diseases and parasites and changes in the natural vegetation.

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

Collaboration with the Department of Environmental Affairs (DEA) - SA National Biodiversity Institute (SANBI) | grasslands program (Facilitate).

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

Collaboration with DEA - Biodiversity legislation - constraints - the interpretation of the term invader species.

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).

The sustainable use of rangeland resources through effective livestock grazing regimes - taking carrying capacity and range condition into account. A pilot rangeland monitoring and improvement program ran for three years and this is currently being formalised as a National Rangeland Monitoring and Improvement Program (NRMIP).

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).

Holistic farming systems - improved grazing - more food for grazing ruminants - improved production efficiency
SANBI grasslands program - improved grazing and production efficiency of livestock.

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).

This has led to an increase in farming with locally adapted breeds but this still needs to be quantified.

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.

Policy and strategy revision currently taking place within the framework of the Global plan of Action - reduction of greenhouse gases, biogas, etc. More attention is being given to the issue of gas emissions from livestock but at the

same time, the positive impact of grazing animals in sustainable grassland farming systems (carbon sequestration) is being quantified.

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).

Not available yet - currently being quantified.

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).

Not available yet.

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.

This involves more than one Government Department - Corporate Governance is a problem as there are different agendas.

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.

SANBI

The use of indigenous and locally developed breeds in grassland farming systems - carbon sequestration - this has not been quantified yet - refer to climate smart animal agriculture.

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.

Joint policies and strategies between DAFF and DEA in particular.

Resource management policies and strategies (National range and forage policy).

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.

CARA legislation - Conservation of Agricultural Resources Act.

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:

Completed as part of phase 1 of the SADC FAO UNDP program for the management of FAnGR. This is currently being revised as additional breeds need to be characterised (e.g. Tankwa goat).

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:

Detailed livestock survey conducted as part of the FAO/ UNDP/ SADC project for the management of FAnGR. This is currently being revised. This included phenotypic characterisation of all the breeds surveyed; Production environments, etc (copy available).

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:

Characterisation of the following breeds:
While this started before the adoption of the GPA, is continuing with the characterisation of the Tankwa goat, Zulu sheep. Funding is needed to complete this work.

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:

A baseline study was carried out as part of the SADC project but this needs to be refined and revised. A national livestock census is being planned but funds may be a problem.

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:

Directorate: Genetic Resources - SD AnGR - responsible for monitoring. Funds are a problem.

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:

While initial surveys were carried out, no specific protocol to monitor the status of FAnGR was adopted. The need is included in the Animal Improvement Policy and the NLDS but there was limited to no funding. This is currently under review.

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:

Basic livestock statistics that can be used to monitor trends ;
 Breed societies provide information - this includes statistics, pedigree data ; analyses
 Specific breed profile studies have been done by SA Stud Book and Livestock improvement Association - these include trends in the breed, etc.
 Fiesian horses - June 2012
 Nooitgedacht horses - August 2012
 SA Dairy Swiss cattle - May 2012
 Beefmaster cattle - July 2013
 Namibian Bonsmara cattle - September 2012
 Charolais cattle - July 2013
 Boran cattle - (2 reports) March and November 2013
 Senepol cattle - October 2012
 Afrisim cattle - July 2012
 SA Angus cattle - January 2014
 South Devon cattle - March 2014
 Ile de France sheep - April 2014
 Braunvieh cattle - February 2014
 Hereford cattle - March 2014
 Sussex cattle - March 2014
 Bonsmara cattle - July 2012
 Afrikaner cattle - June 2012
 Drakensberger cattle - August 2012
 Nguni cattle - September 2012
 Milch goats (4 breeds) - May 2013
 Hugenoot - March 2012
 Example - Afrisim and Drakensberger sire summary
 For more information, contact Charl Hunlun - charl@studbook.co.za

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:

Not applicable - FAO criteria used.

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:

A system to monitor and evaluate recorded breeds is in place - this uses the FAO classification for breeds at risk and makes provision for remedial actions where necessary. An example was the recent evaluation of the Nootgedacht horse gene pool that identified an inbreeding problem that was placing the breed at risk. A similar evaluation was done on recorded Drakensberger and Afrikaner cattle and remedial action was taken in both cases (See question 7).

In addition to this, a system is in place to respond to situations where animals have been destroyed as a result of disease control measures (Avian influenza, African Swine fever) and where resources have been depleted as a result of natural disasters such as fires, floods and drought. This links to the policy interventions on herds and flocks of National importance and animals at Provincial breeding / research stations (table of animals at stations).

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:

Existing protocols according to International standards and research and development - started before the adoption of the GPA. This needs to continue and funding is needed.

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:

Accurate livestock statistics linked to individual animal identification - data collection and processing.
Improved communication at Provincial level.
Funding.

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:

The introduction of individual animal identification by way of tags with randomly allocated numbers and a two dimensional bar code to capture basic information including breed, males, females, reproduction rates, incidence of diseases and parasites, etc.
Establish a network of Provincial coordinators/ recorders linked to a central focal point and the national livestock databank.

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.

See 7 - 10

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:

Animal Improvement policy - herds and flocks of national importance; National Livestock development strategy - both currently under review.

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:

A map depicting the agro ecological zones in the country - linked to livestock farming systems is currently being finalised. This is modelled on a previous map and publication on the factors affecting the regionalisation of livestock in South Africa (Bonsma & Joubert, 1957).

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:

All breed Societies are responsible for this; Breeding programs for direct entry breeds and indigenous breeds with no breed society are also largely in place. Some breeds, however, need specific programs.

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:

All breed Societies have programs and reviews of the status of the breed in question are conducted - To date 20 breed profiles have been done (see 7).

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:

Finance.
Inter Departmental cooperation.
Owner motivation.

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:

One of the impacts of exotics is often more apparent during droughts where the larger and less adapted hybrids are often the first to die. This has an impact on food security in communal areas in particular.

Action to counteract the use of larger and less adapted breeds includes the use of small framed breeds in terminal crossbreeding to supply weaners to feedlots and steers to markets for grass fed beef (climate smart animal agriculture)

The dairy sector in South Africa only uses exotic breeds and genetic material is brought in on a regular basis. This applies to factory systems as well as production off planted pastures. The pig industry is also largely based on exotic breeds (Landrace, Large white, Pietrain, Duroc) but hybrids are used in most modern systems. This has had an impact on pure bred herds. The industrial poultry sector imports grandparent and parent lines on a regular basis for the breeding of hybrids. This has had an impact on the availability of traditional layer and dual purpose breeds such as the rhode island red, plymouth rock, austrolorp, new hampshire. Locally adapted poultry breeds are not really affected but some were used to develop a hybrid, the boschveld that is gaining in popularity as a hardy layer for free range and smallholder production. Demand for another locally developed breed, the Koekoek (Plymouth rock hybrid) has decreased to the stage where there are only limited breeding flocks.

The impact of exotic breeds on locally adapted breeds of beef cattle sector has had an impact on the commercial herd - recent exotic imports include Limousin, Romagnola, Simbra, Brangus, Boran and Wagyu. The impact on the national commercial beef herd has not had a major impact - but breeds such as the Brahman in particular have had an impact on populations of Nguni cattle in communal areas in particular.

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:

National animal recording and improvement schemes; National Livestock Databank.

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:

DAFF Veld livestock liaison committee.

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:

Pilot schemes providing Nguni cattle to farmers in developing areas.
Wool improvement schemes providing information, shearing and marketing facilities and rams.

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:

See 7, 8

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:

This was included in the NLDS.

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:

The importance of local peoples knowledge has been incorporated into programs and policy but needs to be expanded.

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:

Some research and development done - indigenous sheep, pigs, goats (including a range of products - meat, skin, etc.)

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

Characterisation.
Accurate statistics.
Owner motivation and mobilisation.
Development of markets (Conservation through sustainable use).

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

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

STRATEGIC PRIORITY AREA 3: CONSERVATION

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

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

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

Please provide further details:

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

Continuous importation of genetic material (gene flow) for breeds such as the Holstein and Jersey.
Misleading information on medium to large framed exotic breeds to improve locally adapted breeds - Nguni cattle.

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:

The Animal Improvement Policy makes provision for action with herds and flocks of National importance but action to date has been limited and a new risk assessment will be done as part of the National census. This will influence national programs. Additional funding will be needed.

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:

The Animal Improvement policy is currently being reviewed.

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:

See 20

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:

Populations of animals were kept at local agricultural museums, the Agricultural Research Council's Irene farm and farm at Ioskop South (Nguni cattle) and at the National Zoological gardens, (Nguni cattle, donkeys, goats, pigs) and a number of private animal farms. This needs to be updated and revived in some cases - see 20.

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:

See 20, 23, 24

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:

See 23.2

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

- a. Yes
- b. No

Please provide further details:

N/A

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:

Funding; Political and stakeholder support.

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:

See 23.2

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:

Some mechanisms in place but these are not formal. Further action is planned and funding is sought.

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:

An initiative to identify sources of breeds to restock after disasters such as floods, fire and drought is in place. This needs to expand to include semen and embryos. Further action is planned and funding is needed.

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:

Ongoing communication and evaluation - funding is needed.

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:

Provision of information; publication in scientific media; exhibitions at agricultural shows and other events; ARC publication: Beef Breeding in South Africa includes information on breeds; similar publications for other species.

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

Policy endorsed at all levels (being revised)
Strategy - endorsed at all levels (being revised)
Revised legislation to maintain relevance
Accurate statistics - breeds, numbers, males, females, etc.
Recognition of herds and flocks of national importance
Viable populations of breeds - public and private sector collaboration
Gene banks (cryo and live)

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.

See 20 - 32

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:

Revival of the NLDS and the revival of VELDSTOCK.

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:

Policy and strategy currently being revised.

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:

National Livestock development strategy and Animal Improvement policy.

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:

National databank - INTERGIS. This is, however, not functioning as effectively as initially planned as a number of registering authorities do not download basic data onto the system but have their own data bases.

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:

A dedicated official at the ARC was tasked with the updating of data. When this official retired, it took some time to appoint a replacement. This has been done and the South African data on DAD-is will be updated shortly with new information on the Zulu sheep and the recently characterised Tankwa goat.

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

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

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

A NAC was established but is currently dormant due to a lack of funds. This is currently being rectified and will be

revived as a subcommittee of the Ministerial technical Committee (MINTEC) for livestock and rangeland (VELDSTOCK)
The original NAC included representatives from the nine Provinces, the ARC and selected academic institutions.

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

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

Please provide further details:

As the NFP administers the legislation controlling animal improvement in South Africa, there are strong links with all service providers, the pedigree livestock industry, the assisted reproduction industry, the import/ export industry, registering authorities, breed societies, various research institutes and relevant universities. An inter-provincial technical committee (MINTEK) - Veldstock (Veld - livestock liaison committee) has been established to ensure effective communication between the NFP (DAFF - Directorate: Animal Production) and animal and grassland scientists working in the nine Provinces in South Africa.

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

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

Please provide further details:

Exhibitions at shows; information brochures; a conservation NGO, the Farm Animal Conservation Trust (FACT) was established before the adoption of the GPA but this is currently dormant as a result of key officials retiring or leaving the service. FACT is currently being revived placing more emphasis on private sector involvement. FACT published a book on Landrace breeds in South Africa. This was a widely used reference and it is currently being reviewed. The ARC has a gene pool of indigenous breeds and these are exhibited from time to time - mainly at the annual Royal show.

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

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

Please provide further details:

Animal Improvement policy; National Livestock Development Strategy (NLDS); Animal Improvement Act, 1998 (Act 62 of 1998) The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) caters for wildlife resources and a wildlife ranching (Game farming) policy is nearing completion. This policy makes provision for the management of farmed wildlife species as some are viable alternatives to domestic farm animals - particularly in sensitive environments with limited access to resources such as water.

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:

While curricula at a number of tertiary institutions include farm animal genetic resources, training in inventory, characterisation and monitoring post graduate depends largely on the employer. As South Africa is planning a National Livestock census, more attention will be given to this in the near future and it is hoped that regular surveys will become part of other activities linked to the monitoring and control of animal movement (animal identification, etc.) Training also needs to be linked to natural resource monitoring and a pilot program - The National Rangeland Monitoring and Improvement Program - that included the training of rangeland ecologists will be linked to livestock resource monitoring to provide a more holistic view.

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:

Only limited community involvement in FAnGR management and conservation. This is currently changing with initiatives to use indigenous breeds in modern extensive farming systems.

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:

FACT - But this is dormant - currently no functional NGO.

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:

The ARC animal improvement institute, Universities of Pretoria, Free State and SA Stud Book.

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

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

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

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

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

Characterization?

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

Sustainable use and development?

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

Conservation of breeds at risk?

- i. Yes
- j. No, but action is planned and funding identified

- k. No, but action is planned and funding is sought
- l. No

Please provide further details:

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

Characterization?

- a. Yes
- b. No

Sustainable use and development?

- c. Yes
- d. No

Conservation of breeds at risk?

- e. Yes
- f. No

If yes, please list the international NGOs:

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

- a. Yes
- b. No

Please provide further details:

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

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

Please provide further details:

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

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

Please provide further details:

Bilaterals with Mozambique, Botswana, Namibia (limited); Programs to train inseminators in Mozambique; Characterisation collaboration with Mozambique (See genetic characterisation of the indigenous Landim and Pafuri goat breeds from Mozambique - (Garrine, Kotze, Els & Grobler, 2010).

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:

First phase of the SADC FAO UNDP project - regional coordinator and focal point.

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:

Interventions and activities at SADC and AU level - unfortunately, it is not always possible to attend due to short notice.

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:

The Global plan of Action - participation in the Nairobi meeting.

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
The issue of the classification of breeds - currently only locally adapted and exotic. Locally adapted needs sub classes.	South Africa has indigenous livestock, locally developed breeds locally adapted exotic breeds and a small number of recently introduced breeds. Having only two classifications in the SOW and GPA makes it difficult.	Re classification of breeds to take indigenous and locally developed (landrace) breeds into a separate category to focus more attention on these breeds with sustainable farming systems in mind.
Farmed wildlife	A number of wildlife species are being used in farming systems as viable alternatives to conventional farm animals - partly due to changing conditions but also as a result of factors such as stock theft and predation.	Add a section for farmed wildlife - this would include species such as Eland that are farmed in systems in Russia.
Insufficient scope for answers related to the GPA	Most of the questions refer to activities before or after/ as a result of adoption of the GPA. The problem is that, while some action was taken, this was often not sufficient - and there is no scope to include this. All the questions refer to sufficient before and then a range of answers post adoption of the GPA.	Consider a wider range - relating to actions before adoption of the GPA.

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