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

Country report

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

Country: Malawi

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).

Malawi has wide range of farm animal genetic resources (FAnGR) including but not limiting to Cattle, Goats, Sheep, Pigs, Chicken, Ducks, Pigeons, Guinea Fowls, Turkey, Rabbits, Guinea pigs, Donkeys, Camels, and Ostriches. Ninety-five percent (95%) of these FAnGR are of indigenous type and are raised on low-input extensive production systems, a typical characteristic of smallholder sector. Information on the extent of existing diversity, characteristics and use of indigenous farm animal genetic resources (FAnGR) in the country is the basis for their present as well as future sustainable utilization. Effective management of farm animal genetic resources (FAnGR) requires comprehensive knowledge of the breeds' characteristics, including data on population size and structure, geographic distribution, the production environment, and within- and between breed genetic diversity. In Malawi however, there has been no reliable and comprehensive inventory of the countries' domestic animal genetic resources' diversity and most of the animal breeds that have been introduced in the country lack initial documentation on origin, performance, date of introduction and heredity of traits among other necessary information. Further, the exact impact of exotic species on indigenous resources has not been evaluated in detail. The major factors preventing the collection of necessary information are illiteracy, insufficient funding and lack of centralized livestock data recording system.

Currently, there are no clear written policies and legal frameworks explicitly governing Animal Genetic Resources in Malawi. The Livestock Sector Policy in Malawi only includes recognition of the need to conserve animal genetic resources through proper breeding for livestock development and conservation. However, the policy document still has gaps regarding specific strategies that will guide implementation of AnGR activities on ground. The policy is also silent on incentives to promote AnGR.

There are few stakeholders in AnGR who have included conservation efforts of AnGR in their strategic plans, leading to initiation of research studies on AnGR, and efforts to promote AnGR by DAHLD. However, stakeholder sensitization and capacity building through training in AnGR is required in Malawi. Training of animal breeders, pasture breeders, ecosystem specialists, and social scientists is necessary to spearhead sustainable improvement and management of local and introduced AnGR. Similarly, there have not been deliberate programs to promote awareness and understanding

of the roles and values of animal genetic resources and need to conserve them for future use and development despite its high priority in the agricultural and livestock sectors. The understanding of the roles and values of animal genetic resources by smallholder farmers is not well recognized and consequently, the understanding of the role of conservation in terms of future sustainable development in light of changes in environmental conditions and market preferences is quite vague. The National Focal Point (NFP) therefore needs to be well coordinated with the National Commission for Science and Technology formerly known as the National Research Council of Malawi (NRCM) that is entrusted with policy on conservation of natural resources. The strategic priorities for action include characterization, inventory and monitoring of trends and associated risks; sustainable use and development; conservation; and policies, institutions and capacity-building.

The Malawi government through the Ministry of Agriculture and Food Security (MOAFS) is however determined to develop and implement a comprehensive National Agricultural Biodiversity Policy in recognition of the diverse and significant contributions of animal genetic resources to food and Agriculture and of traditional rights of livestock keepers with the absence of clear policies governing the sustainable use and conservation of animal genetic resources. In seeking to develop the National Agricultural Biodiversity Policy, the MOAFS initiated the production of Issues Papers on *"Managing animal biodiversity and associated ecosystems"* which is among the nine thematic areas that have been identified. In light of the foregoing, the Department of Agricultural Research Services, Department of Animal Health and Livestock Development, and Bunda College of Agriculture of the University of Malawi assessed the current status of animal biodiversity and its ecosystems in Malawi. The reviews revealed that Malawi's main livestock species; cattle, sheep, goats, pigs and chickens provide the majority of food production and a direct food source in times of crop failure. The weaknesses and gaps in the current state of AnGR in Malawi need to be reviewed holistically so that they are converted into appropriate actions. In addition, policy statements on breeding includes conservation of AnGR but not clearly linked to each other to provide the strategic priorities for action include going beyond characterization, to inventory and monitoring of trends and associated risks; sustainable use and development through systematic breeding and conservation; and enhancement of policies, institutions and capacity-building. Both conventional and non-conventional species should be targeted in AnGR due to their different state and reasons of vulnerability, and their multi-functionality including climate resilience to communities.

In promoting management, utilization and conservation of AnGR, Malawi as a member of FAO ratified and became party to the CBD, endorsed the Global Plan of Action for AnGR in 2007, and adopted the Interlaken Declaration on Animal Genetic Resources, confirming its responsibility for the conservation, sustainable use and development of animal genetic resources for food and agriculture; for world food security; for improving human nutritional status; and for rural development. Thus, efforts to understand the AnGR were initiated under global initiatives, but were not picked up by national efforts to sustain management and conservation plans. Few studies are disintegrated and require coordination and integration for application in management tools.

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.

A few species such as cattle, goats and chickens have exotic breeds imported but over the past 10 years, majority import come from other developing countries were had imported and adapted such breeds from developed countries.

For example, Black Australorp chickens and Boer goats come from South Africa, Holstein Friesian dairy cows usually come from South Africa, but some from neighbouring countries, recent Santa Getrudis import came from Zambia for beef cattle upgrading in Lower Shire. Import of semen for dairy cattle, however, comes usually from developed countries.

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).

National Census and import permits.

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.

Especially notable is the dairy sector that has seen an increase in number of Holstein Friesian and Jerseys, mainly through imports by NGOs and Government Presidential Initiative on Poverty and Hunger reduction.

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.

Most introductions have gone to many rural areas, in fact all agro-ecological zones of Malawi, dairy breeds are mainly to replace local Malawi Zebu in milk production (leaving MZ neglected), dairy breeds, goat and chicken breeds are used to crossbreed with local counterparts. However, there is fear in that 1) systematic breeding protocols do not exist to regulate and monitor AnGR; 2) monitoring trends of AnGR are not enforced. This leads to local AnGR populations stable but vulnerable to neglect and non-systematic breeding systems. This situation if allowed to continue, threatens the sustainable conservation, management and utilisation of AnGR. There is need to urgently develop strategic national breeding programmes/goals/protocols and strengthening of regulatory bodies to enforce/control the importation and management of imported genetic materials.

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	high	Increased demand has led to over utilisation of AnGR including use of breeding animals due to increased market forces. Livestock is now more economic than domestic consumption oriented, leading to over harvesting from flocks and herds, and in some cases, theft. However, the increased demand has not led to consequent response to breed more and enhance management within dominating extensive production systems. Further, use of inferior breeding bulls by smallholder farmers and consequential inbreeding continues to erode the diversity and useful genetic traits for improving livestock production.
Changing demand for livestock products (quality)	low	medium	Demand for quality and safe products among consumers has led to change in preference towards locally and not intensively produced livestock products. For example, local chickens are preferred to exotic broiler chickens. Local chickens entering the commodity markets has increased despite the increase in broiler production. There is an increase in goats sales at many markets in Malawi due to preference for goat meat which is more locally oriented than cattle from feedlots. The main problem is that majority share benefit goes to middle men than farmers, hence changes do not reflect changes towards intensification at farmsteads.
Changes in marketing infrastructure and access	low	medium	There are limited market infrastructure and poor access to organized livestock markets. This has give middle men room to scavenge the rural communities in search for livestock to purchase. This has created fear and increased theft of livestock which forces livestock keepers to sell big animals and in some cases breedable classes at much lower prices just to avoid their being stolen
Changes in retailing	medium	medium	Marketing force has changed utilisation of major livestock species towards income generation from home consumption, and subsequent influence on flock or herd dynamics. Because of preference for competing phenotypes, inferial stock is left for breeding, leading to gradual shift in the state of AnGR. Influence and impact require documentation and monitoring.
Changes in international trade in animal products (imports)	low	low	Importation of animals products will still have minimal influence.

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 international trade in animal products (exports)	none	low	Malawi does not participate much on international trade of livestock especially from local AnGR, hence current no influence. However, Malawi livestock products may find their way into international market in the near future, mostly likely towards and after 10 years. The effect will then be noted though might start with large - scale, commercial farmers.
Climatic changes	medium	high	Some climate change effects have led to frequent droughts, poor distribution of rains and in some cases flooding that lead to loss of both feed and animals. In addition, livestock has been predisposed to disease attacks and parasite infections.
Degradation or improvement of grazing land	high	high	Increase in human population has led to competition for land for human food production and animal feed. This has resulted in further defragmentation of land, encroachment into previously grazing areas and use of marginal lands for livestock. Rainfall pattern has shifted and narrowed to fewer months leaving a greater part of the year dry. This means less grazing and less fodder storage. Cattle, goats and sheep suffer from feed shortage, leading to poor performance and reproduction.
Loss of, or loss of access to, grazing land and other natural resources	high	high	Livestock has not responded much to effect of climate change unlike the crop sector. The crop sector has introduced climate resilient mitigation croping systems of conservation agriculture (limit access to crop residues) and irrigation farming (limits access to water and green fodder during dry seasons). These have affected feed availability in absence of integration of livestock into the systems. Since breeding takes place during grazing, and multiple use of bulls by several flocks takes advantage of grazing, breeding and exchange of genetic material is affected. Unless reversed, the impact will be high in the near future to cattle, goat and sheep.
Economic, livelihood or lifestyle factors affecting the popularity of livestock keeping	medium	high	Changes in consumer preferences towards local genotypes is increasing. This will have both positive (need for more local animals) and negative (pressure to sell even breeding stock) in the near future.

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
Replacement of livestock functions	none	low	Majority livestock functions have not or minimally replaced. There may be cases of draught power being replaced by use of machinery, but this will be gradual. On a good note, draught power replacement will relieve farmers from castrating males that are otherwise sound for breeding, hence enhancing AnGR.
Changing cultural roles of livestock	low	low	Majority livestock functions have not or minimally replaced. There may be cases of draught power being replaced by use of machinery, but this will be gradual. On a good note, draught power replacement will relieve farmers from castrating males that are otherwise sound for breeding, hence enhancing AnGR.
Changes in technology	low	medium	Over the past 10 years, there has been no unique introduced technology. Technology development is on the agenda and may influence numbers and productivity but within existing production systems in the near future. Reproductive technologies of AI may still remain a challenge, and may subsequently led to continued reliance on natural breeding, and consequent problems of monitoring systematic breeding.
Policy factors	medium	medium	Pluralistic extension and service delivery system has led to many NGOs promoting livestock in their food security interventions. This has accelerated AnGRM and will continue doing so the next decade. Problems include poor policy technical guidance and regulation, leading to non-directional breed development.
Disease epidemics	high	high	Disease epidemics are common in cattle, pigs and chickens. Confinement (Tehtering) of ruminant animals to restricted areas during rainy season continues to predispose them to parasite infections. Epidemics interacting with climate change and poor breeding practices lead to consequent losses or banning of livestock movement.

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)	1	4
Cattle (specialized beef)	1	1
Cattle (multipurpose)	0	0
Sheep	1	2
Goats	1	3
Pigs	1	2
Chickens	2	5
Ducks	1	0
Guinea fowls	3	0
Pigeons	1	0
Rabbits	1	3
Guinea pigs	1	0
Ostriches	1	0
Turkeys	1	0
Horses	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)	5	0	none	none	none	none	none	none

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 beef)	2	0	low	low	none	none	none	none
Cattle (multipurpose)	0	0	none	none	none	none	none	none
Sheep	3	0	none	none	none	none	none	none
Goats	4	0	none	none	none	none	none	none
Pigs	3	0	none	none	none	none	none	none
Chickens	7	0	low	low	none	none	none	none
Ducks	1	0	none	none	none	none	none	none
Guinea fowls	1	0	none	none	none	none	none	none
Guinea pigs	1	0	none	none	none	none	none	none
Pigeons	1	0	none	none	none	none	none	none
Rabbits	4	0	none	none	none	none	none	none
Horses	1	0	none	none	none	none	none	none
Turkeys	1	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	low
Research	low
Knowledge	low
Awareness	low
Infrastructure	low

	Score
Stakeholder participation	low
Policies	low
Policy implementation	low
Laws	low
Implementation of laws	none

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	No one has been trained in Animal Genetic Resources conservation. Funds are major constraint. However, Bunda College of LUANAR introduced an undergraduate course in FAnGRM four years ago and has introduced the same to postgraduate students in 2013.
Research	Apart from characterisation studies on few species implemented during first phase of FAO / UNDP SADC AnGR initiatives, not much has been done in AnGR. This is due to poor and dilapidated livestock infrastructure and lack of well trained personnel
Knowledge	Farmers and stakeholders have low knowledge of the need to sustainably conserve and utilize AnGR. Limited resources is affecting national implementation or publicizing AnGR programme.
Awareness	There is low awareness due to limited funds and misconceptions that introduced exotic breeds are superior to local genotypes.
Infrastructure	There are no infrastructure specifically for AnGR. Even the existing which can also benefit AnGR are in very poor state that they require rehabilitation. There is no institution established for AnGR.
Stakeholder participation	Limited stakeholder participation because of lack of awareness and resources for publicity through conferences, seminars and trainings. currently the stakeholders involved include Department of Agricultural Research Services (DARS), Department of Animal Health and Livestock Development (DAHLD) and Lilongwe university of Agriculture and Natural Resources (LUANAR). Only one local NGO, TAPP has integrated AnGR conservation and utilisation into its interventions. There is limited capacity in animal agriculture, let alone the area of breeding and AnGR conservation.
Policies	The livestock policy developed by DAHLD in 2006, mentions some elements of animal genetic resources but lacks details and clear measures of implementing the AnGR issues. Efforts are being coordinated at Ministry of Agriculture and Food security for tackling national policy on biodiversity in all agricultural aspects.
Policy implementation	Just as above, policy implementation is not straight forward in the area of AnGR. There is limited human resource capacity to interpret the policy statements of AnGR into action.
Laws	There is no law established by the Act of Parliament regarding establishment, implementation and enforcement of AnGR.
Implementation of laws	There is none due to absence of specific roles related to AnGR.

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).

Nationally, no clear step has been taken towards engaging or empowering stakeholders in AnGR management. No

biocultural community protocols exist in Malawi. There is however limited work being maintained in research and some government farms relating to AnGR. After the phasing out of the regional project, limited AnGR conservation activities are carried out and reported annually to stakeholders mostly Government departments and some NGOs but not involving farmers directly.

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	no	no	no	no	no
Cattle (specialized beef)	yes	no	no	no	no	no	no
Cattle (multipurpose)	no	no	no	no	no	no	no
Sheep	no	no	no	no	no	no	no
Goats	yes	no	no	no	no	no	no
Pigs	no	no	no	no	no	no	no
Chickens	yes	no	no	no	no	no	no
Ducks	no	no	no	no	no	no	no
Guinea fowls	no	no	no	no	no	no	no
Pigeons	no	no	no	no	no	no	no
Rabbits	no	no	no	no	no	no	no

Species	Government	Livestock keepers organized at community level	Breeders' associations or cooperatives	National commercial companies	External commercial companies	Non-governmental organizations	Others
Turkeys	no	no	no	no	no	no	no

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

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

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

Species	Tools															
	Animal identification		Breeding goal defined		Performance recording		Pedigree recording		Genetic evaluation (classic approach)		Genetic evaluation including genomic information		Management of genetic variation (by maximizing effective population size or minimizing rate of inbreeding)		Artificial insemination	
	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex
Cattle (specialized dairy)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
Cattle (specialized beef)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Goats	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chickens	0	0	1	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	0	1	4
Cattle (specialized beef)	0	0	1	1
Cattle (multipurpose)	0	0	0	0
Goats	0	0	1	1
Sheep	0	0	0	0
Chickens	0	0	1	1

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

Species	Training	Research
Cattle (specialized dairy)	low	low
Cattle (specialized beef)	low	low
Cattle (multipurpose)	none	none
Sheep	low	none
Goats	low	low
Pigs	low	low
Chickens	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)	none
Cattle (specialized beef)	none
Cattle (multipurpose)	none
Sheep	none
Goats	none
Pigs	none
Chickens	low
Ducks	none
Guinea fowls	none
Pigeons	none
Rabbits	none
Turkeys	none

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

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

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

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

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

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

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

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

Ducks	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	none	none	none	none	none	none
Animal identification	none	none	none	none	none	none	none	none
Recording	none	none	none	none	none	none	none	none
Provision of artificial insemination services	none	none	none	none	none	none	none	none
Genetic evaluation	none	none	none	none	none	none	none	none

Guinea fowls	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	none	none	none	none	none	none
Animal identification	none	none	none	none	none	none	none	none
Recording	none	none	none	none	none	none	none	none
Provision of artificial insemination services	none	none	none	none	none	none	none	none
Genetic evaluation	none	none	none	none	none	none	none	none

Pigeons	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	none	none	none	none	none	none
Animal identification	none	none	none	none	none	none	none	none
Recording	none	none	none	none	none	none	none	none
Provision of artificial insemination services	none	none	none	none	none	none	none	none
Genetic evaluation	none	none	none	none	none	none	none	none

Rabbits	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	none	none	none	none	none	none
Animal identification	none	none	none	none	none	none	none	none
Recording	none	none	none	none	none	none	none	none
Provision of artificial insemination services	none	none	none	none	none	none	none	none
Genetic evaluation	none	none	none	none	none	none	none	none

Turkeys	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	none	none	none	none	none	none
Animal identification	none	none	none	none	none	none	none	none
Recording	none	none	none	none	none	none	none	none
Provision of artificial insemination services	none	none	none	none	none	none	none	none
Genetic evaluation	none	none	none	none	none	none	none	none

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

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

Majority are in intervention implementation using livestock. Within the implementation is the realisation to fulfil certain obligations such as recording, but not necessarily for their intended purposes.

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)	no
Sheep	no
Goats	yes
Pigs	no
Chickens	yes
Ducks	no
Guinea fowls	no
Pigeons	no
Rabbits	no

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

Species	Description of policies or programmes
Cattle (specialized dairy)	No well structured programme. The government is cross-breeding Malawi zebu with pure dairy animals, but also promotes pure breeding of exotic breeds through AI. The crossbreeding requires maintenance of the Malawi Zebu breed but there are no such efforts in current breeding program to conserve the Malawi Zebu.
Cattle (specialized beef)	Operating at low level, the government is implementing some breeding activities in government farms.
Cattle (multipurpose)	
Sheep	
Goats	Government and NGOs promote crossbreeding of meat and dairy exotic breeds. What is lacking is breeding protocol to guide mating between and within breeds.
Pigs	Currently there is clear demarcation between commercial (use of exotic that undergo pure breeding) and local (that also practice pure breeding. Crossbreeding is minimally done in smallholder sector.
Chickens	Operating at low level, the government is implementing some breeding activities in government farms involving Black Australop.

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)	Lack of proper regulation of importation semen has resulted into uncontrolled mixture of genome and birth related complications among dairy animals. Lack of a breeding protocol and regulation has led to use of non evaluated bulls for AI, and potential inbreeding consequences due to few bulls being in use.
Cattle (specialized beef)	Uncontrolled importation of bulls of different beef breeds and subsequent cross-breeding with indigenous Malawi zebu has resulted in genetic contamination and loss of other valuable traits like disease resistance.
Cattle (multipurpose)	
Sheep	There is high possibility of genetic contamination of local sheep with exotic breeds (dorper and Merino).
Goats	Uncontrolled crossing of Boer bucks with indigenous Malawi goats and unscruplous castration of indigenous bucks has resulted in contamination of genes and loss of valuable traits.
Pigs	The limited crossbreeding has created a window for maintaining AnGR but lack of breeding control within local and exotic breeds likely lead to mating between related individuals.
Chickens	The crossbreeding between indigenous chicken and exotic Black Australop has gone for years (since 1960) without comprehensive evaluation, leading to possible consequences of inbreeding, reversing trends gained from crossbreeding.

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.

The country has no breeding policy to guide implementation of breeding and conservation programs. Some dilapidated infrastructures (paddock, weigh-bridges, Spray races,laboratories etc)exist in government research centres and farms but requires major rehabilitation for implementation of any serious breeding programmes. There is also limited personnel trained in animal breeding. Lack of adequate funding is another major constraint. Further, the country does not have breeding protocols in place to regulate, implement and monitor breed development and balance with sustenance of conserved or managed AnGR. No breeding goal and underlying strategies are established for AnGR.

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)	Improve milk yields and quality through developing a breed that is compatible with production systems and resilient to effects of climate change. Need to evaluate and establish the crossbreeding level that is suitable for farming communities.
Cattle (specialized beef)	Breed for beef and as dam line for crossing with improved dairy and beef breeds.
Cattle (multipurpose)	
Sheep	Straight and crossbreeding to multiply the sheep without compromising for related mating and its effects.
Goats	Developing a dual purpose breed through crossing and selection, that will provide both meat and milk, but adaptable to prevailing but changing environments.
Pigs	Straight breeding for exotic intensively raised breeds, ensuring management of inbreeding is enhanced; straight and crossbreeding of local pigs to increase output from flocks. There is need to develop clear breeding protocol for each species.
Chickens	Straight breeding should replace crossbreeding for still subsistence oriented farmers, developing dual purpose through crossing and selection for better managing but still extensively managing farmers; while promoting exotic strains for commercially oriented farmers. Each sector should ensure breeding protocol is well established, implemented and monitored.

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)	none	none	none
Cattle (specialized beef)	low	none	none
Cattle (multipurpose)	none	none	none

Species	In situ conservation	Ex situ in vivo conservation	Ex situ in vitro conservation
Sheep	none	none	none
Goats	none	none	none
Pigs	none	none	none
Chickens	none	none	none
Ducks	none	none	none
Guinea fowls	none	none	none
Pigeons	none	none	none
Rabbits	none	none	none
Turkeys	none	none	none

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	no
Genetic uniqueness	no
Genetic variation within the breed	no
Production traits	no
Non-production traits	no
Cultural or historical importance	no
Probability of success	no

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

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

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

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

Research stations and some government farms are carrying some limited in-situ conservation of Malawi zebu cattle.

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.

N/A

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	
Embryos	
Oocytes	
Somatic cells (tissue or cultured cells)	
Isolated DNA	

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)							
Cattle (specialized beef)							
Cattle (multipurpose)							
Sheep							
Goats							
Pigs							
Chickens							

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

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

- ○ yes
- ◉ no

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

N/A

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.

Absence of formal criteria for classifying breeds as at risk of extinction make it difficult to categorise animal breeds in Malawi and therefore no follow-up measures to monitor recovery or trend in their populations. The annual government livestock production estimates gives some indication based on population of the declining numbers or increase in numbers.

REPRODUCTIVE AND MOLECULAR BIOTECHNOLOGIES

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

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

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

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

Imported semen is artificially inseminated with no due regard to the history of the animals, its pedigree and most importantly disregarding the type of breed being inseminated. The available semen is inseminated to all types of dairy animals. There is only one local national AI center but has only 2 to 4 bulls that are usually picked without genetic evaluation.

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	yes	no	no	no
Embryo transfer	no	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 public (government agency - Department of Animal Health and Livestock Development - DALHD) in collaboration with other partners like Malawi Milk Producers Association (MMPA) and some Non-Governmental Organisations is responsible for procurement, maintenance and distribution at a cost/fees to dairy farmers in Malawi. However, the capacity in terms of infrastructures, human technical skills and finances limit the operational scale to reach many farmers. To a limited extent, some NGOs involved in livestock development/production also provide AI services to farmers in their working areas.

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	no	no
Embryo transfer or MOET	no	no
Semen sexing	no	no
In vitro fertilization	no	no
Cloning	no	no
Genetic modification	no	no
Use of molecular genetic or genomic information for estimation of genetic diversity	no	no
Use of molecular genetic or genomic information for prediction of breeding values	no	yes
Research on adaptedness based on molecular genetic or genomic information	no	no

30.1. Please briefly describe the research.

The topic for research was"Genetic diversity and population structure of Malawi zebu cattle" by Changadeya et al., (2012). The aim of the study was to determine the genetic diversity and population structure of Malawi zebu cattle using microsatellite DNA markers. Published in International Journal of Physical and Social Sciences (IJPSS) Vol.2 (9), ISSN: 2249-5894. However, this work did not cover the whole Malawi but formed a basis for further characterisation.

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

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 are no national legal policy framework supporting Biotechnology research and or development in animal genetic resource management. Only recently have efforts been made to draft guiding principles (which have not been passed by Parliament as required) covering all aspects of crop and livestock hence no activities related to Biotechnology can be initiated. What needs to be dome first is the ratification of legal guiding principle/policy for biotechnology in its entirety including AnGR management. Thereafter, there is need to develop national breeding structures for research and at community level and raise awareness and knowledge of animal genetic resource and the need for their structured conservation, management and utilisation. These structures will be the basic instruments for supporting breeding be it natural mating of using biotechnology. Obviously, there is strong need for human capacity development and sourcing of financial resources to support these operations.

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	Absence of a comprehensive policy document guiding management of biodiversity in Malawi make it difficult for departments and partners to consolidate/integrate their different sectoral/institutional initiatives in conservation and management of biodiversity.
Collaboration in the characterization, surveying or monitoring of genetic resources, production environments or ecosystems	none	Dwindling public and private sector resources challenge joint/collaborative characterisation, monitoring of all aspects of biodiversity.
Collaboration related to genetic improvement	none	There is no guiding document or policy despite presence of NAPA which is housed by separate line ministry of Environmental Affairs.
Collaboration related to product development and/or marketing	none	The Agribusiness policy favours crop sector. Majority livestock products entering the market are from exotic breeds.
Collaboration in conservation strategies, programmes or projects	none	There is no platform to share experiences and learn from the other.
Collaboration in awareness-raising on the roles and values of genetic resources	none	There is no platform.
Training activities and/or educational curricula that address genetic resources in an integrated manner	limited	Natural Resources Management curricula includes livestock and wildlife conservation as topics.
Collaboration in the mobilization of resources for the management of genetic resources	none	There is now platform, nor donor window for utilising the collaboration.

2. Please describe any other types of collaboration.

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

Enrichment of technical skills and supportive roles for comprehensive tackling of issues relating to management of genetic resources can be fostered with a strong collaboration. This would remove repetition or duplication of efforts and improve efficiency of resources utilisation. Knowledge exchange and sharing on issues related to national biodiversity will be enhanced. Chances of sourcing external financial resources will be increased where there is teamwork and cross fertilization/multidisciplinary nature of technical skills. The animal sector could lean from experiences of implemetation of plant genetic resources.

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

Luck of memorandum of understanding on the shared roles and responsibilities amongst departments, institutions and NGOs/ partners including resources funding structures for the respective activities is one of the challenges. The other challenge is luck of a national coordinating body to strengthen institutions and in setting strategic priorities and or goals for national biodiversity. Further, there is serious limited capacity in infrastructure, human and financial resources to enhance collaborative management approaches.

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

There is need to formalise collaboration working agreements and shared responsibilities for implementing management of genetic resources. There is need for setting-up a National Biodiversity Coordinating Body to oversee the strategy. The

NAPA is under separate ministry but not usually linked to Ministry of Agriculture that are direct implementers of plant and animal genetic resources. setting of priorities/goals for all aspects of genetic resources, resources mobilisation and implementation of activities. There is need to prioritize outsourcing of financial resources through development of proposals in support of biodiversity as government resources are fast declining.

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

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

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

- ○ yes
- ◉ no

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

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

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

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

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

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

- ○ yes
- ◉ no

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

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

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

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

Increase and broadening the ownership of livestock by smallholder farmers means that more animal wastes are expected in terms of manure and methane as well as other gasses concerned with global warming and climate change issues. Lack of proper livestock waste management strategies will have grave effects on the environment and pollution of water bodies and ecosystems.

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.

Livestock waste e.g. manure is being used in rehabilitation of the soil and its environment. This is improving soil biodiversity and reducing pollution resulting from application of chemical fertilizers.

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.

1) Develop policy in animal waste management.
2) screening of forages for green house gasses emission and promotion of forages that lease minimal green house gasses when eaten by animals.
3) Promotion of tree legume forages production for improving carbon sequestration.
4) Setting up of a coordinating unit that will oversee participation of stakeholders in management of livestock, plant, forest, aquaculture and the environment.
5) Creation of public awareness of the role of animal genetic resource management on ecosystem services.
6) Human resources development and training

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.

The manure applied to soil helps to increase organic binding ability of soil particle, increase soil biota, increase water holding capacity and infiltration which all significantly reduce soil erosion, siltation of lower river bases and subsequent pollution effects.

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:

The UNDP/FAO development project for Southern Africa provided a kick-start for developing an inventory for animal genetic resources for all livestock. This effort was not completed and the phasing out of the project in 2003 stopped this exercise since nationally resources were and have not been permitting to continue.

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:

Limited phenotypic characterisation were initiated on Malawi Zebu but no comprehensive country-wide characterisation has been done.

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

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

Please provide further details:

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

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

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

Please provide further details:

Some effort was initiated to conduct a baseline survey under the project "Conservation and Management of ANGR" but was not finished. Since the project phased out, there has been no activities running due to financial resources limitation. What is annually done is the data collection on livestock production estimates for all species of livestock in Malawi.

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:

Through the government structures, the Department of Animal Health and Livestock Development (DAHLD) is responsible for taking annual livestock populations. However, due to financial limitations, there is no comprehensive national monitoring but give only the estimates of livestock populations in Malawi. With proper resources this activity requires involvement of other stakeholders and research institutions to monitor the status and documents population size and structure of animal genetic resources.

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:

What is currently collected is estimates. No structured protocols in place and needs to be developed with some technical assistance from FAO or Countries that have these structures in place.

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:

The population trend are but only estimates. No comprehensive monitoring strategies are followed due to lack of funds.

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:

No clear cut criteria is in place to guide assessment of risk status of AnGR.

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:

There are no emergency response systems in place combined with not clear criteria for assessing breeds at risk.

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:

No research is currently being conducted but need is there to develop methods and technical standards or protocols. If resources can be identified, this is a priority activity so the phenotypic and molecular characterization could be done and eventually breed evaluation or comparisons.

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:

1) Lack of proper system for conducting a effective inventory, characterisation and monitoring programmes.
2) Insufficient funds for the exercise.
3) Inadequate human resources skills,
4) limited and dilapidated livestock research infrastructures and equipment.

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:

1) Development of effective systems for conducting inventory, characterisation and monitoring programmes.
2) Human skills development and training.
3) Development of collaborative or regional proposals for possible funding,
4) Rehabilitation and restocking of livestock infrastructures with appropriate and current analytical equipments

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.

Limited funds constrain national wide comprehensive carrying of inventory survey for all livestock species in Malawi. Instead, annual livestock estimates are being conducted to have some indication of direction of trend in animal populations by species but not by breed.

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:

There is no nation policy in place specifically governing the promotion of sustainable use f AnGR in Malawi. Institutional policies only gives a recognition of the need to conserve AnGR but lacks specific measures to translate into action points.

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

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

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

Please provide further details:

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

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

Please provide further details:

There are no strategic national breeding programmes in Malawi. Livestock keepers breed their animals through natural mating system in communal grazing areas. In this breeding practice, there in no selection of bulls rather small bulls are used/given more chance since the potential would be big breeding bulls are castrated for draught power or for further sale to buyers. In dairy, artificial insemination is practiced but on a limited scale and no record of the history of bull and the cow/heifer being inseminated.

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:

There is urgent need to develop the long-term sustainable use planning, including strategic breeding programmes to guide implementing institutions and livestock keepers on breeding rights, recording and traceability instruments, balancing production and utilisation among others.

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:

Knowledge and awareness gap needs to be addressed. Empowerment of stakeholders and livestock keepers for their involvement in sustainable use and development of AnGR. Reorganisation of livestock farmers into animal species community groups and development of community AnGR protocols. There is need to strengthen public and private sector institutions to have an increased role in setting up national conservation centers for quick identification and follow-up emergency response measures protecting the at risk breeds. Putting in place legal policy frameworks to guide implementation, restrict use and curb the theft through enforcement of animal identification and impose strict penalties for people found/involved with animal theft.

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

Glossary:

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

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

f. No

Please provide further details:

No assessment has been done. There is however, urgent need to conduct the assessment. Long history of importation of exotic cattle and semen and into Malawi requires evaluation. The country does not know the levels of the genotype being born and that are currently in place. Chances are very high that we may be running into inbreeding and cross contamination of genes and breeds.

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:

The country has not yet developed a national livestock recording system. However, a pilot project was initiated by Lilongwe University of Agriculture and Natural Resources (LUANAR). Since then no further uptake for national wide application due to financial resources limitations.

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

- [x] g. No

Please provide further details:

Mechanisms are lacking but needed to facilitate interaction among stakeholders and all scientific discipline.

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
- [x] g. No

Please provide further details:

There are no measures in place to provide farmers and livestock keepers with information. Farmers and livestock keepers, being custodians of most (95%) indigenous animals genetic materials, have free access and there are no binding policies/laws barring their utilisation or accessing AnGRs.

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
- [x] g. No

Please provide further details:

Current status quo and as has been before, there are no binding contractual agreements or policies in place barring farmers or other stakeholders from accessing of sharing benefits of the knowledge of AnGR. The farmers or livestock keepers are occasionally called by extension staff for various activities/projects information. Farmers are free to discuss or share knowledge with fellows on benefits etc.

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
- [x] g. No

Please provide further details:

No organized and or community based breeding strategies/protocols exist to guide livestock keepers on on simple but

practical breeding principles.

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:

Since there are no breeding strategies in place, no prioritized training on breeding is planned. However, some development projects that may are/may not be targeting AnGR management include project specific training sessions on various animal husbandry practices including some elements of breeding in general. The country needs more training for animal breeding into animal genetic resources tailor made courses. Lucky enough, The University of LUANAR has crafted and incorporated such courses in its curriculum.

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:

There are no government incentives to farmers or livestock keepers in support of indigenous or local production systems and associated traditional knowledge/practices related to AnGR. Government initiatives are rather bringing livestock extension knowledge/information supporting improved livestock production systems to enhance livestock production and productivity. The decision rests with individual livestock farmer/keeper based of his/her capacity (financially/ technically) to take up the new knowledge or stick with indigenous production systems. There are limited and non-coordinated research work targeting/tapping on and enhancing indigenous knowledge/information to strengthen issues of AnGR.

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:

Market demands and preferences from livestock consumers and increased choices for indigenous livestock products has and continues to drive high prices for indigenous products. This also has made retailers search for or encouraging farmers to supply indigenous/locally produced livestock and livestock products by hiking the prices on offer.

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

1) Capacity building in Animal Breeding and Nutrition. Development and training of Animal breeders in the country is a priority for national understanding and setting national breeding programmes including protocols on AnGR. Nutrition is fundamental for better nutritional management of AnGR
2) Resources to undertake comprehensive national livestock inventory and monitoring capacity and assessment of trends in animal genetic resources in Malawi
3) Resources to carry out nationwide phenotypic, genetic and molecular characterisation of all livestock species
4) Development and strengthening of breeding infrastructure instrument at public and private sector research institutions and at community farmers level
5) Organisation of farmers and livestock keepers into livestock communities/associations/clubs followed by training in AnGR conservation, management and sustainable utilisation
6) Develop national policy guidelines and community based AnGR management protocols

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:

Lack of finance and technical capacity limit assessment based on established FAO criteria on erosion of genetic resources.

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:

1) Lack of systematic and controlled importation of breeding materials (semen and animals) and subsequent uncontrolled breeding
2) Indiscriminate slaughters of young and breedable animals
3) Lack of selection and continued use of inferior breeding bulls
4) Castration of potential breeding bulls for draught power leaving inferior ones
5) Loss of animals due to nutritional related diseases and tick borne diseases

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:

There is need for development of national conservation policy on animal genetic resources.

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

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

Please provide further details:

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

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

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

Please provide further details:

Some work on genetic biodiversity characterisation of indigenous Malawi Zebu identified some niches within the selected districts to be conservation areas for each of the three indigenous Malawi Zebu populations. This was preliminary work that needs to be built on for nationwide genetic characterisation from which then measures would be taken to designate areas for specific in situ conservation efforts. This should cover not only cattle but all species of livestock including the minority/ the to be assessed as endangered/ at risk species.

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

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

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

Please provide further details:

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

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

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

Please provide further details:

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

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

- ◉ a. Yes
- ○ b. No

Please provide further details:

The importance of Animal Genetic Resources for food and agriculture necessitates concerted efforts in conserving and managing these resources for sustainable utilisation. Over 95% of livestock is indigenous or locally adapted to the country. Much of the sufficiency in livestock products that the country is aiming targets these resources kept by most rural farmers. Without conservation measures in place would endanger the sustainable management and use leading genetic erosion and complete loss of the precious resources.

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

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

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

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

- ○ a. Yes
- ○ b. No

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

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

Please provide further details:

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

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

Please provide further details:

No standards/protocols are in place to aid in assessing breeds at risk of human disaster, the country does not have arrangements to protecting the endangered breeds. Apart from government established national parks and game reserves for conserving wild animals, no infrastructures exist for the purpose of protecting animal breeds at risk of human disaster or even extinction as the case may be.

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

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

Please provide further details:

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

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

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

The limited research taking place revolves around improvement and conservation of Malawi Zebu. But due to resource limitations, some breeding work is taking place though selection is not done due to small population size of the cows/ heifers involved and the capacity to develop human skill and infrastructure for a more detailed work.

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:

Only localised project work in some livestock species most especially poultry do contain elements of promotion, documentation of knowledge and best practices on conservation.

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

1) Comprehensive baseline survey for inventory and monitoring of AnGR trends and associated risks
2) Characterisation of genetic biodiversity of all livestock species in the country
3) Setting up a national breeding programme and animal recording system for all livestock species
4) Organise and train livestock communities on the need for recognition, management and conservation of indigenous animal genetic resources
5) Engagement of all stakeholders to developing Sustainable National and community based AnGR management protocols
6) Establishment and strengthening existing Government research/conservation Centers for implementation of management and conservation of AnGR
7) Capacity building, institutional and policy development for AnGR management and Conservation

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

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

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

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

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

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

Please provide further details:

Gaps exist in human capacity, infrastructure development of institutions to effectively support holistic planning of livestock sector. Various institutions have some human and technical skills but resources for coordinating activities of these institutions is limiting.

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

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

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

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

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

- ○ a. Yes
- ◉ b. No, but they will be addressed in forthcoming plan
- ○ c. No

Please provide further details:

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

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

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

National biodiversity strategy on AnGR are highlighted in livestock policy documents but need clearer articulation on measures for implementation.

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

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

Please provide further details:

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

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

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

Please provide further details:

Malawi has not been updating information of DAD-IS.

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 stakeholders meeting was planned but failed to take place. This is a priority for the country and soon it will be recalled.

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:

The National Focal point needs to be strengthened for it to effectively enforce interaction amongst stakeholders. Lack of financial resources is limiting and crippling proper planning and execution of activities that could strengthen interaction among various stakeholders.

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:

Inadequate government funding limits the activities of the national focal point and institution to plan and execute deliberate programmes for increased public awareness of the roles and values of AnGR. This situation does not only affect AnGR activities but all national livestock programmes.

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:

No legal national policies exist in Malawi for AnGR management. The government through the Ministry of Agriculture and Food Security is endeavouring to develop national biodiversity policy which should encompass instruments and measures for management of AnGR.

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:

No training specifically targeting AnGR in general and specifically of inventory, characterisation, monitoring, sustainable use, development and conservation issues. Malawi desperately needs training in AnGR including but not limiting to breeding, characterisation, sustainable management and utilisation, conservation, animal health and nutrition among others.

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:

Sensitisation and awareness promotion is needed for all stakeholders followed by formation of /grouping of livestock communities so that community-based AnGR protocols can be developed for breeding, sustainable use and conservation initiatives.

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:

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:

Research and training institutions exist but require strengthening in the areas of livestock research and training infrastructure development and rehabilitation, higher level training for breeding to develop strategic and prioritised breeding goals and measures for medium-long term breed improvement programmes for both public and private institutions and community based livestock keepers.

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.

There is general recognition of the lack of a comprehensive policy framework on national biodiversity and government through the Ministry of MoAFS is spearheading this initiative. Institutions have long existed but require strengthening and rehabilitation of structures. Human development and capacity building are the drivers of economic development and there is urgent need for increased opportunity for training of animal breeders, conservation, environmental and ecosystem management, risk assessment and emergency animal risk management responses among others.

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:

Apart from the FAO and also AU-IBAR, Malawi has not entered/made any international collaboration in areas of characterisation, sustainable use or even conservation of breeds at risk.

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:

There is no national funding specifically for AnGR in Malawi. The limited government funding is very thinly spread to all activities.

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:

Under the UNDP/FAO project on management and conservation of animal genetic resources the ended in 2003. Since then, Malawi has not received external resources for the purpose of AnGR conservation and management.

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:

Malawi is a developing country that requires assistance to support and strengthen national and global action plan on AnGR.

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

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

Please provide further details:

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

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

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

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

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

Please provide further details:

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

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

Please provide further details:

But to a limited extend through localised research projects with partners. The results are reflected in FAO website like Dr T.N. Gondwe, Simpson J, Chagunda M.H.G, Dr James Banda (late) and others.

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

- ○ a. Yes

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

Please provide further details:

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

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

Please provide further details:

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

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

Please provide further details:

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

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

Please provide further details:

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

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

Please provide further details:

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

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

Please provide further details:

EMERGING ISSUES

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

Issues to be addressed in future

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

Submit by Email