| 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: Bhutan

I.   EXECUTIVE SUMMARY

Please provide an executive summary (not more than two pages) that will allow national and international stakeholders to gain a quick overview of the content of the country report.
The executive summary should contain information on:
- key trends and driving forces affecting animal genetic resources management in your country;
- strengths, weaknesses and gaps in capacity to manage animal genetic resources in your country;
- key constraints and challenges with respect to animal genetic resources management in your country;
- priorities and strategic directions for future action (focusing particularly on the next ten years).

The importance of management of Animal Genetic Resources (AnGR) is increasingly felt and accorded importance in Bhutan. A formal AnGR conservation program was established in 2007 and since then various initiatives are in place in line with global plan of action for AnGR. Currently concurrent emphasis are laid in understanding the genetic diversity and documentation, ex-situ conservation of potentially threatened breeds. Ex-situ conservation inform on semen conservation from cattle, sheep, chicken and pigs and conservation farms for these species including Mithun and horse. The in-situ are mainly through awareness programs, provision of incentives to potentially threatened breeds and species, group formation and instituting niche marketing and product development.

Some of the driving forces affecting the AnGR and their management are:
1. Increasing demand for animal products and effort to increase production favor particularly high yielding breeds and less emphasis on low yielding breeds.
2. Diminishing roles of animal in religious and cultural life.
3. Easy access to imported products (meat, fibres) dissuades keeping of animals.
4. Farm labor shortages and rural urban migration.
Environmental protection and conservation of culture is one of the four pillars of Bhutan's development philosophy of development. In this line various policies, programs, strategies and action plans for conservation and sustainable use are in place. Although there are no policy specifically for AnGR and their management, it is included as a component of biodiversity and environment. And a holistic approach of conservation and sustainable utilization are being put in place and rapid progress made in these areas. However, these initiatives are not very systematic particularly the in-situ conservation and utilization and decisions for conservation are based on insufficient information.

Currently, understanding of AnGR diversity in the country is limited to some species (cattle, sheep and yak). Most in-situ conservation programs such as provision on incentives to traditional livestock keeper are unsustainable. The policy on conservation and use of biological resources are broad and not specific to AnGR.

Some of the key constraints in management of AnGR in the country are lack of clear policy directives on conservation and sustainable use, inadequate human resources and technical capacity. Lack of fund for implementation of management activities. Therefore, the challenges in management of genetic resources are enhancing technical and human resources capacity, sourcing of funds and to stabilize the declining population of traditionally farmed and locally adapted breeds.

The priorities and strategic directions for AnGR management are in areas of understanding and documentation of genetic diversity, reassessment of population of FAnGR and risk status, prioritization of breeds and species for conservation, use of innovative measures for conservation and sustainable use, strengthen ex-situ conservation initiatives (nucleus herd and cryoconservation), develop breeding and conservation policies for AnGR management. And finally develop capacity for extraction and use of conserved genetic materials for breed reconstitution and revival.

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

FLOWS OF ANIMAL GENETIC RESOURCES

1. Studies of gene flow in animal genetic resources have generally concluded that most gene flow occurs either between developed countries or from developed countries to developing countries. Does this correspond to the pattern of gene flow into and out of your country?
For developed countries, exceptions to the usual pattern would include significant imports of genetic resources from developing countries. For developing countries, exceptions would include significant exports of genetic resources to developed countries, and/or significant imports and/or exports of genetic resources to/from other developing countries.

- ⦿ yes
- ○ no
- ○ yes but with some significant exceptions

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

2. Have there been any significant changes in patterns of geneflow in and out of your country in the last ten years?
- ⦿ yes
- ○ no

2.1. If yes, please indicate whether this view is based on quantified data (e.g. import and export statistics collected by the government).
- ⦿ yes
- ○ no

2.2. If yes, please provide references (preferably including web links) (if relevant, indicate which types of animal genetic resources are covered).
(Source: Department of Livestock data base, Unpublished)

2.3. Please also describe the changes, indicating the species involved, the direction of the changes, and the regions of the world to and from which the patterns of imports and exports have changed.
The change in gene flow (import) is mainly in for cattle and specifically for dairy. Increasingly live animals are imported from neighboring countries to meet demand for milk immediately. An estimated 9500 live cattle import be imported into

the country. Earlier semen were imported from developed countries was the main source of inflow of germplasm into the country. About three breeds of live goats were also introduced into the country for possible crossbreeding purposes.

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.

In order to meet the increasing demand for animal products, production from high yielding breeds have incentives in place. However the lack of such incentives for low yielding locally adapted breeds is changing preference of the farmers towards high yielding imported breeds and possible decline in numbers and loss of genetic diversity.

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	Increasing in demand for animal product has favored production from a high yielding breeds and thus utilization of low yielding locally adapted breeds are not accorded importance which might lead to homogenization of breeds and loss of diversity.
Changing demand for livestock products (quality)	low	low	Demand for special animal products are beginning to emerge in Bhutanese market. These products mainly from locally adapted breeds and such changes is likely to favor locally adapted breeds and get due attention for their effective management.
Changes in marketing infrastructure and access	none	low	The change in marketing infrastructure and access will favor use of variety of genetic resources; niche product marketing will favor more locally adapted breeds.
Changes in retailing	low	low	Not much of change in management of genetic resources is expected through changes in retailing.
Changes in international trade in animal products (imports)	low	low	Bhutan imports a major portion of animal product. The change in international trade particularly leading to reduce import will favor effective management while increasing import will negatively affect the management of animal genetic resources.

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	Bhutan hardly exports any animal products and at least for another decade Bhutan production of animal product will be for within country consumption and thus this factor will not have any effect to the management of animal genetic resources as such.
Climatic changes	low	medium	Although climate change is a seriously taken issue in Bhutan, its impact on animal genetic resources and their management has been minimal. However, with emerging diseases in face of changing climate, the animal genetic resources and their management will be accorded due importance in future.
Degradation or improvement of grazing land	medium	medium	The quality of grazing land has declined over the years thus the carrying capacity has declined and further leading to overgrazing. This might require downsizing of low producing breeds and emphasis on high yielding breeds
Loss of, or loss of access to, grazing land and other natural resources	low	low	No observable loss or loss of access to grazing land in the past and the same is expected in future. If at all it occurs it will have a low.
Economic, livelihood or lifestyle factors affecting the popularity of livestock keeping	medium	medium	Farm labor shortage is a common constraint among the livestock farmers. This is as a result of alternate income opportunities available. Thus livestock keeper has to invariably downsize the animals and keep only the good quality animals thereby reducing the genetic base.
Replacement of livestock functions	low	low	Although farm mechanization is underway, considering the steep terrains of the country has affected the AnGR and their management minimally. Similarly it would have very low impact in future.
Changing cultural roles of livestock	low	low	Animals have many cultural roles particularly in beliefs and social arena. Animal sacrifices and offerings for which the animals are reared is either dying away or substituted for religious taboo against animal slaughter. As a result the extent of animal raising for such purpose has been impacted and will continue to be impacted in future.
Changes in technology	low	medium	No major changes in technology related to animal production has been observed in Bhutan. The impact is low which may be as a result of feeding, housing and breeding. However in future, technological changes in areas of reproduction and breeding is expected to have additional impact on AnGR and its management.
Policy factors	medium	medium	

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
Disease epidemics	low	medium	The impact of disease epidemics to the AnGR and its management has been low. This has been particularly with out break of bird flu. The flow of genetic resources for improving has been reduced.

OVERVIEW OF ANIMAL GENETIC RESOURCES

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

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

Species	Locally adapted breeds	Exotic breeds
Cattle (specialized dairy)	0	2
Cattle (specialized beef)	0	0
Cattle (multipurpose)	2	0
Sheep	2	1
Goats	1	3
Pigs	2	4
Chickens	8	5
Horses	3	2
Yaks	2	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)	2	2	none	none	none	none	none	none
Cattle (specialized beef)	0	0	none	none	none	none	none	none
Cattle (multipurpose)	1	1	high	high	high	medium	medium	medium
Sheep	3	3	high	high	high	medium	low	low
Goats	1	1	none	none	none	none	none	none
Pigs	2	2	low	low	low	low	none	none
Chickens	2	2	low	low	low	low	none	none
Horses	2	2	low	low	low	none	none	none
Yaks	2	2	high	low	low	medium	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	none
Research	low
Knowledge	low
Awareness	medium
Infrastructure	low
Stakeholder participation	low
Policies	low
Policy implementation	low
Laws	medium

	Score
Implementation of laws	low

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	The tertiary education in Bhutan is relatively new establishment. Currently there are no capacity to impart education on AnGR management. The incorporate AnGR and its management is necessary.
Research	Currently apart from characterization studies of few species were carried out ex-country mainly for academic interest. Thus there is a need to further conduct research to understand the genetic resources and efficient management of the genetic resources.
Knowledge	Currently the access to knowledge by stakeholders is poor. This is as a result of poor information generation on genetic resources and at the same time limited research on these genetic resources. Again research, documentation of information and research are necessary.
Awareness	The awareness on roles and importance of animal genetic resources are good among the stakeholders. However, such awareness needs to be improved.
Infrastructure	Currently management of animal genetic resources particularly in-situ are looked into by Department of Livestock. Department of Livestock has a network of district field offices through which the resources are managed. The department is also involved in ex-situ in vivo conservation of animal genetic resources as conservation farms. For ex-situ in-vitro conservation animal genebank has been established. However, ex-situ management has to be based on priority of the breed which is currently not.
Stakeholder participation	The participation of stakeholders in management of animal genetic resources are in place. Most of the conservation initiatives and AnGR management are done with close collaboration with the stake holders.
Policies	There are no policies specifically for AnGR management but it is in part included under the livestock sector development policy which is under formulation and in National Biodiversity Strategy and Action plan 2013. Since this policy provides only a broad based directives for biodiversity in general, there is a need to have policies, plans and strategies specific to animal genetic resources in Bhutan in future.
Policy implementation	The policy implementation for biological resources in general is good but when it comes specifically to animal genetic resources management it somehow stands diluted for their lack of clarity, policy conflicts etc.. Thus, for a successful implementation of policy of AnGR management, there is a need for a separate policy, plans or strategy for animal genetic resources by itself.
Laws	Laws in place for AnGR management are as a part of legislations for Livestock which lacks sufficient details on management of genetic resources. Thus there is a need to update current regulations or frame separately for AnGR management exclusively.
Implementation of laws	

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

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

Livestock breeder groups have been formed for dairy cattle breeds (Jersey and Brown Swiss). Groups are also formed for production from locally adapted breeds.

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	yes	no	no	no	no	no
Cattle (specialized beef)	no	no	no	no	no	no	no
Cattle (multipurpose)	yes	yes	no	no	no	no	no
Sheep	yes	yes	no	no	no	no	no
Goats	no	no	no	no	no	no	no
Pigs	yes	yes	yes	no	no	no	no
Chickens	yes	no	no	no	no	no	no
Horses	yes	no	no	no	no	no	no
Yaks	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	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	2	0	0	0	2	0	2	0	0	0	0	0	0	0	2
Cattle (multipurpose)	1	0	1	0	1	0	1	0	1	0	0	0	0	0	1	0
Sheep	0	0	1	0	0	0	0	0	1	0	1	0	1	0	0	0
Goats	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Horses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yaks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Species	Straight/pure-breeding only		Straight/pure-breeding and cross-breeding	
	Loc	Ex	Loc	Ex
Cattle (specialized dairy)	0	0	0	2
Cattle (multipurpose)	0	0	1	0
Sheep	2	0	0	0
Goats	0	0	1	2
Horses	3	0	0	0
Pigs	0	0	2	0
Chickens	0	0	8	0
Yaks	2	0	0	0

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

Species	Training	Research
Cattle (specialized dairy)	low	low
Cattle (specialized beef)	none	none
Cattle (multipurpose)	low	low
Sheep	low	low
Goats	none	none
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)	low
Cattle (specialized beef)	none
Cattle (multipurpose)	low
Sheep	none
Goats	none
Pigs	none
Chickens	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	low	none	low	none	none	none	none
Animal identification	medium	low	none	none	none	none	none	none
Recording	medium	low	none	none	none	none	none	none
Provision of artificial insemination services	high	low	none	none	none	none	none	none
Genetic evaluation	low	low	none	none	none	none	none	none

Cattle (multipurpose)

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

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	low	none	none	none	none	none	
Animal identification	none	low	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	none	none	none	none	none	none	none	none

Horses	Government	Research organizations	Breeders' associations or cooperatives	Individual breeders/livestock keepers	National commercial companies	External commercial companies	Non-governmental organizations	Others
Setting breeding goals	low	low	none	none	none	none	none	none
Animal identification	low	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

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.

Government particularly the Department of Livestock (DoL) and research organizations are involved in all aspect of breeding. DoL sets breeding goals and is involved in animal identification and recording. The provision of artificial insemination, animal recording and genetic evaluations are carried out on a small scale by conducted by research organization.

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

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

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

Species	Description of policies or programmes
Cattle (specialized dairy)	National Dairy Development Program. Livestock sector development policy advocates use of high yielding exotic breeds such as Jersey and Brown Swiss to improve milk production in the country.
Cattle (specialized beef)	No
Cattle (multipurpose)	National Nublang Breeding Program. Livestock sector development policy advocates improving draught power and milk of Nublang breed through breed improvement through selection and initiation of open nucleus breeding and use of advance reproductive technologies.
Sheep	National Sheep Breeding Program. Livestock sector development policy.
Goats	Livestock sector development policy recommends improvement in production through crossbreeding with exotic breeds or improvement of traditionally adapted breeds.
Pigs	National Pig Breeding Program. Livestock Breeding Policy advocates improving production through crossbreeding and improvement of traditionally adapted breeds.
Chickens	National Poultry Breeding Program. Livestock Breeding Policy advocated improvement of traditionally strains or locally adapted breeds or varieties to improve production.

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)	There will be an invariable increase in milk production through use of high yielding exotic breeds and cross breeding program. However sustainability of production will be questionable as it is dependent on import of live animals and not target at improving the animals themselves.
Cattle (specialized beef)	
Cattle (multipurpose)	Existing program and policy will favor effective management of genetic resources but not much has been initiated in improving the performances of these breeds.
Sheep	Policy and program on sheep are not very focused. The population of some breed of sheep are drastically declining and would continue to decline unless concerted efforts made in direction of sustainable utilization.
Goats	There is a policy indication for improving the productivity through crossbreeding. However, the performance of locally adapted goats are unknown at the moment.
Pigs	Increasing production through crossbreeding and introduction of exotic high yielding species. However, pig farming in general over declining and more specifically with locally adapted breeds. This might lead to further loss of genetic diversity.
Chickens	Production is mainly through improved breeds/strains. Poultry development program is concentrated mainly on improving production from high yielding strains.

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.

Currently breeding program lacks focus. The objective of the breeding program is to meet the quantitative demand existing in the country and not long term (genetic improvement through breeding).

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)	Future objective is to have a superior locally adapted specialized dairy breeds producing on average 8000L per lactations through selection and breeding. Breeding research and capacity has to be enhanced.
Cattle (specialized beef)	
Cattle (multipurpose)	To develop production performance of these cattle breeds through selection and breeding. Currently performance records are available but have not been used for selection. Breeding is mainly to avoid inbreeding in the population. In future, the available records have to be utilized make selection and breeding for improved performance.
Sheep	Performance recording, selection and breeding for special purpose has to be developed specially for wool type breeds.
Goats	Rather than crossbreeding with exotic breeds, performance parameters of traditionally adapted breeds has to be studied and decisions made on the need of improvement.
Pigs	Production performance and quality of locally adapted breeds has to be studied. Based on this, their production and quality enhanced through appropriate breeding techniques to produce niche products.
Chickens	Continue to meet the demand for poultry products through exotic high yielding. At the same time there is a need to identify potential strains of locally adapted strains for specialized products and improve on it.

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)	low	low	low
Cattle (specialized beef)	none	n/a	n/a
Cattle (multipurpose)	medium	medium	low
Sheep	low	low	low
Goats	none	none	none
Pigs	low	low	low
Chickens	low	low	low
Horses	low	low	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	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
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	no	no	no	no	no	no	no
Cattle (multipurpose)	no	yes	yes	yes	no	yes	no	no	no	no	no	yes
Sheep	yes	yes	yes	no	no	no	yes	no	no	no	yes	yes
Goats	no	no	no	no	no	no	no	no	no	no	no	no
Pigs	yes	yes	yes	no	no	no	no	no	no	no	yes	yes
Chickens	no	yes	yes	no	no	no	no	no	no	no	no	yes
Yaks	yes	yes	yes	no	no	no	no	yes	yes	yes	no	yes
Horses	no	yes	yes	no	no	yes	no	no	no	no	no	yes

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

Cattle (multipurpose):
Sites identified for in-situ conservation, rearing group formed, incentives (breeding stock, processing equipments, housing and pasture development) and awareness/education.

Sheep:
Potential sites identified for different breeds, support for housing, processing and breeding stock provided, awareness/education.

Pigs:
Site identification, group formation, subsidies for housing and supply of breeding stock, awareness/education.

Chicken:
Site identification, group formation, housing and breeding stock support and marketing, awareness/education

Yaks:
Site identification, group formation, milk processing equipment, pasture development and breeding stock, awareness/education.

Horse:

Site identification for in-situ conservation, group formation, supply of breeding stock, pasture development, awareness/education.

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

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

- ⦿ yes
- ◯ no

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

- ◯ yes
- ◯ no

23.2. If yes, please describe the plans.

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

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

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

Species	Number of breeds for which material is stored	Number of breeds for which sufficient material is stored	Does the collection include material from not-at-risk breeds?	Have any extinct populations been reconstituted using material from the gene bank?	Have the gene bank collections been used to introduce genetic variability into an in situ population?	Have the gene bank collections been used to introduce genetic variability into an ex situ population?	Do livestock keepers or breeders' associations participate in the planning of the gene banking activities?
Cattle (specialized dairy)	2	2	yes	no	no	no	no
Cattle (specialized beef)	0	0	no	no	no	no	no
Cattle (multipurpose)	2	2	yes	no	no	no	yes
Sheep	3	0	yes	no	no	no	yes

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?
Goats	0	0	no	no	no	no	no
Pigs	1	0	yes	no	no	no	yes
Chickens	4	0	yes	no	no	no	yes

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

Cattle (dairy):
Genetic materials in form of semen (Jersey and Brown Swiss) of both imported and collected from locally adapted breeds are conserved with Dairy Development Program. They are also used for breed improvement program in the field.

Cattle (multipurpose):
Semen conserved for Nublang and Mithun. Initiated collection and banking from respective breeding programs.

Sheep:
Collection initiated from locally adapted breeds with emphasis for Jakar sheep whose population is rapidly declining.

Pig:
Collection and banking of semen from locally adapted initiated.

Chicken:
Collection and banking from locally adapted strains initiated.

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.

Yes, the need was discussed during SAARC Animal Genetic Resources Consultation Workshop at Kandy 4-6 Sept, 2013. In vitro gene bank was mainly for maintenance of diversity transboundary breeds.

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

REPRODUCTIVE AND MOLECULAR BIOTECHNOLOGIES

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

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

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

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

Artificial insemination is for dairy breeds are widely available in the country but most concentrated in peri-urban areas. Similarly for multiple purpose breeds (milk and draught) particularly Mithun and Nublang are used in rural areas. However with respect to MoET, embryo transfer, sex semen facilities are in place and services to be initiated soon.

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	no	no	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.

Public sector particularly the government agencies are involved in collection, processing, distribution and provision of insemination services. Similarly government is venturing into establishment of facilities and provision of embryo transfer services.

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

Biotechnologies	Public or private research at national level	Research undertaken as part of international collaboration
Artificial insemination	yes	no
Embryo transfer or MOET	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	yes	yes
Use of molecular genetic or genomic information for prediction of breeding values	no	no
Research on adaptedness based on molecular genetic or genomic information	no	no

30.1. Please briefly describe the research.

Bhutan at National level has undertaken research into artificial insemination of Mithun and technology successfully launched. Research on MOET and Embryo Transfer are yet to be initiated in the country.

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

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

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

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

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

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

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

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

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

Artificial insemination (AI):
Species and breed coverage: breeds: Jersey, BS (imported and locally produced), Nublang and Mithun (locally

produced).
Mobile AI facilities are in place in periurban areas.

Constraints:
Low success rates, poor recording.

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	Overall a joint strategies and action plan has been developed; National Biodiversity Strategy and Action Plan encompassing all aspect of animal, plant and other components of biodiversity.
Collaboration in the characterization, surveying or monitoring of genetic resources, production environments or ecosystems	none	Mostly done independently.
Collaboration related to genetic improvement	none	Mostly done independently.
Collaboration related to product development and/or marketing	none	Mostly done independently.
Collaboration in conservation strategies, programmes or projects	limited	Mostly done independently but one program Agrobiodiversity (animal and crops) was collaboratively undertaken in the past.
Collaboration in awareness-raising on the roles and values of genetic resources	limited	Agrobiodiversity program is undertaken collaboratively. ⊞
Training activities and/or educational curricula that address genetic resources in an integrated manner	limited	The RNR (Renewable Natural Resources) concept is present in curricula but to a very limited extent.
Collaboration in the mobilization of resources for the management of genetic resources	none	

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

This will be holistic approach benefiting all of these components particularly by not having contradicting policies or strategies. For instance, forestry policy contradicts goat farming in Bhutan.

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

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

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

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

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

- ○ yes
- ◉ no

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

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

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

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

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

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

- ○ yes
- ◉ no

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

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

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

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

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

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

Please provide further details:

> Some of the species (cattle, sheep and yak) were completed before adoption of GPA, currently characterization, inventory is being done for chicken, horse and pig.

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:

> Phenotypic characterization of unstudied species chicken, pig and horse have been initiated.

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:

> Molecular characterization to understand genetic diversity has been initiated for chicken and pigs in the country.

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:

Coverage extend from species level to breed level for cattle since 2009.

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:

AnGR program of National Biodiversity Centre (NBC) is mandated for monitoring status of AnGR. This activity is coordinated by NBC and implemented in collaboration with DoL.

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:

Department uses structured questionnaires prepared with involvement of stakeholder and the data is collected at the extension centre level and complied at the national level by DoL but protocol is not very comprehensive.

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:

Breed based population monitoring for cattle has been initiated after adoption of GPA.

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

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

◉ a. FAO criteria

○ b. National criteria that differ from the FAO criteria

○ c. Other criteria (e.g. defined by international body such as European Union)

○ d. None

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

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

○ a. Yes, a comprehensive system was established before the adoption of the GPA

○ b. Yes, a comprehensive system has been established since the adoption of the GPA

○ c. For some species and breeds (coverage expanded since the adoption of the GPA)

○ d. For some species and breeds (coverage not expanded since the adoption of the GPA)

○ e. No, but action is planned and funding identified

◉ f. No, but action is planned and funding is sought

○ g. No

Please provide further details:

Operational emergency response system particularly for safeguarding breeds at risk are absent but there are such system for animal disease outbreaks. Thus, emergency disease response system can be upgraded to emergency response system in future.

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:

The methods, standards and protocols used elsewhere in the region is being used.

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

○ a. Yes

○ b. No

○ c. No major barriers and obstacles exist. Comprehensive inventory, characterization and monitoring programmes are in place.

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

Lack of technical capacity, inadequate financial resources and human resources.

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:

Sourcing of fund and building of technical capacity (facilities and human resources).

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.

Characterization is complete for yak, sheep and cattle in the country. Currently, characterization (phenotypic) is underway for horse, pig and chicken. The molecular component will be done in collaboration with Kyoto University, Japan. Once the genetic diversity of the species and within them are understood, monitoring of most domestic animals will be undertaken at breed level.

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 are various policies and action plans as a whole for biodiversity conservation and utilization in which animal genetic resources is a component of it. These are Livestock Sector Development Policy, 2013 and updated National Biodiveristy Strategy and Action Plan 2013 which awaits endorsement and enforcement.

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:

> Agrobiodiversity conservation approach encompassing crops and animals in agro-ecosystem.

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:

> Breeding program exists for cattle (Jersey, Brown Swiss, Mithun, Nublang), Horse, chicken and pigs.

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:

> A long term sustainable use planning has been developed for only cattle particularly Nublang cattle.

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:

> There is a limited resources and are being diverted to those activities that results in short duration.

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:

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:

Recording system instituted for Jersey, Brown Swiss, Nublang maintained at government farms and those among contract bull breeding groups.

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

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

Please provide further details:

The annual Livestock workshop and conference provides platform for planning but till date such platform has not been utilized for sustainable use and development of genetic resources.

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

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

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

○ g. No

Please provide further details:

The requirement for access to the genetic resources are routed through their respective extension centers to the district livestock office and then to the DoL/NBC.

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

○ a. Yes, sufficient measures (policy and/or agreements) have been in place since before the adoption of the GPA

○ b. Yes, sufficient measures (policy and/or agreements) are in place because of progress made since the adoption of the GPA

◉ c. Yes, some measures (policy and/or agreements) are in place (progress has been made since the adoption of the GPA)

○ d. Yes, some measures (policy and/or agreements) are in place (but no progress has been made since the adoption of the GPA)

○ e. No, but a policy and/or agreements are in preparation

○ f. No, but a policy and/or agreements are planned

○ g. No

Please provide further details:

Bhutan Access and Benefit Sharing Policy awaits endorsement in which animal genetic resource is included as component of biological resources.

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

○ a. Yes, sufficient programmes have existed since before the adoption of the GPA

○ b. Yes, sufficient programmes exist because of progress made since the adoption of the GPA

◉ c. Yes, some programmes exist (progress has been made since the adoption of the GPA)

○ d. Yes, some programmes exist (but no progress has been made since the adoption of the GPA)

○ e. No, but action is planned and funding identified

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

○ g. No

Please provide further details:

Although not much of training is provided to the livestock keepers, technical support and services on breeding is a regular service provided by livestock extension offices across the country.

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

○ a. Yes, priorities have been identified or updated since the adoption of the GPA

○ b. Yes, priorities were identified before the adaption of the GPA but have not been updated

○ c. No, but action is planned and funding identified

◉ d. No, but action is planned and funding is sought

○ e. No

Please provide further details:

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

○ a. Yes, sufficient measures have been in place since before the adoption of the GPA

○ b. Yes, sufficient measures are in place because of progress made since the adoption of the GPA

◉ c. Yes, some measures are in place (and were established or strengthened after the adoption of the GPA)

○ d. Yes, some measures are in place (but no progress has been made since the adoption of the GPA)

○ e. No, but action is planned and funding identified

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

○ g. No

Please provide further details:

Yes, some of the ethinobotanic practices of veterinary has been documented.

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:

Considering locally adapted breeds are low yielders and generally smallholders which are often spread wide apart, the volume of production is small which does not support a perpetual market. Therefore, group formation of producers from locally adapted breeds has been instituted and marketing of product on a small ways has been instituted.

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

ref 27

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.

Farmers participatory approaches in product development and niche marketing. Wool product development and niche marketing of products from Jakar sheep in collaboration with Mithan Handicrafts development Pvt ltd. India.

STRATEGIC PRIORITY AREA 3: CONSERVATION

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

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

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

Please provide further details:

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

Crossbreeding of traditionally adapted breeds to high yielding exotic breeds, inbreeding (Yaks) due to small population, declining utility if horse due to road access (Horse) and available of imported animal products (chicken, pig and sheep). No clear breeding policy and objective.

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:

Although policies are in place, Livestock sector development policy (draft) and Livestock breeding policy, it does not provide clear direction on what has to be done with breeds at risk. NBC coordinates AnGR conservation programs for breeds at risk.

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:

In-situ conservation sites identified and conservation activities are initiated.

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:

Conservation farm has been established for Nublang cattle and Mithun. Recently, the conservation farm for Jakar sheep, Sapha pigs and Yuta horses are in place.

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:

Ex-situ in vitro banking of Jakar sheep semen is being initiated.

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:

It was initiated after adoption of GPA.

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

○ a. Yes

○ b. No

Please provide further details:

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

○ a. Country requires no conservation programmes because all animal genetic resources are secure

◉ b. Yes

○ c. No

○ d. No major barriers and obstacles exist. Comprehensive conservation programmes are in place

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

Farmers are resource poor farmers interested to switch to high yielding breeds at any point of time. Conservation needs to be incentivized for which there are no funds.

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

◉ a. Yes

○ b. No

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

◉ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

○ d. No

Please provide further details:

The gaps are in terms of representation of diversity. Most of the collections have just been initiated and having representative collection is a priority in future.

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:

Update of Livestock Rules and Regulation 2008 to include protection of breeds and population that are at risk from

natural or human-induced disasters.

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

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

Please provide further details:

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

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

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

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

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

Please provide further details:

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

Understanding existing diversity, population and risk assessment and prioritize breed for conservation
Development of clear policy on animal genetic resource management in the country
Develop breed specific strategy and action plans
Building capacity (Technical and Human resources) for management

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:

The planning is usually done with consultatively.

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:

Biodiversity Action Plan 2009 is being updated.

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:

As a part of biodiversity is addressed in NBSAP.

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:

It is being updated in National Livestock Sector Development policy.

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

○ a. Yes, a national database has been in place since before the adoption of the GPA

◉ b. Yes, a national database is in place because of progress made since the adoption of the GPA

○ c. Yes, a national database is in place but still requires strengthening (progress since adoption of the GPA)

○ d. Yes, a national database is in place but still requires strengthening (no progress since adoption of the GPA)

○ e. No, but action is planned and funding identified

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

○ g. No

Please provide further details:

NCIS: National cattle information system is in place for cattle which will be extended to other species in future.

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

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

○ a. Yes, regular updates have been occurring since before the adoption of the GPA

◉ b. Yes, regular updates started after the adoption of the GPA

○ c. No, but it is a future priority

○ d. No

Please provide further details:

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

◉ a. Yes, established before the adoption of the GPA

○ b. Yes, established after the adoption of the GPA

○ c. No, but action is planned and funding identified

○ d. No, but action is planned and funding is sought

○ e. No

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

National Advisory Committee for AnGR has been formed prior to GPA but is nonfunctional.

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

○ a. Yes, strong coordination has been in place since before the adoption of the GPA

◉ b. Yes, strong coordination was established after the adoption of the GPA

○ c. No, but action is planned and funding identified

○ d. No, but action is planned and funding is sought

○ e. No

Please provide further details:

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

○ a. Yes, activities commenced before the adoption of the GPA

◉ b. Yes, activities commenced after the adoption of the GPA

○ c. No, but activities are planned and funding identified

○ d. No, but activities are planned and funding is sought

○ e. No

Please provide further details:

Inform of Expos, exhibitions, fairs.

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

○ a. Yes, comprehensive national policies and legal frameworks were in place before the adoption of the GPA and are kept up to date

○ b. Yes, comprehensive and up-to-date national policies and legal frameworks in place because of progress made since the adoption of the GPA

◉ c. Yes, some national policies and legislation in place (strengthened since the adoption of the GPA)

○ d. Yes, some national policies and legislation in place (not strengthened since the adoption of the GPA)

○ e. No, but action is planned and funding identified

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

○ g. No

Please provide further details:

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

○ a. Comprehensive programmes have been in place since before the adoption of the GPA

○ b. Comprehensive programmes exist because of progress made since the adoption of the GPA

○ c. Some programmes exist (further progress since the adoption of the GPA)

○ d. Some programmes (no further progress since the adoption of the GPA)

○ e. None, but action is planned and funding identified

○ f. None, but action is planned and funding is sought

○ g. None

Please provide further details:

Technology transfer with Kyoto university on molecular characterization.

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:

Strengthened for Yaks, horse, pig, poultry, sheep, chicken.

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:

┌───┐
│   │
│   │
│   │
└───┘

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

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

┌───┐
│   │
│   │
│   │
└───┘

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

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

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

Characterization?

◉ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

○ d. No

Sustainable use and development?

◉ e. Yes

○ f. No, but action is planned and funding identified

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

○ h. No

Conservation of breeds at risk?

○ i. Yes

○ j. No, but action is planned and funding identified

○ k. No, but action is planned and funding is sought

◉ l. No

Please provide further details:

┌───┐
│ Answered in 57.   │
│   │
└───┘

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:

```
Budget for AnGR conservation and sustainable utilization has progressively increased over the years.
```

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:

```
UNDP GEF funding, UNDP Small Grants Program.
```

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

○ a. Yes, support or participation in place before the adoption of the GPA and strengthened since

○ b. Yes, support or participation in place before the adoption of the GPA but not strengthened since

○ c. Yes, support or participation in place since the adoption of the GPA

○ d. No, but action is planned and funding identified

○ e. No, but action is planned and funding is sought

● f. No

Please provide further details:

```

```

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

○ a. Yes, support or participation commenced before the adoption of the GPA and strengthened since

○ b. Yes, support or participation commenced before the adoption of the GPA but not strengthened since

● c. Yes, support or participation commenced since the adoption of the GPA

○ d. No, but action is planned and funding identified

○ e. No, but action is planned and funding is sought

○ f. No

Please provide further details:

Asian Regional Focal Point for AnGR at Bangkok.
SAARC AnGR Conservation and Management Workshop.

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

○ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

○ d. No

◉ e. No, because country is generally not a donor country

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

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

○ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

◉ d. No

Please provide further details:

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

○ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

◉ d. No

Please provide further details:

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

○ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

◉ d. No

Please provide further details:

```

```

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

○ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

◉ d. No

Please provide further details:

```

```

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

○ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

◉ d. No

Please provide further details:

```

```

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

○ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

◉ d. No

Please provide further details:

```

```

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

◉ a. Yes

○ b. No, but action is planned and funding identified

○ c. No, but action is planned and funding is sought

○ d. No

Please provide further details:

```
SAARC Animal Genetic Resources Program.
```

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