



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: Nepal

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).

1: Key Trends and Driving Forces Affecting AnGR Management in Nepal

There has been a change for demand (more) of livestock product both in terms of quantity and the quality due to population growth, urbanization and higher income. This has resulted in the higher demand for milk, meat and eggs. This will impact on the promotion of AnGR. There has been a change in market infrastructure in terms of market access. For examples, supermarket is becoming popular in some urban areas. Use of frozen meat and meat product and milk and milk products are in increasing trend. This will affect AnGR positively. The taste and preference of the consumers is changing. They seem to like the convenient parts (breast and legs in chicken; legs in goat, more lean and less fat) and organic and produced at low input system. This will encourage the promotion of local breeds.

Degradation of grazing lands: Rangelands negatively affect AnGR (particularly in sheep, goats and yak in mountains) coupled with community forestry programme (restricted access for animal grazing). But stall fed is encouraged leading to better environment. Urbanization and industrialization lead to less access to grazing lands affecting AnGR negatively.

Use of technologies (biotechnology) is making positive effect on AnGR and promotes the use of local and endanger breeds.

Climate change: Drought in summer affects forage situation and ultimately AnGR. Snow fall in mountains in terms of duration and the amount of snow (decreased) in winter affects vegetation including crops affecting AnGR. Similarly, flood (excess particularly in rainy season) and landslide may also affect AnGR negatively.

2: Strengths, weakness and gaps in capacity to manage AnGR

Institution and stakeholders: The capacity of the Department of Livestock Services (DLS) has increased: the network

throughout the country, strengthening of national focal point for AnGR management and others. The capacity for education and research has increased over the periods. The first agricultural university in 2011 (higher level of academic studies including the use of animal biodiversity courses) and the establishment of private agricultural colleges happening. NARC capacity for doing research on AnGR has increased. Awareness on the importance of AnGR (particular local breeds and conservation of endanger breeds) has increased both at the community and central level. Commodity association, farmers groups and cooperatives and even commercial companies are emerging strongly affecting AnGR positively. The youths (returning from abroad) attraction for livestock farming as a means of livelihood promotes the use of AnGR. With regard to policy and its implementation, no specific policy for AnGR particularly focussing on local breeds exists affecting less use of local breeds.

Structured breeding programmes: Limited to the public sector (Government farms) and limited programmes at farmers level (goat, cattle and buffalo, and pigs). Even at Government farms, the programmes for local breeds don't exist affecting the less promotion of local AnGR. The conservation programmes (particularly for endanger breeds) are initiated but are not fully oriented for active conservation. In situ conservation coverage is not adequate. Gene bank exists for PGR and lacks for AnGR (in vitro) but cryopreservation facilities exist and some works are done. This is limited to transboundary breeds. Some initiation for local breeds begun. This will promote the local AnGR.

Reproductive and Molecular Biotechnology: AI (to a great extent) is in use and contributes to the promotion of AnGR. **Policy:** Breeding policy drafted but still not approved. This (if approved and implemented) will affect positively for AnGR (both local and transboundary breeds).

3: Key Constraints and Challenges with respect to AnGR management

Inadequate incentives at breed level; current state of genetic erosion due to indiscriminate and adoch crossbreeding; emerging animal diseases (Avian flue in chicken; PPR for goats); climate change (drought, flood, landslide, snowfall); lack of comprehensive base line survey/inventory and monitoring to assess the trend and status as a major constraint; lack of comprehensive characterization of AnGR (at molecular level); inadequate specific policies favouring use and promotion of breeds; and strategic breeding programmes lacking for most of the breeds.

4: Priorities Action and Strategic Directions for Future Action

Strategic Direction 1: Effective Management of AnGR for its Conservation and Utilization. Priority actions for meeting this direction are: Establishing community based biodiversity management approaches for AnGR; strengthen in situ conservation programmes linking with improvement; reorient research and development plans and programmes for making conservation and use of local genetic resources (AnGR) a priority agenda; develop programmes to create market incentives for the conservation and sustainable use of AnGR; create the awareness on the importance and value of genetic resources; include the importance and contribution of AnGR in the curricula (school, college level); make an inventory of indigenous knowledge, skills and practices and promote use of indigenous technologies, knowledge and skills for conservation and sustainable use of AnGR; enhance research capacity for producing quality seeds of both local and transboundary breeds (AnGR); enhance research capacity on conservation within the country and make relevant research on the promotion of local genetic resources; improve public private partnership for research work for conservation; establish bio-safety measures in place; promote the use of AnGR through value addition and product diversification.

Strategic Direction 2: Prevent the Extinction of Threatened Species and Breeds of AnGR and Maintain the Genetic Diversity. The priority actions are: comprehensive base line inventory/survey for all livestock species and breeds; develop a systematic monitoring system and mechanisms for continued monitoring the trend of biodiversity status, with priority focus on threatened and endangered species; employ suitable methods of conservation for endanger and threatened species and breeds; apply holistic and integrated approach (including incentives measures) for conservation; awareness and capacity building for conservation work.

Strategic Direction 3: Development of Effective Policies and Legislations for Effective Management of AnGR. The priority actions are: formulate specific policy and legislations for effective management of AnGR; formalization of new policies and harmonizing existing policies in the context of recent emerging global and national policies changes on biodiversity, climate change and food security; establish and strengthen incentives and incentive measures for eliminating perverse incentive and promoting positive incentives; develop appropriate policy framework to link between forestry, livestock and agriculture more effectively.

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.

Exceptions are buffalo and goats. Significant numbers of buffalo genetic resources (semen, live animals) and goats (live animals) are flowing from developing country (India) to Nepal. Similarly, several strains of synthetic layers and broilers are coming from India, particularly parent stocks.

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

- yes
 no

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

- yes
 no

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

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

For import: Live goats (both for breeding and slaughter) and buffaloes (for breeding)
For export: Buffaloes (for slaughter in India)

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

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

The pattern and objectives of keeping livestock species is gradually changing. Commercial dairy animal farming as well as commercial goat and pig production are in emerging trend in the country. Consequently, low productive native breeds are gradually decreasing. Furthermore, the out-migration of the youth, urbanization and migration to urban centre has constantly put pressure on the management of native livestock breeds. In commercial production system, demand for high producing animals is increasing and import of frozen semen, embryos and live animals is taking place. Massive cross breeding with exotic breeds have also exacerbated in the rapid decline of local animal genetic resources. The

unproductive local animals are also being exported though illegally for the slaughter purpose. These would affect the local AnGR for long term.

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)	high	high	This will lead to intensive livestock production where much role of exotic breeds will have taken place and local breeds (if not strategically planned) will be affected.
Changing demand for livestock products (quality)	medium	high	This may support local AnGR promotion as they seem to have quality attributes (taste, etc).
Changes in marketing infrastructure and access	medium	medium	This demands more livestock products and hence affects AnGR positively as there would be more demand .
Changes in retailing	medium	medium	Positive effect on AnGR (AnGR will be promoted) as more livestock and the products will be needed.
Changes in international trade in animal products (imports)	medium	low	Affects local AnGR as import substitution would rely on productive breeds.
Changes in international trade in animal products (exports)	low	medium	This will support promotion of both local and transboundary AnGR.
Climatic changes	low	medium	This will affect AnGR negatively as the climate change variables such as drought, flood, snowfall etc would bring negative impact on AnGR.
Degradation or improvement of grazing land	medium	medium	There will be less fodder for AnGR and this would be detrimental to AnGR management.
Loss of, or loss of access to, grazing land and other natural resources	high	medium	Negative effect to AnGR as there will be less feed and fodder.
Economic, livelihood or lifestyle factors affecting the popularity of livestock keeping	medium	high	In improved state of economy and livelihoods, there would be more demand of livestock and its product and hence AnGR will be promoted.
Replacement of livestock functions	medium	high	In this case, livestock will be replaced by some other options as a means of livelihoods and tjis would make less use of AnGR.

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 cultural roles of livestock	medium	medium	AnGR (local species and breeds) are kept for some cultural roles, which have no direct value but indirect values. If this role is changed, local AnGR will be affected as this would be replaced by transboundary breeds (has direct values).
Changes in technology	medium	medium	This would seek for enhanced productivity and hence promote exotic AnGR, which are productive.
Policy factors	medium	medium	In case of policy factors (enabling environment) AnGR will be promoted.
Disease epidemics	medium	medium	Negative effect (more to exotic breeds as local breeds seem to be less affected).

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)	6	2
Sheep	4	5
Goats	4	6
Pigs	4	5
Chickens	3	5
Buffaloes	3	1
Ducks	0	2
Horses	1	1
Ostriches	0	1
Rabbits	0	4
Turkeys	0	2
Quails	0	1
Yaks	1	0

CHARACTERIZATION

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

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

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

Species	Baseline survey of population size	Regular monitoring of population size	Phenotypic characterization	Molecular genetic diversity studies – within breed	Genetic diversity studies based on pedigree	Molecular genetic diversity studies – between breed	Genetic variance component estimation	Molecular genetic evaluation
Cattle (specialized dairy)	0	0	none	none	medium	none	none	none
Cattle (specialized beef)	0	0	none	none	none	none	none	none
Cattle (multipurpose)	1	1	high	low	low	none	none	none
Sheep	0	0	high	none	none	none	none	none
Goats	0	0	high	low	none	none	medium	low
Pigs	0	0	high	none	none	none	low	none
Chickens	0	0	high	low	none	none	none	low
Horses	0	0	medium	none	none	none	none	none
Buffaloes	0	0	high	medium	medium	medium	low	none
Rabbits	0	0	none	none	none	none	none	none
Yaks	0	0	high	low	low	none	none	none
Turkeys	0	0	none	none	none	none	none	none
Quails	0	0	none	none	none	none	none	none
Ostriches	0	0	none	none	none	none	none	none

INSTITUTIONS AND STAKEHOLDERS

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

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

	Score
Education	low
Research	low
Knowledge	medium
Awareness	low
Infrastructure	low
Stakeholder participation	low
Policies	low
Policy implementation	low
Laws	low
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	Biodiversity courses (at different level of education) need to be strengthened. Available are two public sector universities - IAAS/TU and AFU for teaching; Private sector colleges for teaching.
Research	Capacity for molecular level of characterization is inadequate and none for valuation study on AnGR (particularly local breeds). Available are NARC within public funded institution; public and private colleges and universities and few NGOs engaged in research and technology generation.
Knowledge	Stakeholders in AnGR management have medium level of knowledge. However, understanding on linkage between AnGR management and food security is weak.
Awareness	Still not adequate awareness in case of all stakeholders for overall management of AnGR. However, over the last years awareness on the importance and values of AnGR has increased. DLS, NARC, Academic institution, and other related stakeholders are becoming more aware on their roles.
Infrastructure	Improved at DLS, NARC, Universities at the organizational level for delivering services; established/strengthened market access and networks for delivery. Examples are the supermarkets in the urban areas are becoming quite popular.
Stakeholder participation	This has increased to some extent. The public sector institutions (Department, NARC, and Universities), private sectors (NGOs, private companies, cooperatives, and professional societies) and other related stakeholders have started working in collaboration and partnership and for making decisions together. This has to be more strengthened and strategic.
Policies	Several policies (though not specific) exist. More specific policy needed. Several programmes are on.
Policy implementation	Implementation is a bit weak. This has to be improved greatly.
Laws	This exists to an extent (as conservation and sustainable use of AnGR is being promoted) but needs more a sort of regulatory mechanism in place.
Implementation of laws	Implementation (as usual) is inadequate.

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>).

Commodity associations and groups; farmers' groups; cooperatives and commercial farms are in place and they have been empowered in terms of participating and making decisions together with public sector for the management of AnGR.

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	yes	yes	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	yes	yes	yes	yes	no	no	no
Pigs	yes	yes	yes	yes	no	no	no

Species	Government	Livestock keepers organized at community level	Breeders' associations or cooperatives	National commercial companies	External commercial companies	Non-governmental organizations	Others
Chickens	yes	yes	yes	yes	no	no	no
Buffaloes	yes	yes	no	no	no	no	no
Rabbits	yes	no	no	yes	no	no	no
Ostriches	no	no	no	yes	no	no	no
Yaks	yes	yes	no	no	no	no	no
Turkeys	yes	no	no	no	no	no	no
Quails	yes	no	no	no	no	no	no

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

NA

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

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

Species	Tools															
	Animal identification		Breeding goal defined		Performance recording		Pedigree recording		Genetic evaluation (classic approach)		Genetic evaluation including genomic information		Management of genetic variation (by maximizing effective population size or minimizing rate of inbreeding)		Artificial insemination	
	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex
Cattle (specialized dairy)	0	2	0	2	0	2	0	2	0	2	0	0	0	0	0	2
Cattle (multipurpose)	6	2	6	2	6	0	0	0	2	0	0	0	0	0	7	0
Sheep	4	5	4	5	4	0	0	0	0	0	0	0	0	0	0	0
Goats	4	6	4	6	4	0	0	0	1	0	0	0	0	0	1	3
Pigs	3	4	3	4	3	0	0	0	0	0	0	0	0	0	0	4
Chickens	3	5	3	5	3	0	0	0	1	0	0	0	0	0	0	5
Buffaloes	3	1	3	1	3	1	0	1	0	0	0	0	0	0	3	1
Yaks	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0
Rabbits	0	0	0	4	0	4	0	4	0	4	0	0	0	4	0	0
Turkeys	0	2	0	2	0	2	0	2	0	2	0	0	0	0	0	0
Quails	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0
Ostriches	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0

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

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

Species	Breeding method			
	Straight/pure-breeding only		Straight/pure-breeding and cross-breeding	
	Loc	Ex	Loc	Ex
Cattle (specialized dairy)	0	2	0	2
Cattle (multipurpose)	6	0	6	2
Sheep	4	0	4	5
Goats	4	6	4	6
Pigs	3	5	3	5
Chickens	3	5	3	5
Buffaloes	3	0	3	1
Yaks	1	0	1	0
Ostriches	0	1	0	0
Rabbits	0	4	0	0
Turkeys	0	2	0	0
Quails	0	1	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	medium
Cattle (specialized beef)	none	none
Cattle (multipurpose)	low	low
Sheep	low	low
Goats	medium	medium
Pigs	low	low
Chickens	medium	medium
Buffaloes	low	low
Ostriches	none	none
Quails	none	low
Turkeys	none	low
Yaks	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	low
Goats	low

Species	Organization of livestock keepers
Pigs	low
Chickens	medium
Buffaloes	low
Yaks	low
Rabbits	low
Turkeys	none
Quails	none
Ostriches	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	medium	medium	low	low	low	none	none	none
Animal identification	medium	medium	low	low	low	none	none	none
Recording	low	low	low	low	low	none	none	none
Provision of artificial insemination services	medium	medium	medium	medium	medium	none	none	none
Genetic evaluation	low	low	none	low	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	low	low	medium	low	none	low	none
Animal identification	low	low	low	medium	low	none	low	none
Recording	none	none	none	low	low	none	none	none
Provision of artificial insemination services	low	low	low	low	low	none	none	none
Genetic evaluation	none	low	none	none	none	none	none	none

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

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

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

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

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

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

NA

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.

Gov: Providing services (AI and technical supports); Research Organization: Genetic evaluation, setting breeding goal and generating technologies and findings); Breeder associations: In-situ level management; Companies: Breeding and parental stock (In poultry commercial and in pigs towards commercial).

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
Buffaloes	yes
Rabbits	yes
Yaks	yes
Turkeys	yes
Quails	yes
Ostriches	no

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

Species	Description of policies or programmes
Cattle (specialized dairy)	Breeding policy (draft); Dairy cattle improvement programme for selecting bull mother to be used for genetic improvement programme (Jersey and HF); AI mission for making genetic improvement; Forage mission for enhancing the productivity through a supply of fodder and forage.
Cattle (specialized beef)	NA
Cattle (multipurpose)	Cross breeding local breeds with Haryana (Indian breed) using NS and AI.
Sheep	Selection within a breed in some breeds and crossbreeding with exotic for others.
Goats	Selective breeding in local breeds; Crossbreeding with some.
Pigs	Pure breeding of both local and exotic; Crossbreeding between exotics for fattening; Crossbreeding for some local breeds with exotic.
Chickens	Pure breeding for exotic and highly productive breeds including synthetic layers and broilers breeds; Crossbreeding of local with exotic (dual purpose) for meat and egg production at free range and semi-intensive system of production.
Buffaloes	Buffalo Genetic Improvement Programme for bull mother selection to be used for genetic improvement programme [Murrah]; Crossbreeding of local with Murrah for enhancing milk production; Selective breeding in local.

Species	Description of policies or programmes
Yaks	Pure breeding of Yak with Nak, Crossbreeding of Yak with mountain cattle (Chaury).
Rabbits	Pure breeding of Angora rabbits for wool production.
Turkeys	Restricted to research station.
Quails	Restricted to research station.
Ostriches	Restricted to few farms [Recently introduced].

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)	Will enhance dairy production and productivity.
Cattle (specialized beef)	NA
Cattle (multipurpose)	Will improve the productivity and contribute to the conservation and sustainable use.
Sheep	Will improve the productivity and contribute to the conservation and sustainable use.
Goats	will improve the productivity and encourage promoting local breeds.
Pigs	Will improve the productivity; Use of crossbreeding local with exotic may negatively affect local breeds, which are good for back yard farming.
Chickens	Will improve the productivity; Use of crossbreeding local with exotic may negatively affect local breeds, which are good for dual purpose (meat and eggs) in semi- intensive and free range system.
Buffaloes	Will enhance productivity and contribute to the conservation and sustainable use.
Yaks	Will enhance milk production in Chauries (crossbred); Will maintain the productivity within yak.
Rabbits	Will enhance productivity.

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.

Inadequate resources, small herd size and scattered herds/farms, and inadequate suitable technologies for small herd size are main constraints. There is a success case in Khari goats, a local breed located in the hills of Nepal. Selective breeding using a simple selection schemes at the farmer's level (with selection criteria: Larger weaning weight born from multiple cases and finally larger 6 months weight) has produced a promising results in terms of improving and conserving the breed. DCIP and BGIP, development of cattle and buffalo resource centers contributed in enhancing the productivity and crossbreeding population, farmers awareness about the potential of crossbreds has increased.

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)	Dairy cattle improvement programme with enhancing milk yield with higher fat % as a breeding objective.
Cattle (specialized beef)	NA
Cattle (multipurpose)	Dairy cattle improvement programme with enhancing milk and other important trait that the local breeds are having, e.g. draft power.
Sheep	Wool improvement programme; Carpet type wool production programme.

Species	Description of future objectives, priorities and plans
Goats	Selection within a breed in Khari goats; Crossbreeding local breeds with exotic large size goats (Boer).
Pigs	Pure breeding local and exotic breeds; Crossbreeding local with exotics.
Chickens	Pure breeding chicken at free range system; Crossbreeding local with exotics in semi-intensive system; Pure breeding exotic (layers) in intensive and semi-intensive system.
Buffaloes	Pure breeding local breeds and exotic; Crossbreeding local with exotic.
Yaks	Pure breeding in yak; Crossbreeding of yak with cattle.
Rabbits	Pure breeding for enhanced wool production.

CONSERVATION

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

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

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

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

Species	In situ conservation	Ex situ in vivo conservation	Ex situ in vitro conservation
Cattle (specialized dairy)	none	none	none
Cattle (specialized beef)	n/a	n/a	n/a
Cattle (multipurpose)	medium	none	none
Sheep	medium	none	none
Goats	medium	none	none
Pigs	medium	none	none
Chickens	medium	none	none
Buffaloes	medium	none	none
Yaks	medium	low	none
Rabbits	none	none	none

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

- yes
 no

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

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

	Considered in formal prioritization approaches
Risk of extinction	yes

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

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

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

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

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

In situ conservation programme in Khari goats; Achhami and Lulu cattle; Lime, Parkote and Gaddi [local buffalo breeds].

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.

National Livestock Breeding Centre (NLBC under DLS) has been planning to set up a gene bank for the conservation and use of AnGR; Similarly Animal Breeding Division (ABD under NARC) has started collecting semen for local breeds (Achhami and Lulu cattle) and has a plan for Gaddi buffalo.

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	no
Embryos	no
Oocytes	no
Somatic cells (tissue or cultured cells)	no
Isolated DNA	no

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 <i>in situ</i> population?	Have the gene bank collections been used to introduce genetic variability into an <i>ex situ</i> population?	Do livestock keepers or breeders' associations participate in the planning of the gene banking activities?
Cattle (specialized dairy)	0	0	no	no	no	no	no
Cattle (specialized beef)	0	0	no	no	no	no	no
Cattle (multipurpose)	0	0	no	no	no	no	no

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

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

But cryopreservation (in the form of semen) does take place in exotic cattle (dairy specialized breeds: Jersey and HF) and exotic buffalo (Murrah) for mainly improvement purpose through artificial insemination.

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.

NA

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.

No

REPRODUCTIVE AND MOLECULAR BIOTECHNOLOGIES

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

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

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

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

Embryo transfer has taken place in dairy cattle with success but the production of embryo has not taken place. However, a thought for doing this at research level has begun.

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

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

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

Public sectors: Research, production and supply of semen and technical services; Breeders associations and cooperatives: Facilitate and support AI programme in a cluster, Make access of semen to the group members; NGOs: Technical services; Companies: Semen and technical 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	yes	yes
Semen sexing	no	no
<i>In vitro</i> 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.

Research on the production of semen in cattle and buffalo (to a greater extent) and goats, sheep and pigs (to lesser extent) is on.

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

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

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

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

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

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

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

Use of biotechnology, particularly AI in cattle (to a great extent) and buffalo (to a lesser extent) has been very

successfully implemented in the country. This technology has been used for improvement using semen of exotic breeds but this can be used for conservation of local endanger breeds and improvement of local breeds.

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	National Biodiversity Strategy (2002) and a revision of National Biodiversity Strategy and Action Plan (NBSAP:2014-2020) is in preparation. This national level of strategic document does include several important thematic areas (Forestry, Wetland, Agrobiodiversity (AnGR as a part of this), and Rangelands and several cross sectoral themes have been included. In this sense, yes, there is a joint national strategies and action plans.
Collaboration in the characterization, surveying or monitoring of genetic resources, production environments or ecosystems	limited	Collaboration between livestock and agriculture including fisheries exists both at the central and district level for promoting production and ecosystem and services.
Collaboration related to genetic improvement	limited	Collaboration with Plant Resources would benefit as most of the feed comes from plant resources (crop by-products and supplement feed) and high producing animals kept in stall-fed would give less pressure to the forest and hence help environment.
Collaboration related to product development and/or marketing	limited	Products (yak cheese, <i>chhurpi</i> , <i>dry meat</i> , and other milk products) based enterprises could be developed in a areas where the community forestry programme and rangelands (coming under forest protected areas) would make benefits to the community residing closer to the areas.
Collaboration in conservation strategies, programmes or projects	limited	Community based biodiversity programmes (basically focussed for PGR) but does include AnGR as a part of this and both the sectors benefit.
Collaboration in awareness-raising on the roles and values of genetic resources	limited	Agrobiodiversity Conservation Committee at the districts level led by DAOs (PGR) organize awareness raising activities. Similarly DFO lead the biodiversity conservation work.
Training activities and/or educational curricula that address genetic resources in an integrated manner	limited	Agrobiodiversity courses are included in the academic studies (under and post graduate).
Collaboration in the mobilization of resources for the management of genetic resources	limited	Agrobiodiversity (both PGR and AnGR) related works are made with resources mobilization

2. Please describe any other types of collaboration.

National biodiversity strategy (2002) includes agrobiodiversity including animal biodiversity and rangelands biodiversity.

The revision of national biodiversity strategy and action plan (NBSAP:2014-2020) is in process and this includes AnGR as an important part of the national strategy.

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

Plans based on integrated approach would bring more benefits as AnGR, agriculture and forestry are integral components of Nepalese farming system.

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

Resources, Policy support, Understanding (Conflicting roles and managing it for better contribution), and Limited practices for working in collaboration.

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

Reorientation to work in integrated mode rather than in isolation, and change in mind set up needs to be done for strengthening collaboration.

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).

Management of crop residues, control of weeds and invasive species, and soil nutrient cycle through manure.

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).

Management of crop residues has helped AnGR management and in turn has increased supply food (milk and meat and their products). Similarly, control of weeds and maintenance of soil nutrient cycle has contributed to supply of food (cereals, pulses, and vegetables).

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

This has helped AnGR in its sustainable use and management.

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.

Promoting local breeds at low input and harsh environment (Semi-intensive production system). Yak/Chaury, sheep and mountain goats in higher hills and mountain areas (extensive production system) farming are very much environmental friendly. Discouraging farming of livestock (chicken and pigs), in the areas close to human settlements and for this environment impact assessment (EIA) is mandatory. Stall fed target in goats in extensive system for environment protection; forage mission and forage programme are indirect incentives for environment.

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).

Being well adapted to the environment, these local breeds have given less pressure and have helped maintained the environment as such. By imposing EIA regulations, livestock farming has been regulated and this has helped environment being protected through maintaining and improving soil fertility.

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).

Remarkable progress through EIA; forage programme; stall fed and community forestry programme (restricting free grazing) have contributed to better management of AnGR.

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.

Awareness on the importance of the programme (Stall fed) and traditional practices for doing things are major constraints.

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.

For migrating system local level regulations for management of AnGR (time and duration of grazing); For rangeland management, the local communities are doing this.

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.

Integrated role of AnGR for ecosystem.

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.

Promoting stall fed system and promoting environment.

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:

25 local breeds (7 in cattle; 3 in buffaloes; 4 in sheep; 4 in goats; 3 in pigs; 3 in chicken, 1 in horse) have been identified before the first country report was developed [Refer to the first CR].

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:

25 local breeds were characterized at phenotypic level before the adoption of GPA.

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 level characterization was done for few breeds (Lulu cattle) and several breeds are characterized at biochemical level (Yak; Lime, Parkote and Gaddi buffaloes; Khari goats and others).

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:

There is a system of collecting animal census every ten years on the basis of species but not breed wise. This doesn't provide the information on the population of AnGR on breed wise. However, information on breed wise population is being obtained through the district livestock offices.

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:

The focal point for AnGR has been identified. An advisory committee including several stakeholders for AnGR management has been proposed.

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:

The monitoring for assessing the status and trend of AnGR over the time hasn't started.

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 level information is lacking, animal census takes place every 10 years but this is happening at species level so far but thought is on for this.

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:

Basically FAO criteria.

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:

Breed level information is not available but thought is on and once this is made, a plan can be made.

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:

Phenotypic level characterization of all local breeds (25) has been completed.

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 breed level information, inadequate resources, and less priority agendas are important constraints.

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:

Having the information on breed level, increasing the resources and integrating AnGR with development agenda are some of the measures that could address this problem.

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 at molecular level has started in some breeds.

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:

National Agriculture Policy (2004); Agrobiodiversity Policy (2007); Animal Breeding Policy (in draft); National Biodiversity Strategy (2002) and revision of national biodiversity strategy and action plan (2014-2020) under preparation.

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:

The national biodiversity strategy and action plan has the provision of integrating agro-ecosystem approach for AnGR management.

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:

In general dairy cattle specialized breeds and buffaloes have the breeding programme for the enhancing the productivity of the animals.

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:

The long term sustainable plan exists for some breeds and species. These are available for Khari goats.

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:

Inadequate capacity (technologies and human resources) to use AnGR; inadequate awareness (development infrastructure) on the use of AnGR; and enabling policy environment.

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:

Not specifically done but the observations suggested that it might affect local breeds on long run and hence the study of this kind would be desirable.

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 only exists at the public sector (farms operated by the state: Research and production). The recording schemes for few species has begun with some selected farmers.

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:

National Plan of Action has the provision of advisory committee and through this work is being strengthened. DLS and NARC among public sector organizations, Universities (public and private), Private companies, Commodity groups and organizations, I/NGOs and other related stakeholders quite often meet and interact together.

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:

Information on the findings and technologies (both in English and Nepali) by NARC and DLS help them in having access to AnGR. This is also made through several other activities such as training, workshops, seminars and others.

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:

Access to GR and benefit sharing for PGR (but also covers partly AnGR) has been drafted but not yet approved.

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:

Trainings: Training on management and related technical matters; Technical support: Inputs (breeding stock), performance recordings, and AI.

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:

Technical support: For diversifying use of AnGR (local breeds having several positive attributes), value addition and product diversification.

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:

Free range poultry production for low input system is well sustainable system, rangeland management in higher hills and mountains is well sustained.

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:

Milk and milk product (low), Meat (good), Yak cheese, meat of local breed of chicken, Ghee (concentrated form of butter) from cattle and buffalo.

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

Research and technologies on value addition and product diversification, Establishing positive attributes of local breeds and linking them to market, Establishing policy support for promoting local AnGR.

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.

Formation of policies (National agriculture policy, 2004; Agrobiodiversity policy, 2007) and revision of policies and strategies (Agrobiodiversity policy, national biodiversity strategy and action plan: 2014-2020) are made. The specific and more focussed for AnGR, particularly, local AnGR needs to be developed. The strategies and programmes for use and development are in place (to some extent) but has to be strengthened.

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:

Breed level information lacks but DLS district offices maintain and update animal census on breed wise. And based on these information, assessments are made with priority on breeds at risk. Examples are Achhami cattle, Hurrah pigs, and Lampuchhre sheep.

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:

Low productivity, lack of valuation for non-economic traits (Social, cultural), out-migration, alternative sources for livelihoods, poor promotion of products, lack of regulation for local breeds and scale/size of production. Local breeds are more affected.

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

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

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

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

Please provide further details:

Animal breeding policy (draft); Livestock policy (draft); Agro-biodiversity policy (2007), National agriculture policy (2006); Rangeland policy (2012); Poultry policy (2011); Conservation and promotion programme in cattle and buffalo, goat, and sheep.

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:

National Biodiversity Strategy (2002), which includes AnGR as a part of the total biodiversity is being reviewed as revision of national biodiversity strategy and action plan (2012-2020) is in preparation stage.

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:

Achhami and Lulu cattle, Lime, Parkote and Gaddi buffalo and Hurrah pigs.

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:

This is common for exotic breeds in cattle and buffalo only in a sense dairy cattle (Jersey and HF) and Murrah buffalo

are being kept at different locations in the country. Although this is done for improvement not for conservation. This is not done specifically in case of local breeds, but this could be done for Achhami cattle, Hurrah and Bampudke pigs, local chicken, and Lampuchhre sheep.

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:

Achhami cattle, and Lulu cattle.

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:

Semen production from these breeds has begun.

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

- a. Yes
- b. No

Please provide further details:

This has already begun.

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:

Inadequate research and technologies; lack of conservation friendly specific policy; inadequate resources; low productivity, lack of valuation for non-economic traits (Social, cultural), out-migration, alternative sources for livelihoods, poor promotion of products, and lack of regulation for local breeds.

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

- a. Yes
- b. No

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

- a. Yes

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

Please provide further details:

Ex situ collection for few local breeds and species is on. Establishing production technology is on.

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:

This is unlikely to occur in Nepal. The disasters (natural and human induced) may occur but the species and breeds are unlikely to be severely affected.

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:

As in 41, this is unlikely to happen.

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:

Identification of local breeds suited for different domain; establishing semen production technologies in cattle and buffaloes; and characterization of local breeds at phenotypic level.

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:

Publication and documents by NARC and DLS; training and workshops are being done.

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

Capacity enhancement (research, development and education); resources, enabling policy, and priority agenda.

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.

There are some policies (general) but specific and conservation friendly policy needs to be in place. In situ conservation programmes, particularly at farmers level is on. *Ex situ* conservation are not focussed for endanger and local breeds but the facilities of doing this exist in the country.

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:

Working in isolation, and no integrated and holistic approach.

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:

This is included within the national strategy for the conservation of AnGR (2012) where national advisory committee is proposed; national biodiversity strategy and action plan (NBSAP 2014-2020 in preparation).

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:

The national biodiversity strategy (2002) and the revision of national biodiversity strategy and action plan (2014-2020) include animal biodiversity as an important components of the biodiversity.

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

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

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

National agriculture policy, Livestock master plan, Agriculture development strategy (draft), Rangeland policy, Poultry policy, animal breeding policy (draft), Livestock policy (draft).

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:

A plan for having this is made and is provisioned through national plan of action.

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:

The focal point (the national coordinator for AnGR) will do this with support from related stakeholders.

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:

This has been proposed and approval is awaited.

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:

Regular meetings amongst stakeholders (research, academic, private, and I/NGOs) take place.

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:

Training, workshop, and awareness campaigns.

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:

National agriculture policy and Agro-biodiversity policy. But the one specific for AnGR is needed.

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:

This is mixed, for examples, good for phenotypic level characterization but weak for molecular level of characterization. Similarly this is weak for monitoring and ex-situ conservation.

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:

Farmers groups under DLS supported programme.

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:

Very few works by a limited NGOS as part of their annual activities with low priority such as Heifer-International Nepal, LI-BIRD, Practical Action, FOREWARD, NaRAM Center and CEAPRED.

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

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

Please provide further details:

Research capacity has increased (NARC, Academic institutions and NGOs) to some extent but this has to be more strengthened.

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.

DLS (the focal for AnGR work) and NARC (the focal for professional inputs) have increased their capacity for planning and implementing AnGR measures but this has to be strengthened. The state of education and research capacities for AnGR management has improved. Several courses for biodiversity have been initiated. There has been significant progress on the awareness of the roles and values of AnGR at different levels (community to policy level). There are some policies and regulations in this field but more specific and focussed with strong regulatory mechanism in built has to be made for effective AnGR management.

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:

Characterization of Lulu cattle was done in collaboration with the national research institution in Japan. Similarly molecular characterization of some other breeds and species are taking place with university in China through higher studies. Collaboration with ILRI is also there.

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:

Heifer International Nepal, Rockefeller foundation, and Practical Action.

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

- a. Yes
- b. No

Please provide further details:

National resources has increased, private sectors including NGOs involvement has increased.

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:

This is managed through internal resources but it is realized that we may need it.

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:

Because we are not a donor country.

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:

Because we are not a donor country.

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:

Because we are not a donor country.

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:

Not so far but but it seems that we may (in future) contribute being involved for the common breeds.

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:

Not made contribution so far.

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:

Not contributed so far.

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:

Not made contribution so far.

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:

We may contribute being involved in future.

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:

Not in case of AnGR but for PGR we have contributed through CG centres.

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:

Observation of Biodiversity Day and Environment Day, World Animal Welfare Day, Milk day, Poultry day and others.

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:

Not contributed so far but has expertise to contribute if needed.

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