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

Country report

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

Country: Malaysia

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).

Under Malaysia's Agro-food policy (2011-2020), the key thrusts are high-value agriculture development, sustainable agriculture development, private sector investment to modernize the sector and knowledgeable and informed human capital. Livestock development is one of the specific strategies to achieve the policy's objectives. In the livestock sector, the main commodities in order of economic importance are poultry, swine, cattle, buffalo and small ruminants. Non-ruminants are managed under medium to high input management systems, whilst ruminants are generally managed in low to medium input systems.

Geneflow mainly involves poultry and pig breeds moving from developed countries into Malaysia. The poultry and swine industries depend greatly on high-yielding imported breeds and their management within farms has remained quite constant over the years. There is a niche market for the production of local kampong (village) chicken. The local beef breed (Kedah-Kelantan) and its crosses are widely used in traditional farming systems and in integration with oil palm estates. A large proportion of feeder cattle used in feedlotting systems are imported. The local dairy industry uses the local synthetic breed (Mafriwal), Friesian crossbreds and imported temperate breeds. The goat industry is mainly for goat meat and breeds used are local Katjang crosses, Boer and their crosses and Jamnapari and their crosses. The sheep industry uses a variety of breeds such as Dorper, Damara and Barbados Blackbelly. There is no replacement of livestock functions except in the case of the swamp buffalo where they are used for beef and rarely used for draft purposes. Species populations have generally remained stable over years. The country is not much affected by disease epidemics.

The focal point for animal genetic resources in Malaysia is the National Institute of Veterinary Biodiversity in Jerantut, state of Pahang. The focal point is short on trained technical staff to undertake the various projects on management of animal genetic resources.

Although yearly livestock census are undertaken on the species level, detailed breed specific census are not done due to lack of capacity.

Breeding programs in general are costly on infrastructure and breeding stock. Hence most breeding programs are conducted by the government. Breeder organizations are as yet non-existent. To move ahead, the private sector needs to get involved and become the main driver for these breeding programs. The country also lacks technical expertise in handling these breeding projects. Particular successes were in the development of the Mafriwal dairy cattle, Brakmas cattle and the IKTA quail. This was because the government had large farms having these types of animals and there were in-house geneticists/animal breeders employed on these farms.

There is a cattle artificial insemination service run by the Department of Veterinary Services. The service is limited in scope due to limited manpower. There are trained DIY (Do-It-Yourself) farmers who also provide these services in collaboration with government agencies. In the last 2 years, an attempt has been made to commercialize the artificial insemination services through provision of services through private breeding companies but their impact is limited. Embryo transfer, MOET are used experimentally. The Center for Marker Discovery & Validation (CMDV) is undertaking pioneering work on Marker Assisted Selection in goats and cattle.

The main policies and legislation involving animal genetic resources are the National Agro-food Policy, 2011; Animals Act (1953, Revised 2006); National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization, 2012. In the states of Sarawak and Sabah, enactments on access to biodiversity were established in 1997 and 2000 respectively. An ABS (Access & Benefit Sharing) law draft is available at national level but has not gone through parliamentary review. The challenge is to implement policies and this can only be done with adequate technical staff and financial inputs.

Only the public sector is involved in *in situ* conservation. Among breeds conserved include the Kedah-Kelantan cattle, Katjang goats, Barbados Blackbelly sheep and Kampong chicken. The private sector and NGO's are not involved in conservation activities. This may be due to much more emphasis being given to wildlife conservation as Malaysia is a mega-diverse country. The cost of maintaining semen banks is high but this has continued to be made possible through the utilization of operating budgets at the national focal point. Much needs to be done to harvest and freeze embryos from breeds, particularly those at risk.

Knowledge is still lacking regarding the characteristics of local breeds within their production systems and on the molecular level. Much needs to be done in this area and barriers and obstacles include the unavailability of sufficient expertise, funding problems and lack of awareness on the need for inventory, characterization and monitoring.

Priorities for the coming years will be to implement Malaysia's Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization (2012). Initially will be the establishment of a National Farm Animal Genetic Resources Technical Working Group. Programs to increase awareness on AnGR issues for various stakeholders will continue to be put in place. On individual projects, plans are afoot to undertake a well-organized breeding project for the local Kedah-Kelantan cattle. The Mafriwal cattle breed development will undergo further acceleration with the involvement of private sector farmers. The Brakmas cattle developed by MARDI (Malaysian Agriculture Research & Development Institute) will be further expanded. Evaluation studies will be done with the Barbados Blackbelly, Dorper and Damara breeds. The conservation program for the native Katjang goats will be continued. Evaluation studies will be conducted with the Boer and their crossbreds. Native chickens will still be produced for the niche market. MARDI is developing local strains of native chickens. The swamp buffalo will be monitored and improvement programs initiated mainly in East Malaysia. We endeavor to improve sustainable use of AnGR. We will continue to build on increasing trained local expertise in the management of AnGR. We will also seek for new funding sources. With the recent establishment of the interim Asian Focal Point for Animal Genetic Resources, it is hoped that expertise can be developed on a regional basis so that there is an improvement in characterization, inventory and monitoring of trends on a regional level.

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

FLOWS OF ANIMAL GENETIC RESOURCES

1. Studies of gene flow in animal genetic resources have generally concluded that most gene flow occurs either between developed countries or from developed countries to developing countries. Does this correspond to the pattern of gene flow into and out of your country?

For developed countries, exceptions to the usual pattern would include significant imports of genetic resources from developing countries. For developing countries, exceptions would include significant exports of genetic resources to developed countries, and/or significant imports and/or exports of genetic resources to/from other developing countries.

- (●) yes
- ( ) no
- ( ) yes but with some significant exceptions

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

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

- ( ) yes
- (●) no

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

- ( ) yes
- ( ) no

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

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

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

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

Geneflow mainly involves poultry and pig breeds from developed countries into Malaysia. The poultry and swine industries depend highly on imported breeds and their management within farms has remained quite constant over the years. Up till now there does not appear to be any significant negative consequences for the risk status of locally adapted AnGRs.

LIVESTOCK SECTOR TRENDS

4. Please indicate the extent to which the following trends or drivers of change have affected or are predicted to affect animal genetic resources and their management in your country and describe these effects.

Note: Relevant impacts on animal genetic resources and their management might include, for example, changes in the type of animal genetic resources kept (e.g. different breeds or species), changes in the uses to which animal genetic resources are put, changes in the geographical distribution of different types of animal genetic resources, increases or decreases in the number of breeds at risk of extinction, changes in the objectives of breeding programmes, changes in the number or type of conservation programmes being implemented, etc. In the text sections, please briefly describe the changes. If possible, provide some concrete examples of the challenges or opportunities presented by the respective drivers and the actions taken to address these challenges or opportunities. If relevant, you may also indicate why a given driver is not affecting animal genetic resources and their management in your country. For a general discussion of drivers of change, please see The State of the World’s Animal Genetic Resources for Food and Agriculture (Part 2, Section A) (http://www.fao.org/docrep/010/a1250e/a1250e00.htm).

Drivers of change	Impact on animal genetic resources and their management over last ten years	Future impact on animal genetic resources and their management (predicted for the next ten years)	Describe the effects on animal genetic resources and their management
Changing demand for livestock products (quantity)	medium	medium	Demand for high yielding breeds of livestock (mainly poultry and swine) and moving into industrial production systems.
Changing demand for livestock products (quality)	medium	medium	The demand for better quality livestock is important but the pricing is also important.
Changes in marketing infrastructure and access	none	none	Not much changes in marketing infrastructure and access.
Changes in retailing	none	none	Not much changes in retailing
Changes in international trade in animal products (imports)	none	none	Not much changes
Changes in international trade in animal products (exports)	none	none	Not much changes
Climatic changes	low	low	Limited changes
Degradation or improvement of grazing land	low	low	Low impact
Loss of, or loss of access to, grazing land and other natural resources	low	low	Low impact
Economic, livelihood or lifestyle factors affecting the popularity of livestock keeping	low	low	Low impact
Replacement of livestock functions	low	low	Mostly low except in the case of swamp buffalo where its no more used for draft. The swamp buffalo population is decreasing over time albeit at a very slow rate.
Changing cultural roles of livestock	low	low	Low impact
Changes in technology	low	low	Low impact
Policy factors	low	low	Low impact
Disease epidemics	low	low	The country is not much affected by disease epidemics.

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)	3	2

Species	Locally adapted breeds	Exotic breeds
Cattle (specialized beef)	5	5
Cattle (multipurpose)	0	0
Sheep	1	6
Goats	2	7
Pigs	2	3
Chickens	5	10
Buffaloes	3	1
Deer	1	1
Ducks	3	2
Geese	1	1
Horses	2	0
Muscovy ducks	0	1
Ostriches	0	1
Quails	1	0
Rabbits	0	2

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	medium	low	none	none	low	none

Species	Baseline survey of population size	Regular monitoring of population size	Phenotypic characterization	Molecular genetic diversity studies – within breed	Genetic diversity studies based on pedigree	Molecular genetic diversity studies – between breed	Genetic variance component estimation	Molecular genetic evaluation
Cattle (specialized beef)	2	2	medium	low	none	none	low	none
Cattle (multipurpose)	0	0	none	none	none	none	none	none
Sheep	0	0	medium	low	none	none	none	none
Goats	0	0	medium	low	none	none	low	none
Pigs	0	0	medium	none	none	none	none	none
Chickens	0	0	medium	low	none	none	low	none
Buffaloes	2	2	medium	none	none	none	none	none
Deer	0	0	low	none	none	none	none	none
Ducks	0	0	low	none	none	none	none	none
Geese	0	0	low	none	none	none	none	none
Horses	0	0	low	none	none	none	none	none
Muscovy ducks	0	0	low	none	none	none	none	none
Ostriches	0	0	low	none	none	none	none	none
Quails	1	1	high	none	none	none	none	none
Rabbits	0	0	low	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

	Score
Awareness	medium
Infrastructure	medium
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	Mainly taught at the universities
Research	Undertaken by universities, Malaysian Agriculture Research & Development Institute and National Veterinary Biodiversity Institute
Knowledge	Some experts are highly proficient but mostly of low to medium knowledge.
Awareness	Satisfactory level
Infrastructure	Good infrastructure in National Veterinary Biodiversity Institute
Stakeholder participation	Low
Policies	Mostly being formulated by Natural Resource and Environment ministry
Policy implementation	Limited
Laws	Limited
Implementation of laws	Limited

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).

There is the Federation of Livestock Farmers Association. Breed societies encouraged but not developed as yet.

BREEDING PROGRAMMES

Note: Breeding programmes: systematic and structured programmes for changing the genetic composition of a population towards a defined breeding goal (objective) to realize genetic gain (response to selection), based on objective performance criteria. Breeding programmes typically contain the following elements: definition of breeding goal; identification of animals; performance testing; estimation of breeding values; selection; mating; genetic gain and transfer of genetic gain. Breeding programmes are usually operated either by a group of livestock breeders organized in a breeders' association, community-based entity or other collective body; by a large commercial breeding company; or by the government.

To provide further details of your country's activities in the field of breeding programmes, please go to Strategic Priority Area 2 of the "Progress report on the implementation of the Global Plan of Action for Animal Genetic Resources 2007–2013" (below).

10. Who operates breeding programmes in your country?

Note: the objective of this question is to identify which stakeholders lead or organize the breeding programmes that exist in your country. Stakeholder participation in the implementation of the various elements of breeding programmes is covered under Question 15. If you wish to provide further information on the activities of the various stakeholder groups (including collaborative activities on an international scale), please provide it in the text section of Question 15.

Species	Government	Livestock keepers organized at community level	Breeders' associations or cooperatives	National commercial companies	External commercial companies	Non-governmental organizations	Others
Cattle (specialized dairy)	yes	no	no	no	no	no	no
Cattle (specialized beef)	yes	no	no	no	no	no	no
Cattle (multipurpose)	no	no	no	no	no	no	no
Sheep	no	no	no	no	no	no	no
Goats	yes	no	no	no	no	no	no
Pigs	no	no	no	no	no	no	no
Chickens	yes	no	no	no	no	no	no
Buffaloes	no	no	no	no	no	no	no
Deer	no	no	no	no	no	no	no
Ducks	no	no	no	no	no	no	no
Geese	no	no	no	no	no	no	no
Horses	no	no	no	no	no	no	no
Muscovy ducks	no	no	no	no	no	no	no
Ostriches	no	no	no	no	no	no	no
Quails	yes	no	no	no	no	no	no

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

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

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

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

Species	Tools															
	Animal identification		Breeding goal defined		Performance recording		Pedigree recording		Genetic evaluation (classic approach)		Genetic evaluation including genomic information		Management of genetic variation (by maximizing effective population size or minimizing rate of inbreeding)		Artificial insemination	
	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex	Loc	Ex
Cattle (specialized dairy)	1	0	1	0	1	0	1	0	1	0	0	0	0	0	1	0
Cattle (specialized beef)	2	0	2	0	2	0	2	0	2	0	0	0	0	0	2	0
Sheep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goats	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1
Pigs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chickens	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0
Buffaloes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ducks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geese	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Horses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muscovy ducks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostriches	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quails	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0
Rabbits	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Species	Breeding method			
	Straight/pure-breeding only		Straight/pure-breeding and cross-breeding	
	Loc	Ex	Loc	Ex
Cattle (specialized dairy)	0	0	1	0
Cattle (specialized beef)	0	0	2	0
Sheep	0	0	0	0
Goats	0	0	0	1
Pigs	0	0	0	0
Chickens	1	0	0	0
Buffaloes	0	0	0	0
Deer	0	0	0	0
Ducks	0	0	0	0
Geese	0	0	0	0
Horses	0	0	0	0
Muscovy ducks	0	0	0	0
Ostriches	0	0	0	0
Quails	0	1	0	0
Rabbits	0	0	0	0

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

Species	Training	Research
Cattle (specialized dairy)	medium	medium
Cattle (specialized beef)	medium	medium
Cattle (multipurpose)	none	none
Sheep	medium	low
Goats	medium	low
Pigs	medium	low
Chickens	medium	low
Buffaloes	low	low
Deer	low	low
Ducks	low	low
Geese	low	low
Horses	low	low
Muscovy ducks	low	low
Ostriches	low	low
Quails	medium	medium
Rabbits	low	low

14. Please indicate the extent to which livestock keepers in your country are organized for the purposes of animal breeding.

Species	Organization of livestock keepers
Cattle (specialized dairy)	low
Cattle (specialized beef)	low
Cattle (multipurpose)	none
Sheep	low
Goats	low
Pigs	low
Chickens	none
Buffaloes	none
Deer	none
Ducks	none
Geese	none
Horses	none
Muscovy ducks	none
Ostriches	none
Quails	low
Rabbits	none

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Mostly livestock breeding work is undertaken by the government - Department of Veterinary Services and Malaysian Agriculture Research and Development Institute. Breeder organizations are as yet non-existent. Some individual breeders may undertake animal identification and recording.

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

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

Species	Policies or programmes
Horses	no
Muscovy ducks	no
Ostriches	no
Quails	yes
Rabbits	no

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

Species	Description of policies or programmes
Cattle (specialized dairy)	The National Agro-food Policy, 2011-2020 specifically mentions Research & Development in Animal Breeding; Animals Act (1953, Revised 2006) contains measures pertaining to the general welfare, conservation and improvement of animals in Peninsular Malaysia; National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization, 2012 - strategies strive for a coordinated and holistic approach to conserve and optimize the use of AnGR in Malaysia.
Cattle (specialized beef)	The National Agro-food Policy, 2011-2020 specifically mentions Research & Development in Animal Breeding; Animals Act (1953, Revised 2006) contains measures pertaining to the general welfare, conservation and improvement of animals in Peninsular Malaysia; National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization, 2012 - strategies strive for a coordinated and holistic approach to conserve and optimize the use of AnGR in Malaysia.
Cattle (multipurpose)	No specific policy application
Sheep	No specific policy application
Goats	The National Agro-food Policy, 2011-2020 specifically mentions Research & Development in Animal Breeding; Animals Act (1953, Revised 2006) contains measures pertaining to the general welfare, conservation and improvement of animals in Peninsular Malaysia; National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization, 2012 - strategies strive for a coordinated and holistic approach to conserve and optimize the use of AnGR in Malaysia.
Pigs	Industry driven policy to use exotic commercial breeds.
Chickens	Industry driven policy to use exotic commercial breeds.
Buffaloes	No specific policy application
Deer	No specific policy application
Ducks	No specific policy application
Geese	No specific policy application
Horses	No specific policy application
Muscovy ducks	No specific policy application
Ostriches	No specific policy application
Quails	The National Agro-food Policy, 2011-2020 specifically mentions Research & Development in Animal Breeding; Animals Act (1953, Revised 2006) contains measures pertaining to the general welfare, conservation and improvement of animals in Peninsular Malaysia; National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization, 2012 - strategies strive for a coordinated and holistic approach to conserve and optimize the use of AnGR in Malaysia.

Species	Description of policies or programmes
Rabbits	No specific policy application

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)	Have own locally derived breed (Mafriwal cattle) but many farmers still prefer imported Friesian or Friesian-Jersey cattle due to higher milk yield.
Cattle (specialized beef)	Still have a population of local Kedah-Kelantan cattle. These animals and their crosses in demand in oil-palm integration projects. Plans afoot to undertake a well-organized breeding project for the Kedah-Kelantan. Also have 2 synthetic breeds developed namely the Brakmas (Brahman and Kedah-Kelantan) and Cheroke (Charolais and Kedah-Kelantan).
Cattle (multipurpose)	No particular programmes for multi-purpose cattle.
Sheep	Hair sheep such as Barabados Blackbelly promoted. More recently, Dorper and Damara breeds have been imported. However no specific breeding program in place for sheep.
Goats	For meat, Boer, Jamnapari and Katjang breeds and their crosses promoted. For dairy, Saanen is promoted. Some experimentation with Shami goats. Breeding program in place for Boer goats.
Pigs	In the 1980's a wide range of breeds was farmed but today the industry uses 3 breeds to produce a 3-way terminal cross using Landrace, Large White and Duroc. Farmers are contented with this breed combination. All breeding stocks are imported.
Chickens	Mostly the broiler and layer industries use imported breeding stock. A niche market uses local Kampong chicken for which there is a specific breeding program.
Buffaloes	The swamp buffalo population is slowly decreasing mainly because buffalo are no longer used as draft animals. They are however still in demand for beef. Swamp buffalo are not crossed with other breeds and kept pure and under a extensive management system. Murrah buffalo are kept for milk production. There is no specific breeding program in place for buffalo breeds.
Deer	No particular breeding programs for deer
Ducks	No particular breeding programs for ducks
Geese	No particular breeding programs for geese
Horses	No particular breeding programs for horses
Muscovy ducks	No particular breeding programs for Muscovy ducks
Ostriches	No particular breeding programs for ostriches
Quails	A quail breed with male and female lines has been developed called IKTA quail. This quail preforms exceptionally well and is in demand by farmers.
Rabbits	No particular breeding programs for rabbits

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.

Breeding programs in general are costly on infrastructure and breeding stock. Hence most breeding programs are conducted by the government. To move ahead, the private sector needs to get involved and become the main driver for these breeding programs. The country also lacks technical expertise in handling these breeding projects. Particular successes were in the development of the Mafriwal dairy cattle, Brakmas cattle and the IKTA quail. This was because

the government had large farms having these type of animals and there were in-house geneticists/animal breeders employed on these farms.

19. Please describe future objectives, priorities and plans for the establishment or further development of breeding programmes in your country.

Species	Description of future objectives, priorities and plans
Cattle (specialized dairy)	The Mafriwal cattle breed development will undergo further acceleration with the involvement of private sector farmers.
Cattle (specialized beef)	The Brakmas cattle developed by MARDI (Malaysian Agriculture Research & Development Institute) will be further expanded. The Kedah-Kelantan native cattle will undergo a genetic improvement program.
Cattle (multipurpose)	Nil.
Sheep	Evaluation studies will be done with the Barbados Blackbelly, Dorper and Damara breeds.
Goats	The conservation program for the native Katjang goats will be continued. Evaluation studies will be conducted with the Boer and their crossbreds.
Pigs	The Swine Industry will source from overseas better stocks of Duroc, Landrace and Large White breeds for crossbreeding locally.
Chickens	The use of imported commercial stocks will be continued for production of >90% of poultry meat and eggs. Native chickens will still be produced for the niche market. MARDI is developing local strains of native chickens.
Buffaloes	The swamp buffalo will be monitored and improvement programs initiated mainly in East Malaysia.
Deer	No specific breeding plans for deer.
Ducks	Ducks are all imported. No specific breeding plans for ducks.
Geese	No specific breeding plans for geese.
Horses	No specific breeding plans for horses.
Muscovy ducks	No specific breeding plans for Muscovy ducks.
Ostriches	Ostriches are all imported. No specific breeding plans for ostriches.
Quails	IKTA quail will continue to be developed for quail farmers.
Rabbits	Rabbit stocks of commercial farming importance are all imported. No specific breeding plans for rabbit breeds.

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)	medium	medium	medium

Species	In situ conservation	Ex situ in vivo conservation	Ex situ in vitro conservation
Cattle (specialized beef)	medium	medium	medium
Cattle (multipurpose)	none	none	none
Sheep	medium	medium	medium
Goats	medium	medium	medium
Pigs	none	none	none
Chickens	none	none	none
Buffaloes	none	none	none
Deer	none	none	none
Ducks	none	none	none
Geese	none	none	none
Horses	none	none	none
Muscovy ducks	none	none	none
Ostriches	none	none	none
Quails	medium	none	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	no
Genetic uniqueness	no
Genetic variation within the breed	no
Production traits	no
Non-production traits	no
Cultural or historical importance	no
Probability of success	no

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

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

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

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

Only the public sector is involved in in situ conservation. Breeds conserved include the Kedah-Kelantan cattle, Katjang goats, Barbados Blackbelly sheep and Kampong chicken.

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

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

◉ yes

- ○ no

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

- ○ yes
- ○ no

23.2. If yes, please describe the plans.

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

	Stored in national genebank
Semen	yes
Embryos	no
Oocytes	no
Somatic cells (tissue or cultured cells)	no
Isolated DNA	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 in situ population?	Have the gene bank collections been used to introduce genetic variability into an ex situ population?	Do livestock keepers or breeders' associations participate in the planning of the gene banking activities?
Cattle (specialized dairy)	1	1	yes	no	no	no	no
Cattle (specialized beef)	4	0	yes	no	no	no	no
Cattle (multipurpose)	0	0	no	no	no	no	no
Sheep	5	0	yes	no	no	no	no
Goats	2	0	yes	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
Deer	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?
Ducks	0	0	no	no	no	no	no
Geese	0	0	no	no	no	no	no
Horses	0	0	no	no	no	no	no
Muscovy ducks	0	0	no	no	no	no	no
Ostriches	0	0	no	no	no	no	no
Quails	0	0	no	no	no	no	no
Rabbits	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.

In some cases (eg. the Kedah-Kelantan cattle semen), attempts have been made to back-cross crossbreds to the native cattle breed.

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.

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 such cases.

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)	medium	low	low	low	low	none	none	low	none
Cattle (specialized beef)	medium	low	low	low	low	none	none	low	none
Sheep	low	low	low	none	none	none	none	none	none
Goats	low	low	low	none	none	none	none	low	none
Pigs	medium	none	none	none	none	none	none	none	none
Buffaloes	low	none	none	none	none	none	none	none	none
Deer	none	none	none	none	none	none	none	none	none
Ducks	none	none	none	none	none	none	none	none	none
Geese	none	none	none	none	none	none	none	none	none
Horses	none	none	none	none	none	none	none	none	none
Muscovy ducks	none	none	none	none	none	none	none	none	none
Ostriches	none	none	none	none	none	none	none	none	none
Quails	none	none	none	none	none	none	none	none	none
Rabbits	none	none	none	none	none	none	none	none	none

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

There is a cattle artificial insemination service run by the Department of Veterinary Services. The service is limited in scope due to limited manpower. Embryo transfer, MOET are used experimentally. Sexed semen is imported and used for cattle. The Center for Marker Discovery & Validation (CMDV) is undertaking pioneering work on Marker Assisted Selection in goats and cattle.

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

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

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

Artificial insemination for ruminant species is provided mainly be the government. There are trained DIY (Do-It-Yourself) farmers who also provide these services in collaboration with government agencies. In the last 2 years, an attempt has been made to commercialize the artificial insemination services through provision of services through private breeding companies but their impact is limited.

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

Biotechnologies	Public or private research at national level	Research undertaken as part of international collaboration
Artificial insemination	no	no
Embryo transfer or MOET	no	no
Semen sexing	no	no
In vitro fertilization	no	no
Cloning	no	no
Genetic modification	no	no
Use of molecular genetic or genomic information for estimation of genetic diversity	no	no
Use of molecular genetic or genomic information for prediction of breeding values	no	no
Research on adaptedness based on molecular genetic or genomic information	no	no

30.1. Please briefly describe the research.

Research in artificial insemination and ET/MOET were undertaken in the past, but there is no research done in this area over the past 5 years. Pioneering work on genetic markers is being conducted at the Center for Marker Discovery and Validation

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

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

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

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

Sheep	Ranching or similar grassland -based production systems	Pastoralist systems	Mixed farming systems (rural areas)	Industrial systems	Small-scale urban or peri-urban systems
Artificial insemination using semen from locally adapted breeds	n/a	n/a	low	n/a	low
Artificial insemination using nationally produced semen from exotic breeds	n/a	n/a	low	n/a	low
Artificial insemination using imported semen from exotic breeds	n/a	n/a	low	n/a	low
Natural mating	n/a	n/a	high	n/a	high

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

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

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

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

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

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

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

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

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

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.

The coverage of artificial insemination on the cattle population is estimated to be about 4 - 5%. Budget constraints have prevented the expansion of the artificial insemination services provided by government. The privatization of the artificial insemination service is being explored. As for ET and MOET, there are problems in finding halal drugs for superovulation (In the west, porcine FSH is used successfully for superovulation but due to its origin, the drug cannot be used in Malaysia). The use of molecular biotechnologies is in the infant stages and the establishing of the CMDV (Center for Marker Discovery & Validation) may expand its use.

III. DATA CONTRIBUTING TO THE PREPARATION OF *THE STATE OF THE WORLD'S BIODIVERSITY FOR FOOD AND AGRICULTURE*

INTEGRATION OF THE MANAGEMENT OF ANIMAL GENETIC RESOURCES WITH THE MANAGEMENT OF PLANT, FORESTRY AND AQUATIC GENETIC RESOURCES

1. Please indicate the extent to which the management of animal genetic resources in your country is integrated with the management of plant, forestry and aquatic genetic resources. Please describe the collaboration, including, if relevant, a description of the benefits gained by pursuing a collaborative approach.

	Extent of collaboration	Description
Development of joint national strategies or action plans	extensive	A multi-sectoral approach was taken in drafting Malaysia's Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Use (2012).

	Extent of collaboration	Description
Collaboration in the characterization, surveying or monitoring of genetic resources, production environments or ecosystems	none	As yet there is no collaboration in this area.
Collaboration related to genetic improvement	none	As yet there is no collaboration in this area.
Collaboration related to product development and/or marketing	none	As yet there is no collaboration in this area.
Collaboration in conservation strategies, programmes or projects	none	As yet there is no collaboration in this area.
Collaboration in awareness-raising on the roles and values of genetic resources	none	As yet there is no collaboration in this area.
Training activities and/or educational curricula that address genetic resources in an integrated manner	none	As yet there is no collaboration in this area.
Collaboration in the mobilization of resources for the management of genetic resources	none	As yet there is no collaboration in this area.

2. Please describe any other types of collaboration.

Nil.

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

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.

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

There are very few players in the management of genetic resources within the country. Management of each sector already is exhaustive on human resources and negates collaborative work between sectors.

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

There needs to be an increase in human resources within each sector. This needs greater public spending and the availability of more financial grants. Training of new human resources needs to be addressed.

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

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

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

- ○ yes
- ◉ no

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

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

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

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

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

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

- (•) yes
- ( ) no

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

The main problems with animal genetic resources is pollution of the environment, particularly with mixed farming and industrial production systems. The Malaysian Environmental Quality Act (1974) addresses these concerns.

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).

Some farms have been investing in practically zero-discharge systems and in reducing fly problems. Some (poultry and pig) have implemented "closed-house" systems. There have been farms which have closed down, being unable to adhere to provisions within the Malaysian Environmental Quality Act (1974).

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).

For farms adhering to environment friendly measures, animal genetic resources are better managed. However it must be stated that most livestock farms are still not compliant to environmental standards.

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.

Complying with standards set by environment regulations is costly and can render livestock businesses less competitive to countries which do not strictly comply with standards. Cost is the main constraint with livestock keepers.

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.

In Malaysia, beef cattle are being raised in oil palm estates. The estates practicing integration with beef cattle can reduce herbicide and fertilizer use. This is an example where the use of animal genetic resources is environment-friendly.

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.

Using bio-reactors to harness methane (a green-house gas) for fuel has been explored but there has been no (commercial) breakthrough in the use of this technology.

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.

Animal genetic resources have been identified as one of the major contributors to green house gases. To mitigate the effects of AnGR on the environment, better management of waste in livestock farms, the treatment of feces to produce quality organic fertilizer, improving of feeding to reduce production of green house gases by livestock etc are options in reduction of environmental problems.

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

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

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

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

1. Which of the following options best describes your country's progress in building an inventory of its animal genetic resources covering all livestock species of economic importance (SP 1, Action 1)?

Glossary: An inventory is a complete list of all the different breeds present in a country.

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

Please provide further details:

Since the GPA, more information has been collected on individual breeds of livestock and DAD-IS has been updated. However this is an on-going process and cannot be considered as complete.

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:

There is on-going work in implementing phenotypic characterization studies.

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:

There is on-going work in this area particularly by University Putra Malaysia. However studies are ad-hoc in nature and very dependent on the availability of grants and local expertise.

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:

Annual surveys are made of population size at the species level. They are also made for selected local breeds such as the Kedah-Kelantan cattle, LID cattle, Swamp buffalo and Murrah buffalo. A more comprehensive baseline survey was undertaken in the years 2000-2002 on several breeds. No such surveys have since been undertaken except for local goats (Kambing Katjang).

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:

All characterization work is coordinated by the National Institute of Veterinary Biodiversity (formerly National Institute of Animal Biotechnology).

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:

In the survey of years 2000-2002, protocols were established. In the goat survey of 2010-2012, protocols were also established.

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:

Monitoring is undertaken by the Department of Veterinary Services, Malaysia on the species level on an annual basis. They are also made for selected local breeds such as the Kedah-Kelantan cattle, LID cattle, Swamp buffalo and Murrah buffalo.

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:

FAO criteria are referred to.

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:

The country has the capacity to identify breeds that come to be at risk of extinction and the ability to take timely action to address the problem. There is also an early warning and emergency response system for disease risks.

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:

There is a great need to develop expertise in this area before protocols or standards can be established.

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:

Barriers and obstacles include the unavailability of sufficient expertise, funding problems and lack of awareness on the need for inventory, characterization and monitoring.

12. If applicable, please list and describe the measures that need to be taken to address these barriers and obstacles and to enhance your country's inventory, characterization and monitoring programmes:

1. Greater involvement of FAO in training of local expertise (even on regional level)
2. Exposure of policy makers and planners to the need of inventory, characterization and monitoring
3. Making funds available to undertake projects

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.

With the recent establishment of the interim Asian Focal Point for Animal Genetic Resources, it is hoped that expertise can be developed on a regional basis so that there is an improvement in characterization, inventory and monitoring of trends on a regional level.

STRATEGIC PRIORITY AREA 2: SUSTAINABLE USE AND DEVELOPMENT

- The state of national sustainable use policies for animal genetic resources
- The state of national species and breed development strategies and programmes
- The state of efforts to promote agro-ecosystem approaches

14. Does your country have adequate national policies in place to promote the sustainable use of animal genetic resources (see also questions 46 and 54)?

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

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

Malaysia's National Policy on Biological Diversity (1998) http://www.nre.gov.my/Malay/Biodiversiti/Documents/Dasar_Kepelbagaian_Biologi_Kebangsaan.pdf.
Malaysia's National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization (2012) http://www.fao.org/ag/againfo/programmes/documents/genetics/country_reports/Malaysia_NSAP_Oct2013.pdf

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 agro-ecosystem approach is outlined in Malaysia's National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization (2012) http://www.fao.org/ag/againfo/programmes/documents/genetics/country_reports/Malaysia_NSAP_Oct2013.pdf.

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:

Breed development projects are all conducted by the government. So far, the private sector has not been involved in breed development. The projects on breed development are for the Mafriwal synthetic cattle breed, Brakmas synthetic cattle breed, Cheroke synthetic cattle breed and IKTA quail breed.

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:

Detailed planning on long-term sustainable use is still lacking. However this will be addressed in future development plans.

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:

No comprehensive studies have been undertaken on major barriers and obstacles to enhancing the sustainable use and development of AnGR within the country.

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.

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

Please provide further details:

Action is planned for an assessment of the impact of the use of exotic breeds on locally adapted breeds. Funding will be sought.

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 systems and organizational structures are only available on selected government farms.

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:

So far there are no mechanisms in place to facilitate interactions between stakeholders. Where necessary, this is done ad hoc.

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:

No progress in this area.

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:

In the states of Sarawak and Sabah, enactments on access to biodiversity were established in 1997 and 2000 respectively. An ABS law draft is available at national level but has not gone through parliamentary review.

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:

No progress in this area.

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:

Priorities in this area are detailed in Malaysia's National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization (2012).

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:

It has been realized that traditional knowledge needs to be documented for future generations.

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:

Promoting products will assist conservation efforts and will be given priority.

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

No comments.

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.

Specific sustainable use and development activities will need to be developed in future.

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:

Specific studies to access factors leading to the erosion of animal genetic resources will need to be undertaken particularly by local universities.

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

1. Lack of appreciation of the value of local breeds e.g. the Kedah-Kelantan breed of cattle
2. Use of farm machinery causing draft animals to become redundant eg. Swamp Buffalo
3. Crossbreeding of native animals with exotic breeds causes erosion of local germplasm

4. Intensification of livestock production using imported or crossbred animals at the expense of local breeds eg. beef cattle and poultry
5. Decline in economic viability of traditional farming systems leads to erosion of various native breeds

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:

All livestock breed conservation programs are undertaken by the government. The government has embarked on conservation projects for a few selected breeds of locally adapted breeds such as Kedah-Kelantan cattle and Katjang goats.

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:

This is only for the selected breeds being conserved.

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:

This is for selected breeds only such as the Katjang goat and Kedah-Kelantan cattle.

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:

There are government conservation farms established for breeds thought to be at risk eg. Kedah-Kelantan cattle and Katjang goats.

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

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

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

Please provide further details:

Ex situ in vitro conservation is only for frozen semen from breeds at risk. No frozen embryos are stored as yet.

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:

1. Ex situ in vivo conservation of Kedah-Kelantan cattle established before GPA
2. Ex situ in vivo conservation of Katjang goats established after GPA
3. Ex situ in vitro conservation of Kedah-Kelantan semen established before GPA

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

- ○ a. Yes
- ○ b. No

Please provide further details:

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

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

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

1. Lack of sufficient trained local expertise in conservation and also in embryo work
2. Lack of land resources/farms to conduct ex situ in vivo conservation activities
3. Lack of sufficient funding
4. Lack of appreciation of the value of local breeds leading to low priority in allocation of budgets

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:

Action is being taken to sufficiently increase the genetic diversity of collections.

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:

Protection of local breeds is covered under Malaysia's Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization (2012). However action has yet to be taken.

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:

The managers believe that having sufficient ex situ in vitro collections would suffice.

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:

There were limited studies for example in the cryopreservation of cattle embryos (before GPA).

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:

Firstly local expertise needs to be developed to enable documentation and dissemination of knowledge, technologies and best practices for conservation.

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

1. Training in all aspects of managing conservation including acquiring associated technology
2. Increasing awareness especially among policy makers
3. Seeking funding for all conservation projects now and in the future
4. Improving sustainable use of animal genetic resources.

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.

Recently in 2013 the interim Asian Regional Focal Point for Animal Genetic Resources was re-established. In relation to conservation projects, Malaysia hopes to be able to contribute and benefit from this regional network.

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

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

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

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

Please provide further details:

The custodian of the livestock industry in Malaysia is the Department of Veterinary Services. This department has sufficient capacity to support holistic planning of the livestock sector.

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:

Malaysia's National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization (2012) - link http://www.fao.org/ag/againfo/programmes/documents/genetics/country_reports/Malaysia_NSAP_Oct2013.pdf

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 country's National Biodiversity Strategy (1998) is described in http://www.cbd.int/doc/world/my/my-nbsap-01-en.pdf. While not specifically mentioned, Animal Genetic Resources are covered generally by this national strategy and action plan. However, Malaysia's National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization (2012) do specifically cover animal genetic resources.

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:

The National Agro-food Policy (2011 - 2020) contains the livestock sector strategy. The document is available only in Malay from - http://www.moa.gov.my/c/document_library/get_file?uuid=158c7169-fb48-4cc3-879b-6cad35d030d0&groupId=41803

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:

Information is available but there is no national electronic database. We are dependent on information updated in DAD-IS.

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:

Regular updates have been entered on DAD-IS for Malaysian breeds since 1995/96.

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:

The establishment of a National Farm Animal Genetic Resources Technical Working Group is an action plan under the

National Strategies and Action Plans for Agrobiodiversity Conservation and Sustainable Utilization (2012). However, this working group has yet to be organized and its formation is scheduled for the near future.

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:

More needs to be done at the National Focal Point (National Institute for Veterinary Biodiversity) for networking with all stakeholders. The National Focal Point needs to be strengthened with the addition of more trained staff.

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:

Activities on increasing public awareness are undertaken on an ad hoc basis.

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:

The Animals Ordinance (1953) has been updated recently. The Malaysian Animal Industry law is presently being drafted.

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:

Some programs are being run by the local universities and by the National Focal Point.

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:

All initiatives are presently run by the government. Other organizations are not active.

59. Are there any national NGOs active in your country in the fields of:

Characterization?

- ○ a. Yes
- ◉ b. No

Sustainable use and development?

- ○ c. Yes
- ◉ d. No

Conservation of breeds at risk?

- ○ e. Yes
- ◉ f. No

If yes, please list the national NGOs and provide links to their web sites:

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

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

Please provide further details:

The National Institute of Veterinary Biodiversity (Focal Point) and University Putra Malaysia have been 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.

Much progress was made in Policies, Institutions and Capacity-building during the period when the Asian Regional Focal Point was in operation (1994-1998). Certainly there was much collaboration between the Global Focal Point and countries within the region. Hopefully the momentum will improve with the re-establishment of the Asian Focal Point.

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:

Other than guidance provided by Technical Guidelines from the Global Focal Point, no international collaboration has been established.

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

Characterization?

- ○ a. Yes
- ◉ b. No

Sustainable use and development?

- ○ c. Yes
- ◉ d. No

Conservation of breeds at risk?

- ○ e. Yes
- ◉ f. No

If yes, please list the international NGOs:

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

- ○ a. Yes
- ◉ b. No

Please provide further details:

All funding for animal genetic resources programmes has been from internal funding using mainly operating budgets.

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:

As yet no requests have been made for external funding.

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:

No specific programs to assist developing countries or countries with economies in transition. Some exposure to conservation programs provided to international students under the Malaysian Technical Cooperation Program (MTCP).

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:

Not enough financial resources to do so.

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:

Not enough financial resources to do so.

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 enough financial resources to do so.

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 enough financial resources to do so.

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 enough technical and financial resources to do so.

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 enough technical and financial resources to do so.

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:

Not enough technical and financial resources to do so.

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 enough technical and financial resources to do so.

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:

Not enough technical and financial resources to do so.

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 enough technical and financial resources to do so.

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
Effects of national Access and Benefit Sharing (ABS) legislation on international trade in AnGR.	Since the establishment of the Nagoya Protocol, many countries are drafting their ABS laws and these laws may limit/ significantly limit transboundary use of AnGR.	A study on use of AnGR globally in relation to ABS laws.
As an annex to the GPA perhaps a compiled list of success stories in conservation and sustainable use of AnGR should be made available	Success stories will be a source of encouragement to countries on the positive results from intervention activities.	Compilation of notable success stories from developed and developing countries.
Linkage between climate change and livestock diseases.	New and emerging diseases can cause catastrophic losses to animal genetic resources. The relationship of these diseases to climate change should be elucidated.	GPA should have a note on disease and climate change.
Feed resources available to AnGR can be limiting and cause erosion of AnGR.	How feed resources are managed within a country can have effects on its AnGR.	A note on feed and other resources needed to maintain a country's AnGR.
Animal Welfare and management of AnGR	Some countries may implement stringent animal welfare standards which make management of AnGR difficult. On the other hand countries which import food of animal origin may require stringent animal welfare standards be applied to animals farmed.	Some indication of a country's compliance with international animal welfare standards.

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