



## Progress report on the implementation of the *Global Plan of Action for Animal Genetic Resources* - 2007 to 2011

Country: **Australia**

### 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:

Pure farm livestock breeds of economic importance are recorded in registration systems. These systems are usually maintained by breed societies, industry-based organisations or large commercial companies.

It is worth noting that farm animals in Australia are derived from overseas breeds and the parent breeds generally still exist in the country of origin. Australia has conducted significant breeding programs in generating local strains through targeted cross breeding, and has also developed breeds that are adapted to the Australian environment.

The Rare Breeders Trust (RBTA) conducts further inventories that complement the general industry data.

For some farm animals such as poultry, it is difficult to obtain reliable data and the inventory in place is not as complete as it is for the other livestock species such as cattle (beef and dairy), sheep, goats and pigs.

**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 ☐
- g. None, but action is planned and funding is sought ☐
- f. None ☐

Please provide further details:

Livestock in Australia is composed of exotic breeds first introduced at the time of European settlement. As such, the livestock industry is heavily based on European breeds. The characterisation of cattle, sheep and pigs in Australia is extensive, accurate and is used to inform many genetic selection schemes. Australia has conducted significant breeding programs in generating local strains through targeted cross breeding, and developing breeds that are adapted to the Australian environment.

The Australian beef industry uses modern genetic evaluation systems such as BREEDPLAN to aid in genetic selection. BREEDPLAN uses Best Linear Unbiased Prediction (BLUP) technology, and produces Estimated Breeding Values (EBVs) for a range of traits commercially available for testing in selected breeds.

Dairy cow genetic selection is achieved mainly through the Australian Dairy Herd Improvement Scheme (ADHIS); it determines Australian breeding values (ABVs) for dairy traits and maintains performance and pedigree data. ADHIS participates in international evaluations with Interbull, and also releases ABVs for foreign bulls.

The sheep industry employs LAMBPLAN and MERINOSELECT to assist in determining breeding values for sheep, for traits related to meat and wool production respectively. The two systems provide programs that allow breeders to benchmark their animals and track improvement in their genetic make-up.

The pig industry employs a genetic evaluation system known as PIGBLUP. Traits analysed include production, reproduction and carcass traits. This, in combination with improved artificial insemination techniques, has enhanced the use of purchased fresh semen from high-performing boars which have been selected on their estimated breeding values (EBV).

The majority of the chicken-meat and egg industries use hybrid lines developed by multinational chicken breeding companies.

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

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

g. None

☐

Please provide further details:

Molecular marker technologies are used to underpin pedigree studies, phenotypic characterisation and selection strategies. There are a number of performance recording and genetic evaluation programs. Best Linear Unbiased Prediction (BLUP) analyses, are carried out by industry or breed societies.

A number of molecular markers have been developed for the beef industry. For example, markers for tenderness have been validated and are included in BREEDPLAN EBVs. Meat and Livestock Australia and Beef CRC are developing the Beef Information Nucleus (BIN) herds.

In the dairy industry, breeding values are estimated with genomic data, otherwise known as ABV(g)s have been developed.

An information nucleus, similar to the BIN in cattle, is also being developed for sheep.

**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:

In general, the populations of different breeds in Australia are recorded by commercial breeders, breed associations and volunteer NGOs. This information has been collected and put into the DAD-IS database. There is good information for cattle, sheep and pigs. In the case of chickens, there is no current systems for recording the population numbers of the many different breeds of chickens kept by poultry enthusiasts.

**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:

Animal genetic resource conservation and management in Australia is conducted primarily by private corporations and industry organisations, commercial breeding programs and individual breed associations.

**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:

No, not formally but protocols are in place.

Each organisation collects and records information in the way which suits them best. Most breed societies are well aware of inbreeding depression, and the Rare Breed Trust of Australia has developed categories for describing the conservation status of AnGR in Australia. These are: at risk, vulnerable, endangered and critical. These categories are defined by numerical thresholds for cattle, sheep and pigs, using data from breed societies. However, there are no breed registries for poultry in Australia, and while the same categories are used, the underlying data is gathered from several disparate sources. The Rare Breed Trust of Australia has a specific interest in the rarer breeds in Australia and has established an extensive network of smaller breeders and breeder associations within the animal production industry.

**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:

Yes, with the exception of chicken breeds. Population numbers of the rarer breeds kept by poultry fanciers are not recorded and most of the commercial egg and meat production comes from imported hybrid lines.

**8. Which criteria do 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 ☐

If applicable, please describe your national criteria or provide link to website describing criteria of international body:

The RBTA uses criteria similar to the FAO criteria. <http://www.rbta.org/>

**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:

No, not formally. In Australia, farmer profitability is crucial to ensuring the survival of rare breeds. Preservation of breeds is therefore highly dependent on their successful marketing and use. Niche markets are being created that promote the meat quality of selected breeds in specialty and boutique markets. Initiatives are also underway to establish rare breed farms to ensure a secure supply of meat from several rare breeds in order to promote products from these animals and preserve their numbers.

**10. Is your country conducting research to develop methods, technical standards or protocols for phenotypic or molecular characterization, or breed evaluation, valuation or comparison? (SP 2, Action 2)**

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

Please provide further details:

The livestock industry is very active in developing and using phenotypic and molecular characterisation methodologies for breed evaluation and development. Production traits are the major focus of this work.

**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. ☒

If yes, please list them, being as specific as possible:

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

- Improving the monitoring and information infrastructure through recording schemes and suitably linked databases in order to address the increasingly complex livestock objectives necessary to meet social and commercial needs. Not-for-profit organisations currently maintain databases and collect animal genetic resource information at irregular intervals. It is difficult to determine the conservation status of a number of breeds owing to a lack of data.
- Providing sufficient training in genetic management and operation of livestock conservation and improvement schemes.
- Ensuring effective technology transfer between groups. For example, Dairy Australia, Meat and Livestock Australia and Australian Wool Innovation, in collaboration with breeding companies and research organisations, fund information programs for all animal producers.
- Increasing the availability of information on performance standards for breeds and whole-of-chain marketing.
- Funding individual research programs, in collaboration with breeding companies and research institutes, into genetic management and selection techniques for livestock improvement programs, and developing state-of-the-art technologies and/or approaches for effective and sustainable management of animal genetic resources.
- Developing animal genetic resources programs to align with environmental and climate change priorities; for example, through improving the sustainability and adaptability of livestock production systems.
- Preserving genetic variability through cryopreservation of genetic material. Some bull and pig breeding companies and several non-government organisations maintain gene banks.

**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):**

## 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 the text of the policies or a web link to the document:

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

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

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

Please provide further details:

### 16. Are breed development programmes revised, for all major species and breeds in your country, with the aim of meeting foreseeable economic and social needs and market demands (SP4, Action 2)?

- a. Yes, regular revisions commenced before the adoption of the GPA ☒
- b. Yes, regular revisions commenced 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 information:

Yes, but the responsibility lies with the industries. Functionality, improved productivity and environmental adaptation of farm animals are the main traits targeted in breeding programs.

**17. Is long-term sustainable use planning - including, if appropriate, strategic breeding programmes - in place for all major livestock species and breeds (SP4, Action 1)?**

- a. Yes, since before the adoption of the GPA ☒
- b. Yes, put in place after the adoption of the GPA ☐
- c. For some species and breeds (further progress made since the adoption of the GPA) ☐
- d. For some species and breeds (no further progress made since the adoption of the GPA) ☐
- e. No, but action is planned and funding identified ☐
- f. No, but action is planned and funding is sought ☐
- g. No ☐

**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. ☒

If yes, what are they?

**19. Have the long-term impacts of the use of exotic breeds on local 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.*

- a. No exotic breeds are being used for agricultural production ☐
- b. Yes, assessments were introduced before the adoption of the GPA ☐
- c. Yes, assessments were introduced after 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 information:

All of the main livestock breeds used in this country are exotic. While some have been developed here, they are the result of stabilised crosses between exotic breeds. Significant export industries have been developed in the areas of beef, dairy, sheep meat and wool, and domestic food security is not considered a major concern for Australia in the near to medium term.

**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 ☐

**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 ☐

**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

☐

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

- a. Yes, sufficient agreements have existed since before the adoption of the GPA ☐
- b. Yes, sufficient agreements exist because of progress made since the adoption of the GPA ☐
- c. Yes, some agreements exist (progress has been made since the adoption of the GPA) ☐
- d. Yes, some agreements 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 information:

Australia ratified the Convention on Biological Diversity and is a signatory to the Nagoya Protocol. Changes to domestic legislation need to be undertaken before Australia can ratify the Nagoya Protocol. Australia is also a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which means that wild harvest of native animals are subject to regulatory control. However, there are no specific arrangements for access and benefit sharing related to animal genetic resources for food and agriculture.

**24. Have training and technical support programmes for the breeding activities of livestock-keeping communities 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 ☒

**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

☐

**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 ☐

**27. Have efforts been made in your country to promote products derived from indigenous and local species and 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 ☐

**28. If applicable, please list priority requirements for enhancing the sustainable use and development of animal genetic resources in your country - please be as specific as possible:**

**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):**

Within the regional and international context, Australia, through the Australian Centre for International Agricultural Research (ACIAR), AusAID and other privately and publicly funded programs provides training to overseas scientists and assists overseas countries to develop their agricultural systems. A particular focus is on Australia's near neighbours in the Pacific and South East Asian region, although Australia is involved with projects around the world.

Australia is unique in being a developed nation with large areas of agricultural lands in the tropics and arid zones. As such, aspects of Australian science relating to tropical agriculture and those related to the arid zone can be passed on to developing countries in the region and those situated within a similar climatic zone. Australia exports semen and embryos from cattle and sheep, and live cattle for breeding programs to a number of countries, including China, Indonesia and Russian Federation.

### 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 ☐

**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:**

Analyses of Australian Dairy Herd Identification Scheme (ADHIS) records indicate a significant level of inbreeding in the Holstein-Friesian breed. The increased use of artificial insemination and extensive use of a small number of high-performing bulls has contributed to this trend.

Australia's livestock industry is based around exotic breeds. A number of these are under threat of extinction in their country of origin. Australia still has a number of these breeds (British breeds in particular) and there are attempts to establish programs to ensure their survival. However, their overall number in Australia is small, and ensuring a sustainable gene pool for future breeding while preventing severe inbreeding will be a challenge.

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

- a. Yes, comprehensive policies and programmes have been in place since before the adoption of the GPA ☐
- b. Yes, comprehensive policies and programmes exist because of progress made 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 ☒

**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 ☒

**34. What measures are being used in your country to conserve breeds at risk of extinction and to prevent breeds from becoming at risk (SP 8 and SP 9)?**

***In situ***

*Glossary: In situ - support for continued use by livestock keepers in the production system in which the livestock evolved or are now normally found and bred.*

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

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:

Industry determines which species need conserving. Commercial returns to farmers are crucial in ensuring the survival of (rare) breeds. The preservation of breeds is therefore highly dependent on the successful marketing and consumption of these breeds. Niche markets are being created that promote the meat quality of some of these breeds. It is anticipated that selected supermarket groups will be stocking brand/ breed marketed boutique meat based on selected breeds.

Organisations such as the RBTA play a role in monitoring the status of rare breeds. Initiatives are underway to build rare breed farms to ensure a secure supply of meat from selected rare breeds in an attempt to promote products from these animals (including beef and turkey) and thus to provide a means of rescuing these breeds from extinction. The RBTA is playing a pivotal role in this program, it is currently involved in setting up a farm animal conservation trust that aims to ensure the survival of some selected breeds, such as the Wessex Saddleback pig, which no longer exist in their country of origin.

Native species are farmed or harvested from the wild and are currently present in sufficient numbers. As indicated in Q23, these species are part of Australia's obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The conservation management plans help to ensure that the international trade does not lead to extinction of the species.

***Ex situ in vivo***

*Glossary: Ex situ in vivo - 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.*

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

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:

### ***Ex situ in vitro***

*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.*

- i. Yes ☒
- j. No, but action is planned and funding identified ☐
- k. No, but action is planned and funding is sought ☐
- l. No ☐

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:

Not formally. The respective industries have *ex situ* storage in place for their breeds of importance. This is to ensure future access to genetic stock for breeding purposes, mostly in relation to productivity, quality traits, environmental adaptation - including climate change, external drivers such as green house gas emissions associated policies, etc.

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

- a. Yes ☐
- b. No ☐

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

- a. Yes ☒
- b. No ☐
- c. No major barriers and obstacles exist. Comprehensive conservation programmes are in place ☐

If yes, please list them, being as specific as possible:

As indicated previously, the main breeds in Australia are derived from exotic genetic material. Australia has conducted selected adaptive breeding programmes that have resulted in some unique domestic breeds that are highly suitable to the Australian environment. The not-for-profit organisations that conduct regular inventories of rare breeds in Australia find it difficult to obtain funding. It should be noted that, with some exceptions, the breeds in question still exist in their countries of origin, albeit sometimes at very low numbers.

Initiatives are underway to build rare breed farms to ensure a secure supply of meat from selected rare breeds in an attempt to promote products from these animals (including beef and turkey) and thus to provide a means of rescuing these breeds from extinction. The RBTA is playing a pivotal role in this program.

### **37. 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?

- c. Yes ☐

- d. No, but action is planned and funding identified ☐
- e. No, but action is planned and funding is sought ☐
- f. No ☐

**38. 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 ☐

**39. 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 ☐

**40. 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 ☐

If yes, briefly describe the research:

There is research into the development of new methods for *ex situ* conservation of AnGR for food and agriculture and *in situ* conservation for Australian native animals (not generally considered AnGR for food and agriculture). While Australian agriculture depends on cryopreservation to underpin its artificial insemination industries and allow the relatively low-risk import of genetic resources, it falls to the private sector to determine what technologies/ techniques are best and how they are used for conservation purposes, and indeed to what level conservation is undertaken.

**41. 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 ☒

**42. What are your country's priority requirements for enhancing conservation measures for animal genetic resources? Please list them, being as specific as possible:**

See answer to question 12.

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

#### Strategic Priority Area 4: Policies, Institutions and Capacity-building

- 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

**44. Has your country assessed its national institutional capacity to support holistic planning of the livestock sector since the adoption of the GPA (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 ☒

**45. Have tools been developed for national planners to use in shaping the future development of the livestock sector in accordance with national priorities, including in relation to the deployment of animal genetic resources (SP 12, Action 4)?**

- a. Yes, the development of tools commenced before the adoption of the GPA ☒
- b. Yes, the development of tools 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 ☐

If yes, please describe the tools:

There are many tools that researchers, breeders and producers can use to assess genetic resources or improve breeding outcomes. These are primary web based, and some examples are given in *Farm animal genetic resources: second national report - Australia*, which was sent to the FAO in late 2012.

**46. 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 a copy of your country's national strategy and action plan as a separate document or a web link to the document:

http://

**47. 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 ☐

**48. Has your country established or strengthened a national database for animal genetic resources (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 ☒

**49. 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 ☐

**50. 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 ☒

If yes, list its main functions:

**51. 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 ☒

**52. Does the National Focal Point 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 ☒

If yes, briefly describe them:

**53. Have national policies and legal frameworks for animal genetic resources been reviewed and appropriate changes made if necessary (SP 20)?**

- a. Yes, frameworks were reviewed before the adoption of the GPA and appropriate changes made ☐
- b. Yes, frameworks have been reviewed since the adoption of the GPA and appropriate changes made ☐
- c. Yes, frameworks have been reviewed since the adoption of the GPA, but appropriate changes not yet made ☐
- d. No, but action is planned and funding identified ☐
- e. No, but action is planned and funding is sought ☐
- f. No ☒

**54. Have your country's needs for research and education been reviewed in all areas of management of animal genetic resources since the adoption of the GPA (SP 13, 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 ☒

If yes, briefly describe them:

**55. Have partnerships been established among research, training and extension institutions and networks of researchers, breeders and conservation organizations to support the implementation of the Global Plan of Action (SP 14, Action 2)?**

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

**56. 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 ☐

**57. 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:

Rare Breeds Trust of Australia: <http://www.rbta.org/>

**58. 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 ☐
- d. No ☐

**59. Please provide further comments describing specific activities related to Strategic Priority Area 4: Policies, Institutions and Capacity-building (including regional and international cooperation):**

The world class genetic evaluation programs that play a major role in ensuring the efficiency of animal-based agriculture in Australia have been largely developed and implemented through the actions of various RDCs, industry associations, universities and government agencies. Individual breed societies, producer groups and some NGOs have also been instrumental in the development and implementation of these programs. They generally act together with organisations and associations conducting the research and there is ready exchange of data and services amongst the groups.

Livestock industries associations and research institutes have played, and continue to play, a vital role in addressing issues of national importance concerning the livestock industry:

- Improving the environmental sustainability of livestock production systems.
- Developing climate change adaptation and greenhouse gas mitigation schemes.
- Improving the information infrastructure through recording schemes and appropriately linked databases to address the increasingly complex livestock objectives required to meet the needs of society and commerce.
- Technology transfer. For example, Dairy Australia, Meat and Livestock Australia and Australian Wool Innovation fund information programs for all animal producers.
- Increasing the availability of information on performance standards for breeds, including knowledge transfer through extension services.
- Training in genetic management and the operation of livestock conservation and improvement schemes.
- Funding individual research programs, in collaboration with breeding companies and research institutes, into genetic management and selection techniques for livestock improvement programs and new approaches to the sustainable use of genetic variation in livestock.
- Cryopreservation of genetic material for the preservation of genetic variability. Gene Banks are generally maintained by service provider companies and breeding companies.

## 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

**60. 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 ☒

If yes, briefly describe the collaboration:

Australian researchers collaborate with many countries in the area of farm animal science.

**61. 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:

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

- a. Yes ☐
- b. No ☒

If yes, provide brief details:

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

- a. Yes ☐
- b. No ☒

If yes, provide brief details (from whom, for what, how much):

**64. Has your country established or strengthened international research and education programmes to assist developing countries and countries with economies in transition to better manage animal genetic resources (SP 16)?**

- a. Yes, programmes established before the adoption of the GPA and strengthened since ☐
- b. Yes, programmes established before the adoption of the GPA but not strengthened since ☒
- c. Yes, programmes established 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 ☐

If yes, briefly describe them:

These are related to sustainable development in general, and in some cases can include better animal husbandry systems and have included projects for the characterisation of some genetic resources in countries in the Southwest Pacific region.

**65. Has your country established or strengthened international support to assist developing countries and countries with economies in transition to obtain training and technologies and to build their information systems (SP 15)?**

- a. Yes, programmes established before the adoption of the GPA and strengthened since ☒
- b. Yes, programmes established before the adoption of the GPA but not strengthened since ☐
- c. Yes, programmes established 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 ☐

If yes, provide brief details:

Projects for the characterisation of some animal genetic resources in countries in the Southwest Pacific region have been conducted, along with awareness-raising workshops in the same region.

**66. 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 ☐

If yes, provide brief details and specify whether it was bilateral or multilateral; research cooperation or aid; and to whom and for what it was given:

--