



# 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: United Kingdom

## 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).

### **Key trends and driving forces affecting animal genetic resources management in your country**

Agriculture is crucial to the UK economy, food production and food security and it is central to our way of life. Agriculture forms an integral part of the rural infrastructure, is a significant employer particularly in rural areas and has a vital role in conserving biodiversity and the natural environment.

Agriculture accounts for 70% of total land use within the UK. In 2011, the total area of land on agricultural holdings in the UK was 17.2 million hectares. Around 72% of this is grassland used for grazing livestock and the remainder is used to grow crops. Over 7 million hectares of farmland in the UK are managed under agri-environment schemes, which incentivise farmers to adopt land management and farm practices that are beneficial to the environment.

UK agriculture's contribution to the national economy was estimated at £7.1 billion in 2010. By value, it provides us with around 60% of our food. The food and drink industry was estimated to contribute £24.6 billion to the national economy in 2010 - and is the dominant form of land use. Agriculture provided direct employment to 476,000 people (including farmers and spouses) in 2011.

### **Strengths, weaknesses and gaps in capacity to manage animal genetic resources in your country**

The UK has firm capacity to support and manage its animal genetic resources and a National Action Plan helps to guide this support. The UK has fully functional NFP for AnGR as well as an Expert Committee for the conservation and sustainable use of FAnGR (see <http://www.defra.gov.uk/fangr/>). There are strong links between the NFP, FAnGR stakeholders and the Expert Committee and we use these links frequently on FAnGR business. Additionally there is a mature system of stakeholder bodies (national Breed Societies and species organisations), industry platforms and support networks funded by levy and the taxpayer that help unify the various sectors to manage our genetic resources sensibly.

Our main weakness is the absence of an improved, automated, cost effective FAnGR database supporting more regular

monitoring of UK FAnGR (even though we maintain EFABIS and another genetic resources website). We hope to have the improved database operating shortly.

#### **Key constraints and challenges with respect to animal genetic resources management in your country**

Key constraints and challenges include the availability of national and international funding and resources and recognition of FAnGR in UK policies and strategies - especially so in respect of poultry genetic resources.

#### **Priorities and strategic directions for future action (focusing particularly on the next ten years)**

The UK believes that FAnGR has a key role in helping to address key future challenges for agriculture. These include:

- Global population growth - and feeding the future population sustainably
- Living with Climate change
- Scarcity of resources for agriculture (including genetic resources diversity, energy, water and minerals)
- Stronger focus on sustainable use of resources

To address these challenges we expect to focus on the following activities:

- Providing expert advice where needed (for example on EU proposals on zootechnical matters, EU proposals on cloning, EU proposals on its future Genetic Resources programme and input into consultations etc);
- Development and implementation of an improved FAnGR monitoring system;
- Advising on best practice in integrated in situ and ex situ conservation strategies, including identifying current gaps, and incentives to address these which do not deter private involvement;
- Continuing work to raise the awareness of FAnGR;
- Networking and engagement in the appropriate forums to represent UK FAnGR interests
- Continuing to press for FAnGR to be integrated into all relevant UK and international policies and programmes;
- Identifying research needs and supporting further research into the conservation, sustainable use and general importance of FAnGR;
- Horizon scanning and looking at new technologies such as reproductive technologies, genetic modification, genome editing, genomic selection, biobanking, cryopreservation, animal and animal product identification/traceability/ authenticity.

## **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).

Data is extractable from the UK system but is not readily available on a public website.

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.

Large increase in export of cattle pig and poultry genetics to Russian Federation and China.

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.*

These commercial operations fund R&D which enable mainstream AnGR to be utilised sustainably and which also provide techniques applicable to the conservation of breeds at risk.

## 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	neutral
Changing demand for livestock products (quality)	high	high	positive
Changes in marketing infrastructure and access	medium	medium	positive in specialist marketing and negative in mainstream
Changes in retailing	high	high	positive in specialist marketing and negative in mainstream
Changes in international trade in animal products (imports)	medium	medium	neutral

Drivers of change	Impact on animal genetic resources and their management over last ten years	Future impact on animal genetic resources and their management (predicted for the next ten years)	Describe the effects on animal genetic resources and their management
Changes in international trade in animal products (exports)	low	medium	positive
Climatic changes	low	medium	neutral
Degradation or improvement of grazing land	low	medium	neutral
Loss of, or loss of access to, grazing land and other natural resources	low	medium	neutral
Economic, livelihood or lifestyle factors affecting the popularity of livestock keeping	medium	high	positive
Replacement of livestock functions	low	low	neutral
Changing cultural roles of livestock	low	low	neutral
Changes in technology	medium	high	positive
Policy factors	high	high	positive
Disease epidemics	medium	high	negative

## 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)	9	3
Cattle (specialized beef)	22	14
Cattle (multipurpose)	6	0
Sheep	60	20
Goats	5	11
Pigs	34	5
Chickens	60	58
Ducks	15	17
Geese	8	15
Turkeys	10	7
Horses	21	52

## 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)	22	22	high	medium	high	medium	high	low
Cattle (specialized beef)	48	48	medium	high	medium	low	medium	low
Cattle (multipurpose)	27	27	low	medium	high	none	low	none
Sheep	95	95	medium	low	low	low	low	none
Goats	19	19	low	none	medium	none	none	none
Pigs	28	28	high	medium	high	low	none	none
Chickens	33	0	low	low	low	medium	none	none
Ducks	12	0	low	low	low	low	low	low
Geese	6	0	low	low	low	low	low	low
Turkeys	8	0	low	low	low	low	low	low

## 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	medium
Research	high
Knowledge	medium
Awareness	high
Infrastructure	high
Stakeholder participation	high
Policies	medium
Policy implementation	high
Laws	high
Implementation of laws	high

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	<ul style="list-style-type: none"> <li>• There is no tertiary education in FAnGR management in the UK. Conservation biology in general focuses on floral and faunal biodiversity. Thus for example the 14th Student Conference on Conservation Science, held at Cambridge University in March 2013 (<a href="http://www.sccs-cam.org/Pdfs/2013/SCCS_Report_2013v4.pdf">http://www.sccs-cam.org/Pdfs/2013/SCCS_Report_2013v4.pdf</a>) included nothing on FAnGR; it was attended by over 300 people including 171 postgraduate students working in conservation science, with students attending from 63 countries.</li> <li>• There are only a few Master's degree courses in conservation biology and those are not heavily subscribed. The MRes programme in Biodiversity, Evolution and Conservation at University College London (probably the UK's longest established conservation biology master's degree) only has 8 students, of whom 5 are from outside the EU.</li> <li>• There are a Masters programmes/courses in Animal Breeding and Genetics in Scotland. 4 students graduated in 2012; and were 1 UK MSc, 2 EU MSc and 1 UK Diploma. Enrolments in 2012 are 1 from the UK and 3 from overseas.</li> <li>• At Masters level, universities will usually be supportive towards students who nominate their own dissertation topics. Thus for example Glasgow has three master's programmes, any of which might involve work with farm animals for their research projects. MSc Animal Welfare Science, Ethics and Law; MSc Quantitative Methods in Biodiversity, Conservation and Epidemiology; MRes Ecology and Environmental Biology. This year there are 10 international students, 25 UK, and 6 other EU students. Undergraduate degrees in conservation biology are offered by 20 higher education institutions; in the outline course descriptors, none mention FAnGR and genetics appears to be optional in most, if not all.</li> </ul>
Research	<ul style="list-style-type: none"> <li>• The UK has contributed significantly to aspects of quantitative, population and molecular genetics and information handling relevant to FAnGR. Considering large EU-funded projects on FAnGR (PIGBIODIV, AVIANDIV, ECONOGENE, NEXTGEN, Heritage Sheep, EURECA, ELBARN, EFABIS, GLOBALDIV) the UK led two (PIGBIODIV and Heritage Sheep) and was a partner in 3 others; the UK contribution was for the most part in molecular genetics.</li> <li>• Work on quantitative and population genetics of livestock has also involved international collaboration and has tended to be funded by national governments. There has been very little research in user-friendly tools for management of AnGR.</li> </ul>
Knowledge	Dissemination of guidance to breed societies is problematic, primarily because of limited financial resources.



	Description
Awareness	Awareness is generally high except that clear rules are not yet in place relating to the culling of important nucleus herds and flocks in the event of disease outbreaks.
Infrastructure	In the UK context, infrastructure for AnGR management is essentially the same as that needed for pedigree breeding (facilities for cryoconservation, shows and sales, breed administration) and is fully adequate.
Stakeholder participation	Through breed societies and NGOs such as the Rare Breeds Survival Trust, and Defra's FAnGR Expert Committee, participation is facilitated, though (as is general in conservation) good inter-personal relations are critically important.
Policies	The Rural Development Programme review is under way. Outcomes, in the form of support regimes, may or may not be favourable to FAnGR. Policies for support of FAnGR have not however taken adequate account of the needs of non-grazing livestock (notably pigs and poultry). Whether the importance of FAnGR is fully appreciated by veterinary officials, is not entirely clear.
Policy implementation	Policy implementation is effective, but one key policy - support through Rural Development Programme for native breeds at risk - has not been effectively monitored, in that data on the actual breeds supported and the numbers of animals involved, have not been gathered.
Laws	Relevant laws are those putting EU Directives on FAnGR into effect.
Implementation of laws	Implementation of relevant laws is consistent and effective.

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

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

Livestock in the UK is in the private sector and can be fragmented, with breeding decisions taken by owners and managers. However there is a mature system of stakeholder bodies (national Breed Societies and species organisations), industry platforms and support networks funded by levy and the taxpayer that bring together breeding strategies and objectives. Additionally there is increasing awareness of genetic issues and better information and tools all of which facilitate genetic management and, in principle, monitoring.

## 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)	no	yes	yes	yes	yes	yes	yes
Cattle (specialized beef)	no	no	yes	yes	no	yes	yes
Cattle (multipurpose)	no	no	yes	yes	no	yes	yes
Sheep	no	no	yes	yes	no	yes	yes
Goats	no	no	yes	no	no	yes	yes
Pigs	no	no	yes	yes	no	yes	yes
Chickens	no	no	yes	yes	no	yes	yes
Ducks	no	no	yes	yes	no	yes	yes
Geese	no	no	yes	no	no	yes	yes
Turkeys	no	no	yes	yes	no	yes	yes

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

Others include individual breeders, in the case of the rarest breeds which may exist on only one holding (for example Chillingham and Swona cattle).

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)	6	1	6	1	6	1	6	1	0	0	0	0	0	0	0	0
Cattle (specialized beef)	20	9	20	9	20	9	20	9	0	0	0	0	0	0	0	0
Cattle (multipurpose)	4	1	4	1	4	1	4	1	0	0	0	0	0	0	0	0
Pigs	14	3	14	3	14	3	14	3	0	0	0	0	0	0	0	0
Sheep	28	7	28	7	28	7	28	7	0	0	0	0	0	0	0	0
Goats	0	1	0	1	0	1	0	1	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
Sheep	10	0	6	0
Pigs	0	0	0	0
Cattle (specialized dairy)	1	1	4	0
Cattle (specialized beef)	9	0	10	0
Cattle (multipurpose)	3	0	0	0
Goats	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	high
Cattle (specialized beef)	medium	high
Cattle (multipurpose)	medium	high
Sheep	medium	high
Goats	low	medium

Species	Training	Research
Pigs	medium	high
Chickens	medium	high
Ducks	low	low
Geese	low	low
Turkeys	low	medium

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)	high
Cattle (specialized beef)	medium
Cattle (multipurpose)	low
Sheep	medium
Goats	low
Pigs	high
Chickens	high
Ducks	medium
Geese	low
Turkeys	medium

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

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

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

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

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

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

n/a

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.

The UK Governments play a low part in the implementation of most of the activities with the exception of animal identification for the mammalian (but not avian) species. The UK Governments do provide support for research on all aspects of farm livestock (e.g. productivity, welfare, genetics, identification) with emphasis on the mammalian species (except goats) and chickens.

Research organisations deliver the research commissioned by the UK Governments, production companies and breeders associations. Most research is directed at the mammalian species (except goats) and chickens. Breeders associations may set goals in breeding programmes (e.g. by either maintaining pure-breeding or, in some breeds, by selective introgression to achieve objectives considered desirable). They also develop and use genetic evaluation indices to support their breeding aims and may commission data collection and analysis to track progress. Some also collect and store *ex situ* genetic resources such as semen for use in AI.

National Commercial Companies are predominant in the pig and poultry (chickens and turkeys) industries where they conduct highly developed breeding programmes to develop hybrid strains with high productivity etc. They are also very important in the delivery of AI services in dairy cattle, and to a lesser extent beef cattle, breeding programmes. External Commercial Companies are not active in the UK.

NGOs play a low role in breeding programmes except for the rarest breeds of all species where the aims are to maintain genetic variability and to increase numbers. In the rare mammalian breeds there is a low level of AI provision by NGOs.

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)	yes
Sheep	yes
Goats	yes
Pigs	no
Chickens	no
Ducks	no
Geese	no
Turkeys	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)	Support is through existing agri-environment scheme elements which are very different in each of the four parts of the UK (including different species being eligible in different nations/DAs). The only measure that might qualify as being aimed specifically at supporting breeding programmes in the UK is the NI CMS 'headage' support for Irish Moiled cattle (a locally-adapted breed in FAO defined terms).

Species	Description of policies or programmes
Cattle (specialized beef)	Support is through existing agri-environment scheme elements which are very different in each of the four parts of the UK (including different species being eligible in different nations/DAs). The only measure that might qualify as being aimed specifically at supporting breeding programmes in the UK is the NI CMS 'headage' support for Irish Moiled cattle (a locally-adapted breed in FAO defined terms).
Cattle (multipurpose)	Support is through existing agri-environment scheme elements which are very different in each of the four parts of the UK (including different species being eligible in different nations/DAs). The only measure that might qualify as being aimed specifically at supporting breeding programmes in the UK is the NI CMS 'headage' support for Irish Moiled cattle (a locally-adapted breed in FAO defined terms).
Sheep	Support is through existing agri-environment scheme elements which are very different in each of the four parts of the UK (including different species being eligible in different nations/DAs).
Goats	Support is through existing agri-environment scheme elements which are very different in each of the four parts of the UK (including different species being eligible in different nations/DAs).
Pigs	none
Chickens	none
Ducks	none
Geese	none
Turkeys	none

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)	Rapid genetic progress towards several breeding goals. In the last 10 years the emphasis has changed from production goals towards survival traits such as health and longevity. Planning of matings to restrict the rate of increase of inbreeding is, however, a secondary consideration. Application of the EU rule that three top crosses confers purebred status is detrimental to conservation planning and monitoring. Strengthening of monitoring and conservation of "original populations" is necessary.
Cattle (specialized beef)	Rapid genetic progress primarily towards growth rate and lean meat yield, accelerated in all native commercial breeds including several of those at risk, by the use of continental breeds and "daughter" breeds from overseas. Application of the EU rule that three top crosses confers purebred status is detrimental to conservation planning and monitoring. Strengthening of monitoring and conservation of "original populations" is necessary.
Cattle (multipurpose)	Breeds in this category are not systematically selected though individual breeders may well have breeding goals. Genetic conservation is often a high priority for these breeders.
Sheep	Several breeds have systematic breeding programmes using EBVs. This is particularly evident in the terminal sire breeds, though it is also found in some hill breeds. Very many breeds are not systematically selected though individual breeders may well have breeding goals. Genetic conservation is often a high priority for these breeders. The Government imposed a breeding plan for the elimination of scrapie-susceptible alleles from the national sheep flock, and this was (correctly) accompanied by a cryoconservation programme.
Goats	There is virtually no systematic recording and breeding of dairy goats, elite herds probably depending on genetic advance in continental goat industries. Several breeds are not systematically selected though individual breeders may well have breeding goals. Genetic conservation is often a high priority for these breeders.

Species	Description of consequences
Pigs	In the commercial sector most farmers purchase gilts and boars from companies where there has been rapid genetic progress primarily towards growth rate and lean meat yield and fecundity. In the traditional sector breeds in this category are not systematically selected though individual breeders may well have breeding goals. Genetic conservation is often a high priority for these breeders.
Chickens	In the commercial sector most farmers purchase birds from companies where there has been rapid genetic progress primarily towards growth rate and lean meat and egg yield. In the traditional sector breeds in this category are not systematically selected though individual breeders may well have breeding goals. Genetic conservation is often a high priority for these breeders.

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.

Constraints are at two levels:

- (1) the provision of information and guidance to breed societies for the development of conservation breeding programmes. This is being addressed through implementation of the results of the GC0146 research project;
- (2) lack of information flow from breed societies to policy makers. Defra FAnGR committee is seeking ways of establishing a database system to achieve this.

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)	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Cattle (specialized beef)	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Cattle (multipurpose)	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Sheep	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Goats	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Pigs	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Chickens	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Ducks	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Geese	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.
Turkeys	In England, we are hoping to include measures in the next RDP to support conservation breeding programmes for our native breeds 'at risk' in all the species & categories listed, plus equines, ducks, geese, and turkeys.

## 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	none	low
Cattle (specialized beef)	high	none	low
Cattle (multipurpose)	high	none	medium
Sheep	high	none	medium
Goats	high	none	low
Pigs	high	none	medium
Chickens	low	none	none

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

- yes  
 no

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

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

	Considered in formal prioritization approaches
Risk of extinction	yes
Genetic uniqueness	yes
Genetic variation within the breed	no
Production traits	no
Non-production traits	no
Cultural or historical importance	yes
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	yes	yes	yes	yes	no	no	no	yes	no	yes	yes
Private sector	yes	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Cattle (specialized dairy)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Cattle (specialized beef)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Cattle (multipurpose)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sheep	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Goats	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pigs	yes	no	no	yes	yes	yes	yes	yes	no	yes	yes	yes
Chickens	no	no	no	no	no	yes	no	no	no	yes	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.

The public sector does not promote any specific commercial markets or breed related cultural activities - but aims to create an enabling environment in which all markets and cultural activities have the potential to flourish and be successful. Whilst the public sector may not be directly responsible for breed at risk conservation breeding programmes, selection programmes and promotion of tourist attractions - these issues are taken seriously - for example the UK government recently funded a research project 'Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance' <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18551&FromSearch=Y&Publisher=1&SearchText=gc0146&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

The private sector, including Breeders Organisations and NGOs, promote at-risk breeds at livestock shows and as tourist attractions in farm parks. Some at-risk breeds are considered superior in habitat and landscape management and are used by conservation organisations and by private individuals grazing land on behalf of conservation organisations. Some breeders associations have awards for the best flock/herd, sometimes sub-divided by size. The Rare Breeds Survival Trust and some breeders associations operate voluntary conservation breeding programmes and extension programmes. Some breeders associations operate selection programmes for productivity. Additional conservation activity is performed in the British Pig Association ([www.britishpigs.org/](http://www.britishpigs.org/)); National Sheep Association ([www.nationalsheep.org.uk/](http://www.nationalsheep.org.uk/)); National Beef Association ([www.nationalbeefassociation.com/](http://www.nationalbeefassociation.com/)); The Rare Poultry Society



(<http://www.rarepoultrysociety.co.uk/>) ; The Poultry Club of Great Britain (<http://www.poultryclub.org/>); The Cobthorn Trust (<http://www.cobthorn.org/>).

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.

There is not a single (or distributed) bank wholly in state ownership and no current plans to develop one. A national archive for rare breeds was formally established in 2002/3 by the national NGO the Rare Breeds Survival Trust (RBST); and is stocked through an ongoing programme of collection carried out with the help of breed associations. Additionally some years ago an Ovine Semen Archive was developed by UK Government in association with national sheep industry stakeholders - this Archive is now maintained independently by national industry stakeholders. Gene banks for pigs exist and are maintained by breeder organisations or other NGOs. The UK continues to look for cost effective ways to improve its current national gene banking arrangements. Also the UK is an active participant in the ERFP EX Situ Working Group and looks for opportunities to collaborate and improve national and regional ex situ arrangements in this forum.

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	yes
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)	5	2	yes	no	yes	no	yes

Species	Number of breeds for which material is stored	Number of breeds for which sufficient material is stored	Does the collection include material from not-at-risk breeds?	Have any extinct populations been reconstituted using material from the gene bank?	Have the gene bank collections been used to introduce genetic variability into an in situ population?	Have the gene bank collections been used to introduce genetic variability into an ex situ population?	Do livestock keepers or breeders' associations participate in the planning of the gene banking activities?
Cattle (specialized beef)	22	6	yes	no	yes	no	yes
Cattle (multipurpose)	7	1	no	no	yes	no	yes
Sheep	73	18	yes	no	no	no	yes
Goats	2	0	no	no	no	no	yes
Pigs	11	0	no	no	no	no	yes
Chickens	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.

Large White Semen frozen in the 1980's when the pedigree population was more than 10 times the current size has recently been used to inseminate Large White sows. 50 year old Dexter bull semen has been used in the critically endangered Original Population Project, with great success. There are other examples from other breeds and species. There is not a single (or distributed) bank wholly in state ownership and no current plans to develop one. A national archive for rare breeds was formally established in 2002/3 by the national NGO the Rare Breeds Survival Trust (RBST); and is stocked through an ongoing programme of collection carried out with the help of breed associations. Additionally some years ago an Ovine Semen Archive was developed by UK Government in association with national sheep industry stakeholders - this Archive is now maintained independently by national industry stakeholders. Gene banks for pigs exist and are maintained by breeder organisations or other NGOs. The UK continues to look for cost effective ways to improve its current national gene banking arrangements. Also the UK is an active participant in the ERF EX Situ Working Group and looks for opportunities to collaborate and improve national and regional ex situ arrangements in this forum.

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.

The UK is an active participant in the ERF EX Situ Working Group and in this forum is considering opportunities (no strategy has yet been confirmed or agreed) for a virtual regional ex situ gene bank (or inventory) that relies upon the existing gene bank resources in countries and better coordinating and joining up of these resources - rather than creating a new resource.

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.

The following breeds were formerly classified as at SEVERE risk of extinction but have recovered to a position in which they are no longer at SEVERE risk: (N.B. These lists of breeds are solely compiled by the RBST and do not necessarily reflect any published official Defra lists of UK 'breeds at risk' - e.g. the UK BAR and UK NBAR lists):

Cattle: Beef Shorthorn, Belted Galloway, Longhorn, Red Poll

Sheep: Black Welsh Mountain, Hebridean, Jacob, Kerry Hill, Lleyn, Llanwenog, Ryeland, Shetland, Shropshire, Southdown, South Wales Mountain, Wiltshire Horn

For all the breeds listed the primary reason for the recovery in numbers was the action taken by the Rare Breeds Survival Trust (RBST), a charitable NGO dedicated to the conservation of the UK's native breeds of farm animals. A secondary contribution to recovery (or at least maintenance of recovered populations) has been that keepers of the breeds listed were eligible for financial support through the various agri-environment schemes in the constituent countries of the UK. For example, in England there were two supplements that were linked to habitat management for specific conservation objectives under the Higher Level of the Environmental Stewardship agri-environment scheme. The first supported native breeds of grazing animals at risk from extinction (using EU numerical definitions of at risk) provided these were used for grazing habitats of conservation value. The second supported the use of cattle (both breeds at risk and breeds not at risk) if these were used for grazing habitats of conservation value. Note that participation in all UK agri-environment schemes is voluntary and, in addition, the supplements for grazing with cattle and/or breeds at risk were discretionary (i.e. paid only where the habitat management was deemed a priority).

See full text in the annex at the end of this document.

## 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)	low	low	low	low	low	low	low	low	low
Cattle (specialized beef)	low	low	low	low	low	low	low	low	low
Cattle (multipurpose)	low	low	low	low	low	low	low	low	low
Sheep	low	low	low	low	low	low	low	low	low
Goats	low	low	low	low	low	low	low	low	low
Pigs	low	low	low	low	low	low	low	low	low
Chickens	low	low	low	low	low	low	low	low	low
Ducks	low	low	low	low	low	low	low	low	low
Geese	low	low	low	low	low	low	low	low	low
Turkeys	low	low	low	low	low	low	low	low	low

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

A variant of genetic modification (genome editing) of livestock is currently being researched in pigs.

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	no	no	no	no	yes	yes
Embryo transfer	no	no	no	no	yes	yes

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.

Advanced reproductive technologies for cattle and pigs are provided by commercial companies or in some cases veterinary practices (e.g. embryo transfer and IVF in cattle).

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	yes	no
Semen sexing	yes	yes
<i>In vitro</i> fertilization	yes	yes
Cloning	no	no
Genetic modification	yes	yes
Use of molecular genetic or genomic information for estimation of genetic diversity	yes	yes
Use of molecular genetic or genomic information for prediction of breeding values	yes	yes
Research on adaptedness based on molecular genetic or genomic information	yes	yes
Genome editing	yes	yes

30.1. Please briefly describe the research.

Government and private sector funded projects on reproductive technologies in cattle, sheep and pigs.  
 Genomic characterisation, association studies and genomic selection research in all UK livestock species.  
 Genome editing research in pigs funded by Government and the private sector.  
 An international collaboration with the US and Kenya (ILRI) on genetic modification of cattle for disease resistance.  
 Research on GM chickens and their resistance to disease.  
 Primordial germ cell research in chickens.

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.

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

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.

Mainstream breeders using dense SNP data will monitor diversity in mainstream populations (for their own use, not for publication). Genomic information used in some diversity studies or rare breeds but such information not used in conservation strategies as far as we know. Genomic selection has been adopted in dairy cattle, pigs and poultry and is being explored in other species and sectors - this will allow us to consider wider breeding objectives. Constraints do exist and the UK would support an open debate on the science, as the science for many technologies has advanced and changed significantly in recent years.

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

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

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



	Extent of collaboration	Description
Development of joint national strategies or action plans	limited	Recently we have started an exercise to share expertise, knowledge and experience across the areas of AnGR and PGR; hopeful it will lead to greater learning, integration and management improvements in addressing more widely genetic resources for agriculture. Additionally (and for a longer period) some positions in UK government hold responsibility for both AnGR and PGR also working to integrate issues manage and bring issues together where appropriate.
Collaboration in the characterization, surveying or monitoring of genetic resources, production environments or ecosystems	limited	Forest Research have been involved with the Dr John Wooliams at the Roslin Institute, Edinburgh University for 2 EU funded projects (NovelTree and ProCoGen) which involved genome scanning, a new technique developed in animal genetics, to search for genetic markers within Sitka spruce that could be used to identify good individuals early for breeding. This was supported by work that was undertaken with Prof Mark Blaxter at Genepool (Edinburgh Uni) to develop RAD sequencing that would allow very fast genotyping of SNIPs without prior knowledge of the genome.
Collaboration related to genetic improvement	limited	See above
Collaboration related to product development and/or marketing	none	
Collaboration in conservation strategies, programmes or projects	limited	Forest Research have used Genepool to sequence the bacterial agent involve with horse chestnut bleeding canker. There is also a project looking at wood ants ( <i>Formica lugubris</i> ) with Dr Elva Robinson at York Uni as part of a landscape genetic project.
Collaboration in awareness-raising on the roles and values of genetic resources	limited	Recently we have started an exercise to share expertise, knowledge and experience across the areas of AnGR and PGR; hopeful it will lead to greater learning, integration and management improvements in addressing more widely genetic resources for agriculture. Additionally (and for a longer period) some positions in UK government hold responsibility for both AnGR and PGR also working to integrate issues manage and bring issues together where appropriate.
Training activities and/or educational curricula that address genetic resources in an integrated manner	limited	
Collaboration in the mobilization of resources for the management of genetic resources	limited	Recently we have started an exercise to share expertise, knowledge and experience across the areas of AnGR and PGR; hopeful it will lead to greater learning, integration and management improvements in addressing more widely genetic resources for agriculture. Additionally (and for a longer period) some positions in UK government hold responsibility for both AnGR and PGR also working to integrate issues manage and bring issues together where appropriate.

## 2. Please describe any other types of collaboration.

Defra Genetic Resources for Agriculture Team frequently collaborate with CGRFA, ERFP, UK FAnGR Committee, UK GRFA National Co-ordinator, UK Plant Genetic Resources Groups, UK Forrestry Genetic Resources National Co-ordinator; UK Rural Development Programmes; UK Biodiversity Strategies Teams across the UK, the administrations of

the UK, within government Departments, Teams and policy areas; on various exercises and activities. Forestry Resource Team have undertaken work for Royal Society for the Protection of Birds developing a DNA test for species recognition using droppings from red and black grouse and capercaillie and scats from foxes and pine martens.

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

There are many potential benefits from strengthening collaboration. In the UK our aim is to recruit some further but minimal) government resources for genetic resources and this is expected to improve our performance on genetic resources in a number of ways including collaboration. We also consider there may be opportunities for the UK sectors that are more advanced in genetic resources to help those sectors less advanced. Animal breeders and geneticists are far ahead of tree breeders and therefore there are potentially large benefits to be had from collaboration with them. Increasingly specialist outfits, e.g. Genepool offer a service that is equally useful to tree genetics as other forms, and this has the potential to speed up our breeding programmes immensely.

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

Severe and increasing constraints of funding (revenue and capital), staff resources (private and public sectors); stakeholder engagement and support; etc. Currently a number of the collaborations mentioned are the result of informal contacts and location convenience. The Scottish Government has set up a Scottish Biodiversity Strategy group that is trying to pull together all the different threads of biodiversity and perhaps this type of approach could be useful more widely.

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

At least partially overcome constraints by escalating genetic resources up lists of national and international (e.g. EU's CAP) priorities, new/additional sources of funding (e.g. levies, charitable trusts/foundations, etc), parity of importance with all 'wild' biodiversity, equality of support with agriculture/horticulture/silviculture/aquaculture and associated subsidies/investments, and as mentioned above some minimal additional government resources.

## 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).*

In the UK our Millennium Ecosystem Assessment (MEA) framework is widely accepted as a useful starting point. The MEA identifies four broad categories of ecosystem services including the category of 'provisioning services' where we

obtain products from ecosystems such as food, freshwater, fibre and genetic resources. FAnGR is therefore a key provisioning service within the context of ecosystems services and work is underway to try and ensure that FAnGR is fully recognised and integrated into all relevant ecosystems services policies and actions. The MEA can be found at <https://www.gov.uk/ecosystems-services>.

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).

Outcomes have yet to be realised

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).

Outcomes have yet to be realised

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.

Not applicable

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).

Not applicable

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).

Not applicable

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.

Problems include a lack of objective information on environmental impact of different breeds, different breeding goals, different breed and production systems and their combinations. A future problem is a lack of instruments to incentivise positive ecosystem and environmental outcomes once this information is available. Lack of understanding and recognition across all the relevant policy areas - which leads to insufficient priority and therefore no potential for dedicated funding or other resources.

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.

The UK responded the FAO survey 'Environmental Value of Livestock Breeds' providing information about approx 50 breeds in the UK. Information included the period of time the breed has been present, a description of the agro-ecosystem, the management of the grazing, evidence of the breeds grazing activity contributing to maintaining the agro-ecosystem and this information can be re-sent if necessary. Grazing with native breeds at risk of cattle, sheep and ponies is supported through the RDPs in England (directly) and Wales (indirectly) via current agri-environment schemes.

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.

Steps to strengthen positive links include provision of objective information on environmental impact of different breeds, different breeding goals, different breed and production systems and their combinations. Provision of instruments to incentivise positive ecosystem and environmental outcomes once this information is available. Need comprehensive recognition of FAnGR as core components of National Ecosystems, Ecosystems Services, Natural Capital, Biodiversity, Natural Resources, Nature, Natural environment management, etc. Then they can potentially be fully incorporated into Payments for Ecosystem Services, Ecosystems Markets, Biodiversity Offsetting, etc.

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

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

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

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

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

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

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

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

Please provide further details:

A full inventory for all breeds present in the UK was published by Defra in the UK Country Report on Farm Animal Genetic Resources in 2002 [<http://www.defra.gov.uk/publications/2011/05/10/pb7959-farm-animal-genetic-resources-2002/>] and in the Poultry in the UK in 2010. [[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69294/pb13451-uk-poultry-faw-101209.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69294/pb13451-uk-poultry-faw-101209.pdf)]. A commitment to updating the UK's breed Inventory was included in England's biodiversity strategy, Biodiversity 2020, which was published in August 2011. Defra recently published a second UK Country Report on Farm Animal Genetic Resources and this included the updated inventory for

all breeds in 2012 [<https://www.gov.uk/government/publications/uk-country-report-on-farm-animal-genetic-resources-2012>]. The 2012 inventory of breeds data is being transferred into the EFABIS database.

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:

Characterisation of mainstream breeds is possible, based on comprehensive performance recording systems. These systems enable breeds, families and individuals with particular commercial attributes to be identified and genetic variation within these breeds to be exploited. New approaches are making this exploitation more efficient, both for the production traits (for example milk yield, carcass composition) that have been of longstanding interest, but also for newly important traits that are less accessible to recording and selection procedures. The latter traits include those of relevance to disease resistance, animal welfare, and mitigation of climate change. In breeds at risk, scientific characterisation of the traditionally important production traits has not advanced greatly, though the specialised systems of which many are components, such as conservation grazing, are becoming well characterised at the systems level.

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:

Defra has funded research on a review of molecular characterisation studies relating to UK Farm Animal Genetic Resources. The research took place in 2009 and the final report can be found at: <http://randd.defra.gov.uk> Project No. IF0180. Understanding of the molecular mechanisms of traits controlled by many genes, such as milk yield in cows and feed conversion ratio in poultry, has not been necessary for the great advances that have been made in development of these phenotypes. The underpinning science has been quantitative, rather than molecular, genetics. However, advances in molecular genetics, and especially the availability of genotyping for many thousands of single nucleotide polymorphisms (SNPs), together with the efficient breeding structures and rich phenotypic data available, are enabling new breeding strategies, such as genomic selection. This uses both phenotypic records and genomic information to produce more accurate predictions of breeding worth. Paradoxically, the study of genes that perform no function (because they do not code for any physical product) is of great value in the characterisation of FAnGR. As these accumulate mutations at known rates, the degree to which breeds diverge in respect of these mutations can reveal how long it is since they diverged from a common stock. Work here has, however, focused less on the specifics of UK breed history than on topics of international and multidisciplinary interest such as domestication and the early development of livestock husbandry. Accessible work in breeds at risk was outlined by Review of Molecular Characterisation Studies Relating to UK Farm Animal Genetic Resources (mentioned above).

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:

Defra recently published an updated UK Country Report on Farm Animal Genetic Resources and this includes the updated inventory for all breeds in 2012 [<https://www.gov.uk/government/publications/uk-country-report-on-farm-animal-genetic-resources-2012>]. The 2012 inventory of breeds data is being transferred into the EFABIS database. A full inventory for all breeds present in the UK was first published by Defra in the earlier UK Country Report on Farm Animal Genetic Resources in 2002 [<http://www.defra.gov.uk/publications/2011/05/10/pb7959-farm-animal-genetic-resources-2002>] and in the Poultry in the UK in 2010 [[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69294/pb13451-uk-poultry-faw-101209.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69294/pb13451-uk-poultry-faw-101209.pdf)].

5. Have institutional responsibilities for monitoring the status of animal genetic resources in your country been established (SP 1, Action 3)?

*Glossary: Monitoring is a systematic set of activities undertaken to document changes in the population size and structure of animal genetic resources over time.*

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

Please provide further details:

The UK published a National Action Plan on FAnGR in 2006 which sets out responsibilities. This is available at <http://www.defra.gov.uk/publications/2011/05/10/pb12190-fangr-action-plan/>

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:

Proposals for a new FAnGR electronic monitoring system are being developed and funding for the first few years has been agreed. A robust commitment was made in the 2012 UK Country Report on Farm Animal Genetic Resources (see page 6 of this link <https://www.gov.uk/government/publications/uk-country-report-on-farm-animal-genetic-resources-2012>) to 'establish an improved, automated, effective and cost effective central database to support more regular monitoring of UK FAnGR including trends and potential threats'. This improved monitoring will enable the UK to update national and global inventory information more frequently. A Project Team in Defra are actively considering options for the provision of this database.

7. Are the population status and trends of your country's animal genetic resources being monitored regularly for all livestock species of economic importance (SP 1, Action 2)?

- a. Yes, regular monitoring commenced before the adoption of the GPA
- b. Yes, regular monitoring commenced after the adoption of the GPA
- c. Yes, regular monitoring is being undertaken for some species (coverage increased since the adoption of the GPA)
- d. Yes, regular monitoring is being undertaken for some species (coverage not increased since the adoption of the GPA)
- e. No, but action is planned and funding identified
- f. No, but action is planned and funding is sought
- g. No

Please provide further details:

The UK has periodically updated EFABIS and accordingly DAD-IS (for many breeds in the years 2002, 2006 and 2012 and for less breeds in the years 1983, 1986, 1991, 1994, 1997, 1999). Two breed inventories have been published in Country Reports in 2002 and 2013. This data contributes to the international inventory, characterisation and monitoring of breeds and production systems.

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:

The UK's FAnGR expert committee's working paper on 'Definitions of a breed for the purpose of the UK Inventory' is available at: <http://www.defra.gov.uk/fangr/2011/03/17/national-inventory/>. The Committee has also recommended revised thresholds for UK Breeds at Risk Register lists.

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:

Expansion of coverage has been recommended and adopted - links to new UK Breeds At Risk Register lists are provided below. The UK Government has produced two lists of breeds considered to be at risk in the UK, which are based on whether a breed is scarce in terms of actual numbers, measured using the number of pedigree breeding females. These lists and their criteria are:

a) UK Native Breeds at Risk (UK NBAR). All UK native breeds that are eligible for support under agri-environment schemes through EU rural development programme legislation are included within the lists of eligible Native Breeds at Risk in the UK. There are separate lists of such eligible breeds for agri-environment schemes in England, Scotland, Wales and Northern Ireland. Under these schemes (Higher Level Stewardship in England, Glastir in Wales, the Scotland Rural Priorities Scheme and the Northern Ireland Countryside Management Scheme) a grazing supplement may be paid for suitable grazing with native breeds at risk. There are [199] UK Native breeds on the most recent UK NBAR list which was published in July 2012. The current list of UK Native Breeds at Risk for use in UK Rural Development Programmes

is available at: [<http://www.defra.gov.uk/fangr/breeds-at-risk-register/>]; and

b) UK Breeds at Risk (UK BAR). These breeds are potentially at particular risk in the event of outbreaks of exotic disease in the UK and may be considered for sparing from culling, provided that disease control is not compromised. There are also a number of breeds that have been identified as being at especial risk due their geographic concentration within the UK. An example of provisions to spare from culling can be viewed in the England FMD Regulations 2006 (See page 7, Section 2, No.9 this link to the legislation [http://www.legislation.gov.uk/ukxi/2006/183/pdfs/ukxi\\_20060183\\_en.pdf](http://www.legislation.gov.uk/ukxi/2006/183/pdfs/ukxi_20060183_en.pdf)).

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:

It is in the UK that most of these methods, technical standards and protocols were originally developed, animal genetics being an area of particular UK expertise. Most of this research was conducted in government research institutes and university departments until the 1980s, when the availability of public money for "near-market research" was radically curtailed. However, this work led to the science underpinning FAnGR conservation and development which is available to be put into practice. Some breed societies and NGOs do apply this science, to varying extents, and one of the duties of the Defra FAnGR Committee is to provide advice to policy makers on scientific matters. Currently the UK's research activity in this general area is either funded directly by breed societies, government agencies and industry bodies, or is conducted as part of transnational collaborations such as EU-funded projects. Generally this work is not targeted at specific UK FAnGR issues, but the UK's vigorous tradition of scientific publishing does serve to disseminate new findings. The only area where the UK has conducted little recent research is in the valuation of FAnGR (though the seminal paper in this area was in fact published by C. Smith, Edinburgh, in AGRI vol. 3, 1984). Here, UK contributions have been mainly in relation to wild flora and fauna and as the subject develops we can expect the relevance of this work to FAnGR to become evident.

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:

Availability of national and international funding resources remain a challenge. However the UK has produced two Country Reports in 2002 and in 2012 and a Poultry report in 2010 - which contained comprehensive inventories of breeds and more frequent updates for some breeds have been provided in EFABIS.

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:

Adequate funding is absolutely essential; Recognition of FAnGR as a core part of national biodiversity; Comprehensive priority support through the EU CAP and Rural Development programmes; FAnGR not given equal priority with plant genetic resources - far less financial resources allocated to FAnGR.

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.*



The UK National Action Plan on FAnGR (2006) is available at <http://www.defra.gov.uk/publications/2011/05/10/pb12190-fangr-action-plan/>.

A summary report of the work of the National Standing Committee on FAnGR 2008-11 and a final Progress Log of the National Standing Committee are available at <http://www.defra.gov.uk/fangr/2011/05/12/end-of-term-report-2008-2011/>. Please note that the Committee has now been reclassified as an expert committee and as of August 2011 is known as the Farm Animal Genetic Resources Committee. The UK is an active participant in ERFP routinely attending the annual Assembly, the Documentation and Information Work Group, and the Ex Situ Work Group. The UK is one of four European countries that voluntarily contributes the highest sum of funding towards the ERFP annual budget that is used to fund Working Groups, Task Forces and Ad hoc actions in which European countries collaboratively work together to address implementation of the four priorities of the Global Plan of Action.

## 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:

Policies and commitments to the sustainable use of AnGR are included in

(i) The UK National Action plan 2006 available at <http://www.defra.gov.uk/publications/2011/05/10/pb12190-fangr-action-plan/> (pages 32-40);

(ii) England's Biodiversity strategy "Biodiversity 2020" available at <http://www.defra.gov.uk/publications/2011/08/19/pb13583-biodiversity-strategy-2020/> (page 14), Scotland's Biodiversity Strategy available at <http://www.scotland.gov.uk/Resource/0042/00425276.pdf>.

(iii) In January 2011, the Government's Chief Scientific Adviser published the Foresight report on The Future of Food and Farming: Challenges and Choices for Global Sustainability. This identifies the scale of the challenge if the world is to feed its population sustainably in future. In response to the report, the Government has published a Foresight Action Plan that includes taking forward work on the conservation, characterisation and sustainable use of FAnGR and restates our commitment to meeting the Nagoya Aichi targets.

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:

We are working with relevant policy colleagues to try and ensure the further integration of FAnGR in agro-ecosystems approaches and national ecosystem assessments.

(i) The Millennium Ecosystem Assessment (MEA) framework identifies four broad categories of ecosystem services including the category of 'provisioning services' where we obtain products from ecosystems such as food, freshwater, fibre and genetic resources. FAnGR is therefore a key provisioning service within the context of ecosystems services and work is underway to try and ensure that FAnGR will be fully recognised and integrated into all relevant ecosystems

services policies and actions. The MEA is available at [http://archive.defra.gov.uk/environment/natural/documents/UKNEA\\_SynthesisReport.pdf](http://archive.defra.gov.uk/environment/natural/documents/UKNEA_SynthesisReport.pdf)

(ii) England's Biodiversity strategy "Biodiversity 2020" available at <http://www.defra.gov.uk/publications/2011/08/19/pb13583-biodiversity-strategy-2020/> commits the UK Government to the conservation of agricultural genetic diversity as a "Priority Action" including: raising awareness of existing genetic diversity within farmed animals and its importance for food security; encouraging responsible management and conservation of genetic diversity resource by relevant stakeholders; incorporating sustainable maintenance of genetic diversity into relevant policies and programmes (including incentive measures and protective arrangements); updating the UK's Inventory of FAnGR; and establishing efficient identification and monitoring systems for genetic diversity, including maintaining ex situ collections.

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

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

Please provide further details:

Breeding plans exist and are regularly reviewed. Breeding plans are long term but the contexts within which they operate may vary from region to region and change from year to year. Breeding plans are heavily influenced by the economic context and are now having to take account of the social and political environments. Productivity has always been an important objective, to which welfare and health have been added in recent years, and now ecosystem service and environmental footprint issues are becoming of interest.

In sheep, breeding activities aimed at improving performance are widespread, though most intense in a small number of breeds that perform particular key functions within the system and where improvement is most immediately cost-effective. Selection for local adaptation is evident in several hill breeds.

In goats, crossbreeding is particularly significant because of the benefits to milk production, though breeds specialized for fibre and meat are important.

With pigs, the breeding plans operated by companies are commercially confidential though inferences can be drawn about breeding plans in the non-corporate minority and native breeds sectors. Currently the sector is under intense economic pressure.

Breeding plans as they operate in equines and in non-corporate poultry are almost entirely of conservation orientation

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:

Livestock in the UK is in the private sector and can be fragmented, with breeding decisions taken by owners and managers. However there is a mature system of stakeholder bodies (national Breed Societies and species organisations), industry platforms and support networks funded by levy and the taxpayer that bring together breeding strategies and objectives. Additionally there is increasing awareness of genetic issues and better information and tools all of which facilitate genetic management and, in principle, monitoring.

18. Have the major barriers and obstacles to enhancing the sustainable use and development of animal genetic resources in your country been identified?

- a. Yes
- b. No
- c. No major barriers and obstacles exist. Comprehensive sustainable use and development measures are in place.

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

Inadequate funding; need for improved recognition of FAnGR as part of national biodiversity/natural resources/natural capital/ ecosystems/ food security.

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.*

c. Yes, assessments were introduced after the adoption of the GPA.

Please provide further details:

A full assessment of these issues has not been conducted in the UK. However we do consider these issues as they arise or when and where they are likely to arise. For example exotic species (e.g. water buffalo) and breeds (e.g. Konik ponies), not only displace UK native breeds from UK conservation grazing and associated support, but (if newly imported) may pose a disease threat to all the UK's FAnGR. We also need to consider Exotic Breeds at Risk, especially where few or none of these animals now exist in their original country of origin.

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:

There is a mature system of stakeholder bodies (national Breed Societies and species organisations), industry platforms and support networks funded by levy and the taxpayer that bring together breeding strategies and objectives. Additionally there is increasing awareness of genetic issues and better information and tools all of which facilitate genetic management and, in principle, monitoring.

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:

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:

There is a mature system of stakeholder bodies (national Breed Societies and species organisations), industry platforms and support networks funded by levy and the taxpayer that bring together breeding organisations, strategies, objectives and information; and flock/herd/stud books that record AnGR information are often made public. Additionally, arrangements under zootechnical recognitions further enable access to published information on AnGR - UK zootech recognitions are available at <http://www.defra.gov.uk/fangr/zootechnics/>

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:

Having signed the Protocol in 2011, the UK is in the process of implementing the Nagoya Protocol Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, through an EU Regulation and national measures.

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:

The Rare Breeds Survival Trust is active in conservation of breeds at risk and is also actively using support groups to attend agricultural shows and engage with the public to educate them about farm animal breeds and encourage the keeping of breeds that are suitable for their needs. The Rare Breeds Survival Trust has 28 of these support groups spread across the regions of the country, see link: <https://www.rbst.org.uk/support-groups>. Additionally there is a mature system of stakeholder bodies (national Breed Societies and species organisations), industry platforms and support networks that offer (if not training) information and support to livestock keepers

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:

Previously the focus was on the number of animals per breed. Now that breed numbers are stronger Breed Societies and NGOs have prioritised the genetic management of breeds using pedigree based software. The extent of adoption depends critically on funding and resources at the national, regional and international levels.

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:

The UK has a number of breeds adapted and historically linked to local produce and activities. Horse logging – taking timber out of an area using UK native breed horses rather than heavy mechanical equipment – provides an example of forestry management that can be undertaken without causing major damage to the soil, to the flora and watercourses and with no pollution. Many of the UK's habitats that are now valued for their biodiversity were created by, or for, farm animals. These habitats include various types of upland and lowland grasslands and heathlands, hay meadows and pasture-woodlands. Other habitats, such as sand dunes, salt marshes and even woodlands may benefit from light grazing. If any of these habitats are not grazed they are likely to lose their special conservation value as they become invaded and eventually dominated by scrub and trees through the process of ecological succession. As well as sharing a history of traditional management through grazing, many of these habitats share another characteristic: relatively poor soil nutrient concentrations. This is important for reducing the vigour of otherwise dominant plant species and hence allows a greater variety of plant species to survive. However, it also means that, in agricultural terms, the productivity of the vegetation is low. In the past this low productivity has often meant that either the land is abandoned for agriculture, allowing the process of succession to scrub and woodland or more often that artificial fertilisers are used which greatly reduce plant diversity. The few remaining good quality areas are now highly valued for conservation and are often protected as nature reserves.

See full text in the annex at the of this document.





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:

In 1986 only 2,609 pedigree Aberdeen Angus calves were registered. By 2012 over 15,000 pedigree registrations were processed. This virtual six fold rise over twenty five years was almost entirely due to the rising influence of successful UK retailer branded Aberdeen Angus beef programmes.

Thanks to the determination of a very small group of dedicated Gloucester cattle farmers in the county of Gloucester the breed has survived, complete with its particular dairy characteristics. Whilst most Double Gloucester cheese produced today comes from standard dairy cattle breeds, there are a very small number of specialist dairies in Gloucestershire who now successfully make 29 traditional Single Gloucester cheese from the milk of Gloucester cows. Quite different to the supermarket product, Single Gloucester is now a registered EU PDO (Protected Designation of Origin). It must be made from whole milk in the County of Gloucestershire and the producers of the cheese must have a registered herd of Gloucester cows.

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

Full recognition of FAnGR as a core part of national Biodiversity. Comprehensive specific support for FAnGR in European Union Common Agricultural Policy. Development of effective cattle TB vaccines. Fiscal incentives. Proportionate regulatory frameworks that recognise micro-enterprises' role as keepers of most FAnGR.

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.*

Ref: UK National Action Plan on FAnGR 2006; England's Biodiversity strategy "Biodiversity 2020" published at <http://www.defra.gov.uk/publications/2011/08/19/pb13583-biodiversity-strategy-2020/>; Scotland's Biodiversity Strategy published at <http://www.scotland.gov.uk/Resource/0042/00425276.pdf>; Research on 'Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance' <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18551&FromSearch=Y&Publisher=1&SearchText=gc0146&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>; European Region Focal Point participation ; In January 2011, the Government's Chief Scientific Adviser published the Foresight report on The Future of Food and Farming: Challenges and Choices for Global Sustainability and this identifies the scale of the challenge if the world is to feed its population sustainably in future, in response to the report the Government has published a Foresight Action Plan that includes taking forward work on the conservation, characterisation and sustainable use of FAnGR and restates our commitment to meeting the Nagoya Aichi targets.

### 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:

Factors are regularly assessed in tri annual expert meetings and geographical localisation, disease risks, introgression and effective population size have been identified as crucial to an accurate assessment of risk status.

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:

Retailer-driven specifications for commodity animal products is causing rapid and substantial introgression of external genetics into some breeds - notably dairy and beef cattle 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:

Policies and commitments conserve AnGR are included in  
(i) the UK National Action plan 2006 available at <http://www.defra.gov.uk/publications/2011/05/10/pb12190-fangr-action-plan/> (page 13);  
(ii) England's Biodiversity strategy "Biodiversity 2020" available at <http://www.defra.gov.uk/publications/2011/08/19/pb13583-biodiversity-strategy-2020/> (page 14), Scotland's Biodiversity Strategy available at <http://www.scotland.gov.uk/Resource/0042/00425276.pdf>  
(iii) In January 2011, the Government's Chief Scientific Adviser published the Foresight report on The Future of Food and Farming: Challenges and Choices for Global Sustainability. This identifies the scale of the challenge if the world is to feed its population sustainably in future. In response to the report, the Government has published a Foresight Action Plan that includes taking forward work on the conservation, characterisation and sustainable use of FAnGR and restates our commitment to meeting the Nagoya Aichi targets.

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:

Conservation policies and programmes are reviewed. For example the UK National Action Plan on FAnGR sets out a number of activities and progress on these activities is provided in the UK Country Report on FAnGR 2012 (page 47)

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:

The UK's Breeds at Risk Registers are regularly revised. Using these lists  
 (i) Payments are made to UK Native Breeds At Risk through EU co-financed Rural Development Programmes  
 (ii) Breeds at risk can potentially be spared from culling in the event of a disease outbreak. The UK's FAnGR expert committee explored the need to fund research on conservation strategies and supported the completion of the research now published at 'Research on 'Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance'  
<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18551&FromSearch=Y&Publisher=1&SearchText=gc0146&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

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:

The RBST owns small numbers of some at risk breeds. These are kept for RBST by private individuals or RBST approved farm parks.

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:

An initial exercise has been carried out in 2013 to identify ex situ in vitro collections. In the time available it has not been possible to contact all possible holdings of ex situ collections and further, more comprehensive work will be needed in this area in future. The ex situ information that has been collected so far has been published at <http://www.defra.gov.uk/fangr/documents/>.

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:

See 36 above

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

- a. Yes
- b. No

Please provide further details:

N/A

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:

Lack of funding resources; zootechnical legislation requirements being unachievable for numerically small breeds; the need to develop effective cattle TB vaccines; lack of recognition of FAnGR as part of biodiversity/ecosystems/ natural capital/natural resources.

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

- a. Yes
- b. No

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

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

Please provide further details:

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

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

Please provide further details:

Since the formation of Rare Breeds Survival Trust in 1973 (to help conserve and safeguard Britain's native breeds from extinction) no native livestock breed has become extinct in the UK.

The Rare Poultry Society was formed in 1969 since which time it has been the official body for this sector. The survival of all the most endangered breeds of chickens has been achieved by the activities of The Rare Poultry Society combined with The Cobthorn Trust and its National Poultry Collection. Without their work several poultry breeds would not exist today.

The UK's official Breeds at Risk Registers are regularly revised. Using these lists

- (i) Payments are made to UK Native Breeds At Risk through EU co-financed Rural Development Programmes
- (ii) Breeds at risk can potentially be spared from culling in the event of a disease outbreak..

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:

Since the formation of Rare Breeds Survival Trust in 1973 (to help conserve and safeguard Britain's native breeds from extinction) no native livestock breed has become extinct in the UK. The RBST maintains a genebank and uses this resource to help keep the numbers of breeds at sustainable levels.

The Rare Poultry Society was formed in 1969 since which time it has been the official body for this sector. The survival of all the most endangered breeds of chickens has been achieved by the activities of The Rare Poultry Society combined with The Cobthorn Trust and its National Poultry Collection. Without their work several poultry breeds would not exist today.

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:

Examples include:

- Using software designed for breed development to achieve genetic conservation.
- Reproductive technology - primarily for commercial application can be used to achieve genetic conservation.

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:

Pioneering Breed Conservation NGO Rare Breeds Survival Trust and other NGOs (for example the British Pig Association ([www.britishpigs.org/](http://www.britishpigs.org/)); National Sheep Association ([www.nationalsheep.org.uk/](http://www.nationalsheep.org.uk/)); National Beef Association ([www.nationalbeefassociation.com/](http://www.nationalbeefassociation.com/)); The Rare Poultry Society (<http://www.rarepoultrysociety.co.uk/>); The Poultry Club of Great Britain (<http://www.poultryclub.org/>); The Cobthorn Trust ( <http://www.cobthorn.org/> ) have been active in this area to varying degrees. The UK has published research that offers guidance on best practice for breeding plans and conservation strategies. This research has been widely advertised including to the European community via a message from the ERF Secretariat and through the ERF website. See Research on 'Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance' <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18551&FromSearch=Y&Publisher=1&SearchText=gc0146&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

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

Full recognition of FAnGR as a core part of national Biodiversity. Comprehensive specific support for FAnGR in European Union Common Agricultural Policy. Development of effective cattle TB vaccines. Fiscal incentives. Proportionate regulatory frameworks that recognise micro-enterprises' role as keepers of most FAnGR. UK National Action Plan on FAnGR 2006 (see Q13), England's Biodiversity strategy "Biodiversity 2020" published at <http://www.defra.gov.uk/publications/2011/08/19/pb13583-biodiversity-strategy-2020/>, Scotland's Biodiversity Strategy published at <http://www.scotland.gov.uk/Resource/0042/00425276.pdf>, Research on 'Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance' <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18551&FromSearch=Y&Publisher=1&SearchText=gc0146&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>. European Region Focal Point participation. In January 2011, the Government's Chief Scientific Adviser published the Foresight report on The Future of Food and Farming: Challenges and Choices for Global Sustainability. This identifies the scale of the challenge if the world is to feed its population sustainably in future. In response to the report, the Government has published a Foresight Action Plan that includes taking forward work on the conservation, characterisation and sustainable use of FAnGR and restates our commitment to meeting the Nagoya Aichi targets.

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

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

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

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

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

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

Please provide further details:

The UK has sufficient institutional capacity to support holistic planning of the livestock sector. The UK has fully functional NFP for AnGR as well as an Expert Committee for the conservation and sustainable use of FAnGR (see <http://www.defra.gov.uk/fangr/>). There are strong links between the NFP, FAnGR stakeholders and the Expert Committee and we use these links frequently on FAnGR business; such as the preparation of the 2012 UK Country Report on Farm Animal Genetic Resources and published 'Research on Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance'. Additionally there is a mature system of stakeholder bodies (national Breed Societies and species organisations), industry platforms and support networks funded by levy and the taxpayer that bring additional coordinated support to the 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:

The UK National Action Plan on FAnGR (2006) is available at <http://www.defra.gov.uk/publications/2011/05/10/pb12190-fangr-action-plan/>  
 A summary report of the work of the National Standing Committee on FAnGR 2008-11 and a final Progress Log of the National Standing Committee are available at <http://www.defra.gov.uk/fangr/2011/05/12/end-of-term-report-2008-2011/>.  
 Additionally an update on progress of these activities is provided in the UK Country Report on FAnGR 2012 (page 47) <https://www.gov.uk/government/publications/uk-country-report-on-farm-animal-genetic-resources-2012>

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:

England's Biodiversity strategy "Biodiversity 2020" published at <http://www.defra.gov.uk/publications/2011/08/19/pb13583-biodiversity-strategy-2020/>, Scotland's Biodiversity Strategy published at <http://www.scotland.gov.uk/Resource/0042/00425276.pdf>. Both these strategies reflect the importance of FAnGR. We are working with the Administrations in Wales and Northern Ireland to produce strategies that also reflect the importance of FAnGR.

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:

AnGR are increasingly being considered in national livestock sector strategies, plans and policies. For example:

- The draft England bovine TB strategy is considering research about cattle genetic resistance to bovine TB - <https://consult.defra.gov.uk/farming/tb/>
- DairyCo is a levy-funded, not-for-profit organisation working on behalf of Britain's dairy farmers. They are developing a national strategy aiming to reduce the dairy deficit - <http://www.dairyco.org.uk/news/news-articles/december-2013/united-dairy-industry-pitches-ambitious-strategy-to-government/>. It will be important that this ambitious strategy takes advantage of the diverse genetic resources available in Great Britain that can help address some of the aims of the strategy.

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

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

Please provide further details:

A robust commitment was made in the 2012 UK Country Report on Farm Animal Genetic Resources (see page 6 of this link <https://www.gov.uk/government/publications/uk-country-report-on-farm-animal-genetic-resources-2012>) to 'establish an improved, automated, effective and cost effective central database to support more regular monitoring of UK FAnGR including trends and potential threats'. A Project Team in Defra are actively considering options for the provision of this database. We also maintain a separate website dedicated to UK genetic resources for agriculture and this is available at <http://www.grfa.org.uk/index.html>.

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

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

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

Please provide further details:

The UK has periodically updated EFABIS and accordingly DAD-IS (for many breeds in the years 2002, 2006 and 2012 and for less breeds in the years 1983, 1986, 1991, 1994, 1997, 1999). This data contributes to the international inventory, characterisation and monitoring of breeds and production systems.

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

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

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

A summary of the FAnGR Committees terms of reference can be found at <http://www.defra.gov.uk/fangr/about/>

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:

There are strong links between the NFP, FAnGR stakeholders and the FAnGR Expert Committee and we use these links frequently on FAnGR business; such as the preparation of the 2012 UK Country Report on Farm Animal Genetic Resources (this includes an updated inventory for all breeds in 2012), and the completion of published Research 'Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance'.

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:

The NFP with assistance from the FAnGR Expert Committee participate in various activities to increase public awareness of the roles and values of AnGR. Firstly we maintain a dedicated website/pages explaining the importance of FAnGR, we issue one or two Newsletters a year to FAnGR stakeholders advising them on FAnGR matters, and we recently published the 2012 UK Country Report on Farm Animal Genetic Resources (<https://www.gov.uk/government/publications/uk-country-report-on-farm-animal-genetic-resources-2012>). We also maintain a separate website dedicated to UK genetic resources for agriculture and this is available at <http://www.grfa.org.uk/index.html>.

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:

Legal arrangements

(i) The UK Government has recently published an updated list of breeds that are considered to be at risk in the event of an exotic disease outbreak and may potentially be exempt from precautionary culling if certain conditions are met. Details of the relevant breeds and the criteria used to consider inclusion on the list are based on recommendations from the FAnGR expert Committee. The list is reviewed regularly and is available at: <http://www.defra.gov.uk/animal-diseases/controls/culling-exemptions/>

(ii) Under EU Rural Development rules, grants can be paid for the conservation of genetic resources. In England, the Higher Level Stewardship Scheme supports conservation grazing involving native breeds at risk. Similar schemes exist in Wales; Scotland; and Northern Ireland. The current list of eligible UK native breeds at risk is available at: <http://www.defra.gov.uk/fangr/2011/03/21/breeds-at-risk/>.

(iii) New Zootechnical Regulations in England came into force on 30 November 2012 covering purebred breeding cattle, sheep and goats, pigs and hybrid pigs [http://www.legislation.gov.uk/ukxi/2012/2665/pdfs/ukxi\\_20122665\\_en.pdf](http://www.legislation.gov.uk/ukxi/2012/2665/pdfs/ukxi_20122665_en.pdf) Policy arrangements to conserve and sustainably use AnGR are included in

(iv) the UK National Action plan 2006 available at <http://www.defra.gov.uk/publications/2011/05/10/pb12190-fangr-action-plan/> (page 13);

(v) England's Biodiversity strategy "Biodiversity 2020" available at <http://www.defra.gov.uk/publications/2011/08/19/pb13583-biodiversity-strategy-2020/> (page 14), Scotland's Biodiversity Strategy available at <http://www.scotland.gov.uk/Resource/0042/00425276.pdf>

(vi) The Government has published a Foresight Action Plan that includes taking forward work on the conservation, characterisation and sustainable use of FAnGR and restates our commitment to meeting the Nagoya Aichi targets.

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:

We are considering the possibilities for funding such activities through Rural Development Programme measures.

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:

There is a mature system of stakeholder bodies (national Breed Societies and species organisations), industry platforms and support networks funded by levy and the taxpayer that bring together breeding, conservation and sustainable use strategies and objectives.

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:

The Rare Breeds Survival Trust is active in conservation of breeds at risk and their activities will contribute towards the sustainable use and development of breeds. Further information on its website at: <https://www.rbst.org.uk/>  
Other NGOs that contribute to characterisation, sustainable use and development include the British Pig Association ([www.britishtpigs.org/](http://www.britishtpigs.org/)); National Sheep Association ([www.nationalsheep.org.uk/](http://www.nationalsheep.org.uk/)); National Beef Association ([www.nationalbeefassociation.com/](http://www.nationalbeefassociation.com/)); The Rare Poultry Society (<http://www.rarepoultrysociety.co.uk/>); The Poultry Club of Great Britain (<http://www.poultryclub.org/>); The Cobthorn Trust (<http://www.cobthorn.org/>).

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 Rare Breeds Survival Trust is active in conservation of breeds at risk and is also actively using support groups to attend agricultural shows and engage with the public to educate them about farm animal breeds and encourage the keeping of breeds that are suitable for their needs. The Rare Breeds Survival Trust has 28 of these support groups spread across the regions of the country, see link: <https://www.rbst.org.uk/support-groups>.  
Defra also funds research which is specifically relevant to the conservation and sustainable use of FAnGR and can be accessed at <http://www.defra.gov.uk/fangr/research/>.

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.*

The National Action Plan was published in 2006 and the National Standing Committee on FAnGR (now the Expert Committee on FAnGR) was established to oversee actions.



## 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:

The UK is one of four European countries that voluntarily contributes the highest sum of funding towards the ERF annual budget that is used to fund Working Groups, Task Forces and Ad hoc actions in which European countries collaboratively work together to address implementation of the four priorities of the Global Plan of Action. The UK is an active participant in ERF routinely attending the annual Assembly, the Documentation and Information Work Group, and the Ex Situ Work Group readily exchanging information and collaborating with developing countries to address implementation of the four priorities of the Global Plan of Action.

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:

Rare Breeds International [www.rarebreedsinternational.org/](http://www.rarebreedsinternational.org/)

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

- a. Yes
- b. No

Please provide further details:

The extent of support to animal genetic resources depends critically on funding and resources at the national, regional and international levels.

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:

The extent of support to animal genetic resources depends critically on funding and resources at the national, regional and international levels.

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:

The UK is one of four European countries that voluntarily contributes the highest sum of funding towards the ERFPA annual budget that is used to fund Working Groups, Task Forces and Ad hoc actions in which European countries collaboratively work together to address implementation of the four priorities of the Global Plan of Action. The UK is an active participant in ERFPA routinely attending the annual Assembly, the Documentation and Information Work Group, and the Ex Situ Work Group readily exchanging information and collaborating with developing countries to address implementation of the four priorities of the Global Plan of Action. The UK recognises that the extent of support to animal genetic resources depends critically on funding and resources at the national, regional and international levels.

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:

The UK is one of four European countries that voluntarily contributes the highest sum of funding towards the ERFPA annual budget that is used to fund Working Groups, Task Forces and Ad hoc actions in which European countries

collaboratively work together to address implementation of the four priorities of the Global Plan of Action. The UK is an active participant in ERFAP routinely attending the annual Assembly, the Documentation and Information Work Group, and the Ex Situ Work Group readily exchanging information and collaborating with developing countries to address implementation of the four priorities of the Global Plan of Action. The UK recognises that the extent of support to animal genetic resources depends critically on funding and resources at the national, regional and international levels.

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:

The UK is one of four European countries that voluntarily contributes the highest sum of funding towards the ERFAP annual budget that is used to fund Working Groups, Task Forces and Ad hoc actions in which European countries collaboratively work together to address implementation of the four priorities of the Global Plan of Action. The UK is an active participant in ERFAP routinely attending the annual Assembly, the Documentation and Information Work Group, and the Ex Situ Work Group readily exchanging information and collaborating with developing countries to address implementation of the four priorities of the Global Plan of Action. The UK recognises that the extent of support to animal genetic resources depends critically on funding and resources at the national, regional and international levels.

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:

The UK has periodically updated EFABIS and accordingly DAD-IS (for many breeds in the years 2002, 2006 and 2012 and for less breeds in the years 1983, 1986, 1991, 1994, 1997, 1999). This data contributes to the international inventory, characterisation and monitoring of breeds and production systems.

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:

The UK has periodically updated EFABIS and accordingly DAD-IS (for many breeds in the years 2002, 2006 and 2012 and for less breeds in the years 1983, 1986, 1991, 1994, 1997, 1999). This data contributes to the international inventory, characterisation and monitoring of breeds and production systems. Also, a robust commitment was made in the 2012 UK Country Report on Farm Animal Genetic Resources (see page 6 of this link <https://www.gov.uk/government/publications/uk-country-report-on-farm-animal-genetic-resources-2012>) to 'establish an improved, automated, effective and cost effective central database to support more regular monitoring of UK FAnGR including trends and potential threats'. This improved monitoring will enable the UK to update national and global inventory information more frequently. A Project Team in Defra are actively considering options for the provision of this database.

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

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

Please provide further details:

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

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

Please provide further details:

The UK actively supports national in situ programmes. National efforts include: Under EU Rural Development rules, grants can be paid for the conservation of genetic resources.

In England, the Higher Level Stewardship Scheme supports conservation grazing involving native breeds at risk. The UK continues to develop and improve its in situ programmes and recently completed some research on best practice and this is published and has been advertised to the European community and so in part contributes towards regional programmes (see Research on 'Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance' <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18551&FromSearch=Y&Publisher=1&SearchText=gc0146&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>). Additionally, the UK is an active participant in ERFP routinely attending the annual Assembly, the Documentation and Information Work Group, and the Ex Situ Work Group readily exchanging information and collaborating with developing countries to address implementation of the four priorities of the Global Plan of Action.

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:

The UK actively supports national in situ programmes. National efforts include: Under EU Rural Development rules, grants can be paid for the conservation of genetic resources.

In England, the Higher Level Stewardship Scheme supports conservation grazing involving native breeds at risk. The UK continues to develop and improve its in situ programmes and recently completed some research on best practice and this is published and has been advertised to the European community and so in part contributes towards regional programmes (see Research on 'Development of co-ordinated in situ and ex situ UK Farm Animal Genetic Resources conservation strategy and implementation guidance' <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18551&FromSearch=Y&Publisher=1&SearchText=gc0146&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>). Additionally, the UK is an active participant in ERFP routinely attending the annual Assembly, the Documentation and Information Work Group, and the Ex Situ Work Group readily exchanging information and collaborating with developing countries to address implementation of the four priorities of the Global Plan of Action.

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:

The UK has periodically updated EFABIS and accordingly DAD-IS (for many breeds in the years 2002, 2006 and 2012 and for less breeds in the years 1983, 1986, 1991, 1994, 1997, 1999). This data contributes to the international inventory, characterisation and monitoring of breeds and production systems. Also, a robust commitment was made in the 2012 UK Country Report on Farm Animal Genetic Resources (see page 6 of this link <https://www.gov.uk/government/publications/uk-country-report-on-farm-animal-genetic-resources-2012>) to 'establish an improved, automated, effective and cost effective central database to support more regular monitoring of UK FAnGR including trends and potential threats'. This improved monitoring will enable the UK to update national and global inventory information more frequently. A Project Team in Defra are actively considering options for the provision of this database. The UK has an active expert policy team that has been and continues to be engaged in national, european and international forums, in the development and implementation of arrangements related to The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. This engagement has impacts on the establishment of fair and equitable arrangements for the storage, access and use of genetic materials stored in supra-national ex-situ gene banks.

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:

The UK works hard to raise awareness of AnGR issues in the European region and wider. For example the UK recently prompted the European Regional Focal Point to circulate a letter to all European National Coordinators encouraging them to engage in the EU negotiations for the EU Commissions proposed Animal Health Regulation - highlighting the importance that it reflect FAnGR interests and carry forward provisions to protect FAnGR that were in earlier EU legislation.

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:

The UK is actively involved in reviewing and developing international policies and regulatory frameworks relevant to AnGR. Current EU proposals we are engaged in and pressing for FAnGR needs are the Rural Development Regulations, Animal Health Regulation, Equine Identification, cloning and zootechnical matters.

## 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
The extent to which a country has integrated into its national policies provisions for equal status for biodiversity for both wild and agricultural animals.	Currently biodiversity is often assumed to mean only wild biodiversity - but the European interpretation at least includes both wild and agricultural biodiversity - see the EU Biodiversity Strategy to 2020, Action 10.	Raising awareness of the scope of the meaning of biodiversity in the global, regional and national forums promoting this scope be explicitly reflected in official laws, guidance and other key information resources.
The extent to which a country can/has authenticated products that are claimed to be products produced from a specific breed .	Currently products can be labelled as being derived from a particular breed and sold at a high premium. Retailers and customers need to be able to purchase these expensive products with confidence that they contain what the label claims is in them.	Support and encourage research and monitoring of food authenticity.
The degree to which international, regional and national rules and political commitments coexist (for example CBD, EU Rural Development, EU cloning Regs, EU zootech Regs and EU Animal Health Regs) and are developed to consistently support the conservation and sustainable use of FAnGR	EU rules are developed and they often do not clearly or explicitly reflect or support the commitments countries have (and commitments the EU has) to political commitments such as the CBD	Raising awareness of the scope of the CBD in the global, regional and national forums promoting this scope be explicitly reflected in official laws, guidance and other key information resources.

Submit by Email

# Annex

## Additional information to questions

### Section II of Country Report

**Q6 column 2** – these figures are not precise. What the UK wanted to indicate is that monitoring for all species/breeds is performed regularly (at least every 10 years) except for poultry

**Q10 & Q12** – Whilst we know who operates breeding programmes in the UK for a number of breeds we do not know what breeding methods are being applied. There is not an inconsistency between the responses to Q10 and Q12 – the responses simply reflect that there is a gap in our knowledge and so we are not able to fully answer Q12

**Q27** – We are restricted in the No. of characters in each box/field. Ideally we would have been able to submit into the Country Report the full text below:

The following breeds were formerly classified as at SEVERE risk of extinction but have recovered to a position in which they are no longer at SEVERE risk: (N.B. These lists of breeds are solely compiled by the RBST and do not necessarily reflect any published official [Defra] lists of UK 'breeds at risk' - e.g. the UK BAR and UK NBAR lists).

#### Cattle

- Beef Shorthorn
- Belted Galloway
- Longhorn
- Red Poll

#### Sheep

- Black Welsh Mountain
- Hebridean
- Jacob
- Kerry Hill
- Lleyn
- Llanwenog
- Ryeland
- Shetland
- Shropshire
- Southdown
- South Wales Mountain
- Wiltshire Horn

For all the breeds listed the primary reason for the recovery in numbers was the action taken by the Rare Breeds Survival Trust (RBST), a charitable NGO dedicated to the conservation of the UK's native breeds of farm animals.

Actions taken by RBST include:

- Monitoring the populations of native breeds
- Increasing knowledge of registered UK rare breed livestock amongst the public and, particularly, livestock keepers
- Promotion of the keeping of registered UK rare breed livestock
- Supporting and encouraging responsible breeding programmes
- Facilitating promotion and development of UK rare breeds by their breeders' organisations
- Maintenance of a gene bank of UK rare native breeds
- Support of, and participation in, research
- Influencing governments to ensure that there is a clear understanding of the issue of genetic diversity and the importance of conservation
- Working with governments to minimise the impact of disease outbreaks

A secondary contribution to recovery (or at least maintenance of recovered populations) has been that keepers of the breeds listed were eligible for financial support through the various agri-environment schemes in the constituent countries of the UK. For example, in England there were two supplements that were linked to habitat management for specific conservation objectives under the Higher Level of the Environmental Stewardship agri-environment scheme.

The first supported native breeds of grazing animals at risk from extinction (using EU numerical definitions of at risk) provided these were used for grazing habitats of conservation value. The second supported the use of cattle (both breeds at risk and breeds not at risk) if these were used for grazing habitats of conservation value. Note that participation in all UK agri-environment schemes is voluntary and, in addition, the supplements for grazing with cattle and/or breeds at risk were discretionary (i.e. paid only where the habitat management was deemed a priority).

In Wales the current agri-environment scheme supports a similar range of the breeds listed above as in England but is not linked to habitat management. In Scotland six breeds native to Scotland are supported by the agri-environment scheme, including one breed (Belted Galloway) from the above list. In Northern Ireland only one cattle breed is supported and that is still a breed at risk. All UK agri-environment schemes are under review as part of the current reform of the EU's Common Agricultural Policy.

#### **Section IV of Country Report**

Q26 - We are restricted in the No. of characters in each box/field. Ideally we would have been able to submit into the Country Report the full text below:

The UK has a number of breeds adapted and historically linked to local produce and activities.

Horse logging – taking timber out of an area using UK native breed horses rather than heavy mechanical equipment – provides an example of forestry management that can be undertaken without causing major damage to the soil, to the flora and watercourses and with no pollution.

Many of the UK's habitats that are now valued for their biodiversity were created by, or for, farm animals. These habitats include various types of upland and lowland grasslands and heathlands, hay meadows and pasture-woodlands. Other habitats, such as sand dunes, salt marshes and even woodlands may benefit from light grazing. If any of these habitats are not grazed they are likely to lose their special conservation value as they become invaded and eventually dominated by scrub and trees through the process of ecological succession.

As well as sharing a history of traditional management through grazing, many of these habitats share another characteristic: relatively poor soil nutrient concentrations. This is important for reducing the vigour of otherwise dominant plant species and hence allows a greater variety of plant species to survive. However, it also means that, in agricultural terms, the productivity of the vegetation is low.

In the past this low productivity has often meant that either the land is abandoned for agriculture, allowing the process of succession to scrub and woodland or more often that artificial fertilisers are used which greatly reduce plant diversity. The few remaining good quality areas are now highly valued for conservation and are often protected as nature reserves.

Livestock that can flourish on the relatively poor forage of these nature reserves include hardy and thrifty native breeds such as Shetland, Longhorn, Belted Galloway and Highland cattle and sheep breeds such as Hebridean and Soay.

Ponies too have been used, including Exmoor (Figure 11), Welsh Section A semi-feral and Highland. Bagot goats have been used in the management of chalk heaths in Sussex. Pigs have a more limited function in conservation management but have been used in woodland regeneration.

Flanders Moss, near Stirling in Scotland is the largest remaining area of raised bog in the UK. Now managed by Scottish Natural Heritage and local farmers, the Moss has been largely treeless for a long time. However, past management has led to parts of the Moss drying out and trees such as pine and birch starting to spread across the bog. In recent years, seasonal grazing of Blackface sheep and Shetland cattle (Figure 12) has been introduced to control this. Thus conservation grazing has become a 'new' use for many breeds at risk and has the potential to make a significant contribution to the conservation of Farm Animal Genetic Resources.