REVIEW OF POLICY GOVERNING FARM ANIMAL GENETIC RESOURCES CONSERVATION STRATEGIES AND BREEDING PROGRAMMES

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EXECUTIVE SUMMARY

1. This report considers the policies that govern Farm Animal Genetic Resources (FAnGR) conservation strategies and breeding programmes. FAnGR are critical natural capital: they provide ecosystem services that cannot be substituted by other forms of capital.

2. The UK has obligations to conserve its FAnGR under the, mainly international, agreements to which it is a signatory. These include:
   - The World Conservation Strategy (1980)
   - The Convention on Biological Diversity (1992)
   - Various EU regulations
   The commitments relevant to the conservation of FAnGR these entail are outlined.

3. The UK has opportunities to support the conservation of FAnGR under regulations and programmes, mainly at the European Union level. The historical development of such measures is outlined and the current regulations summarised. These include:
   - The European Union Biodiversity Strategy to 2020
   - The European Union Roadmap to a Resource Efficient Europe

4. To meet its obligations and take advantage of the opportunities the UK has developed a suite of national programmes at the UK and at devolved government levels. These include biodiversity strategies and agri-environment schemes for each of the countries of the UK. The policies and measures of these programmes relevant to the conservation and sustainable use of FAnGR are summarised.

5. In England financial support for FAnGR conservation and sustainable use has been through agri-environment schemes and has been linked to habitat management through the grazing of cattle or animals from a list of native breeds at risk. This excludes some species of farm livestock (e.g. poultry) and limits opportunities for others (e.g. pigs).

6. In the other UK countries agri-environment measures are also the means of support for FAnGR, but policies vary e.g. in Northern Ireland just one breed (Irish Moiled cattle) is supported whereas in Scotland eight cattle breeds are supported on the basis that they are native to, or traditional in, Scotland irrespective of their rarity. In Wales support under Glastir is offered to native breeds at risk of cattle, sheep and equines.

7. The UK has not adopted direct support of FAnGR through conservation strategies or breeding programmes, although these are possible under agri-environment regulations and have been developed and funded in other Member States. Neither has the UK developed a national gene bank or other ex situ resources for FAnGR which are also permitted by EC regulations.

8. The UK has contributed to FAnGR conservation and wise use through the continuing support of the FAnGR Expert Committee, publication of regular Country Reports on FAnGR and through active participation in EU and international bodies such as the European Regional Focal Point for Animal Genetic Resources.

9. Recognition of FAnGR as an integral element of biodiversity has been slow, but there is now increasing acceptance at all levels of government and by other stakeholders; this has not yet translated into adequate funding in comparison to ‘wild’ biodiversity and plant genetic resources.

10. In part, this increased recognition is a result of the greater appreciation of the role of livestock in delivering ecosystem services and the need for FAnGR to meet challenges such as sustainable food production, climate change, nutrient cycling and waste product recycling.

11. Reform of the Common Agricultural Policy provides an opportunity for the UK to develop support programmes for FAnGR, including conservation strategies and breeding programmes. In addition, exemption from culling for breeds at risk must be retained in the proposed EU Animal Health Law.
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1 INTRODUCTION

Policies governing FAnGR conservation strategies and breeding programmes can be categorised into two broad groups:

i. those, mainly international, agreements that place an obligation on the UK to conserve its FAnGR, and

ii. those, mainly EU, regulations and programmes that would allow support for the conservation of FAnGR.

To be implemented these need to be translated into national policies and actions.

International and national policy documents increasingly recognise the concept of ‘natural capital’ i.e. those elements of nature which either directly provide or underpin human well-being (Natural Capital Committee, 2013; see also the 2011 Natural Environment White Paper http://www.official-documents.gov.uk/document/cm80/8082/8082.pdf). These elements of nature perform ‘ecosystem services’ which are often undervalued, if they are accounted at all. FAnGR should be recognised as natural capital or even as ‘critical natural capital’ (that is the part of natural capital that performs important ecosystem functions and that cannot be replaced by other forms of capital such as human-made or social capital). Wisely used and effectively managed FAnGR can make an invaluable contribution to human well-being, but the threats to FAnGR globally are such that the FAO launched the first Global Plan of Action for Animal Genetic Resources, and the associated Interlaken Declaration, in 2007.

The UK is a signatory to the Global Plan of Action and the Interlaken Declaration, as well other relevant international agreements as described below. The second UK Country Report on Farm Animal Genetic Resources will be published in 2013, demonstrating the UK’s commitment to the recognition and monitoring of this element of its natural capital. However, further actions will be needed in order to fully meet the UK’s obligations and commitments under international agreements to conserve and wisely use its FAnGR.

The proposals for FAnGR conservation strategies and breeding programmes discussed elsewhere in this project would need to be driven by, and consistent with, the UK’s obligations under the international agreements to which the UK is a signatory and the various EU regulations and programmes, particularly the Common Agricultural Policy (CAP). This report outlines those international agreements and relevant EU regulations and programmes and suggests how the UK may develop FAnGR conservation strategies and breeding programmes within that framework. It also suggests how the reform of the CAP for the period 2013-2020 may present new opportunities for FAnGR conservation strategies and breeding programmes in the UK.

2 INTERNATIONAL AGREEMENTS


The 1980 World Conservation Strategy was an initiative by the International Union for the Conservation of Nature and Natural Resources (IUCN), the United Nations Environment Programme (UNEP) and the Worldwide Fund for Nature (WWF). The Strategy had three main objectives of living resource conservation; the objective relevant to the current review (Chapter 1) was:
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‘to preserve genetic diversity (the range of genetic material found in the world’s organisms), on which depend the breeding programmes necessary for the protection and improvement of cultivated plants and domesticated animals, as well as much scientific advance, technical innovation, and the security of the many industries that use living resources.’ [Our emphasis]

Priority requirements for genetic diversity set out in the strategy (Chapter 6) include to:

‘preserve as many varieties as possible of crop plants, forage plants, timber trees, livestock, animals for aquaculture, microbes and other domesticated organisms and their wild relatives. [Our emphasis]

Chapter 9 of the Strategy (Policy making and the integration of conservation and development) includes:

Similarly, the policy goals of agriculture should include: to supply food and other agricultural products in sufficient quantity and of acceptable quality, consistent with...the maintenance of the resource base particularly soils, water, the habitats of organisms necessary for pollination and integrated pest control, and the genetic diversity of crops, domestic animals and their wild relatives; [Our emphasis]

The European Parliament and the European Economic Community supported the Strategy and developed associated programmes, including the establishment of the European Environmental Fund (Talbot, 1980). EU funding for nature conservation and the environment is now through the LIFE Fund (http://ec.europa.eu/environment/life/funding/lifeplus.htm). The most recent European biodiversity action plans are summarised in Sections 2.6.2 and 2.6.5 below.

2.2 Convention on Biological Diversity 1992


The Convention on Biological Diversity (CBD) was drawn up during the preparations for the United Nations Conference on Environment and Development 1992 (the Rio "Earth Summit") where it was opened for signature. The UK was amongst the first of the now 168 signatories to the CBD, having signed at the Rio Summit. The preface to the CBD states that ‘It represents a dramatic step forward in the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources.’

The CBD is relevant for its advocacy of both the direct conservation of animal genetic resources as a component of agro-biodiversity, and for conservation of farm livestock as a means of delivering wider biodiversity conservation through the management of habitats (i.e. conservation grazing). Of the 42 articles in the Convention five have particular relevance to this report, although articles relating to Research and Training, Public Education and Awareness, Access to Genetic Resources, Access to and Transfer of Technology, Technical and Scientific Cooperation and Handling of Biotechnology and Distribution of Benefits have some relevance to conservation breeding programmes and ex situ conservation measures.

The three paragraphs of Annex 1 (Identification and Monitoring) of the CBD are:

1. Ecosystems and habitats: containing high diversity, large numbers of endemic or threatened species, or wilderness; required by migratory species; of social, economic, cultural or scientific importance; or, which are representative, unique or associated with key evolutionary or other biological processes;
2. Species and communities which are: threatened; wild relatives of domesticated or cultivated species; of medicinal, agricultural or other economic value; or social, scientific or cultural importance; or importance for research into the conservation and sustainable use of biological diversity, such as indicator species; and

3. Described genomes and genes of social, scientific or economic importance.

Thus the term biological diversity in the main text includes species that are of agricultural importance as in the second paragraph above. Bearing this in mind the particularly relevant articles are:

**Article 6. General Measures for Conservation and Sustainable Use**

Each Contracting Party shall, in accordance with its particular conditions and capabilities:

a. Develop **national strategies, plans or programmes** for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned; and

b. **Integrate**, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

**Article 7. Identification and Monitoring**

Each Contracting Party shall, as far as possible and as appropriate, in particular for the purposes of Articles 8 to 10:

(a) Identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in Annex I;

(b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use;

**Article 8. In-situ Conservation**

Each Contracting Party shall, as far as possible and as appropriate:

(a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;

(b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;

(c) **Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use**; [Our emphasis]

(d) Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;
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(e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas;

Article 9. Ex-situ Conservation

Each Contracting Party shall, as far as possible and as appropriate, and predominantly for the purpose of complementing in-situ measures:

(a) Adopt measures for the ex-situ conservation of components of biological diversity, preferably in the country of origin of such components;

(b) Establish and maintain facilities for ex-situ conservation of and research on plants, animals and micro-organisms, preferably in the country of origin of genetic resources;

(c) Adopt measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats under appropriate conditions;

Article 10. Sustainable Use of Components of Biological Diversity

Each Contracting Party shall, as far as possible and as appropriate:

(a) Integrate consideration of the conservation and sustainable use of biological resources into national decision-making;

(b) Adopt measures relating to the use of biological resources to avoid or minimize adverse impacts on biological diversity;

(c) Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements;

(d) Support local populations to develop and implement remedial action in degraded areas where biological diversity has been reduced; and

(e) Encourage cooperation between its governmental authorities and its private sector in developing methods for sustainable use of biological resources.

Eleven Conferences of the Parties (COP) to the Convention have been held since 1992, the most recent at Hyderabad in October 2012. However, agricultural biodiversity was considered more fully at the 5th and 10th COP. At the 5th COP, held in Nairobi in May 2000, Decision V/5 reviewed Phase 1 of the Agricultural Biological Diversity programme and agreed a multi-year work programme. In an annex to the Decision (available at http://www.cbd.int/decision/cop/?id=7147) the wide scope of agricultural biodiversity was detailed; this is reproduced below in full in order to demonstrate the integral position of FAnGR within agricultural biodiversity; however, points of particular relevance to the management of FAnGR are identified below the extract:

THE SCOPE OF AGRICULTURAL BIODIVERSITY

1. Agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agro-ecosystem: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes, in accordance with annex I of decision III/11 of the Conference of the Parties to the Convention on Biological Diversity.
2. The Conference of Parties has recognized "the special nature of agricultural biodiversity, its distinctive features, and problems needing distinctive solutions". The distinctive features include the following:
(a) Agricultural biodiversity is essential to satisfy basic human needs for food and livelihood security;
(b) Agricultural biodiversity is managed by farmers; many components of agricultural biodiversity depend on this human influence; indigenous knowledge and culture are integral parts of the management of agricultural biodiversity;
(c) There is a great interdependence between countries for the genetic resources for food and agriculture;
(d) For crops and domestic animals, diversity within species is at least as important as diversity between species and has been greatly expanded through agriculture;
(e) Because of the degree of human management of agricultural biodiversity, its conservation in production systems is inherently linked to sustainable use;
(f) Nonetheless, much biological diversity is now conserved ex situ in gene banks or breeders' materials;
(g) The interaction between the environment, genetic resources and management practices that occurs in situ within agro-ecosystems often contributes to maintaining a dynamic portfolio of agricultural biodiversity.

3. The following dimensions of agricultural biodiversity can be identified:
(a) Genetic resources for food and agriculture, including:
   (i) Plant genetic resources, including pasture and rangeland species, genetic resources of trees that are an integral part of farming systems;
   (ii) Animal genetic resources, including fishery genetic resources, in cases where fish production is part of the farming system, and insect genetic resources;
   (iii) Microbial and fungal genetic resources.
   These constitute the main units of production in agriculture, including cultivated species, domesticated species and managed wild plants and animals, as well as wild relatives of cultivated and domesticated species;
(b) Components of agricultural biodiversity that provide ecological services. These include a diverse range of organisms in agricultural production systems that contribute, at various scales to, inter alia:
   (i) Nutrient cycling, decomposition of organic matter and maintenance of soil fertility;
   (ii) Pest and disease regulation;
   (iii) Pollination;
   (iv) Maintenance and enhancement of local wildlife and habitats in their landscape,
   (v) Maintenance of the hydrological cycle;
   (vi) Erosion control;
   (vii) Climate regulation and carbon sequestration;
(c) Abiotic factors, which have a determining effect on these aspects of agricultural biodiversity;
(d) Socio-economic and cultural dimensions since agricultural biodiversity is largely shaped by human activities and management practices. These include:
   (i) Traditional and local knowledge of agricultural biodiversity, cultural factors and participatory processes;
   (ii) Tourism associated with agricultural landscapes;
   (iii) Other socio-economic factors

The points that have particular relevance to the current report are 2b (that FAnGR are largely managed by farmers and involve indigenous knowledge and culture), 2d (that diversity within species is as important as diversity between species, and has been expanded by agriculture), 2e and 2f (that conservation within production systems is inherently linked to sustainable use but that much agricultural biodiversity is now also conserved in ex situ collections) and all of 3b which lists the ecosystem services and socio-economic and cultural aspects to which agricultural biodiversity (including FAnGR) contributes.
At the 10th COP, held in Nagoya in October 2010, agreements were reached on a range of targets relating to access and benefit sharing (the Aichi targets; see also 2c in the extract of Decision V/5 above). Amongst the decisions taken at Nagoya was COP10 Decision X/34 on Agricultural Biodiversity, which includes the following paragraphs:

6. Recognizes the importance of the processes led by the Food and Agriculture Organization of the United Nations, such as implementation of the Global Plan of Action on Animal Genetic Resources for Food and Agriculture and updating of the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture, which contribute directly to achieving the three objectives of the Convention on Biological Diversity, in crop and livestock sectors;

7. Invites Parties to incorporate, as appropriate, relevant elements of the programme of work on agricultural biodiversity into their national biodiversity strategy and action plans as well as into their relevant sectoral and inter-sectoral policies and plans;

8. Invites Parties and other Governments to take action, taking into account national circumstances, to support, among others, farmers in in-situ conservation of traditional and local varieties, races and breeds and efforts to conserve crop wild relatives as means to ensure food security and nutrition and support traditional lifestyles, consistent and in harmony with the Convention on Biological Diversity and relevant international obligations;

2.3 United Nations Food and Agriculture Organisation’s Commission on Genetic Resources for Food and Agriculture


The United Nations Food and Agriculture Organisation (FAO) published the State of the World’s Animal Genetic Resources for Food and Agriculture in 2007, based on country reports submitted by 169 countries, including the UK. Also in 2007, the International Technical Conference on Animal Genetic Resources for Food and Agriculture, held in Interlaken, Switzerland adopted the Global Plan of Action for Animal Genetic Resources. These are considered further below.

The seventh session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture (ITWG-AnGR), meeting in Rome in October 2012, recommended that the Commission:

i) invite FAO to present The Second Report on the State of the World’s Animal Genetic Resources for Food and Agriculture to the Commission, at its Fifteenth Regular Session (2015), and amend the Multi-Year Programme of Work and the plan for its implementation accordingly;

ii) review, at its Fourteenth Regular Session, a well-structured questionnaire for collecting national data;

iii) request that a draft version of The Second Report on the State of the World’s Animal Genetic Resources for Food and Agriculture be presented to the Eighth Session of the Working Group, for its consideration;

iv) urge all FAO Members and relevant international mechanisms, funds and bodies to give immediate and due priority and attention to the effective allocation of predictable and agreed resources for the preparation of The Second Report on the
State of the World’s Animal Genetic Resources for Food and Agriculture; and

v) appeal to all FAO Members and international organizations to provide, in good time, the relevant information required for the preparation of The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture.

At the Rome meeting the Working Group also considered a document entitled Roles of small-scale livestock keepers in the conservation and sustainable use of animal genetic resources and recommended that the Commission:

i) encourage countries to consider applying the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, especially as they relate to pastoralists and indigenous and small-scale livestock keepers;

ii) request FAO to explore if and how payments for ecosystem services provided by livestock species and breeds could benefit all livestock keepers, with special consideration to the important contributions of small-scale livestock keepers and pastoralists, and to report back to the Commission's next session; and

iii) invite countries to collect and insert data into the production environment descriptor module of DAD-IS, including the ecosystem services provided by breeds kept by small-scale livestock keepers and pastoralists.

FAO publish a series of Technical Guidelines that can be accessed at: http://www.fao.org/documents/en/Livestock%20production%20systems%20management/topicsearch/ ; recent titles include:

- Surveying and monitoring of animal genetic resources
- Phenotypic characterization of animal genetic resources
- Molecular genetic characterization of animal genetic resources
- Cryoconservation of animal genetic resources
- Developing the institutional framework for the management of animal genetic resources

FAO also operates the Domestic Animal Diversity Information System (DAD-IS; see http://dad.fao.org/) that:

‘provides a communication and information tool supporting the implementation of the Global Plan of Action for Animal Genetic Resources. It allows countries to manage and disseminate data on their livestock breeds. These data, at present covering more than 14 000 national breed populations, are used to compile biennial reports on the status and trends of animal genetic resources.’

2.4 Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration 2007


The world’s first Global Plan of Action for Animal Genetic Resources contained 23 Strategic Priorities (organised into four Strategic Priority Areas) ‘aimed at combating the erosion of animal genetic diversity and at using animal genetic resources sustainably’. The development of the action plan involved 169 countries, of which 109 adopted the action plan at an International Technical Conference on Animal Genetic Resources, held in Interlaken,
Switzerland in 2007. They also adopted the Interlaken Declaration on Animal Genetic Resources. The UK has been a party to the Global Action Plan and the Interlaken Declaration since 2007.

By adopting the plan and declaration, countries:

‘confirmed their common and individual responsibilities for the conservation, sustainable use and development of animal genetic resources for food and agriculture; for world food security; for improving human nutritional status; and for rural development.’ [Our emphasis]

All of the Strategic Priority Areas, Strategic Priorities and Actions of the Global Action Plan are relevant to this report and are summarised below.¹

**Strategic Priority Area 1: Characterization, Inventory and Monitoring of Trends and Associated Risks**

The actions provide a consistent, efficient and effective approach to the classification of animal genetic resources, and to assess trends in and risks to animal genetic resources.

**Strategic Priority 1:** Inventory and characterise animal genetic resources, monitor trends and risks associated with them, and establish country-based early-warning and response systems.

**Actions**

1. Conduct or complete inventories of the location, population status, trends and characteristics of animal genetic resources.
2. Expand characterization and monitoring of trends in and risks to animal genetic resources.
3. Encourage the establishment of institutional responsibilities and infrastructure for monitoring of trends in animal genetic resources (for example population size and genetic diversity), including identification, registration and pedigree systems.
4. Promote participatory approaches to characterization, inventory and monitoring of trends and associated risks that foster collaboration among all stakeholders, including livestock keepers and researchers.
5. Undertake international cooperative monitoring of trends and associated risks, inventory and characterization activities among countries sharing transboundary breeds and similar production systems.
6. Strengthen global and regional information systems and networks for inventory, monitoring and characterization. Inter alia, the Domestic Animal Diversity Information System (DAD-IS) and the Global Databank for Animal Genetic Resources for Food and Agriculture should be strengthened to obtain, evaluate and condense information from national databases and monitoring systems, and distribute this information, highlighting threats and needs.
7. Establish or strengthen existing breed endangerment early-warning and response systems, through the further development of national, regional and global risk monitoring mechanisms, and the inclusion of early-warning criteria in existing databases.

¹ We thank Mr. Julian Hosking for the summary he prepared for the UK Farm Animal Genetic Resources Committee in October 2011.
Strategic Priority 2: Develop international technical standards and protocols for characterisation, inventory, and monitoring of trends and associated risks.

Strategic Priority Area 2: Sustainable Use and Development

The actions are to ensure sustainability in animal production systems, with a focus on food security and rural development.

Strategic Priority 3: Establish and strengthen national sustainable use policies.

Actions
1. Review existing national policies on sustainable use to assess their impacts on animal genetic resources management.
2. Develop, as necessary, national policies that incorporate the contribution of animal genetic resources to sustainable use, which may include setting strategic objectives for breeding and sustainable use; conducting economic and cultural valuation of animal genetic resources; and developing approaches, including mechanisms, to support wide access to, and the fair and equitable sharing of benefits arising from the use of animal genetic resources and associated traditional knowledge.

Strategic Priority 4. Establish national species and breed development strategies and programmes.

Actions
1. Develop long-term planning and strategic breeding programmes and consider a number of elements, including: efforts to improve underutilized breeds, especially within low to medium external input production systems; assessments of the impact of exotic animal breeds and the development of measures for producers to realize positive impacts and prevent negative impacts; training and technical support for the breeding activities of pastoralist and farming communities; and the integration of improved husbandry practices in animal genetic resources development programmes. Whereas plans and programmes developed will be national, in some cases cooperation with other countries may be required.
2. Assess breed development programmes and revise, as appropriate, with the aim of meeting foreseeable economic and social needs and market demands, bearing in mind scientific and technological parameters. The information about breeds and production systems could be made available to consumers.
3. Establish and develop organizational structures of breeding programmes, especially breeders' organizations and breeding schemes, including recording systems.
4. Incorporate consideration of the impacts of selection on genetic diversity into breeding programmes and develop approaches to maintain the desired variability.
5. Establish or strengthen recording schemes to monitor changes in non-production traits (e.g. health, welfare) and adjust breeding goals accordingly.
6. Encourage the development of backup collections of frozen semen and embryos from current breeding schemes to ensure genetic variability.
7. Provide information to farmers and livestock keepers to assist in facilitating access to animal genetic resources from various sources.
**Strategic Priority 5** Promote agro-ecosystems approaches to the management of animal genetic resources.

**Actions**
1. Assess environmental and socio-economic trends that may require a medium- and long-term policy revision in animal genetic resources management.
2. Integrate agro-ecosystem approaches in national agricultural and environmental policies and programmes of relevance to animal genetic resources, where appropriate, particularly those directed towards pastoralist and rural smallholder communities, and fragile environments.
3. Establish networks to enhance interaction among the main stakeholders, scientific disciplines and sectors involved.

**Strategic Priority 6** Support indigenous and local production systems and associated knowledge systems of importance to the maintenance and sustainable use of animal genetic resources.

**Actions**
1. Assess the value and importance of indigenous and local production systems, and identify trends and drivers of change that may affect the genetic base, and the resilience and sustainability of the production systems.
2. Support indigenous and local livestock systems of importance to animal genetic resources, including through the removal of factors contributing to genetic erosion. Support may include the provision of veterinary and extension services, delivery of microcredit for women in rural areas, appropriate access to natural resources and to the market, resolving land tenure issues, the recognition of cultural practices and values, and adding value to their specialist products.
3. Promote and enable relevant exchange, interaction and dialogue among indigenous and rural communities and scientists and government officials and their stakeholders, in order to integrate traditional knowledge with scientific approaches.
4. Promote the development of niche markets for products derived from indigenous and local species and breeds, and strengthen processes to add value to their primary products.

**Strategic Priority Area 3: Conservation**

The actions focus on steps needed to preserve genetic diversity and integrity, for the benefit of current and future generations.

**Strategic Priority 7** Establish national conservation policies.

**Actions**
1. Set and regularly review conservation priorities and goals.
2. Assess factors leading to the erosion of animal genetic resources and formulate appropriate policy responses. Establish or strengthen information systems on animal breeding approaches as well as on different gene banks, as they affect animal genetic diversity, in order to enable breeders and countries to make appropriate choices in their improvement programmes.
3. Establish institutional structures and policies, as appropriate, including specific measures to conserve breeds at risk of extinction, and to prevent breeds from becoming at risk. A combination of in situ and ex situ measures is necessary.
4. Provide and catalyse incentives for producers and consumers to support conservation of animal genetic resources at risk, as evaluated by individual
countries, provided that such incentives are consistent with existing international agreements.

**Strategic Priority 8** Establish or strengthen *in situ* conservation programmes.

**Actions**

1. Set and regularly review *in situ* conservation priorities and goals.
2. Encourage the development and implementation of national and regional *in situ* conservation programmes for breeds and populations that are at risk. This may include support, either directly for breeders of threatened breeds, or measures to support agricultural production systems that manage areas of importance to breeds at risk, the encouragement of breed organizations, community-based conservation organizations, non-governmental organizations and other actors to participate in conservation efforts provided that such support or such measures are consistent with existing international agreements.
3. Promote policies and means to achieve the sustainable use of a diversity of local breeds, without the need for support from public funds or extra funding, through *in situ* conservation.

**Strategic Priority 9** Establish or strengthen *ex situ* conservation programmes.

**Actions**

1. Set and regularly review *ex situ* conservation priorities and goals.
2. Establish or strengthen national and regional facilities for *ex situ* conservation, in particular cryogenic storage. Support the efforts of countries within a region that have opted to establish a regional facility.
3. Establish modalities to facilitate use of genetic material stored in *ex situ* gene banks under fair and equitable arrangements for storage, access and use of animal genetic resources.
4. Develop and implement measures to secure *ex situ* collections from loss of genetic diversity resulting from disease outbreaks and other threats, in particular by establishing backup samples.
5. Identify and fill gaps in *ex situ* collections.
6. Develop procedures for replenishment of genetic material taken from gene banks, by systematically developing links with live populations, or establishing in *vivo* populations of breeds at risk at off-farm locations, such as zoos and parks.

**Strategic Priority 10** Develop and implement regional and global long-term conservation strategies.

**Actions**

1. Assist countries to develop and implement conservation plans for breeds and populations, particularly transboundary breeds and populations, combining in *situ* and *ex situ* measures.
2. Establish integrated support arrangements to protect breeds and populations at risk from emergency or other disaster scenarios, and to enable restocking after emergencies, in line with the national policy.
3. Establish regional and global networks of gene banks for animal genetic resources and harmonize approaches to conservation in gene banks and to facilitating exchange.
4. Facilitate the establishment of core collections of animal genetic diversity, at the appropriate regional or species level.
Strategic Priority 11 Develop approaches and technical standards for conservation.

Actions
1. Undertake research, including participatory research, to develop in situ and ex situ methods and technologies, including for conservation breeding. Elaborate standardized methods and guidelines for their use, where necessary.
3. Promote the use of appropriate genetic indicators to complement phenotypic characterization as a basis to make decisions on conserving animal genetic resources.
4. Review the impact of zoosanitary standards on the conservation of animal genetic resources, and in particular, their accessibility.

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

The actions directly address the key questions of practical implementation, through coherent and synergistic development of the necessary institutions and capacities.

Strategic Priority 12 Establish or strengthen national institutions, including National Focal Points, for planning and implementing animal genetic resources measures, for livestock sector development.

Actions
1. Analyse national institutional capacity in support of holistic planning of the livestock sector.
2. Establish or strengthen fully functional National Focal Points for animal genetic resources.
3. Develop strong national coordination between the National Focal Point and stakeholders involved in animal genetic resources, such as the breeding industry, government agencies, civil society organizations, and networks and advisory committees.
4. Develop and implement intervention tools, as appropriate, for national planners to shape the future development of the livestock sector in accordance with national priorities, including in relation to the deployment of animal genetic resources, and the effects of animal production systems on the environment.
5. Promote coordination and synergy between the different authorities dealing with various aspects of planning, within and across ministries, as well as with other stakeholders, and ensure their participation in the process.

Strategic Priority 13 Establish or strengthen national educational and research facilities.

Actions
1. Identify the short-term, medium-term and long-term needs for research and education, and promote the formation of the relevant cadres of experts, nationally or through international training.
2. Review national research and education capacities in relevant fields, and establish targets for training to build the national skill base.
3. Establish or strengthen, in partnership with other countries, as appropriate, relevant research, training and extension institutions, including national and regional agricultural research systems, to support efforts to characterize, inventory and monitor trends and associated risks, sustainably use and develop, and conserve animal genetic resources.
4. Review the national educational needs of livestock keepers, while respecting traditional knowledge and indigenous practices.
**Strategic Priority 14** Strengthen national human capacity for characterization, inventory, and monitoring of trends and associated risks, for sustainable use and development, and for conservation.

**Actions**

1. Establish or strengthen training and technology transfer programmes, and information systems for the inventory, characterization and monitoring of trends and associated risks; sustainable use and development; and conservation, particularly in developing countries and countries with economies in transition.
2. Establish or strengthen collaborative networks of researchers, breeders and conservation organizations, and other public, civil and private actors, within and between countries, for information and knowledge exchange for sustainable use, breeding and conservation.
3. Establish or strengthen community-based organizations, networks and initiatives for sustainable use, breeding and conservation.

**Strategic Priority 15** Establish or strengthen international information sharing, research and education.

**Actions**

1. Establish or strengthen international research and education, in particular, to assist developing countries and countries with economies in transition to better use and develop animal genetic resources.
2. Continue to develop the FAO Domestic Animal Diversity Information System (DAD-IS), as a global communication tool and clearing-house mechanism for animal genetic resources.
3. Develop means for reporting on the status and trends of national animal genetic resources that may also assist governments in relevant reporting in other international forums, to reduce the overall reporting burden.
4. Establish and strengthen the development of national databases to enable information sharing among countries.

**Strategic Priority 16** Strengthen international cooperation to build capacities in developing countries and countries with economies in transition, for:

- characterization, inventory, and monitoring of trends and associated risks;
- sustainable use and development; and
- conservation of animal genetic resources.

**Actions**

1. Build or strengthen technical cooperation and establish facilities for technology transfer and exchange of experience, and enhance educational and other training opportunities, between countries, considering the particular interests of developing countries and countries with economies in transition.
2. Establish or strengthen international collaboration in the characterization, use and development, and conservation of transboundary breeds.

**Strategic Priority 17** Establish Regional Focal Points and strengthen international networks.

**Actions**

1. Support the establishment of country-driven Regional Focal Points for animal genetic resources, where appropriate.
2. Establish or strengthen and maintain regional networks, including regional databases, if required, for the use, development and conservation of animal
genetic resources.
3. Link regional activities on animal genetic resources to regional organizations.
4. Maintain and strengthen the FAO Global Focal Point for animal genetic resources to promote international networking and collaboration.

Strategic Priority 18 Raise national awareness of the roles and values of animal genetic resources.

Action
1. Provide targeted, effective information through media, public events and other means to raise awareness about the important roles and values of animal genetic resources. This should address their specific characteristics and the consequent special policy needs for their sustainable use, development and conservation, including livestock keepers’ contributions, needs, and all relevant rights that may exist at national level. Target audiences include policy-makers, all major stakeholders within the livestock sector and related sectors, and the general public.

Strategic Priority 19 Raise regional and international awareness of the roles and values of animal genetic resources.

Action
1. Support regional and international campaigns to raise awareness of the status of animal genetic resources for food and agriculture, and seek to develop wide support at the government and institutional levels, as well as among the general public.

Strategic Priority 20 Review and develop national policies and legal frameworks for animal genetic resources.

Actions
1. Periodically review existing national policies and regulatory frameworks, with a view to identifying any possible effects they may have on the use, development and conservation of animal genetic resources, especially with regard to the contribution and needs of local communities keeping livestock.
2. Consider measures to address any effects identified in reviews of policy and legal frameworks. Measures may include policy or legislative changes, or adjustments at the level of implementation, taking into account the need to balance the goals and objectives of the relevant legal instruments and policies, and the interests of different stakeholders.
3. Encourage consistency of national law and policies concerning animal genetic resources with relevant international agreements, as appropriate.
4. Ensure that relevant research results are taken into consideration in the development of national policies and regulations on animal genetic resources.

Strategic Priority 21 Review and develop international policies and regulatory frameworks relevant to animal genetic resources.

Actions
1. Review existing international agreements that impact upon the use, development and conservation of animal genetic resources, with a view to ensuring that international policies and regulatory frameworks take into account the special importance of animal genetic resources for food and agriculture for food security, the distinctive features of these resources needing distinctive solutions, the
importance of science and innovation, and the need to balance the goals and objectives of the various agreements, as well as the interests of regions, countries and stakeholders, including livestock keepers.

2. Review the implications and impacts of international agreements and developments relevant to access to animal genetic resources and sharing the benefits of their use upon animal genetic resources stakeholders, especially livestock keepers.

**Strategic Priority 22** Coordinate the Commission’s efforts on animal genetic resources policy with other international forums.

**Action**
1. Develop cooperation with and strengthen the involvement and contributions of international organizations and forums in supporting the work of the Commission on Genetic Resources for Food and Agriculture on animal genetic resources.

**Strategic Priority 23** Strengthen efforts to mobilize resources, including financial resources, for the conservation, sustainable use and development of animal genetic resources.

**Actions**
1. Assist all stakeholders to strengthen capacity-building, including by exchange of experience, by enhancing research and educational activities, and by providing training opportunities, technology transfer and financial resources, at national, regional and international levels, as detailed in PART III below.

2. Develop a follow-up process to implement the Global Plan of Action for Animal Genetic Resources.

3. Strengthen cooperation and coordination of conservation, sustainable use and development of animal genetic resources at national, regional and international levels, including through ex situ backup systems for the protection against the risk of emergency or disaster scenarios.

The CBD requires signatories to develop Biodiversity Action Plans (BAP); the EC’s BAP for Agriculture and the UK BAPs are summarised below (Sections 2.6.2, 3.1, and 3.3-3.6).
Interlaken Declaration on Animal Genetic Resources (2007)

In recognition of the essential roles and values of animal genetic resources for food and agriculture, in particular, their contribution to food security for present and future generations; aware of the threats to food security and to the sustainable livelihoods of rural communities posed by the loss and erosion of these resources; we, the representatives of one hundred and nine States, and the European Community and forty-two Organizations have gathered together in Interlaken, Switzerland, at the invitation of the Food and Agriculture Organization of the United Nations and hosted by the Government of Switzerland, at this first International Technical Conference for Animal Genetic Resources, aware of our responsibilities and the many challenges that must be addressed, but convinced and confident that progress can and should be made. This International Technical Conference on Animal Genetic Resources is a major contribution to establishing an effective international framework for the sustainable use, development and conservation of animal genetic resources for food and agriculture, and world food security.

Confirming our common and individual responsibilities in respect of conservation, sustainable use and development of animal genetic resources for food and agriculture, we recognize the interdependence of countries, regions and peoples regarding these resources.

We commit ourselves to achieving the sustainable use, development and conservation of animal genetic resources for food and agriculture. We also commit ourselves to facilitating access to these resources and the fair and equitable sharing of the benefits arising from their use, consistent with relevant international obligations and national laws. Our objective is to enhance world food security, improve human nutritional status, and contribute to rural development.

We recognize that existing diversity in animal species is not used to the extent possible for increased food production, improved human nutrition, and to further sustain rural communities, or for more efficient production systems. We note with alarm the significant ongoing loss of livestock breeds. The continuing erosion and loss of animal genetic resources for food and agriculture would compromise efforts to achieve food security, improve human nutritional status and enhance rural development. We acknowledge that efforts to further conserve, develop, improve and sustainably use animal genetic resources should be enhanced.

We recognize that prompt action should be taken to conserve animal breeds at risk, due to the alarming rate of erosion in animal genetic resources. We acknowledge that maintaining the diversity of animal genetic resources for food and agriculture is essential to enable farmers, pastoralists and animal breeders to meet current and future production challenges resulting from changes in the environment, including climate change; to enhance resistance to disease and parasites; and to respond to changes in consumer demand for animal products. We also recognize the intrinsic value of biological diversity and the environmental, genetic, social, economic, medicinal, scientific, educational, cultural and spiritual importance of breeds of livestock, and our ethical responsibility to ensure genetic resources are available to future human generations.

We are aware that the demand for meat, milk and other animal products is dramatically increasing. The sustainable use, development, and conservation of animal genetic resources for food and agriculture will make a vital contribution to achieving the goals of the Rome Declaration on World Food Security, the World Food Summit Plan of Action, as well as the Millennium Development Goals, in particular Goal 1: eradication of extreme poverty and hunger, and Goal 7: ensure environmental sustainability. The sustainable use, development and conservation of animal genetic resources for food and agriculture make an essential contribution to facilitating the implementation of Agenda 21 and the Convention on Biological Diversity.
We affirm the desirability, as appropriate, subject to national legislation, of respecting, reserving and maintaining traditional knowledge relevant to animal breeding and production as contribution to sustainable livelihoods, and the need for the participation of all stakeholders in making decisions, at the national level, on matters related to the sustainable use, development and conservation of animal genetic resources.

We are aware that future demand for animal products must be met within the context of sustainable agriculture and development, and that this will require integrated approaches to economic development and the pursuit of social, cultural and environmental objectives. We understand the need for adopting management approaches that combine the best of traditional and modern knowledge and technologies, and the need to apply the agro-ecosystem approach and integrated natural resource management practices.

We acknowledge that major gaps and weaknesses exist in national and international capacities to inventory, monitor, characterize, sustainably use, develop and conserve animal genetic resources. We recognize the need for substantial financial resources, long-term support for national and international animal genetic resources programmes, to increase world food security and contribute to sustainable rural development. We affirm the need to review institutional capacity, management structures, programmes and policies, to identify deficiencies and address them through strengthening national capabilities, particularly in developing countries. We call for enhanced partnerships among governments, scientists, farmers, pastoralists, breeders and consumers, to build upon ongoing efforts to manage animal genetic resources and overcome major gaps and weaknesses.

At this first International Technical Conference on Animal Genetic Resources, we have adopted the Global Plan of Action for Animal Genetic Resources. We are convinced of the utmost importance of integrating it into national biological diversity and agriculture policies, plans and programmes, and indispensable national, regional and international cooperation. This Global Plan of Action for Animal Genetic Resources provides a comprehensive and coherent framework for enhancing management activities in relation to animal genetic resources for food and agriculture, including through strengthening policies, institutions and building capacity. Implementation of the Global Plan of Action for Animal Genetic Resources will contribute to creating synergies among ongoing activities, as well as facilitate the most efficient use of available financial and human resources, and more effort is required to maintain adequate financial resources for supporting developing countries.

We recognize that the main responsibility for implementing the Global Plan of Action for Animal Genetic Resources rests with national governments. We undertake to honour our commitments to taking the necessary steps to implement the Global Plan of Action for Animal Genetic Resources, in accordance with our national capacities and resources. We invite all people and their communities and organizations to join us in the common cause.
2.5 The CBD Strategic Plan for Biodiversity 2011-2020 (2010)

http://www.cbd.int/sp/

At the 10th COP of the CBD Decision X/2 adopted a revised Strategic Plan for Biodiversity including the Aichi Biodiversity Targets. Relevant Aichi Targets from the Strategic Plan address a number of commitments including to raise awareness and respect traditional uses of biodiversity. The European Council has committed to implement the Strategic Plan. Target 13 is of particular relevance to farm animal genetic diversity.

**Target 1:** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

**Target 3:** By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

**Target 7:** By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

**Target 13:** By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

**Target 18:** By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

2.6 European Directives and Regulations

2.6.1 Regulations (EEC) 797/85 and (EEC) 2078/92


The concept of agri-environmental schemes developed in the mid 1980s (e.g. the UK’s Broads Grazing Marshes Conservation Scheme 1985-86) and the enabling of member states to draw up agri-environment schemes was incorporated into the CAP in 1985 under (EEC) Regulation 797/85. In the UK the regulation was enacted as the 1986 Agriculture Act (Coates, 1997).

The EU policy framework changed following the ‘Agenda 2000’ process, the main outcomes
over the next few years being to cut prices for certain commodities with compensatory direct payments and creation of a new Rural Development Regulation (RDR) and Programme (RDP). This regulation supports rural development and agri-environment schemes designed to diversify rural economies, to encourage farmers to look to markets and diversified forms of income to reduce their dependence on subsidy, and enhance the environment. (Policy Commission on the Future of Farming and Food, 2002 (the ‘Curry Report’; see http://webarchive.nationalarchives.gov.uk/20100807034701/http/archive.cabinetoffice.gov.uk/farming/pdf/PC%20Report2.pdf)

Further definition was given to agri-environment measures in Regulation (EEC) 2078/92, which obliged member states to establish agri-environment measures under which farmers were offered payments in return for compliance with specified conservation practices. Well over 100 schemes were approved by the European Commission; these covered a wide range of objectives including, in some member states, the rearing of rare livestock breeds (Mitchell, 1997) but in the UK the Environmentally Sensitive Area (ESA) scheme and later the Countryside Stewardship Scheme (CSS) focused solely on habitat and landscape measures.


The Biodiversity Action Plan for Agriculture was developed in response to both the Agenda 2000 reform of the CAP and to take account of obligations under the CBD. The BAP included the following priority (Paragraph 31):

Supporting specific measures related to the use of genetic resources, to the maintenance of local, traditional and rustic breeds and varieties and the diversity of varieties used in agriculture.

The BAP goes on to state (Paragraph 36) that agri-environment schemes operate mainly through rural development measures:

The agri-environmental strategy put forward by the Agenda 2000 is largely aimed at enhancing the sustainability of agro-ecosystems, mainly through the rural development measures (including agri-environment scheme) and common rules applicable to direct payments within the common market organisations. It is based on the idea that farmers must be willing to respect a basic set of environmental rules without receiving any corresponding compensation. Where they supply goods or services involving more than just compliance with usual good farming practices, they could receive a payment to offset at least the costs and income losses incurred.

Mention is made of the ability of agri-environment schemes to support FAAnGR conservation: ‘...rearing of threatened farm animal breeds or cultivation of local traditional varieties...’ (Paragraph 50). The BAP identifies the Sectoral Objectives in agriculture as defined by the Community Strategy on Biodiversity (COM (1998) 42). These include:
1. Plant and Animal Genetic resources. Objectives are:

1.1 To formulate policy measures, programmes and projects which promote the implementation of the Global Plan of Action for the conservation and sustainable use of plant genetic resources for food and agriculture.

1.2 To promote the development of technologies assessing levels of diversity in genetic resources.

1.3 To reinforce the policy of conservation – in situ and ex situ - of genetic resources of actual or potential value for food and agriculture.

1.4 To promote the development of adequate gene-banks useful for the conservation in situ and ex situ of genetic resources for food and agriculture so that they will be available for use.

1.5 To ensure that legislation does not obstruct the conservation of genetic resources

4.3. Genetic resources (Sectoral Objective No. 1)
Section 4.3 expands on this Sectoral Objective and paragraphs 74, 75 and 78 are relevant:

74. The first five-year programme for the implementation of the Regulation No. 1467/94 which came to an end in 1999 has essentially concentrated on the ex-situ conservation of genetic resources and was particularly concerned with the characterisation of genetic resources available in the gene bank collections. This approach represents a vital element of any strategy aiming at the conservation of biodiversity enabling to safeguard varieties neglected by farmers for food production. Thanks to research and selection carried out by the institutions responsible for the conservation of genetic material, the characteristics of local varieties have been improved. They represent however at the same time the indispensable conditions for the conservation of the genetic resources necessary for the future in the context of a modern agriculture. Experience demonstrates that this approach is particularly important for (intending) users of the results of this programme. Their active participation to several projects constitutes outstanding evidence in this respect.

75. The first programme has mainly dealt with plant genetic resources (17 projects from 24 projects in total). Nevertheless, the Community institutions have recognised the vital role that the Regulation 1467/94 has to perform in the conservation of breeds of farm animals and agricultural plants.

78. However, if Regulation 1467/92 is to be able to make an effective contribution towards achieving the objectives of the Community biodiversity strategy, it is essential that a future programme should make a major contribution to in situ conservation and on farm management, thus making it possible to take account of the specific features of eco-regions and the conservation and evolution of species/races specific to such regions or to natural habitats. This also entails greater integration of NGOs and farmers in the genetic resource conservation process.
2.6.3 Council Regulations EC 1467/94 and EC 870/2004

Council Regulation EC 1467/94 established a Community programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture. The programme ran for five years and was later repealed under Council Regulation EC 870/2004, which established a new programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture. The first two paragraphs of the Regulation EC 870/2004 stated:

1. Biological and genetic diversity in agriculture is essential to the sustainable development of agricultural production and of rural areas. The necessary measures should therefore be taken to conserve, characterise, collect and utilise the potential of that diversity in a sustainable way to promote the aims of the common agricultural policy (CAP).

2. The conservation and sustainable use of genetic resources in agriculture also contributes to the aims of the Convention on Biological Diversity approved by the Community by Council Decision 93/626/EEC and the related Community biodiversity strategy which includes an action plan for biodiversity conservation and the protection of genetic resources in agriculture. It is also a major objective of the FAO's Global Plan of Action for the Conservation and Sustainable Utilisation of Plant Genetic Resources for Food and Agriculture and of the International Treaty on Plant Genetic resources for Food and Agriculture, which the Commission and the Member States signed on 6 June 2002.

The targeted actions identified in the Regulation include:
(a) actions promoting the ex situ and in situ conservation, characterisation, collection and utilisation of genetic resources in agriculture;
(b) the establishment of a European decentralised, permanent and widely accessible web-based inventory of genetic resources currently conserved in situ including in situ/on farm genetic resources conservation activities;
(c) the establishment of a European decentralised, permanent and widely accessible web-based inventory of the ex situ collections (gene banks) and in situ facilities (resources) and databases currently available or being developed on the basis of national inventories;
(d) the promotion of regular exchanges of technical and scientific information, in particular on the origins and individual characteristics of available genetic resources, among competent organisations in the Member States.

Precise details were left to the discretion of Member States, but the general qualifying principle is that livestock should be protected for environmental maintenance, or if they are threatened with extinction due to poor, or potentially poor, economic performance (Lefebvre et al. 2012).

Five projects on animal genetic resources were co-funded by Council Regulation EC 870/2004 (Table 1); between them these accounted for just 22% of the total funding (plants, including trees (12%) accounted for the remainder). Regrettably, the UK was not a partner in four of these projects although the UK has contributed information or data to EFABIS and GLOBALDIV. The UK was involved in the Heritage Sheep Project (http://ec.europa.eu/agriculture/genetic-resources/actions/f-040/final-fact-sheet_en.pdf). This project was based on a questionnaire survey of local breed societies for 49 breeds of sheep from five Member States (including 15 breeds from the UK) to determine the special values
of each breed, the range and number of threats facing the breeds, the numbers of breeding animals that then existed and whether those numbers were likely to increase or decrease.

Table 1. The five farm animal genetic resources projects co-funded under Council Regulation EC 870/2004.

<table>
<thead>
<tr>
<th>Agri Gen Res No.</th>
<th>Project Title</th>
<th>Project Short Name</th>
<th>Co-ordinator</th>
<th>Web Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>040</td>
<td>Heritage Sheep</td>
<td>HeritageSheep</td>
<td>University of York</td>
<td><a href="http://www.heritagesheep.eu">http://www.heritagesheep.eu</a></td>
</tr>
<tr>
<td>066</td>
<td>European livestock breeds and rescue net</td>
<td>ELBARN</td>
<td>Euronatur, Radolfzell, Germany</td>
<td><a href="http://www.elbarn.net/elbarn/">http://www.elbarn.net/elbarn/</a></td>
</tr>
<tr>
<td>067</td>
<td>A global view of livestock biodiversity and conservation</td>
<td>GLOBALDIV</td>
<td>Universita Cattolica del Sacro Cuore, Milan</td>
<td><a href="http://www.globaldiv.eu">http://www.globaldiv.eu</a></td>
</tr>
</tbody>
</table>

At the instigation of the European Commission, an independent panel of experts was convened to evaluate the outputs of Council Regulation EC 870/2004 (Banos et al. 2012; see [http://www.rfp-europe.org/fileadmin/SITE_ERFP/Brussels/870_evaluation_01062012.pdf](http://www.rfp-europe.org/fileadmin/SITE_ERFP/Brussels/870_evaluation_01062012.pdf)). The UK responded to the questionnaire survey on which the report was partially based and made (in brief) the following comments/recommendations:

- The programme should be renewed, but there should be greater collaboration between farming industry organisations, researchers and farmers; creation of gene- or bio-banks may foster greater collaboration.
- FAnGR should be given equal recognition in all Community actions for biodiversity as ‘wild’ biodiversity and plant genetic resources.
- Programme measures should deliver sustainable benefit for FAnGR conservation: outputs should have real impact on farmers and breeders. Rural Development Policy measures were more effective in reaching stakeholders.
- Equidae should be given greater attention in the programme.
- Zootechnical regulations are a major burden on individuals, micro- and small-enterprises, charities etc. This burden should be reduced, at least for these stakeholders, who conserve most of agricultural genetic resources.
The most effective drivers of FAnGR conservation are measures that support profitable returns from the market; these should be combined with revenue and capital payments associated with sustainable conservation activities.

EU-wide lists of endangered breeds are useful, but should take account of a wider range of criteria including geographic concentration, inbreeding, introgression and effective population size as well as numerical scarcity.

Adequate funding is essential for all FAnGR conservation activities.

Collections and associated databases, funding and training are crucial but centralisation of collections would be unwise.

The provenance of farm animal products is important and effective, practical and enforceable traceability is essential. Animal movement traceability systems need to be integrated with animal breeding traceability systems.

Resources should be made available to shorten supply chains for farm animal products to support use of FAnGR and stimulate local production.

Many of these suggestions/recommendations (which may also have been made by other respondents) were adopted in the independent expert panel’s conclusions and recommendations:

Conclusions
The independent experts conclude that Council Regulation (EC) No 870/2004 (24 April 2004) “establishing a second Community Programme on the conservation, characterisation, collection and utilisation of genetic resources in and repealing Regulation (EC) No 1467/94” has:
1. Stimulated considerable interest among various groups of stakeholders within the European Union and beyond.
2. Promoted collaboration among diverse groups of stakeholders in different countries.
3. Led to the establishment of useful links and partnerships across Europe.
4. Advanced the understanding of some local practices and needs.
5. Led to useful results and guidelines for the conservation of valuable genetic resources.
6. Established well characterised and evaluated core collections and cryo-banks of various plant and animal species.
7. Improved the scientific knowledge on the nature, management and potential of genetic resources of some species of farm animals, crops and forest trees in Europe.

In addition:
8. Because of considerable emphasis on scientific activities relative to their implementation in practice, although the characterisation, collection and conservation aspects of agricultural genetic resources were effectively addressed for the species studied, the utilisation component of the Programme was not addressed to the same extent.
9. In some cases the structure of reimbursing costs made it difficult for certain organisations to participate.
10. In some cases, the project results, although potentially relevant, were not available to the end users.
11. A number of newly developed databases and established ones were used to accommodate the data generated but open access to these results was not always possible. Furthermore, no mechanism was put in place to facilitate accessibility to the results via a single European portal.
12. Long-term benefits of conservation may not be realised due to the high costs of relevant activities.
Recommendations

In view of the above, the independent experts make the following recommendations:

1. The EC Programme on agricultural genetic resources should continue, building on the successes of the two previous Programmes. Ways should be found to reduce the administrative burden on coordinators in order to improve the effectiveness of project execution and delivery of results.

2. A new Community Programme should require that the primary objective of selected Actions be the delivery of appropriate utilisation of agricultural genetic resources in practice. To attain this objective, an increased involvement of end-users and Small and Medium Enterprises in the funded Actions should be promoted, to ensure the immediate transfer and implementation of project results.

3. The new Community Programme must harness all recent scientific and technological developments, which can offer improvements in the speed and efficacy of characterisation of agriculturally relevant traits. The aim should be the practical application of recent scientific advances to the conservation and utilisation of genetic resources in agriculture. To this end, participation of applied research organisations in combination with the end-users mentioned above should be encouraged.

4. Another important emphasis of the new Community Programme should be on adding value at EU level through the harmonisation of efforts, policies and programmes on the conservation and utilisation of the agricultural genetic resources across all Member States.

5. Activities that promote the evaluation and exploitation of agriculturally important interactions between microbes and farm animals/crop plants that have been identified and characterised in previous research should be encouraged.

6. Another priority of the new Community Programme should be the conservation, characterization and utilisation of genetic resources for fresh-water and marine aquaculture.

7. The new Community Programme should also focus on plant species for production of biomass and industrial products.

8. Options should be explored for better coordination of relevant EC programmes with the objectives of achieving economies of scale, avoiding overlaps, creating positive synergies and leading to outcomes for end-users.

9. Given the high costs of long-term conservation, a new Community Programme should support relevant activities that have the potential to eventually generate income for the end-users. The aim should be that the conservation and utilisation of these agricultural genetic resources become self-supporting.

10. Before the launch of any new programme, the Commission should organise a two-day meeting of stakeholders to discuss the modalities and to start build interest groups.


Council Regulation (EC) No 1698/2005 enabled EU Member States to support rural development using funding from the European Agricultural Fund for Rural Development (EAFRD). Amongst other measures, Article 39 of the regulation allowed payments to farmers who entered voluntary agri-environment schemes. Paragraph 5 of Article 39 specified:

‘Support may be provided for the conservation of genetic resources in agriculture for operations not covered by the provisions under paragraphs 1 to 4.’
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The Annex to the Regulation set the rate of payment for support of ‘Local breeds in danger of being lost to farming’ at €200 per livestock unit, although a footnote stated that ‘These amounts may be increased in exceptional cases taking account of specific circumstances to be justified in the rural development programmes.’

Commission Regulation (EC) No 1974/2006 set out the detailed provisions for implementation of Council Regulation (EC) No 1698/2005. In relation to conservation of farm animal genetic resources, Paragraph 4a of Article 27 stated that support may relate to the rearing of farm animals of ‘local breeds indigenous to the area and in danger of being lost to farming’. Paragraphs 3 and 4 of Article 28 set out the measures that could be supported:

3. The operations for the conservation of genetic resources in agriculture eligible for support under Article 39(5) of Regulation (EC) No 1698/2005 shall include the following:

   (a) targeted actions: actions promoting the ex situ and in situ conservation, characterisation, collection and utilisation of genetic resources in agriculture, including web-based inventories of genetic resources currently conserved in situ, including in situ/on-farm conservation, and of ex situ collections (gene banks) and databases;

   (b) concerted actions: actions promoting the exchange of information for the conservation, characterisation, collection and utilisation of genetic resources in Community agriculture, among competent organisations in the Member States;

   (c) accompanying actions: information, dissemination and advisory actions involving non-governmental organisations and other relevant stakeholders, training courses and the preparation of technical reports.

4. For the purposes of this Article, the following definitions shall apply:

   (a) ‘in situ conservation’ means the conservation of genetic material in ecosystems and natural habitats and the maintenance and recovery of viable population of species or feral breeds in their natural surroundings and, in the case of domesticated animal breeds or cultivated plant species, in the farmed environment where they have developed their distinctive properties;

   (b) ‘in situ/on-farm conservation’ means in situ conservation and development at farm level;

   (c) ‘ex situ conservation’ means the conservation of genetic material for agriculture outside their natural habitat;

   (d) ‘ex situ collection’ means a collection of genetic material for agriculture maintained outside their natural habitat.

Annex II of Commission Regulation (EC) No 1974/2006 indicated that a list of local breeds in danger of being lost to farming and the number of breeding females concerned must be certified by a duly recognised technical body or breeder’s organisation/association:

- the list of local breeds in danger of being lost to farming and the number of breeding females concerned. That number must be certified by a duly recognised technical body – or breeder’s organisation/association – which must register and keep up-to-date the herd or flock book for the breed. Evidence that the body concerned possesses the necessary skills and knowledge to identify animals of the breeds in danger,

Annex IV set the numerical thresholds for breeds to be considered as in danger of being lost
to farming and Annex V set the conversion rates for animals to livestock units.

**Annex IV: THRESHOLDS FOR ENDANGERED BREEDS (REFERRED TO IN ARTICLE 27(4))**

<table>
<thead>
<tr>
<th>Eligible farm animal species</th>
<th>Thresholds under which a local breed is considered as being in danger of being lost to farming (number of breeding females (*))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>7 500</td>
</tr>
<tr>
<td>Sheep</td>
<td>10 000</td>
</tr>
<tr>
<td>Goat</td>
<td>10 000</td>
</tr>
<tr>
<td>Equidae</td>
<td>5 000</td>
</tr>
<tr>
<td>Pigs</td>
<td>15 000</td>
</tr>
<tr>
<td>Avian</td>
<td>25 000</td>
</tr>
</tbody>
</table>

(*) Number, calculated for all Member States, of breeding females of the same breed available for pure-bred reproduction registered in a herd book kept by an approved breeding organisation recognised by the Member State in accordance with Community zootechnical legislation.

**Annex V: TABLE OF CONVERSION OF ANIMALS TO LIVESTOCK UNITS (REFERRED TO IN ARTICLE 27(13))**

<table>
<thead>
<tr>
<th>Animals</th>
<th>Conversion rate (LU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulls, cows and other bovine animals over two years, equine animals over six months</td>
<td>1,0 LU</td>
</tr>
<tr>
<td>Bovine animals from six months to two years</td>
<td>0,6 LU</td>
</tr>
<tr>
<td>Bovine animals below six months</td>
<td>0,4 LU</td>
</tr>
<tr>
<td>Sheep</td>
<td>0,15 LU</td>
</tr>
<tr>
<td>Goats</td>
<td>0,15 LU</td>
</tr>
<tr>
<td>Breeding sows &gt; 50 Kg</td>
<td>0,5 LU</td>
</tr>
<tr>
<td>Other pigs</td>
<td>0,3 LU</td>
</tr>
<tr>
<td>Laying hens</td>
<td>0,014 LU</td>
</tr>
<tr>
<td>Other poultry</td>
<td>0,003 LU</td>
</tr>
</tbody>
</table>

2.6.5 **Our life insurance, our natural capital - A European Union Biodiversity Strategy to 2020 - EC COM(2011) 244 final 2011**

http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5B1%5D.pdf

In its introduction (reproduced below) the EU BAP to 2020 recognises and explicitly states that biodiversity is natural capital that delivers ecosystem services. Although this may be taken as referring more specifically to ‘wild’ biodiversity, FAnGR may play a role in ecosystem services through management of habitats and in providing the raw material for genetic improvement of livestock in both intensive and extensive farming systems.

Biodiversity — the extraordinary variety of ecosystems, species and genes that surround us is our life insurance, giving us food, fresh water and clean air, shelter and medicine, mitigating natural disasters, pests and diseases and contributes to regulating the climate. Biodiversity is also our natural capital, delivering ecosystem services that underpin our economy. Its deterioration and loss jeopardises the provision of these services: we lose species and habitats and the wealth and employment we derive from nature, and endanger our own wellbeing.
Target 3 and two actions of the Biodiversity Strategy are particularly relevant to the conservation and wise use of FAnGR:

**Target 3:** Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity

*Action 9a:* Better target Rural Development to biodiversity conservation. The Commission and Member States will integrate quantified biodiversity targets into Rural Development strategies and programmes, tailoring action to regional and local needs.

*Action 9b:* The Commission and Member States will establish mechanisms to facilitate collaboration among farmers and foresters to achieve continuity of landscape features, protection of genetic resources and other cooperation mechanisms to protect biodiversity.

*Action 10:* Conserve Europe’s agricultural genetic diversity. The Commission and Member States will encourage the uptake of agri-environmental measures to support genetic diversity in agriculture and explore the scope for developing a strategy for the conservation of genetic diversity.

The Biodiversity Strategy also refers to overseas territories in **Section 4.1**:

*The Commission and Member States will work with the outermost regions and overseas countries and territories, which host more endemic species than the entire European continent, through the BEST (Biodiversity and Ecosystem Services in Territories of European Overseas) initiative to promote biodiversity conservation and sustainable use.*

Although the reference to endemic species again implies ‘wild’ biodiversity, the FAnGR of overseas territories should be encompassed by the BEST initiative. Section 4.2 refers to funding sources and particularly relevant is the following paragraph:

*rationalise available resources and maximise co-benefits of various funding sources, including funding for agriculture and rural development, fisheries, regional policy and climate change. Indeed, investing in biodiversity can pay off in more ways than one and offers a cost effective response to the climate change crisis. The inclusion of biodiversity objectives should be explored as part of the Common Strategic Framework under consideration by the Commission to prioritise funding under the five funding instruments under rural, regional, social and fisheries policies.*

**2.6.6 A European Union Roadmap to a Resource Efficient Europe - EC COM (2011) 571 final 2011**


This document also refers to natural capital and focuses (in terms of biodiversity) on ecosystem services:

*… Many of these ecosystem services are used almost as if their supply is unlimited. They are treated as "free" commodities, their economic value is not properly accounted for on the market, and therefore they continue to be overly depleted or polluted, threatening our long-term sustainability and resilience to environmental shocks.*
The document sets the following milestones:

By 2020 natural capital and ecosystem services will be properly valued and accounted for by public authorities and businesses.

By 2020 the loss of biodiversity in the EU and the degradation of ecosystem services will be halted and, as far as feasible, biodiversity will be restored.

To achieve these and other milestones the Commission will

‘Significantly strengthen its efforts to integrate biodiversity protection and ecosystem actions in other Community policies with a particular focus on agriculture and fisheries (continuous)’

and Member States, with the Commission will

‘Work towards the objectives of the Biodiversity Strategy by integrating the value of ecosystem services into policymaking (continuous).’

### 2.6.7 Other European Regulations and Directives

There are other European Regulations and Directives, such as those that concern animal health and welfare, which impact on the conservation and use of FAnGR although they do not address FAnGR issues directly. The implications of the regulations concerning identification and traceability are dealt with in a separate report arising from the project, and are not considered further here.

The regulations concerning animal health are currently under review by the European Commission with the intention of replacing the current complex set of regulations covering all aspects of animal health that has accumulated as the EU addressed issues such as disease control, surveillance, bio-security, vaccination, imports, movements, trade and responsibilities for animal health. The blueprint published in 2007 set the aim of a single Animal Health Law which would set both a legal basis for a common EU health policy and a single, simplified, transparent, flexible and clear regulatory framework for animal health. These are laudable aims, provided that safeguards within the existing regulatory framework are at least retained and preferably strengthened and clarified.

One such safeguard that has direct relevance to FAnGR is the provision in Article 15 of Regulation 2003/85/EC (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2003L0085:20080429:EN:PDF). This regulation specifies the actions that Member States must take in the event of an outbreak of foot and mouth disease. Article 15 allows a Member State to exempt certain premises, or a breeding nucleus of a breed at risk of loss from agriculture, from the general requirement in Article 10 of the Regulation to cull all foot and mouth susceptible animals on premises where foot and mouth disease has been confirmed. The relevant extract of Article 15 is shown below:

**Measures to be applied in case of an outbreak of foot-and-mouth disease in the vicinity or within certain specific premises keeping on a temporary or regular basis animals of susceptible species:**

1. Where an outbreak of foot-and-mouth disease threatens to infect animals of susceptible species in a laboratory, zoo, wildlife park, and fenced area or in bodies, institutes or centres approved in accordance with Article 13(2) of Directive 92/65/EEC and where animals are kept for scientific purposes or purposes related to
conservation of species or farm animal genetic resources, the Member State concerned shall ensure that all appropriate bio-security measures are taken to protect such animals from infection. Those measures may include restricting access to public institutions or making such access subject to special conditions.

2. Where an outbreak of foot-and-mouth disease is confirmed in one of the premises referred to in paragraph 1, the Member State concerned may decide to derogate from Article 10(1)(a), provided that basic Community interests, and in particular the animal health status of other Member States, are not endangered and that all necessary measures are in place to prevent any risk of spreading foot-and-mouth disease virus.

3. The decision referred to in paragraph 2 shall immediately be notified to the Commission. In the case of farm animal genetic resources, this notification shall include a reference to the list of premises established in accordance with Article 77(2)(f), by which the competent authority has identified these premises in advance as breeding nucleus of animals of susceptible species indispensable for the survival of a breed. [Our emphases]

In the UK this last requirement was, for a time, enshrined in the Breeds at Risk Register (BARR) which was developed from 2002 onwards and managed from 2005 by the Rare Breeds Survival Trust (RBST) and British Pig Association (BPA) on behalf of Defra. Keepers of breeds at risk could register their premises, with details of the breeds kept, on-line; initially only foot and mouth susceptible species were included. In the event of an outbreak of foot and mouth disease the BARR would be consulted to determine whether an exemption from culling could be applied, although the derogation would depend on the deployment of effective biosecurity measures to ensure the disease would not be spread. Later the BARR was extended to other species (equines, poultry and waterfowl) and other animal diseases.

In 2011 BARR was discontinued in favour of incorporating the information on breeds, breeders and premises into the Animal Health Information System. Breeders can still register on-line (http://www.defra.gov.uk/animal-diseases/controls/culling-exemptions/) and in the event of an exotic disease outbreak the Animal Health and Veterinary Laboratories Agency (AHVLA) would consider an exemption from culling, subject to effective biosecurity and wider disease containment strategies.

A current concern is that Regulation 2003/85/EC would be repealed under the EU Animal Health Law proposals, but the facility to apply a derogation from culling for breeds at risk is not included in the draft Animal Health Law circulated to Member States. It is vital that this safeguard for breeds at risk is re-instated in order that other measures for the conservation and wise use of FAAnGR are not undermined.
3 UK NATIONAL MEASURES

3.1 A Vision for Biodiversity in Agricultural Landscapes – England Biodiversity Strategy Group 2011


The Vision outlines (in Paragraph 2) the public services that farmland provides and concludes ‘...but although most farmers can get some support on the “income foregone” principle through agri-environment schemes, on the whole they gain no profit from these assets.’

Paragraph 9 restates the essential objectives first set out explicitly in the World Conservation Strategy in 1984 by IUCN and the United Nations including:

*to preserve genetic diversity (the range of genetic material found in the world’s organisms), on which depend the functioning of many of the above processes and life-support systems, the breeding programmes necessary for the protection and improvement of cultivated plants, domesticated animals and microorganisms, as well as much scientific and medical advance, technical innovation, and the security of many industries that use living organisms;*

Under the heading of ‘Turning principles into policy’ – subheading ‘Preservation of genetic diversity’ – this vision includes the following statements:

*It is important to conserve the many varieties of domesticated livestock and crop because not only are they the basis for future plant and animal breeding programmes, but variety also makes domestic crops and livestock less vulnerable to pests and disease outbreaks. Only 30 crops provide 90% of the world’s diet, with wheat, rice and maize accounting for about half. Fewer than 15 species of mammals and birds account for 90% of global livestock production. The United Nations Food and Agriculture Organization indicates that a breed is being lost each month.*

*Farmland is critical to the ecological functioning of the countryside and conservation and agriculture programmes must champion and maintain biodiversity in wild species and domestic breeds. We need to [inter alia]:*

- Use a range of measures to maintain those traditional forms of farming which support wildlife.

- Use rural development programmes, assurance schemes, and other market mechanisms to support the preservation of traditional and local livestock breeds - preferably in the localities in which they originate.

It is now appreciated that within-breed genetic variation must be conserved, as well as the breeds themselves. Measuring the loss of genetic variation from a breed is best done through calculating ‘effective population size’ (Villanueva et al., 2010); however, effective population size is not easy to calculate rigorously without extensive electronic data or to explain to lay audiences.


The first Natural Environment White Paper in over 20 years made little, if any, direct reference to FAnGR but makes a number of commitments to biodiversity generally; for example, it contains a commitment to the CBD Strategic Plan including the short-term ambition:

‘Take effective and urgent action to halt the loss of biodiversity, [so] that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet’s variety of life, and contributing to human well-being, and poverty eradication’.

It also contains a commitment to lead by example in implementing agreements made at Nagoya (including Target 13):

‘The UK will now be pressing for implementation of the Nagoya agreement at the international level, and through leading by example at home.’

Perhaps most notably, as mentioned in the introduction, is the White Paper’s recognition of the concept of natural capital and the value that natural capital has in terms of the ecosystem services it delivers. Some of these ecosystem services can be valued in economic terms, but critical natural capital may be more difficult to evaluate because it cannot be replaced by other forms of capital. FAnGR are an element of critical natural capital and must be valued as a resource that may in time deliver accountable benefits (e.g. disease resistance could be evaluated through improved production, reduced veterinary costs etc.) but also intangibles such as better animal welfare.

The White Paper announced the formation of an independent Natural Capital Committee; that Committee has recently published its first report, which is a useful guide to natural capital in general, although there are only a few references to genetic resources (Natural Capital Committee, 2013; http://www.defra.gov.uk/naturalcapitalcommittee/files/State-of-Natural-Capital-Report-2013.pdf).


The England Biodiversity Strategy explicitly recognises that biodiversity encompasses crop plant and farm animal genetic resources:

Conserving and enhancing biodiversity is not just an issue for wild species. It also applies to cultivated plants and farmed animals as well as to their wild relatives. England is relatively rich in wild relatives of crops, landraces of cereal, vegetable and fruit crops, and traditional orchard trees. There are also over two hundred native breeds of farm animals which are often associated with traditional land management required to conserve important habitats. The great genetic diversity which these provide can make an important contribution to the ecosystem provisioning service of food security by offering genes that are important for future crop or livestock breeding.
The England Biodiversity Strategy also identifies a Priority Action and a related series of actions for the conservation of crop plant and farm animal genetic diversity:

Ensure that ‘agricultural’ genetic diversity is conserved and enhanced wherever appropriate

- We will raise awareness of existing genetic diversity within cultivated plants, farmed animals and their wild relatives, and its importance for food security and renewable supplies of plant materials.
- We will encourage responsible management and conservation of our genetic diversity resource by relevant stakeholders.
- We will incorporate the sustainable maintenance of genetic diversity into key relevant policies and programmes, including incentive measures, protective arrangements and integrated ecosystem landscape-scale approaches.
- We will update the UK’s inventory of farm animal genetic resources, establishing as far as possible efficient identification and monitoring systems for genetic diversity and maintaining existing ex situ collections (such as the National Fruit Collection at Brogdale and the Pea Collection at the John Innes Centre at Norwich).

3.4 Scotland’s Biodiversity – It’s In Your Hands 2004


This 25 year strategy for Scottish biodiversity makes scant reference to the conservation of FAnGR or wider agricultural biodiversity until page 36 where the Objective ‘To halt the loss of biodiversity and continue to reverse previous losses through targeted action for species and habitats’ is considered. The associated Outcome 2030 includes:

Rare and specifically ‘Scottish’ varieties of domestic plants and animals have been catalogued and more effectively conserved.

However, this aspect is not mentioned in the Agenda for Action for the Objective.

In response to the EU Biodiversity Strategy to 2020 (see Section 2.6.3) and the ‘Aichi’ targets under the CBD Strategy for Biodiversity (see Section 2.5) the Scottish Government launched a public consultation on the Scottish 2020 Challenge for Scotland's Biodiversity (http://www.scotland.gov.uk/Resource/0039/00396675.pdf) in July 2012. Consultation responses were published in October 2012 and can be found at: (http://www.scotland.gov.uk/Publications/2012/10/4771/downloads)

Of the 75 responses, at least three referred explicitly to FAnGR; these were the responses from the UK Farm Animal Genetic Resources Expert Committee, Quality Meat Scotland and the Scottish Agricultural College. All three recommended a stronger recognition of FAnGR as an essential element of Scotland’s biodiversity. While the consultation exercise is in progress delivery of the current strategy (i.e. Scotland’s Biodiversity – It’s in Your Hands, 2004) continues.
3.5 Environment Strategy for Wales 2006


Although FAnGR or agricultural biodiversity are not specifically identified in the Environment Strategy for Wales it includes the following Outcome:

The loss of biodiversity has been halted and we can see a definite recovery in the number range and genetic diversity of species, including those species that need very specific conditions to survive.

Amongst the indicators for this Outcome is: Indicators to illustrate range and genetic diversity to be developed. However, in the most recent State of the Environment Report (2010) the last update on these indicators had been in 2008 and the reports stated: Indicators to illustrate range and genetic diversity (to be re-defined).

Current developments in Wales include the amalgamation of the activities of the Countryside Council for Wales (CCW), the Environment Agency Wales (EAW) and Forestry Commission Wales (FCW) into a single body, Natural Resources Wales. In parallel, and in order to be able to fully respond to the EU Biodiversity Strategy to 2020 (see Section 2.6.3), the Wales Biodiversity Partnership adopted the Wales Biodiversity Framework at its 18th meeting: (http://www.biodiversitywales.org.uk/en-GB/Steering-Group-Meetings)

3.6 Northern Ireland Biodiversity Strategy 2002


The Northern Ireland BAP does not specifically mention FAnGR or agricultural biodiversity but includes the following paragraph:

The Executive’s Programme for Government already contains targets for enhancing the role of farming in helping to protect the environment. For example, by March 2003 we aim to have over 6500 participants in agri-environment schemes, which should rise to 10000 participants by 2006. We also plan to provide 12000 additional places for environmental training for farmers by March 2005.

There is also a reference to the possible impact of CAP reform on biodiversity: ‘These and other steps, including anticipated CAP reform, will together assist greatly in the delivery of conservation of our biodiversity.’

Under responsibilities for the NI Department of Agriculture and Rural Development (DARD) are the following passages:

27. The NIBG emphasised the major impact agricultural policy has on biodiversity and made recommendations on this and on the forestry and sea fishing industries’ recommendations 4-13, 14-20 and 21-26 refer).

28. Reference to biodiversity commitments will feature in DARD’s forward Business Plans as well as those for its Forest Service and Fisheries Division. Also, DARD is reviewing its Countryside Management Strategy and this will include specific actions concerned with biodiversity. The Report of the Vision Group, established to make recommendations on the future development of the Northern Ireland Agri-food Sector, recognised that the biodiversity strategy would have important implications for the industry and these will be taken into account as action on the report is taken forward.
In the second report (2009) of the Northern Ireland Biodiversity Group (Delivery of the Northern Ireland Biodiversity Strategy 2005-2009 http://www.doeni.gov.uk/niea/ni_biodiversity_strategy.pdf) the need for a complete review of the Northern Ireland Biodiversity Strategy is one of the cross-cutting recommendations made, stating ‘A major review should be undertaken as a matter of urgency to address the new issues and refine the measures from the old Strategy that are still relevant’ (p86). However, work continues to deliver the 2002 Northern Ireland Biodiversity Strategy.

3.7 Agri-environment and Rural Development Schemes

In the UK FAnGR have been supported through various agri-environment schemes, although this support is generally indirect in that it is linked to the delivery of improved habitat management.

Under the current Entry Level Stewardship scheme operating in England, there are two options (EK5 Mixed stocking and UL18 Cattle grazing on upland grassland and moorland) that support the use of cattle for habitat management, but neither specifies that native breeds of cattle should be used (Natural England, 2012a).

This contrasts with the two supplements promoting grazing with cattle and/or native breeds under the Higher Level Stewardship; HR1Grazing supplement for cattle does not specify breeds that are eligible, only that the cattle ‘must be suitable for meeting the objective(s) and indicators of success to which the supplement is added’ (Natural England 2012b). The supplement is worth £35 ha\(^{-1}\). HR2 Grazing supplement native breeds at risk specifies that the grazing animals must be from an approved list of native breeds at risk, comprising 28 breeds or populations of cattle, 15 of equines, 47 of sheep, 5 of goats and 11 of pigs (Natural England 2012b). The supplement is worth £70 ha\(^{-1}\).

These supplements have been widely adopted – as at January 2013 there were 1,946 agreements featuring the cattle grazing option (HR1) covering over 100,000 ha of farmed land (Hosking, pers. comm., January 2013). Equivalent figures for the grazing with native breeds at risk option (HR2) were 1,177 agreements covering 48,707 ha. Between them the two supplements contribute (over the 10 years that the agreements run) almost £60 million to the rural economy – including almost £28 million directed at supporting the use of native breeds at risk.

In Wales support has, in the past, been directed to the use of Welsh Black cattle; in 2003 the Tir Gofal agri-environment scheme paid participants a 10% top-up on the relevant habitat payments if the habitats were grazed with cattle. This was increased to a 20% top-up if the cattle used were Welsh Black. No other breeds or species received support and the top-up for using Welsh Black was discontinued in 2007 following a review of payments (Wales Audit Office, 2007).

From 2012 the existing agri-environment schemes in Wales (Tir Cynnal, Tir Gofal, Tir Mynydd and the Organic Farming Scheme) were subsumed into a single agri-environment scheme, Glastir (Rose, 2011). There is specific support for FAnGR in Glastir through one option that seeks to encourage native breeds:

**Encourage native breeds**

*Farmers will need to stock land with native or traditional breeds of cattle, sheep, goats, equines or pigs according to the scheme guidance. This option will help to recognise the particular attributes of native breeds in danger of being lost and will*
support the genetic conservation of locally adapted, distinctive breeds. To be eligible animals must be pedigree registered animals and/or their genetically traceable purebred offspring. (Welsh Assembly, 2010)

Thus unlike Tir Gofal this option applies to sheep and equines as well as cattle, although the inclusion of goats and pigs in the above document was later amended (Thomas, pers. comm. January 2013). The list of eligible breeds for 2014 is given on p60 of the Technical Guidance (Welsh Government, 2012); all UK Native Breeds at Risk for the three species are eligible. Applicants selecting this option for 2014 can claim 49 points per livestock unit; the target point score for Glastir entry is 28 points ha\(^{-1}\) (14 points ha\(^{-1}\) for organic farms). The current (2013) payment rates are £34 ha\(^{-1}\) for the standard entry level and £17 ha\(^{-1}\) for the lower entry level.

In Scotland, a range of traditional or native (to Scotland) breeds of cattle are supported through the Grazing Management with Cattle option of the Rural Priorities scheme of the Scottish Rural Development Plan. The Rural Priorities scheme is a competitive upper level scheme and the Grazing Management with Cattle option is only available as part of a ‘Conservation Management Plan with Special Measures for Small Units’. The upper limit of the area of qualifying holdings is 20 ha and the minimum herd size is two breeding cows where cattle are already kept, or two breeding cows or heifers where cattle are introduced. A breeding cow is defined as ‘a cow that forms part of a herd either used for rearing calves for meat production or used for milk production and has borne a calf’. The rate of support (for the five years of the agreement) is £185 ha\(^{-1}\) per year for keeping cattle and £273 ha\(^{-1}\) per year for introducing cattle. Breeds which are eligible for this option are Aberdeen Angus, Ayrshire, Belted Galloway, Galloway, Highland, Luing, Shetland and Shorthorn (http://scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Options/Nativeortraditionalcattle). However, the option is not a FAnGR conservation measure per se as first crosses of these breeds are also eligible for support (which may be important in supporting some parent breeds, such as Beef Shorthorn crossed with Galloway to produce Blue Grey cattle) and the cows may be put to a continental bull. In addition, the limitation to small holdings may increase a perception of native breeds as being irrelevant to larger, commercial farms.

In Northern Ireland, the Countryside Management Scheme provides support for just one breed, Irish Moiled cattle. The development of this breed has a particular association with Northern Ireland, and it is one of the rarest breeds of cattle in the UK (Category 4 At Risk on the Rare Breeds Survival Trust Watchlist i.e. with an estimated population of between 450 and 750 breeding cows). To qualify for support under the Northern Ireland Countryside Management Scheme there must be at least one cow over 12 months of age, they must remain in the herd for the full 12 months for which support is given and, significantly, they must be registered with the Irish Moiled Cattle Society breed register. (http://www.dardni.gov.uk/ruralni/dard_cms_info_cmb.pdf). However, there is no requirement for the eligible cows to be mated with a purebred Irish Moiled bull. The current Northern Ireland Countryside Management Scheme is due to end in 2013.
4 SUMMARY AND DISCUSSION

4.1 Impacts of past and current policies

It is apparent that agricultural biodiversity, and specifically FAnGR, are attracting increasing attention from national and supra-national organisations. The recognition of FAnGR as an integral element of biodiversity has entailed a struggle and is still not fully understood, or accepted, by all researchers, conservation managers and officials engaged with ‘wild’ biodiversity. For example, a review of 62 studies into the effectiveness of European agri-environment schemes in conserving and promoting biodiversity (Kleijn and Sutherland, 2003) makes no mention of those agri-environment schemes that support FAnGR. The FAnGR Committee has made progress with gaining recognition of FAnGR within the broad scope of biodiversity; for example, the species of domesticated livestock in the UK are now included on the UK Species Inventory maintained by the Natural History Museum (http://www.nhm.ac.uk/research-curation/scientific-resources/biodiversity/uk-biodiversity/uk-species/index.html).

Agri-environment schemes are funded through the Rural Development Programmes of Member States i.e. from the ‘Second Pillar’ of the CAP. Pillar 1 is the stream of funding within the CAP that supports production. Pillar 2 supports rural development and environmental protection. Modulation is the process that moves funding between Pillars; member states have a degree of autonomy in setting modulation rates (currently England has a modulation rate of 19%, comprising 14% national modulation and 5% EU modulation; EU modulation does not apply to the first €5000 received by an applicant; https://www.gov.uk/the-single-payment-scheme).

In the UK (and elsewhere in Europe) agri-environment schemes have been directed towards the management and conservation of farmed landscapes and habitats for ‘wild’ biodiversity, with varying degrees of success (McCracken and Bignal 1998; Ovenden et al. 1998; Carey et al., 2002; Critchley et al., 2003; Kleijn and Sutherland, 2003; Berendse et al., 2004; Vickery et al., 2004). In England the only support for keeping livestock is through the Higher Level Scheme (HLS) of the current Environmental Stewardship agri-environment scheme. One mechanism is the support for cattle grazing of particular habitats (upland heaths and grasslands) where grazing with cattle is expected to provide more favourable conditions for plants, breeding waders, invertebrates etc. than grazing with sheep or ponies (Natural England, 2012b).

The other support through HLS is for keepers of certain native breeds. To access this support the livestock must belong to a breed on an ‘Approved List of Native Breeds at Risk’ and the animals’ grazing must help to achieve the relevant options and indicators of success for habitats entered into the HLS scheme (Natural England, 2012b). Breeding of the livestock is not a requirement, but ‘only pedigree-registered animals, and/or their genetically traceable, purebred offspring, are eligible…’. Thus the animals could be, for example, castrated males, and therefore incapable of contributing to the genetic conservation of the breed (barring developing technologies such as somatic cell nuclear transfer). It is possible that the HLS supplements for grazing with cattle and for grazing with native breeds at risk could contribute to FAnGR conservation by creating greater demand for suitable (hardy) cattle breeds and native breeds at risk, but there is no direct support of FAnGR conservation per se, nor is there any mechanism for support of poultry or waterfowl breed conservation in spite of the substantial contribution of these birds to rural livelihoods.

Now that FAnGR are better recognised as a component of biodiversity the means to ensure its conservation need to be found. The direct payment of subsidies (that is payments without any service in return (Hampicke, 2006)) is largely discredited after the excess
commodity production and consequent damage to agricultural habitats of the pre-1992 CAP. However, in Hambicke’s (2006) view economic incentives are essential: land users (and farm animal breeders) should be paid for the results of their activity. More recently this has become known as ‘Payments for Ecosystem Services’ (see, for example, Natural Capital Committee, 2013) and is seen as a means of conserving natural capital, which should include FA\textit{N}GR. This principle is applied in the Rural Development Programmes of at least eleven EU Member States (Austria, Finland, France, Greece, Hungary, Ireland, Latvia, Poland, Slovenia, Spain and Sweden) where breeders of breeds at risk are rewarded for their commitment to keeping those breeds and/or their participation in approved breeding programmes (Small and Hosking, 2009; Ligda and Zjalic, 2011).

Although desirable from both economic and ecological perspectives, a consequence of the decoupling of subsidies from production under the post Agenda 2000 CAP and the subsequent mid-term review that introduced the Single Farm Payment scheme has been a reduction in support for livestock. Under previous CAP schemes support was paid on a headage basis, encouraging farmers to keep as many animals as possible. This had adverse impacts, such as the over-grazing of uplands in the UK (Anderson and Yalden, 1981; Fuller and Gough, 1999; Anderson and Radford, 1994; Welch, 1998), and might also have encouraged the keeping of sheep and goats without any product (Canali and the Econogene Consortium, 2006). On the other hand, decoupling may increase abandonment of marginal lands (Osterburg and von Horn, 2006; Acs et al. 2010) with consequent risks for the hardy, native breeds that can function effectively in such conditions. Keepers of breeds at risk may also keep fewer animals with consequent increased threats to those breeds at risk (Canali and the Econogene Consortium, 2006). The effects of decoupling were likely to be greater in the UK than in some other member states because the UK opted for immediate 100% decoupling of the various livestock premiums (Canali and the Econogene Consortium, 2006). Only Italy and Ireland also opted for immediate 100% decoupling.

Canali and the Econogene Consortium (2006) predicted that ‘The expected decrease of the number of sheep and goats in the EU, and especially in EU countries where the complete decoupling will be in place with the implementation of the 2003 CAP reform (e.g. UK, Italy, Ireland, Germany), will affect even more deeply rare breeds.’ In terms of the rarest breeds in the UK, i.e. those listed by the RBST on its Watchlist, there is no evidence that this prediction has been fulfilled, as few breeds have decreased in number sufficiently to be moved to a higher priority category on the Watchlist and the rate at which such movements have occurred is no greater than prior to the CAP reform (Barber, pers. comm. December 2012). However, it is possible that some breeds with populations just above the RBST’s numerical criteria (sheep 3000, goats 1000, cattle 1500, equines 1500, pigs 1000 (numbers refer to registered adult breeding females)) but within EU or FAO definitions of breeds at risk have decreased. For example, two sheep breeds, Devon Closewool and Border Leicester, were included on the RBST’s 2013 Watchlist, the first time these breeds had declined to such low numbers (Barber, pers. comm., December 2012). The forthcoming revised UK Country Report on FA\textit{N}GR may provide some evidence of population changes of UK breeds between 2002 and 2012, and may reveal whether the CAP reform had an effect, although it may not be possible to disentangle that factor from the myriad others influencing livestock populations.

In contrast to the better recognition of FA\textit{N}GR within biodiversity policies is the risk that measures to safeguard FA\textit{N}GR within animal health regulation may be lost. As noted in Section 2.6.7 the draft EU Animal Health Law no longer makes provision for the exemption from culling of, \textit{inter alia}, breeds at risk. Although disease containment and control are paramount to the protection of all FA\textit{N}GR, where these are not compromised by an exemption from culling of nucleus breeding groups of breeds at risk the facility should be available to the animal health authorities within Member States. Disease outbreaks may
pose a disproportionate threat to breeds that are geographically concentrated if the focus of
the outbreak coincides with the area of breed concentration. In the UK the AHVLA is better
equipped than ever to rapidly respond to disease outbreaks with a range of animal disease
control systems that incorporate information on breeds at risk. The ability to at least
consider an exemption from culling for those breeds is an essential component of the
measures available for the protection of the UK’s FAnGR and strenuous efforts should be
made to ensure it is reinstated in the new EU Animal Health Law.

4.2 Opportunities for FAnGR Conservation

Direct support for the conservation of FAnGR under the CAP has been possible since 1992
when Council Regulation 2078/92 allowed, *inter alia*, a special premium for farmers
who *rear animals of local breeds in danger of extinction* (Martyniuk, 2004). As noted
above, the UK has not made use of the provisions for direct support of breeders allowed in
Regulation 2078/92, preferring other means of achieving FAnGR conservation (Roper,
2004).

The reviews by Small and Hosking (2009) and Ligda and Zjalic (2011) demonstrate that
existing CAP provisions allow member states to support the conservation of FAnGR through
Rural Development Funds. An earlier review of domestic animal biodiversity conservation
through rural development funds (Signorello and Pappalardo, 2003) found that, of the 15 EU
member states in the study, three (Denmark, Netherlands, UK) provided no support for the
conservation of FAnGR in their RDPs. In contrast, Austria supported 29 breeds, France 54,
Germany 46, Italy 77 and Spain 45, although none supported all the breeds considered
at risk by FAO criteria within their RDPs. On that criterion the best performing member
states were Austria (which supported 87.88% of FAO breeds at risk) and Spain (80.36%).
Annual payments to farmers ranged up to a mean (for the member state) of €201.67 and
€191.18 in Italy for cattle and goats respectively, €200.00 for horses in Ireland, €238.40 for
pigs in Germany and €168.19 for sheep in Finland.

Signorello and Pappalardo (2003) concluded that the then current EU supporting measures
needed revision. This conclusion was based on the following outcomes of their analysis of
Rural Development Programmes (RDPs):

- Many breeds at risk of extinction according to FAO standards are not included in
  RDPs
- Where measures for FAnGR conservation are included in RDPs the main focus
  is preserving local cattle and sheep breeds (to the exclusion of other
  mammalian
  livestock species; avian livestock were not considered)
- Payments to farmers did not reflect extinction probability of the breeds kept
- Payments to farmers often did not meet all the relevant criteria in the EEC
  regulations
- Payments to farmers often were insufficient to make keeping local breeds profitable
  (Signorello and Pappalardo, 2003).

Any proposals to support FAnGR conservation programmes should take account of
these conclusions, and despite the proposed reduction in the CAP funding for 2014-2020
(see next section), support for all of the UK’s Native Breeds at Risk is imperative. Ideally
this should come in the form of support through measures additional to those in UK agri-
environment schemes (although these should be retained for their contribution to
environmental and biodiversity objectives). CAP reform provides an opportunity to afford
UK FAnGR, as a core element of the UK’s biodiversity, natural capital and natural
resources, its just (that is, significantly greater) priority. This is considered further in the
In recent years there has been increasing interest in the relationship between livestock and landscape, that is livestock as a component of the landscape rather than just as a means to maintain or restore landscapes (see for example, Evans and Yarwood, 1995; Yarwood and Evans, 2003; Lefebvre et al. 2012). This is perhaps most marked where particular breeds have cultural significance, such as Herdwick sheep in the Lake District, or the various native pony breeds (Exmoor, Dartmoor, New Forest etc.) on their respective moors and commons (Small, 2010; Carson et al., 2009).

It has been argued (Hodge and Reader, 2010) that the Entry Level Scheme (ELS) of Environmental Stewardship could be improved by greater focus on regional priorities, including linking ELS options to, inter alia, Biodiversity Action Plan targets. The contribution sustainable use livestock resources can make to public goods include the conservation of wild species and habitat biodiversity, conservation of farm animal genetic resources, with the potential to contribute to disease resistance, adaptation to climate change and other future challenges, carbon sequestration and hence greenhouse gas mitigation, nutrient cycling and waste product recycling (Hoffmann, 2011; Small, 2011; see also p8 of this report). Hall (2004) discusses the role of livestock biodiversity in sustainable development.

The UK Research Councils’ Rural Economy and Land Use research programme, known as RELU (www.relu.ac.uk), generated important findings on the relevance of agri-environment schemes to mitigation of climate change, and to concepts of ‘ecosystem services’ (Woods 2010). At the EU level, the knowledge base relating to traditional livestock breeds and their interaction with many treasured semi-natural environments has been greatly strengthened; for example, the European Forum on Nature Conservation and Pastoralism has drawn attention to the detrimental effects that badly designed changes to the CAP might have on ‘high nature value’ farming generally, especially on traditional wood pastures and extensive semi-natural grasslands (http://www.efncp.org/download/EFNCP-response-to-CAP-legal-proposals.pdf).

Unfortunately, links are not always strong between the farm animal genetic resources constituency and those policy makers concerned with floral and faunal biodiversity. Even with the development of concepts such as ecosystem services and natural capital the inclusion of FAnGR remains, at best, marginal. For example, in the first report of the Natural Capital Committee there are some mentions of genetic resources in general, but no direct reference to the value of FAnGR (or indeed, plant genetic resources; Natural Capital Committee, 2013).

This is all the more regrettable as there is a wealth of information on the contribution livestock, and livestock farming, can make to habitat management and ‘wild’ biodiversity conservation (see for example, Bignal and McCracken, 1996; McCracken and Bignal, 1998; Wallis De Vries et al., 1998; Small, 2004; Hosking, 2008). There may also be differences in the approach to FAnGR conservation between those policy makers concerned with FAnGR conservation and other ‘experts’: Fadlaoui et al. (2006) analysed the breeds included in RDP measures of 15 EU member states to ascertain the variables used to select breeds for RDP support. They concluded that policy makers seemed less concerned by true extinction risk than the other experts: the latter put more emphasis on genetic distinctiveness and within-breed diversity. However, current inconsistencies in characterisation data for European breeds would need to be rectified before breed selection could be harmonised.

Another opportunity for the conservation and sustainable use of FAnGR in the UK would be the development of ex situ collections. As noted in section 2.6.4, the targeted actions of EC 1974/2006 make specific provision for the establishment of ex situ collections (gene banks) and associated databases. To date none of the UK governments have adopted this strategy.
in their Rural Development Plans, leaving the relatively little cryo-preserved FAnGR in the
UK to farming industry businesses (such as pig breeding companies), umbrella organisations
(such as the British Pig Association), NGOs (such as the Rare Breeds Survival Trust
(RBST)) and individual breeders. Of these, only the collection held by the RBST has the
specific aim of FAnGR conservation, and the collection remains well short of its own target of
25 males of each of the 55 breeds of large livestock on the RBST’s Watchlist (Barber,

This contrasts with other European countries: semen banks for cattle were established in
Sweden in 1967, Iceland in 1969 and Denmark in 1971. Also in 1971 Norway established a
‘live’ gene bank for poultry before semen banks for goats, cattle and pigs were established in
1976, 1977 and 1978 respectively (Maijala, 2011; see also www.genressurser.no). These
Nordic countries have since developed a co-operative programme (now known as NordGen;
see http://www.nordgen.org/index.php/en/content/view/full/2/), sharing resources and
experience where possible but continuing national actions as appropriate. These actions
have included national appraisals of FAnGR resources, including not only the commonly
farmed ruminants but also reindeer, rabbits, bees and fur-farmed animals (Maijala, 2011). In
the responses to the questionnaire on RDP funded support for FAnGR conservation (Small
and Hosking, 2009) Austria, the Czech Republic and the Netherlands also reported support
for ex situ gene banks.

The lack of national ex situ collections for FAnGR in the UK also contrasts sharply with the
support for ex situ collections of plant genetic resources (PGR). Defra rightly takes its
international commitments under the International Treaty on Plant Genetic Resources for
Food and Agriculture (www.planttreaty.org) very seriously, including Article 5.1(e) which
refers to developing an efficient and sustainable system of ex situ conservation. To that end
Defra directly supports the Royal Botanical Gardens, Kew (indirectly funding the Millennium
Seed Bank at Wakehurst Place) and funds collections of PGR for agriculture including the
Pea Gene Bank (John Innes Centre), the National Fruit Collection (Brogdale) and the
vegetable collection at Warwick Horticultural Research Institute. The Scottish Government
supports the Commonwealth Potato Collection at the James Hutton Institute.

The support for PGR demonstrates the UK’s commitment to the conservation and wise use
of genetic resources for food and agriculture, and the preceding sections covering the
international treaties and agreements to which the UK is party have established that ex situ
measures should be an integral element of a well balanced and effective FAnGR
conservation strategy. The establishment of such ex situ resources for the UK’s FAnGR
would be an important development, and perhaps the first step has been taken with Defra’s
acquisition of the open source software CryoWEB (http://cryoweb.tzv.fal.de/) as a means of
documenting the current ex situ resources in the UK.

4.3 CAP Reform

The EU proposes to reform the Common Agricultural Policy (CAP) for the period 2014-2020
and the European Commission published the proposals in October 2011. Defra consulted
on the proposed changes, publishing a discussion document in December 2011
EU proposals for Rural Development Regulation, including agri-environment schemes, are
based on three strategic objectives:

- To contribute to agricultural competitiveness
- The sustainable management of natural resources and climate action
- To balance territorial development of rural areas

FAnGR have a potential role in the first of these objectives and should be seen as a
natural resource in the second. Consequently FAnGR can make a contribution to the six priorities identified by the EC:

- **Fostering knowledge transfer and innovation in agriculture, forestry and rural areas;**
- **Enhancing competitiveness of all types of agriculture and enhancing farm viability;**
- **Promoting food chain organisation and risk management in agriculture;**
- **Restoring, preserving and enhancing ecosystems depending on agriculture and forestry;**
- **Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors;**
- **Promoting social inclusion, poverty reduction and economic development in rural areas.**

FAnGR should contribute to priorities such as enhancing farm viability, restoring, preserving and enhancing ecosystems depending on agriculture and promoting resource efficiency. As stated above (Section 4.2) CAP reform provides an opportunity to enhance the value of FAnGR’s contribution to sustainable farming and land management systems, greater food security and improved climate change resilience. However, for UK FAnGR to realise its full potential with regard to these objectives requires that conservation strategies, such as those described elsewhere in this project, be developed, implemented and supported.

In addition, the ‘small farmer’ option under the proposed Basic Farm Payment system may be an encouragement to smallholders, many of whom are attracted to the keeping of native breeds at risk (Small, 2004). The possibility that the UK would be allowed to use some of its ‘Pillar 1’ funds to support farming in ‘areas of natural constraint’ (broadly the former Less Favoured Areas) and, under certain circumstances, directly to livestock reared also presents opportunities. These would only be permitted where the sector in question is undergoing difficulties and where support is particularly important for economic, social or environmental reasons, which should include FAnGR conservation. Recommendation 13 of the Natural Resources Committee’s first report is that the UK Government should intensify its efforts to reform the CAP with the long term view of phasing out Pillar 1 support and moving subsidies towards Pillar 2 and the provision of public goods (Natural Resources Committee, 2013).

There are features within some of the UK agri-environment schemes that may be examples of good practice that could be extended during the CAP reform. For example, the requirement for breeding in the Scottish Rural Priorities option on Grazing Management of Cattle is significant, as it is not a requirement under either Environmental Stewardship or Glastir. Although economic prerogatives mean it is unlikely, in theory the options under Environmental Stewardship or Glastir can be met with non-breeding herds/flocks, which reflects their emphasis on delivering habitat or landscape objectives. Although these objectives can be as well met by castrated animals a wider range of objectives could be met by ensuring the stock used contribute to the population (and hence genetic resources) of the breeds.

On the other hand, the Scottish Rural Priorities option on Grazing Management of Cattle only applies to eight Scottish native or traditional breeds; there is no consideration of the numerical scarcity of the breeds, whereas both Environmental Stewardship and Glastir support ‘UK Native Breeds at Risk’ (NBAR). In addition, the Scottish Rural Priorities option allows the use of a continental breed bull and may even encourage cross-breeding by also subsidising first crosses of the eligible breeds. Environmental Stewardship has the advantage of including pigs and goats, which have been excluded from Glastir, and the
Scottish Rural Priorities option is only applicable to cattle. The review of Scottish animal breeds (and plant varieties) by Wright et al. (2002) includes much useful information that could be used to justify support for other species and breeds and one of the conclusions of the report is: ‘However there may be a case for providing enhanced levels of support to farms that keep rare or traditional breeds in order to assist in the preservation of these genetic resources’ (Paragraph 9.24).

In the Northern Ireland Countryside Management Scheme the Irish Moiled cows that can attract support need to be registered in the breed herdbook, but there is no requirement for them to be used for pure-breeding (or indeed, any breeding). Thus although the stated aim of the option is ‘It is hoped that this option will generate sufficient additional interest to ensure the long-term survival of the breed’ the opportunity to ensure the cows contribute to the next generation of Irish Moiled cattle is not taken.

CAP reform, and its application within the UK, provides the chance to recognise the sustainable use and conservation of FAnGR as a legitimate objective of Rural Development Programmes in their own right, as well as a means to the end of habitat management and landscape preservation.

4.4 Existing commitments and conclusion

Under the Global Plan of Action for AnGR the UK has committed to implementing 13 of the 23 Strategic Priorities (numbers 1 to 9, 12 to, 14, 18 and 20 – see section 2.4 above) at the national level (Hoffmann and Scherf, 2010, Hoffmann, 2011). Four of these Strategic Priorities (4: Establish national species and breed development strategies and programmes; 5: Promote agro-ecosystems approaches to the management of animal genetic resources; 6: Support indigenous and local production systems and associated knowledge systems of importance to the maintenance and sustainable use of animal genetic resources; 8: Establish or strengthen in situ conservation programmes) are directed at, or could be delivered by, in situ conservation measures.

The UK is also committed to the Targets of the CBD Strategic Plan for Biodiversity 2011-2020 (see Section 2.5) with Target 13 (By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity) of particular relevance. Actions 9a, 9b and 10 of Target 3, of the EU Biodiversity Strategy to 2020 have been outlined in Section 2.6.

Taken together these commitments suggest that the UK should implement measures that extend the current conservation of FAnGR through the continuing support of the FAnGR Committee, publication of regular Country Reports on FAnGR and support through the ‘grazing with cattle’ and ‘grazing with native breeds at risk’ options within Higher Level Environmental Stewardship, important though all these are. There are opportunities to encourage breeders to participate in breeding programmes designed to optimise the conservation of genetic diversity within breeds. These breeding programmes could be operated through breed societies or via umbrella organisations such as the BPA, RBST etc., as is the case in Switzerland (Small and Hosking, 2009).

If taken, the opportunity afforded by the current round of CAP reform could allow the UK to develop the breeding programmes and conservation strategies described elsewhere in this project and so ensure that many of the UK’s international obligations are met. Equally importantly, such breeding strategies and programmes would ensure that the UK’s wealth of farm animal genetic resources and their potential for sustainable and wise use are conserved for the future.
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