Conservation of Farm Animal Genetic Resources: Current policies and post-Brexit options

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Summary

There are currently a range of high-level policies and interventions which aim to mitigate and adapt to long term consequences of environmental change. One aspect of mitigation and adaptation is access to and promotion of genetic diversity within agricultural crops and farmed livestock. Access to genetic resources, and more specifically, databases around genetic potential for exploitation raise important issues around public welfare against private needs and rights.

We review current policies on conservation of genetic resources and potential policy impacts post-Brexit. We find the UK's response in terms of policies encouraging the conservation of FAnGR has been lacking. FAnGR should be re-prioritised as being just as much in the public interest as wildlife biodiversity and therefore an important environmental service. Funding needs to be increased, giving emphasis on "public funding for public good" to renew drive towards fulfilling the targets of the *Global Plan* here in the UK, and conserving our livestock genetic resource for the future

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1.0. Introduction

Current Policy Context Policies for Conservation of Genetic Resources

The *Global Plan for Action for Animal Genetic Resources* was produced as a blue print for "combating the erosion of animal genetic diversity and (at) using animal genetic resources sustainably" (FAO, 2007). This conservation is vitally important; genetic diversity is a key tool to help future generations guarantee food security for growing populations, deal with the effects of climate change, and safeguard against emerging diseases. The UK government confirmed their commitment to this plan and to the *Interlaken Declaration on Animal Genetic Resources*, when they adopted it alongside 109 other states at the 2007 International Technical Conference. Now, over a decade later, Brexit has provided a unique opportunity for the United Kingdom to re-evaluate the agricultural policies which regulate Animal Genetic Resource (AnGR) conservation, specifically the Common Agricultural Policy and how it affects the conservation of the UK's farm animal population diversity.

This paper describes the current activities and policies regarding Farm Animal Genetic Resource (FAnGR) conservation in the UK and discusses the effects that Brexit will have on UK FAnGR and how the British government could best alter policy post-Brexit to give renewed drive towards safeguarding our country's farm animal genetics for future generations.

2.0 Current Situation

Current FAnGR databases in the UK

Conservation of both in vivo and in vitro FAnGR is overseen by the Farm Animal Genetic Resources Committee which is comprised of many technical experts from different roles in UK agriculture. This committee is devolved from any government organization however gives guidance to the Department for Environment, Food and Rural Affairs on FAnGR policy (Rfp-europe.org, 2017). Whilst giving expertise and promoting sustainable use of genetics, the committee did not actively record rare and native breed populations until 2012 (Gov.uk, 2017). Prior to this, the only UK FAnGR database has been managed by the Rare Breeds Survival Trust (RBST), a UK charity responsible for maintaining farm animal genetic diversity and promoting rare and native breed use. Their "Watchlist" is still the main database used to categorize risk status of UK farm animal populations, despite the commission of the UK FAnGR committee to produce the first UK National Inventory of Breeds as part of their 2012 report on UK FAnGR. This inventory was the first government record of UK national breeds in a decade and shows an increasing awareness of the British government to the importance of conserving genetics in the UK, as well as an active response to the *FAO's Global Plan for Action for AnGR*. Prior to this report and inventory there was no government recording of rare breeds being used to guide in situ and ex situ FAnGR conservation activity in the UK.

It was the 2001 Foot and Mouth epidemic which triggered the RBST to set up the National Breeds at Risk (BAR) database. The National BAR database serves two main functions: firstly, to guide government declaration: Article 15 of Regulation 2003/85/EC in the UK, allowing EU member states the option to give exclusions to culling due to Foot and Mouth if the population in question is a rare and/or native breed (Eur-lex.europe.eu, 2004). Subject to disease spread risk assessment, this is a useful tool to sustain in vivo genetic resource populations if Foot and Mouth were to return to Britain. Secondly, to guide the conservation activity of RBST's UK National Livestock Gene Bank (which is discussed below).

Current Government Funding for In Situ FAnGR conservation:

Unlike many other EU states, the UK government has chosen not to directly support livestock breeders and farmers trying to grow and maintain FAnGR around the country. For example, in England the funding available is through the Higher Level Scheme (HLS) of the current Environmental Stewardship agri-environment scheme. One area this scheme puts emphasis on is support for cattle grazing of upland areas where this activity will increase "wild" biodiversity. It makes no mention of which cattle breeds are preferred, in other words, does not insist on the use of rare or native breeds (Natural England, 2012). Like all other UK FAnGR-related funding, it is paid per hectare of grazing and therefore does not directly support many rare and native breed herds; instead putting emphasis on conservation grazing to promote wild biodiversity. This English agri-environment scheme and others in Wales, Scotland and Ireland are all part of the second pillar of the Common Agricultural Policy which aims to increase rural development and protect the environment. When UK governments seek to satisfy the environmental goals of the second pillar they put emphasis upon our country's wild environment and biodiversity, with FAnGR and domestic breed conservation unfortunately taking a back seat. Only by having a positive effect on "wild" conservation and conservation grazing do domestic rare and native breed populations receive any government funding.

This is juxtaposed against (in stark contrast to) the diametrically opposing views of many other EU states and the European Commission who have provided specific regulations to allow member states to further support AnGR conservation. One example of this is Council Regulation (EC) no 1698/2005 which aims to provide a European Agricultural Fund for Rural Development aimed at compensating farmers in return for the environmental services they provide. Article 39:5 of this regulation highlights the "conservation of genetic resources" as a valid environmental service (Ligda and Zjalic, 2011). The UK does not reflect this attitude however and has chosen not to utilize any such FAnGR regulation as part of their Rural Development Policy.

3.0 Post-Brexit Situation

UK FAnGR conservation Post-Brexit:

With Brexit upon the horizon, we are afforded a unique opportunity to re-evaluate our agricultural and environmental priorities and redefine policy so as to conserve our rich heritage of rare and native breed genetic traits. This paper does not seek to define how UK agriculture should be governed post-Brexit, it only seeks to reaffirm the importance of FAnGR conservation in the UK and encourage government support to ensure we continue to uphold the *Global Plan for Action for AnGR*.

As of 2020, UK agriculture will no longer be subject to the Common Agricultural Policy (Gov.uk, 2017) and we will be afforded more freedom to redefine government funding directions in UK agriculture. Whilst Brexit negotiations continue, we can predict it is likely that importing goods from EU states will be costlier after the split, which could mean more pressure on UK food producers to increase our country's food self-sufficiency. This added pressure is likely to change trends in livestock in the years following, towards a few, high production breeds of livestock thus decreasing our domestic animal biodiversity. With this in mind, it is important we conserve as many of the FAnGR of our rare and native breeds as is possible, both as an insurance against extinction (due to disease or other factors) and of specific phenotypes in case future generations of breeders want to re-introduce them into in-situ populations.

Not only are rare breeds potentially vital to the production of viable protein sources in the future, they also hold economic value as part of Britain's natural history. The countryside in the UK, as we see it today has been shaped by the grazing management of these animals and their loss due to disease or lack of breeding will have knock-on effects on the UK landscape. Subsequently, our farming, biodiversity (domestic and wild) and tourism would be affected. It is arguable that much of Britain's countryside has been shaped by the grazing and management of rare and native breeds therefore by maintaining these populations in situ, specifically in their areas of origin, would result in the direct conservation of for our wildlife and maintain the landscape which attracts so many visitors from abroad.

These ideas suggest that the conservation of FAnGR should be considered an asset both for the private sector and a force for public good and so be given raised priority in the new framework which will replace Pillar 2 of the Common Agricultural Policy. This could be implemented in a "public monies for public good" (Helm, D. 2017) framework of a post-Brexit Rural Development Policy in which FAnGR conservation is in the public interest and therefore breeders and gene banks given direct funding.

Post-Brexit Funding of FAnGR:

As mentioned above, many EU states already place FAnGR highly in their national environmental policy alongside wildlife conservation plus make use of European Commission Regulation designed to promote FAnGR conservation in member states. Despite devolution, this attitude should be mirrored in the UK's post-Brexit policy, specifically in new policies which directly fund the production of rare breeds around our country.

One method of encouraging farmers to increase rare breed gene pools could be to provide a payment to holdings where fertile rare breed animals are being produced and added to society herdbooks on a yearly basis. What is classed as "rare" by the government would need to be overseen and edited regularly to reflect changing populations, this could be done using both the RBST Watchlist and National Inventory as guidelines. It is important to note however, that if funds are allocated "per head" then there is a risk of farmers being encouraged to overgraze land. Contingencies to deal with this risk should be included in new policy. It is also likely that if payment for rare breed production isn't balanced with incentives for UK protein production, there is a risk of commercial livestock farmers decreasing meat production and changing their priorities to adding as many rare breed animals to herdbooks per annum and so threatening UK food security. A compromise could be made by putting a premium on meat and animal products which have been produced using certified rare breed herds.

Having discussed the financial encouragement of in-situ FAnGR conservation by livestock breeders, it is vital to consider ex-situ gene bank conservation post-Brexit. What is clear is that the UK FAnGR committee, RBST and other organisations have already created the foundations for widespread FAnGR gene banking in the UK through the RBST Watchlist, the "National Inventory" and the UK National Livestock Gene Bank. However, as an NGO charity they do not have the funding to effectively create a continual gene banking and population recording framework for all rare and native breeds throughout the UK. Government funding and increased government involvement is needed to enable the FAnGR committee and RBST to start widespread ex-situ collections using up-to-date artificial reproduction and cryopreservation techniques. So far in these ex-situ collections, an emphasis has been put on show animals' genetics being conserved (Ligda and Zjalic, 2011), likely due to the organisations funding the cryopreservation having a vested interest in saving the genetics of high

performing animals of each breed. It should be the government's responsibility to ensure a representative sample of each generation of rare and native breeds are conserved, not just show-winning animals. The existing global research into selecting animals for gene bank projects to ensure the collection of genetically varied samples of each generation, should be further developed and funded at a UK level and within the context of UK gene banking.

4.0. Summary

Since the establishment of the FAO's *Global Plan For the Action for AnGR* in 2007, the UK's response in terms of policies encouraging the conservation of FAnGR has been lacking. Brexit, specifically the UK's devolvement from the Common Agricultural Policy, gives us the opportunity to redefine agricultural policy and encourage both food production and environmental services by farmers. FAnGR should be re-prioritised as being just as much in the public interest as wildlife biodiversity and therefore an important environmental service. Funding needs to be increased, giving emphasis on "public funding for public good" to renew drive towards fulfilling the targets of the *Global Plan* here in the UK, and conserving our livestock genetic resource for the future.

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