

A survey of stakeholder attitudes towards bio bank management in Europe

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Summary

Conservation of animal genetic resources is highly relevant to ensure adaptability of livestock production systems. New technologies create novel opportunities in this field. An online survey (N=111) with 29 questions was conducted, covering needs, attitudes and preferences of different stakeholders in animal genetic resources in Europe. Stakeholders considered the conservation of animal genetic resources to be very important and were concerned about the loss of genetic resources. Tools/technologies that should be used more frequently are bio banks, genomic selection and in-situ conservation. Also, bio banks should prioritise endangered breeds over most profitable animals. Regarding access to material, stakeholders leaned towards free access for breed societies and public research institutions, as well as access at a fee for private research organisations and commercial companies. Breed societies and public research institutions should have the most authority in decision making, according to stakeholders, also indicating that funding should come from public sources. This was also supported by the higher level of stakeholder trust in public organisations. This study found a generally positive attitude of stakeholders towards an increased use of bio banks to conserve genetic diversity in the livestock sector, funded and controlled by public institutions and breed societies.

Keywords: farm animals, genetic resources, stakeholders, bio bank management

Introduction

The 2nd global assessment of Animal Genetic Resources (FAO, 2015) points out how livestock diversity facilitates the adaptation of production systems. Further relevant findings of the assessment are the need to strengthen institutional frameworks for the management of animal genetic resources and the emergence of new technologies which pose new opportunities and challenges in the field. In this context and in accordance with the Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration (FAO, 2007), the European Union funded project IMAGE was launched in 2016. Its main goals are to enhance the use of genetic collections, to upgrade bio bank management and to demonstrate the benefits brought by these collections. This should be achieved through the use of genomics, bioinformatics and reproductive biotechnologies. A bio bank in this context was defined as a storage facility for reproductive material, tissues and isolated DNA of farm animals.

In an effort to involve a broader spectrum of stakeholders, as proposed by studies like

Leroy *et al.* (2017), measures are being taken to identify the needs, attitudes and preferences of all stakeholders towards management of animal genetic resources. Stakeholders include researchers, bio bank managers, NGOs, breeding organisations, governmental institutions and breeding industry. IMAGE organises annual stakeholder meetings which facilitate communication and cooperation among a variety of parties. The acquired stakeholder input is used to choose and monitor case studies for the IMAGE project. Among these measures of stakeholder involvement one sociological analysis was performed on the innovation challenges for animal genetic resources, which forms the basis of the paper at hand.

Material and methods

An online survey (N=111) with 29 questions was created and sent out to a variety of stakeholders using the individual networks of the IMAGE partners and gene bank managers all around Europe. However, a majority of replies were sent in from Spain (48%) and France (33%), the rest being made up by other European countries. Non-European replies were eliminated to keep the results relevant to the European situation in management of animal genetic resources, after which 105 interviews remained for further analysis.

The online survey was created using the online software SoSci (<https://www.soscisurvey.de/>, ver. 2.6.00-i) which is free for non-profit academic purposes. The survey consisted of rating scale questions (10), single choice questions (7), multiple choice questions (7), open-end questions (3), one dichotomous question and one rank order scaling question.

The first of two blocks of questions dealt with general information about the participant and their professional activity as well as their involvement with animal genetic resource management, e.g. whether they dealt with in-situ/ex-situ conservation and whether they collaborated regularly with the respective bio bank in their country. The second of two blocks of questions dealt with the participants' views, ideas and attitudes towards animal genetic resource management. Among others, these questions dealt with perceived importance of animal genetic resource management, concern about loss, attitudes towards new technologies, opinions about bio bank access&funding, bio bank decision making, ownership, as well as general satisfaction with the status quo.

Among the 105 datasets, the most predominant line of work was 'Breeder/Breeding organisation' (44%), followed by 'Science' (22%) and 'Extension service provider' (15%). The largest age class was 40-50 (61%) and there were more declared male (65%) than female (27%) participants. Species of interest were cattle (61%), sheep (44%) and goats (38%). Less than 25% indicated that they were interested in poultry, pigs or other species. 66% of participants work with rare breeds, while 46% work with commercial breeds. Of those who are involved in breed conservation (76%), 58% work in in-situ and 44% in ex-situ conservation. 61% are involved with bio banks either as user, donors or managers. A majority of participants are aware of a bio bank in their country/region (72%). 50% of participants indicated that they had monthly or yearly contact with their closest bio bank, while 37% were in contact less than yearly or never.

Descriptive statistical analysis was performed using R and Microsoft Excel.

Results&Discussion

75% of participants considered the importance of management of animal genetic resources as high or very high and 62% believed the importance will even increase in future. A majority are also at least somewhat concerned about loss of rare breeds (85%) and commercial breeds (77%). Areas in which bio banks are perceived as particularly important (>50% indicate high/very high importance) were biodiversity, research, heritage, breed characterisation, breed

restoration and technological development. This seems to be in accordance with generally positive public attitudes about conservation measures investigated by Pouta *et al.* (2014). Creating of new breeds was deemed relatively less important with 32% indicating low/very low importance.

Participants were asked about whether certain tools/technologies for genetic management should be used more, maintained or avoided in future. Tools with the strongest calls for increased use were bio banks (52%), genomic selection (52%) and in-situ conservation (51%). Stakeholder opinions were evenly spread between ‘use more’ and ‘maintain’ conventional breeding programs, ex-situ conservation, embryo transfer and artificial insemination. The relatively highest levels of rejection of and uncertainty towards tools of genetic management was observed for gene editing with 14% opting for avoiding it in the future and 19% choosing the option ‘don’t know’. Stakeholders also held relatively negative and precautionous attitudes towards sexed semen and in-vitro fertilisation. When asked to rank five priorities of collection strategy, a very clear tendency was seen: (1) endangered breeds, (2) highest genetic distance, (3) highest in-breed diversity, (4) most desirable traits and (5) most profitable animals.

Regarding access to material and information from bio banks, stakeholder consensus (>50%) was found in the wish for free access for breed societies and public research institutions, as well as a call for access at a nominal fee for private research organisations and commercial organisations. Stakeholder opinions were split about access for farmers, governing bodies, international organisations and NGOs, with <50% each for the options ‘free access’ and ‘access at a fee’.

When asked about participation and involvement in decision making, stakeholders would have given most authority to breeding societies and public research institutions, and the least authority to commercial companies and private research institutions (Fig. 1). Preferences towards funding proportion between public and private funding for all bio bank activities (management, material collection and characterization, facilitating access) were inquired, showing a clear preference for public funding for bio banks and a rejection for private funding.

On a scale of trust (1=no trust at all; 5=full trust) in matters of animal genetic resource management, public organisations scored highest with an average score of 4.10 followed by private-public partnerships with 3.44. Lower scores were achieved by NGOs (2.89) and private organisations (2.63). The work of bio banks in animal genetic resource management was found to be somewhat, mostly or fully adequate at the moment by 70% of stakeholders in this survey. Much research on stakeholder attitudes towards bio bank management concerns the use of human tissue (Husedzinovic *et al.*, 2015), while more research is needed in the field of livestock bio banks.

Conclusion

This study found a generally positive attitude of stakeholders of animal genetic resources in Europe towards an increased use of bio banks to conserve genetic diversity in the livestock sector, funded and controlled by public (research) institutions and breed societies, which hold much trust from stakeholders.

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Figures

Figure 1. Authority of institutions about bio bank management.

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