**Ad Hoc Action**

**Strengthening national capacities towards the development of a national Gene Bank strategy**

Ex situ WG Meeting, Paris 1-3 June 2022

## Presentation of AHA outcomes – Practical guidelines

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## Objectives:

The proposed Ad hoc action aims to strengthen the national capacities for the management of AnGR and specifically on the *ex situ* conservation actions (development of a national GeneBank).

Assess current situation, needs and barriers and define solutions and priorities to support national efforts towards the development of a national cryo-conservation strategy.

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## Work carried out in 2021-2022

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## **Methodology**:

- To achieve the above objectives a three steps methodology was followed, including Workshops with the members of the AHA and external experts
  - Develop a questionnaire to collect information concerning the Gene Banking strategies in Europe (part A with general information and Part B with more detailed information on the various aspects (financial, technical, organizational and policies).
  - Online Workshop after the collection and first analysis of data, aimed to a first assessment of the situation at participating countries.
  - The 2nd step, aimed to identify the drawbacks impeding the development of ex situ conservation strategies, following a "Metaplan" procedure. The outcomes were discussed during the 2nd Workshop. The drawbacks were grouped in 4 categories (Funding, Organization, Technical, Policies).
  - The 3rd step aimed to exchange on the implemented solutions by the participating countries in the 3rd Workshop open to a wider audience. The solutions are summarized and grouped in categories. This is the base of the practical guidelines that will be developed.

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| Key findings from general information and role of actors in ex situ conservation. |
|---|
| In all countries many breeds have no material or not sufficient material in gene banks, this is the most relevant gap in the ex situ conservation activities. The situation varies by country and some have more developed collection than others. |
| In general countries with more developed collections have designed an AnGR Plan of Action, have National Advisory Committees, National Genebanks and/or registers of Genebanks. |
| Regional/breeding associations Genebanks are not always essentials for the ex situ conservation strategies (country dependent). |
| The State has a central role in the organization of AnGR conservation strategies. In several cases by delegating the functions in other organizations. |
| The main actors in the ex situ conservation strategies are public AI centers, research institutions/universities and breeders associations. |
| Other actors (Private companies, NGOs, ….) have less relevant in the current ex-situ conservation strategies |

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| Key findings from assessment of current situation |
|---|
| The development of collections between species follow different speeds: Cattle, sheep, goats are more advanced, followed by pigs (issues with fertility), rabbits, poultry (differ among countries), horses (less experience) |
| Type of material: semen is the most common material storage and collections of embryos and oocytes are less developed, depending on species and human capacities per country. |
| In endangered breeds with small population size the concern is on the genetic diversity aspects, which makes more difficult the selection of donors. |
| Available funds, very small number of males in some breeds and a lack of a prioritization limits the collections of sufficient material per breed |
| Written agreements between Breeding Associations and Genebanks are essential tools, to reach theses agreements is recommended stablish a decision making process. |
| In some countries, breeding programs have as objective (or obligation) to contribute to the Genebank, not in all. |
| The support from AI Public Centres is a key element, but in some countries developing GeneBanks is not a priority for their AI Public Centres. |
| EU Regulations on national aids and on Rural Development Programs allow the funding of genebanks, but not all countries take advantage of these regulations |
| Derogations for the use of old material or collection on field are highly recommended. |

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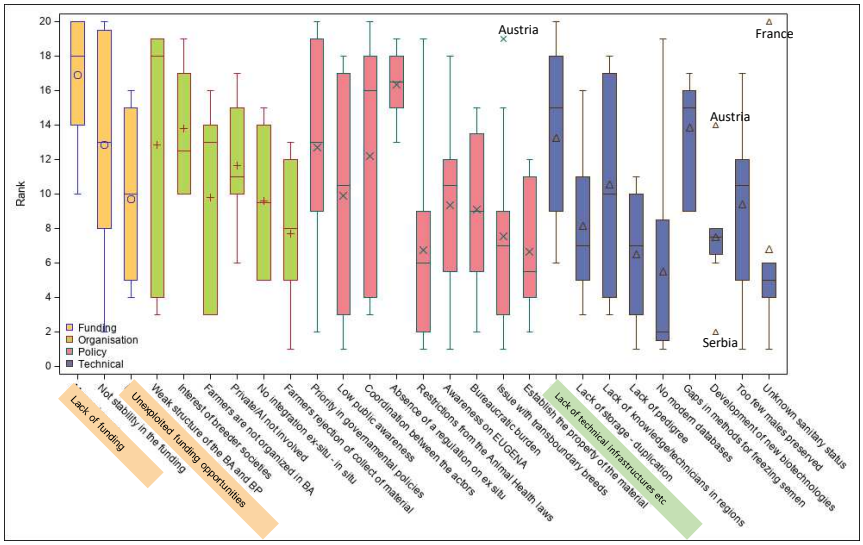


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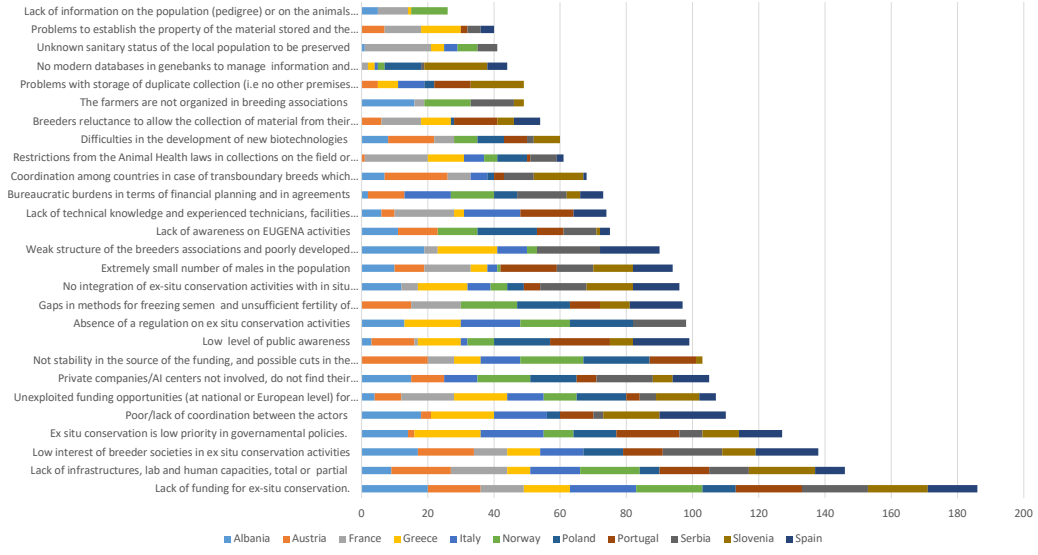


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## Ad Hoc Action

## Strengthening national capacities towards the development of a national Gene Bank strategy

| Category new | PROPOSALS OF DRAWBACKS AND OBSTACLES FOR DEVELOPMENT EX SITU CONSERVATION. | Albania | Austria | France | Greece | Italy | Norway | Poland | Portugal | Serbia | Slovenia | Spain | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Funding | Lack of funding for ex-situ conservation. | 20 | 16 | 13 | 14 | 20 | 20 | 10 | 20 | 20 | 18 | 15 | 186 |
| Technical | Lack of infrastructures, lab and human capacities, total or partial (either depending on the species (i.e available for the cattle / not for other species), or on the population size (i.e not available for endangered breeds)) | 9 | 18 | 17 | 7 | 15 | 18 | 6 | 15 | 12 | 20 | 9 | 146 |
| Policy | Ex situ conservation is low priority in governamental policies. | 14 | 2 | | 20 | 19 | 9 | 13 | 19 | 7 | 11 | 13 | 127 |
| Policy | Poor/lack of coordination between the actors (within Public bodies, and between Public / Private) involve in ex situ conservation activities and lack of accurate knowledge of all existant collections. | 18 | 3 | | 19 | 16 | | 4 | 10 | 3 | 17 | 20 | 110 |
| Organisation of livestock sector | Low interest of breeder societies in ex situ conservation activities | 17 | 17 | 10 | 10 | 13 | | 12 | 12 | 18 | 10 | 19 | 138 |
| Policy- funding | Unexploited funding opportunities (at national or European level) for ex situ activities. | 4 | 8 | 16 | 16 | 11 | 10 | 15 | 4 | 5 | 13 | 5 | 107 |
| Organisation of livestock sector | Private companies/AI centers not involve in the ex situ conservation activities, even if they have big collections of material, because they do not find their economic interest | 15 | 10 | | | 10 | 16 | 14 | 6 | 17 | 6 | 11 | 105 |
| Funding | Not stability in the source of the funding, and possible cuts in the future. | | 20 | 8 | 8 | 12 | 19 | 20 | 14 | | 2 | | 103 |
| Policy - society | Low level of public awareness, in general and in the farmer's community in particular, about the conservation of AnGR. | 3 | 13 | 1 | 13 | 2 | 8 | 17 | 18 | | 7 | 17 | 99 |
| Policy - legal | Absence of a regulation on ex situ conservation activities (i.e no recognition an institution as a Genebank) | 13 | | | 17 | 18 | 15 | 19 | | 16 | | | 98 |
| Technical | Gaps in methods for freezing semen and unsufficient fertility of frozen semen in some species (i.e. horse, poultry) | | 15 | 15 | | | 17 | 16 | 9 | | 9 | 16 | 97 |
| Organisation of livestock sector | No integration of ex-situ conservation activities with in situ conservation. | 12 | | 5 | 15 | 7 | 5 | 5 | 5 | 14 | 14 | 14 | 96 |
| Technical | Extremely small number of males in the population intended to be preserved. | 10 | 9 | 14 | 5 | 3 | 1 | | 17 | 11 | 12 | 12 | 94 |
| Organisation of livestock sector | Weak structure of the breeders associations and poorly developed breeding programs, which not allow the development of ex situ conservation activities. | 19 | | 4 | 18 | 9 | 3 | | | 19 | | 18 | 90 |

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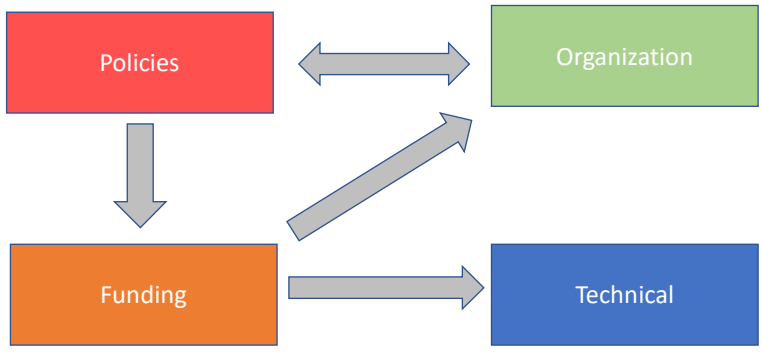
## Solutions presented (to defined drawbacks

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## Policies

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|---|---|---|---|
| Ex situ conservation is low priority in governamental policies. | Establish National Advisory Committee / NAP<br>Awareness of policy markers and stakeholders; Articles and technical notes to inform on the steps of organization / stress the urgency;<br>Exploit the developments at European level (ERFP, relevant research projects), global commitments (FAO, SDGs) | NAP on AnGR states the importance of further development of exiting Ex-situ collections / importance of establishment;<br>National strategy on conservation and sustainable use of GR → comprehensive plan for organization, financing and back-up solutions (more in detail in the guidelines). | SDG 2.5.1.b is an indicator follow by the National Institute of Statistics |
| Poor/lack of coordination between the actors | Improve data collection and coordination among actors | Set up of public entities/bodies connecting all relevant actors with a long-term mandate.<br>Establish the legal framework for the process of official recognition for breeders´ associations. | Disseminate information and encourage Institutions hosting genebanks to participate in national/ international projects |
| Low level of public awareness | Development of community awareness and educational activities for farmers, technicians and society | Increase the awareness on ex situ conservation by: National Genebank Webpage, articles, press releases, radio interviews, TV reports, etc | |
| Absence of a regulation on ex situ conservation activities | Legal framework and Institution responsible for genebanking (long term mandate) | Design of MTA/MAA and SOP for the National Genebank and approval in the national advisory committee | Technical meetings with authorities to address the key issues and gaps in legislation |
| Lack of awareness on EUGENA activities | Enrolment in EUGENA, improve the external awareness on our ex situ conservation activities, but also increase the awareness on the relevance of ex situ conservation at national level | Raise awareness for gene bank and EUGENA at public events | Use EUGENA to exchange across countries |

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## Policies

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|---|---|---|
| Bureaucratic burdens in terms of financial planning and in agreements | Efforts to adapt / adjust the rules to the current situation of the country | |
| Coordination among countries in case of transboundary breeds which avoid duplicate efforts. | Intensify transboundary efforts in endangered cattle, goats, pigs: Coordinate breeding programs, exchange material | Strengthening cross border cooperation |
| Restrictions from the Animal Health laws in collections on the field or use of old material. | Develop cooperation with animal health services; Approved on a case-by-case basis as exceptional situations by health authorities | Exceptions for all major species in the national animal health legislation for the collection of germinal products intended to be stoed in a genebank (i.e collection in farm/on the field). |
| Problems to establish the property of the material stored and the possible uses | Design of MTA/MAA and SOP for the National Genebank and approval in the national advisory committee | Development of the legislative framework Memorandum of Understanding within European Network of GENEBANK. |

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## Funding

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|---|---|---|---|
| Lack of funding for ex-situ conservation | Exploit opportunities within the Rural Development Program<br><br>Funds provided annually for the development of breeding programs.<br><br>Collection and storage of germinal products in genebanks are eligible costs (70%) in the national aids to breeders societies.<br><br>Genebank development /duplication of a collection in National Genebank are a criteria to gain extra funding (compensation system) | Demonstrate the value (monetary quantification) of cryo-conservation; demonstrate cost-effectiveness of ex situ conservation. Compare these costs with potential losses without ex-situ<br><br>Reduce collection targets, currently set too high;<br><br>Collaboration in transboundary /similar breeds to avoid duplicates. | Start setting up collections without much funding from surplus stocks from AI centers<br><br>Communicate widely on advantages of ex situ<br><br>Involve breeding organizations; Public / Private partnerships<br><br>Direct development of genebanks by regional and research institutions |
| Unexploited funding opportunities (at national or European level) for ex situ activities | Integrate ex situ into EU Rural development programmes | Better investigate funding through research opportunities to initiate some collections of genetic material | Breeders societies of local breeds provides the farmer that sell a male to AI-production a small grant to make it more attractive to contribute.<br>Free serological / PCR analyses in the public Animal Health laboratories for samples to be stored in a genebank |
| Not stability in the source of the funding, and possible cuts in the future | Provide strategic analysis for long-term funding | To make clear distinction between funds for conservation/activity and funds for conservation/research<br>Storage is assured by the Agriculture Ministry | Integrate ex situ into other rural support programs |

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## Organization

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|---|---|---|
| Low interest of breeder societies in ex situ conservation activities | Development of community awareness; educational activities for farmers, technicians, AI Centers and society | Develop extension services, capacity building for breeders; Improve the cooperation and complementary of the actors<br>National Genebanks should focus their activities in endangered breeds |
| Private companies/AI centers not involved, do not find their economic interest | Distinguish cryopreservation for preservation / cryopreservation for industrial dissemination | |
| No integration of ex-situ conservation activities with in situ conservation. | Promotion of ex situ conservation through financial support of breeders associations and knowledge transfer.<br>Develop specific projects to foster the involvement of breeders societies (mainly those more reluctants) in genbank activities. | Build interest through case studies showing benefits of ex situ (lost variants, health risks) complementarity with in situ (limit inbreeding; conserve while fertility is good) |
| Weak structure of the breeders associations and poorly developed breeding programs | Agreements between NGB, breeding organisation and breeders societies on the use of some doses.<br>Get the rare breed umbrella societies on board with the development of a genebank.<br><br>Proper identification system of animals, herd book establishing and data recording in farms. | Breeders Associations established to manage local breeds and receive support through RDP measures (in situ conservation)<br><br>Demand that breeding programme (conservation) have the advice of an expert in genetics. |

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## Organization

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|---|---|---|
| Breeders reluctance to allow the collection of material from their animals | Develop educational / awareness programmes for breeder societies and AI companies on the importance of ex-situ conservation<br><br>Describe the mission of a national gene bank in a legal document, describe breeders' rights | Enhance communication and cooperation of actors;<br><br>Advocate for a cryopreservation step in any conservation program<br><br>Technical incentives / other recompensation for breders cooperating in ex situ activities<br>Only for some horse breeds (reluctant to allow access to material), buy directly the material to the horse owners. |
| The farmers are not organized in breeding associations | Organize the livestock sector in breeding societies/cooperatives responsibles of the breeding programmes in acordance with the EU regulation if is the case. Ensure long term funding (RDP measures) | Develop extension services, capacity building, foster technology transfer |
| No modern databases in genebanks to manage information and allow interoperability | Ensure public funding of information system | Regular collection of information of the material stored and uploaded in DAD-IS |
| Lack of information on the population (pedigree) or on the animals (age, pedigree) | Develop molecular tests for pedigree testing | |

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## Technical

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|---|---|---|
| Lack of infrastructures, lab and human capacities, total or partial | Investments in infrastructure, equipment and training | Decrease differences within the country<br>Encouragement and Support of private initiatives for capacity development;<br>Inventory of institutions hosting a collection and their matherial. |
| Gaps in methods for freezing semen and unsufficient fertility of frozen semen in some species | Local breeds benefit from the expertise on Ex-situ conservation applied on commercial breeds (cattle, sheep and goat); Enhance cooperation between countries through research projects | Strengthening the capacities of cryobank with somatic cells, hair and blood |
| Extremely small number of males in the population | Promote cryoconservation before critical status; Develop molecular tests for pedigree testing; Special programs for small populations | Analysis of demographic, genealogical and performance data kept by Breeders Associations to set priorities<br>Collection of information on material stored in different Institutes |
| Lack of technical knowledge and experienced technicians, facilities and equipment | Train / develop a diploma or any official document recognising the skills of AI technicians in cryoconservation for a range of species;<br><br>Enhance cooperation within institutes (research and universities) at national / international level | Decrease differences (facilities, technical experience, etc.) among different areas of the country<br><br>Encouragement and Support of private initiatives for capacity development; |
| Problems with storage of duplicate collection (i.e no other premises available) | Organization and distribution in different locations to safeguard the duplicates | |
| Unknown sanitary status of the local population to be preserved | Recognize molecular tests to assess the sanitary status of the material collected instead of that of the entire flock or breed | |

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**Practical Guidelines:**

- Introduction
- Organized in the four Sections (with solutions / guidelines linked to FAO guidelines)
- It contains practices and steps to follow (not a check list, but a “flexible” document adapted to the needs of each situation)
- Country examples could be useful, but remember these cannot be copied (but inspire)
- References (relevant articles / projects)?

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**AHA outputs and time planning:**

- Report of activities to ERFP
  - For the annual assembly (draft: until 10.07)
- Practical guidelines
  - AHA group meeting (? end of June?)
  - For the annual assembly (draft: until 10.07)
- Article in GenRes journal

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