

Setting up Genebanks in Europe: Main drawbacks and solutions

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Rationale:

Despite the progress on *ex-situ* strategies in European countries (stimulated by the Global Plan of Action (FAO), the ERFP WG *ex situ*, EUGENA, the IMAGE project, several initiatives at national and European level), there are still **significant drawbacks that impede these developments.**

ERFP Ad Hoc Action:

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

Lead: F. Tejerina / C. Ligda



Objective of the AH Action:

- 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.**



Workplan of AH action: February – May 2021

Participated experts from 11 ERFP countries

Step 1: Collect responses through a questionnaire to assess current situation

Analysis of the data and exchange views during online meetings

Step 2: Use metaplan strategy to define the main drawbacks

Countries sent a list of drawbacks

Drawbacks were grouped together in a unique list (27 drawbacks)

Send back to countries to rank the drawbacks (from 1 to 20)

Step 3: Workshop, 26 May

Aim: to identify solutions

– AHA group, ex situ WG, NCs



The questionnaire had the following structure:

Part A. GENERAL INFORMATION.

- Organization of the AnGR management and Ex situ conservation (National Plan of Action, Advisory Committee, Genebanks, EUGENA...).
- Breeds with material/ sufficient material stored in genebanks.

Part B. ASSESSMENT OF CURRENT SITUATION (EX SITU CONSERVATION).

- Role of different actors in the Ex situ conservation, human and technical capacities, collections of public bodies (ministries, regional governments, AI public centers, research Institutes) and private bodies (breeding societies, private companies, NGOs).
- Ex situ conservation in breeding programs.
- Legal framework.
- Organizational aspects of Genebank.
- Technical aspects.
- Funding.

11 answers from: Albania, Austria, France, Greece, Italy, Norway, Poland, Portugal, Serbia, Slovenia and Spain.



Key findings from general information (Part A) and role of actors in ex situ conservation (Part B).

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 ministries (Agriculture) have 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



Key findings from assessment of current situation (Part B)

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)

Semen is the most common material 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 these agreements is recommended establish a decision making process.

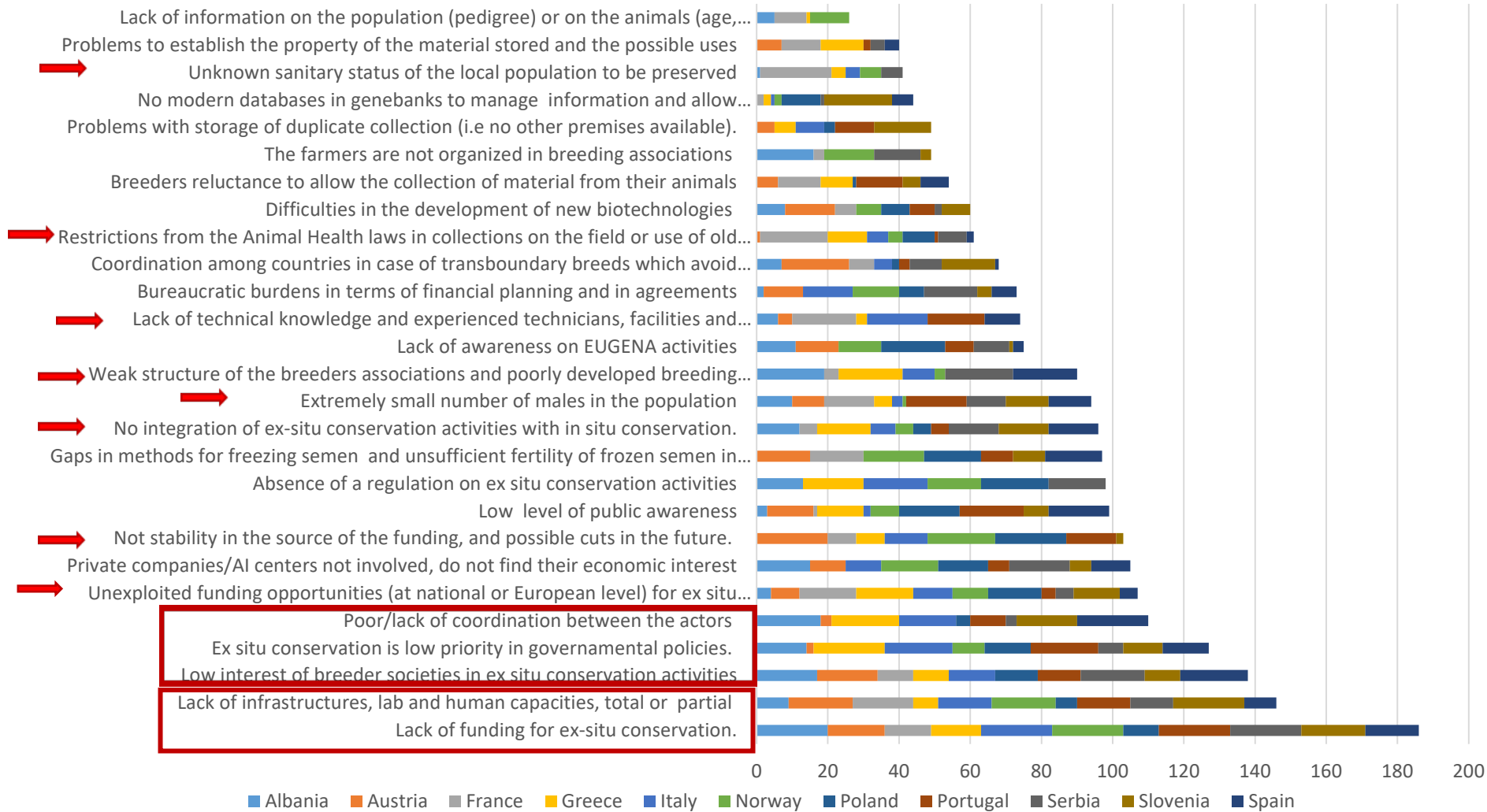
In some countries, breeding programs have as objective (or obligation) to contribute to the Genebank, not in all.

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.

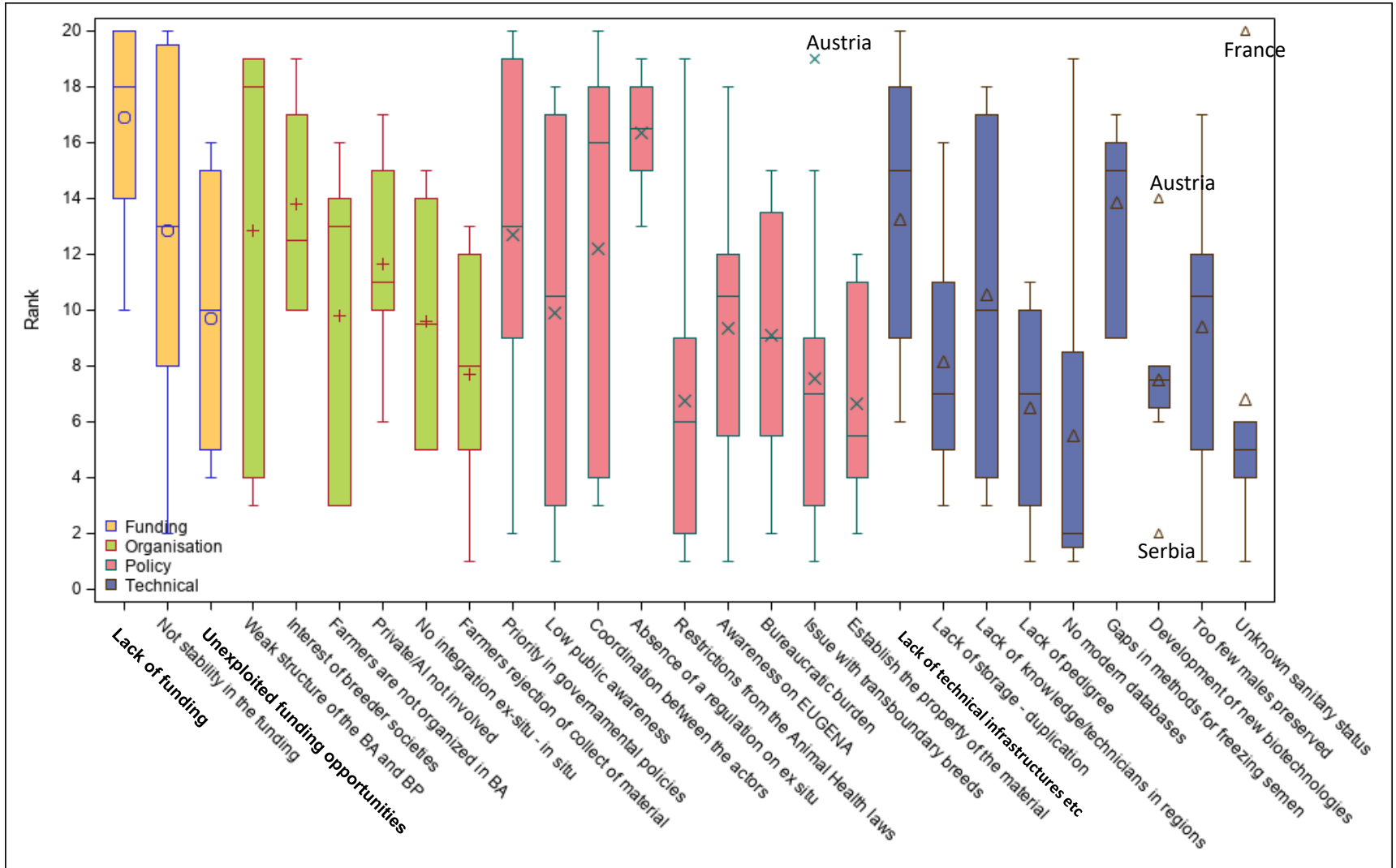
EU Regulations on national aids and on Rural Development Programs allow the funding of genebanks, but not all countries take advantage of these regulations

Derogations in Animal Health Regulation for the use of old material or collection on field are highly recommended.

Main drawbacks



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 governmental 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 insufficient 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



Funding

- **Calculate costs** and demonstrate cost-effectiveness
- **Compare costs** (and compare with potential losses without ex -situ)
- Provide strategic analysis **for long-term funding**
- Exploit opportunities from **RDP programmes**
- Breeders organisations fund the Ex-situ collections /Compensation system (increased funds)
- Stability breeders society operation (Small grants to Breeders Societies)
- Exploit opportunities from Research Grants
- Distinction between funds for conservation/ regular activity and funds for conservation/research
- Reduce collection targets (reduce needs)
- Start setting up collections without much funding by gathering surplus stocks from AI centers
- Communicate widely on advantages of ex situ



Organization of livestock sector

- Distinguish cryopreservation for preservation / cryopreservation for industrial dissemination
- Show benefits of ex-situ (lost variants, health risks)
- Explain the complementarity with in situ (limit inbreeding, conserve while fertility is good)
- Education activities
- Support breeders associations / Capacity building for breeders
- Include cryopreservation in any conservation programme
- Develop modern Genebanks



Policy

- Established National Plan and **National Strategy**
- **Connect all relevant actors** with long-term mandate
- **Legal documents** (mission of the national Genebank), clear breeders' rights
- Cooperation with animal health services
- EUGENA to exchange across countries
- **Networking – coordination between countries** (i.e. transboundary breeds) (exploit the ERFP experience / global commitments)
- Process of recognition for breeders' associations
- Promote cryoconservation before critical status



Technical issues

- Research and training to improve methodologies for cryoconservation in species lacking routine techniques
- Develop molecular tests for pedigree testing
- Recognize molecular tests to assess the sanitary status of the material collected instead of that of the entire flock or breed
- Diploma or other official document recognising the skills of AI technicians in cryoconservation for a range of species
- Cooperation within and between countries (gain from expertise / overcome gaps).

Summing up

Key findings from assessment of current situation

Identification of each institution that is working on ex situ activities is a relevant step to organize and coordinate these institutions in a common strategy.

The **research** projects could play a key role in the collection of material.

Ex situ conservation demands a **regulation and a coordination** among the actors involved.

Other relevant gaps: Financial support (and prioritization for weakest breeder associations), human and technical capacities, awareness of ex situ conservation, dissemination among farmers, information systems, commitment and set priority on the *ex situ* conservation activities.



Summing up

Key Solutions

Funding	<ul style="list-style-type: none">• Cost effectiveness / demonstrate loss• Long term funding and stability• Exploit opportunities• Setting Collection goals
Policy	<ul style="list-style-type: none">• National Strategy• Legal documents• Connect all relevant actors

<ul style="list-style-type: none">• Support breeders organizations• Complementarity <i>ex-situ / in situ</i>	Organization
<ul style="list-style-type: none">• Research and training• Cooperation	Technical



Thank you!

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ERFP Ad Hoc Action

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