

## **Institutional and legal framework for *ex situ* conservation at the national level in Finland**

### **Historical overview of gene bank development**

There were initiatives on actions to save local Finnish cattle breeds as early as the late 1960's by prof Kalle Maijala. The first strategy paper for all the species was produced in 1984 in the Ministry of Agriculture and Forestry. The most important consequences of the work was the involvement of prison farms in maintaining herds of Eastern, Northern and Western Finncattle and a flock of Finnsheep. The cattle herds were made of individuals cattle from different parts of the country found by a last minute survey of herds representing most of the remaining lineages in the breeds. At the same time the existing semen storages were screened and the deposition of semen doses from the rare cattle breeds was started. The worst situation was in the Northern Finncattle and bulls from closely related Swedish breed were used for producing cow replacements in herds.

Since 1995 - after joining EU – subsidies have been paid for rearing endangered local breeds, first to keepers of Eastern and Northern Finncattle and coloured Finnsheep, later also to those having Western Finncattle, Finnhorse, white Finnsheep, Åland Sheep, Kainuu grey sheep, Finn goat and landrace chicken. The subsidy programme has been very successful and now the most endangered breeds are in a safer situation. The cryo preservation scheme has been extended to sheep breeds.

The systematic national programme for farm animal genetic resources started in 1984. The programme is coordinated by MTT Agrifood Research Finland. Much of the work is done in collaboration with the breeding organizations for cattle, sheep/goat, horse and chicken.

There has been a Nordic gene bank organization for farm animals since the 1980's. Finland has been also actively taking part in the European work on animal genetic resources.

### **Objective(s) of national cryopreservation programme/policy**

Cryopreservation programme is part of the national action plan and aiming at the long term preservation of the genetic variation. The programme is founding back-up storages for endangered breeds, primarily for cattle, sheep and horse, to guarantee a continuation of conservation programme after a catastrophe or genetic disaster. The smooth recovery would require sufficient numbers to have a successful re-establishment of a breed with backcrossing.

○ *Collection categories*

The current practical options for cryopreserved material include semen and embryos. The embryos would contain the whole genome and also mitochondria and are therefore an essential basis for a cryobanking. Semen collection and storage are less costly and large number of doses would serve as a complementary back-up for the variation in the embryo bank.

<b>species / breed</b>	<b>volume targets for cryobank</b>	<b>current state</b>	<b>future plans on top of continuing the current activities</b>
<b>Finncattle:</b> Eastern	25 cows x 8 embryos 25 bulls x 200 semen doses	24 cows / 162 embryos 48 bulls / 77,500 semen doses	
Western	200 semen doses per AI bull	159 bulls / 260,000 semen doses	
Northern	25 cows x 8 embryos 25 bulls x 200 semen doses	35 bulls / 60,500 semen doses	embryo freezing
<b>sheep:</b> Åland	25 rams x 200 semen doses	6 rams / 450 semen doses	
Kainuu grey	25 rams x 200 semen doses	4 rams / 250 semen doses	
Finnsheep	50 rams x 200 semen doses	16 rams / 900 semen doses	
<b>Finnhorse</b>	25 stallions x 100 semen doses	-	semen freezing
<b>Finnish Landrace chicken</b>	10 lines x 10 cockerels x 100 semen doses	-	freezing techniques semen collection
<b>Finngoat</b>	25 bucks x 200 semen doses	-	freezing techniques semen collection

**Participation of stakeholders: responsibilities/roles by stakeholder/actor**

○ *Laws, regulations or arrangements between stakeholders*

The semen and embryo collection/freezing are done in collaboration with the breeding and AI organizations, in cattle even the selection of bulls.

The hygienic standards, guarantee time, semen collection and freezing procedures in cattle follow the schemes required for ordinary AI operations in Finland and would also allow exportation.

Most of cryobanked material is maintained at and by the AI organization.

- *Transboundary issues/arrangements*

All the breeds are appearing mainly in Finland. Finnsheep has been exported to dozens of countries, so far the original population is large enough for independent conservation scheme. In Northern Finncattle there is a continuous gene flow from the related Swedish breed. This is coordinated by the breeding organization.

In ram semen collection and freezing, there have been experts from other countries in leading the operations and guiding domestic technicians. Possibly also in the future, foreign experts are used in initiating goat and chicken semen cryobanking programme.

## **Decision making process**

- *Type of material*

Semen is mainly used as a stored material due to the moderate costs while embryo operations would be more expensive. Donors for semen and embryos are chosen based on animal registers and coancestry values in collaboration with breeding organization experts.

There are also DNA samples stored. They are mainly used to characterize the changes that have occurred genome widely in the variation using ever so powerful new technology, esp. SNPs and sequence data.

- *Collection targets (populations, individuals)*

See the Table above.

## **Storage and documentation (2/15)**

- *Storage facilities and rules*

The semen doses and embryos are stored at the AI organization with the procedures required for commercial domestic and exportation operations.

- *Data management and documentation*

The cattle data is in the database maintained by the AI organization.

The sheep data is both at the AI organization and at the CryoWeb database at MTT.

- *Gene bank security*

The security is guaranteed by the standards followed at the AI organization. There is a need to form duplicate storages kept at a different location.

### **Sanitary arrangements/regulations**

The regulations are those required in the EU legislation for commercial domestic and exportation operations.

### **Legal issues (related to genetic material and data)**

- *Ownership and IP*

Most of the cattle semen doses are owned by the AI organization, only some of the oldest bulls have been purchased by the national programme on AnGR. The use of semen doses for pure breeding is guided by joint work with the breeding organization and the national programme with the emphasis on minimizing the rate of coancestry. The use of Finncattle semen for crossbreeding has caused some discussion. The data covers both pedigree information and breeding values for production, health and reproduction traits and is owned by the AI / breeding organization.

In sheep, the cost of the semen collection is covered by the national programme. The ownership of the cryobanked semen doses may need clarification. The pedigree and breeding value information on the rams is owned by the breeding organization.

- *Collecting new material: Articles and conditions in Material Acquisition Agreements*

The documents for the AI bulls purchased by the AI organization follow the standard commercial agreements. For the sheep semen collection there are now MAA documents.

- *Access to gene bank: Articles and conditions in Material Transfer Agreements*

The use of AI bulls in Finncattle breeds would follow normal practices applied for AI bulls. The semen doses owned by the national programme would need a joint decision between the AI organization and the national programme.

There is no established procedure for the sheep material.