WG 3
Techniques of maintaining endangered breeds in situ
("Only continuous utilisation maintains breeds as dynamic entities, adapted to both the needs")

Dr. Daniele Bigi
Dr. Erling Fimland
Prof.Dr. Riccardo Fortina
Dr. Luis Gama
Prof.Dr. Eildert Groeneveld
Prof.Dr. Ante Ivankovic
Dr. Andrea Rosati

Working definitions

Clear terminology is necessary in the conservation effort, to advance understanding, facilitate education and training, communicate successfully with the wider public and realise a common purpose in application.
A minimum set of working definitions are presented in the table

Animal Genetic Resources (AnGR): At the breed level, the genetically unique breed populations formed throughout domestication processes within each animal species of interest to the production of food and agriculture.
Breed: Cultural and technical (genetic) terms are accepted
Domestic Animal Diversity (DAD): The genetic variation or genetic diversity existing among species, breeds and individuals
Conservation of DAD: Sum of operation involved in the management of AnGR such that these resources are best used and developed to meet immediate and short term requirements for food and agriculture, and to ensure the diversity to meet possible longer term needs
In situ Conservation of DAD: The active breeding of animal populations for food production and agriculture, including performance recording schemes and breeding programmes. In situ conservation also includes: ecosystem management, use for the sustainable production of food and agriculture. It does not mean: storage (preservation of a sample of a breed in a situation removed from its normal production environment or habitat, collection and cryopreservation of resources in the form of living semen, ova, embryo or tissues.

General principles for the ELBARN project

1) The breed to be maintained or rescued is a **known breed**
2) **Rescue and ark farms already exist** (it is not necessary or requested to create a new farm for ELBARN)
3) As ark farms could not be large enough to accommodate a complete breed group, there
could be the **need to operate on the basis of more ark farms per breed**
4) Having **multiple locations is desirable** in case of disease outbreaks
5) ELBARN **does not restrict itself to administrative/regional/national boarders**
Remember that WG3 members did not consider:
1) "why" a farmer want to become partner of the ELBARN project
2) who pays for transportation of animals to an ark farm, and for the initial rescue operations
3) the legal issues connected with rescue operations

Requirements

General statement
1) The genetic management of a small population in the most important tool for safeguarding a small population; rescue management and genetic management are considered separately.

2) It is essential to separate the population in small subgroups and spread them in different
rescue farm
a. Group mating: in the in situ conservation program, since the number of animals kept in one place is usually limited, the population is sometimes maintained with divided subpopulations. In this case, it is difficult to carry out random mating over all subpopulations and it is effective to change males among the subpopulations instead of overall random mating. Maintenance of animals in different locations has the additional merit of reducing the risk of accidental loss of the population.
3) It is important to decide how to use males to maintain the biodiversity of the breed.
a. Uniformity of the family size: one of the most efficient techniques to keep genetic variability is to make the family size as equal as possible. It may be easy to imagine that the extinction probability of a certain allele is less in the case that every reproductive animal produces two progenies for the next generation than in the other case that one reproductive animal produce ten progenies and the others produce non. It is usual in a population of domestic animals that males are extremely less than females, but the difference in the number of males and females is not desirable for the small population of the genetic resources, since it means the extreme difference in the number of progenies. When the number of population is fixed, we can minimize the reduction of genetic diversity by equalizing the number of progeny from each individual.

Animals and ark farms management

1) All subgroups of animals need to be managed as one population by a central breed management (**CBM**)
2) Ark farms are required to accept a central mating/selection plan (**MANPLAN**) by the CBM
3) A minimum database or information set (**MINSET**) for this purpose need to be collected
and sent to the CBM
4) Legal requirements: this point need to be discussed in each country

MANPLAN
Pertains to all animals from one breed executed by CBM
For conservation purposes, the breeding program must define the following:
1) Population size
2) Sex ratio (check the derived effective population)
3) Generation interval
4) The maximum use of males (keep family size constant within family selection)
5) Define, execute and monitor exchanges of genetic material (sire rotation)

MINDATA
A minimum data set is required for executing the MANPLAN
The breed description should be done according to EFABIS/DAD-IS
A regular reporting to the CBM is needed
Data for each animal
Species and breed
Breed name (also local name)
Origin and location
Identification number (if existing)
Sex
Sire
Dam
Date of birth (or year)
Culling

Rescue operations management
Some suggestion for rescue operations:

1) Use red tape or similar to delimitate the working area; move fast, no tests.
2) If only few animals can be accommodated, then choose within healthy and good cross section
3) Take to the rescue station as many animals as possible, and as many (unrelated) males as possible
4) If in case of disease not much can be done, than prior action is required

For the next meeting
It is essential to invite a veterinary expert of health measures in case of infection diseases.
It is also necessary to have an expert of legal requirements about animal registration.

Some points of discussion
• Assess also the economic value of these components: 1) advantage/disadvantage of a endangered or local breed as a function of the relative prices for the different (local) animal
products; 2) traditional products such as milk, meat, wool, etc…., but also services such as
insurance for future development of animal production, environmental and cultural functions.
• Need of reliable data on performances of the breed and fitness traits (longevity, fertility,
mortality, feed and management requirements characters).
• Awareness for interaction between farm management and the characteristics of the breed.
• Assess the cultural and historical merit, as antiquity, agricultural systems historically linked to the breed, role in landscape formation, role in gastronomy, role in folklore, role in handicraft, presence in form of higher artistic expression
• Assess special traits that are of interest, like adaptation to a specific environment, natural resistance to parasites or diseases, high fertility, muscle development, wool quality and quantity….
• Selection across breeds. In some situation it is not possible to maintain a breed as a close breeding population, because either the number are too small to avoid excessive amounts of inbreeding, or the number are too small to create a competitive scheme, or characteristics from another breed are higly needed
• Community-based management of animal should set up participatory breed management
programmes (see the "Allevatori Solidali" of RARE) for keeping animals, pastures, etc., and
improvement programmes based on open-nucleus schemes.