

FARM ANIMAL GENETIC RESOURCES

in

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CHAPTER 1 ASSESSING THE STATE OF AGRICULTURAL BIODIVERSITY IN THE FARM ANIMAL SECTOR OF THE COUNTRY

1.1 The Country

The Republic of Austria – situated in Central Europe – is a federal state with nine federal provinces. It has 8.0 million inhabitants (95 inhabitants/km²), 1.6 million people (some 20% of the population) living in the capital Vienna.

Austria has a surface of 8.4 million km²; it is 550 km long and 50 – 300 km wide.

The country consists of 8 types of landscape corresponding to the Austrian production areas

1. High Alps,
2. Pre-Alps,
3. Eastern edge of the Alps,
4. Highlands of granite and gneiss,
5. Carinthian basin,
6. Alpine foothills,
7. South eastern flat and hilly country,
8. North-eastern flat and hilly country.

Among the Austrian landscapes the Alps, which reach altitudes of almost 3,798 m above sea level (Großglockner) cover the largest area.

Across the shelf of the Alps Austria reaches into the Small Hungarian Lowland and there encircles Lake Neusiedel (116m above sea level). The granite and gneiss highland north of the Danube reaches an altitude of 500 – 1100 m above sea level. The area of the fertile lowlands along the Danube, in the Vienna Basin, in Burgenland, Central Styria and the Alpine Klagenfurt Basin with its numerous lakes is far below that of the mountain areas.

Essentially, Austria is situated in the Central European climatic zone (moderate, humid), however, the eastern part and the eastern foothills of the Alps already have characteristics of the more continental Pannonian climate (hot, dry). In elevated areas the central European climate turns into the cooler and more humid Alpine climate. Mean temperatures decline by 0.5 – 0.6°C per 100 m of altitude. Maximum precipitation in the Alpine area is 2,500 mm in

that area the inner alpine longitudinal valleys and basins and the eastern edge of the Alps are the driest regions (500 – 1,200 mm).

In the Alpine foothills precipitation is declining from west to east from 1,400 mm to 530 mm. In the east, which is influenced by the Pannonian climate, they drop down to 400 mm.

1.2 Agricultural Production

The largest part of the country consists of farmland and forests. 46% of the total territory is covered by forests, 42% is farmland. 5,7% of the economically active population are working in agriculture and forestry; the share of agriculture and forestry in the Gross National Output is 1,2%. The area utilized by agriculture and forestry is managed by 217.508 farms of various sizes; the average size is 30,6 ha with and 16,8 ha without forests. In 1999 41% of the farmland was utilized as arable land, 57% as meadows, pastures and Alpine grassland, the rest consists of gardens, fruit cultivation and vineyards (see table 1.2.1)

The main animal products are milk (cow), pork, beef, poultry and eggs. Sheep and goats play a minor role in meat and milk production.

The mean self-sufficiency level in food is 81%; in particular surpluses are produced of milk and dairy products, beef, grains and grain products. The self-sufficiency level in fruit (57%), vegetables (69%), mutton (80%), eggs (81%) and fish (7%) is relatively low. By means of adequate measures within EU programmes a reorientation of production lines with surpluses is aimed at. In particular an extensification of agricultural production in general is promoted. Programmes for landscape protection, in which agriculture and forestry are of great importance, are increasingly valued by the public and private sectors.

1.3 Animal Production in Austria

1.3.1 Production Systems

The Austrian agriculture is small structured compared to EU level. The average farm consists of 16,8 ha farmland (forest discounted). As a rule farms are run by the family as full time or part time farms without foreign labour. In the year 2000 only 126.000 people were still working in agriculture (-2,2% compared to 1999, see Table 1.3.1.1)

The high percentage of organic farming is an Austrian speciality. In Austria nearly 20.000 farms (8,4% of farmland) are organic farms. Extensivisation and sustainability of agricultural production and promotion of organic farming are chief aims of the Austrian Program for Sustainable Agriculture (*Österreichisches Programm für eine umweltgerechte Landwirtschaft, ÖPUL*).

Animal Production systems are changing rapidly (Table 1.3.2.2).

Traditionally animal production plays an important role in Austrian agriculture (Tab. 1.3.1.1).

1.3.2 Cattle – Dairy and Beef Production

As 61% of the farmland is permanent grassland milk and beef production are the main branches of Austrian animal production. The dairy industry produces all milk products from fresh milk and cheeses to butter and milk powder. Domestic consumption and export of dairy products are increasing. The Austrian dairy industry is still small structured, significant changes will be necessary in the following years.

After the BSE-crisis in the year 2000 domestic consumption of veal and beef has stabilised again on a high level. A surplus of 12% of the production has to be exported.

In 2000 621.000 dairy cows were registered. The total number of cows has been decreasing for years. However structural changes increased the number of cows per farm from 12 in 1990 to 22 in 2000. The trend goes from milking to suckler cows. Highly specialised farms with very intensive production concentrate in favoured areas. The extensive farms often are situated in hilly or mountainous country and are farmed part time and/or organic. Most of the organic farms keep dairy cows as well as sucklers.

1.3.3 Pigs

The next important sector is pig breeding and fattening. Pork is the most popular meat in Austria with a consumption of 56,8 kg per head per year. Until Austria joined the EU roughly 100% of domestic consumption were produced. Since 1992 a moderate amount of the production is exported mainly as specialities. Other exports of pork do not play a major role. Pig production is highly specialised and concentrated in the arable parts. The production is intensive with confinement all the year round. Breeding material is established by pedigree farmers using pure-bred animals. In the production of fatteners Pietrain is used as sire and a

crosses from Austrian Landrace x Austrian Large White as dams. These breeding farms only produce fatteners for finishing. About 25% of the farms are integrated units carrying the pigs from birth to slaughter weight. International breeding companies until now play only a minor role but it is increasing.

1.3.4 Poultry

11.077.000 hens and broilers were kept in Austria in the year 2000 producing 86.000 tons of eggs and 106.000 tons of meat.

Following the trend to less fat and more easily digestible food the consumption of poultry is increasing. Despite higher domestic production 33% of the demand has to be imported. Almost the whole production of broilers and turkeys comes from intensive systems in closed units using imported specialised hybrids. In geese and ducks a moderate amount – about 20% of the demand - of free range birds is produced for the seasonal market especially St. Martin's Day (11th November) and Christmas.

Production of eggs has dropped in the past years. Imports mainly consist of eggs and egg products for the industry and stem from intensive layer farms with caged animals. Fresh eggs for detail marketing are produced locally. Free range eggs and eggs from organic farms are in high demand and cover 20% of the domestic market by now. The rest is produced in intensive layer farms.

Local breeds do not play a role in commercial production any more. Fanciers of show poultry and small mammals like rabbits and guinea pigs are organised in 243 organisations for "small animal breeding".

1.3.5 Sheep and goats

The demand for products from sheep and goats has increased in recent years. Particularly lamb meat, milk products and cheeses from sheep and goat are popular. Domestic production has increased but cannot keep up with the demand. The self-sufficiency level in sheep and goat products is about 80% despite 339.000 sheep and 56.000 goats in production in 2000.

Most of the production is extensive and only very few farmers have adopted sheep and goats as a main enterprise. For meat production the old local sheep breeds are crossed with imported breeds. For milking imported high yielding breeds are used. Old local breeds are unable to compete and therefore endangered with few exceptions.

1.3.6 Horses

The traditional role of horses as draught animals on farm has vanished almost completely. Today horses are kept for pleasure riding and driving. From the 1960ies a replacement crossing program for riding horses mainly with German breeding material changed the “Altösterreichisches Warmblut” originating in the Austro-Hungarian Monarchy into a modern sport horse for show jumping, dressage and eventing. The Haflinger remained pure-bred but changed from the heavier draught type to a modern small horse for riding and driving. The old Austrian draught horse (Noriker) today is an endangered breed and maintained by a special conservation program.

Horse breeding is no significant part of an Austrian farmers income. A large part of breeding work in thoroughbreds and saddle horses is done by non-farmers. Haflinger and Noriker still are bred mainly by farmers but most breeders own only 1 or 2 mares and regard breeding as a hobby.

The number of horses is increasing (83.000 in 2000) and providing stables and feed for pleasure horses is an alternative income for some farms situated near towns.

Horse meat traditionally does not play a major role in Austria.

1.3.7 Economic Value

The economic value of animal production for nutrition in 2000 was 2,3 Mio US \$ that is more than 55% of the Gross Agricultural Output. Non-edible animal products like pelts, hides or wool are not important for the farmers income.

The real value of animal production is difficult to assess. A main contribution especially of cattle farming is landscaping in the Alpine region. Tourism is very important for the Austrian economy and its well farmed countryside is one of the main attractions. Only farming is able to preserve an open and cultivated landscape at a reasonable price. Grassland farming and mountain pasturing are parts of the ÖPUL program and receive subsidies.

On farm holidays with direct marketing of local specialities and attractions are popular and provide extra income for farmers.

As a member of the EU Austria participates in the programmes for sustainable development of rural areas.

1.4 Assessing the State of Conservation of Farm Animal Biological Diversity

Conserving biodiversity in farm animals is part of the „National Strategy for Implementation of the Convention on Biologic Diversity“. The Strategy has been drawn up with consideration for European compatibility and is integrated in European programmes.

For farming in Austria nine species are important.

Mammals

- Cattle
- Pigs
- Sheep
- Goats
- Horses

Poultry

- Fowl
- Turkey
- Goose
- Duck

The registered breeds are shown in Table 1.4.1

The responsibility for animal breeding in Austria is in the hands of the Provinces. Breeders organisations, herdbooks and performance recording exist for all registered breeds in Austria (Table 1.4.2).

Biodiversity in farm animals as a whole has increased through imported breeds in the recent years but only a few breeds are important for animal production. For all main breeds of

mammals breeding strategies with performance recording and selection are implemented by the breeders organisations. Breeding standards and breeding goals are defined. Breeding values are calculated according to the BLUP model in cattle and pigs. For sheep, goats and horses the index method combined with performance recording is used.

In cattle and pigs Artificial Insemination (AI) is used on a broad scale. 83% of all cows and 50% of the brood sows are inseminated. To prevent loss of genetic diversity the Institute for Organic Farming and Biodiversity keeps 50 doses of semen from each AI test bull as documentation and for scientific purposes. Commercial AI centres supply the semen, the pedigrees of the bulls and DNA-analysis.

In other species no *ex-situ* conservation of semen or embryos is done except in endangered breeds. Gene-banking for all species of farm animals would be a further insurance against diseases and loss of biodiversity. (Table 1.4.2 and 1.4.3).

For each endangered breed (27 mammal and 7 poultry breeds) an individual gene conservation program was created. *In-situ* conservation is the main target and only animals registered in a herdbook are eligible for the program. In mammals each breeding animal is registered and mated individually using AI if necessary to prevent inbreeding.(Tab. 1.4.4). For this program a part of the Austrian Gene Bank for Endangered Breeds is used. The ÖPUL-program offers subsidies for farmers participating in the programmes. Non-farmers join the gene conservation programmes which are directed by NGOs.

Breeders Associations in the Provinces and the *Verein zur Förderung gefährdeter Haustierrassen* (VEGH) are the most important Austrian NGOs for AnGR.

Characterisation by DNA-analysis is done by the University for Veterinary Medicine in Vienna. At the university DNA banking is used to document small ruminants and pigs. In cattle and horses the change from blood typing to DNA analysis was completed in 2002.

Since the start of the gene conservation programmes by the ÖNGENE in the early 1980ies no breed has been lost and biodiversity in endangered breeds has increased again. At the moment genetic characterisation and genetic distancing between breeds is the main topic of research in endangered AnGR.

1.5 Assessing the State of Utilisation of Farm AnGR

Austria has the capacities to use and further develop her farm AnGR. AI is used on a broad scale in cattle and pigs and embryo transfer techniques are available. Recording and calculation of breeding values is standardised following international guidelines and done by acknowledged organisations on Province level..

Meat and milk production are the main enterprises using farm AnGR in Austria. According to EU directives in the central data base for cattle and pigs kept by the *Agrar Markt Austria* (AMA) all animals and movements of animals are registered. A comprehensive database for small ruminants is currently developed.

Most of the cattle are of dual purpose type, the Austrian Simmental being the most important breed. However a strong trend to specialise in milk or meat production changes the breed pattern. High yielding milk breeds and specialised beef breeds are increasing as well as suckler cows. The ideal suckler cow is of dual purpose type with sufficient milk production for the raising of the calf. These cows usually are used for commercial crossing with beef breeds. Old local breeds are used again on a small scale for extensive production in the high Alps and for production of local specialities.

Pig breeding uses commercial crossing on a broad scale. Mother sows are stress resistant either pure bred Landrace or Large White or F1 crosses. These are bred to a meat breed boar usually Pietrain to produce fatteners. Recording of data is done on farm and standardised progeny testing is used for pedigree animals. DNA typing is used as a routine to test for stress resistance and check the pedigrees. Intensive selection, broad use of AI and concentration of pedigree breeding in very few farms increases the danger of biodiversity loss.

Most fatteners are bred in intensive systems with total confinement. As a market for meat from organic farming and farms regarding animal welfare is arising more research in such systems is needed.

Most of the small ruminants are kept in Alpine regions. In this species local breeds play an important role in landscaping. The autochthonous breeds are well adapted to the harsh and wet climate and mountain pasturing in summer and are robust and fertile. A few farms specialise in milk or meat production using imported breeds (Saanen goat; Friesian Milk Sheep) or commercial crossing.

Breeders associations register pedigree animals and record fertility. Some Provinces use field recording or standardised testing for improving performance. The use of progeny tested sires is propagated. A new production line is kid meat from special meat goats (South African Boer Goat and commercial crosses).

Traditionally exhibitions and showing is important in the west of Austria. Wool, pelts and hides only play a minor role in local markets and fairs.

Endangered breeds are used in landscaping, production of local specialities and products and as show animals for fanciers. Those are often kept by enthusiasts who are not farmers.

Several research projects on small ruminant farming in the alpine region are in progress as well as the genetic testing for Scrapie resistance in sheep in accordance with the EU directives

A research program on genetic distancing in endangered sheep and goat breeds has been launched in 2001. The first results showed all acknowledged sheep breeds to be distinctly separable. One breed (Alpines Steinschaf) had to be split in two following the genetic evidence.

The draught horse has vanished almost completely from the farms. Horse breeding and management is for sport and leisure purposes. Horses on farm are used for landscaping, trail riding, trekking and tourism.

Only the Haflinger and Noriker (endangered) are still bred mostly by farmers. In all other breeds non farmer enthusiasts are dominating. The farmer often provides pastures, stables and feed for a monthly fee.

Besides the main breeds Austrian Saddle Horse, Haflinger and Noriker many imported special breeds are registered. On these no reliable data of registration exist. The EU registration is no help as the data are in the care of different organisations and a central data base is still missing. Furthermore most of the animals are registered as sport horses and pets and “not for slaughter”.

The endangered horse breeds with the exception of the Noriker do not have their origin within the borders of modern Austria. They were constituted in the former Austro-Hungarian

Monarchy. Austria participates in international gene conservation projects for these breeds. They are included in the ÖPUL program.

Characterisation by DNA typing is done in all registered horse breeds for sires and in endangered breeds for all animals.

1.5.1 Identifying the major features and critical areas of AnGR conservation and utilization

Animal breeding is highly organised in Austria. Herdbooks are established for all commercially important breeds and all endangered autochthonous breeds of horses, cattle, pigs, sheep and goats. Performance recording is done on a broad scale and breeding programs are implied. As the commercial breeds are increasingly specialising on single purpose animals for high input production systems a rapid change in environmental or market conditions could cause problems.

In intensive animal production systems using imported feed and genetics sustainability is not ensured. Austria has agreed on a sustainable agricultural production and tries to implement legislatives and policies according to this goal. However a complete implementation for the agricultural sector seems hardly possible in a globalised non sustainable economic system.

A critical area is the poultry sector. In commercial enterprises only imported hybrids are used. No Austrian breeding company remains in business. The imported production animals are bought by the farms or part of production treaties. The hybrids are not self-reproducing any longer.

The indigenous breeds of poultry are conserved by private breeders associations. They are bred by fanciers with no regard to performance traits. For extensive farming a self-replenishing stock of poultry adapted to the local environment would be very useful. The biggest Austrian NGO for endangered breeds tries to re-adapt three old Austrian chicken breeds for extensive farming. A characterisation of production traits and sustainable conservation breeding would be feasible for Austrian poultry breeds.

Conservation breeding of old and rare Austrian breeds is part of the ÖPUL therefore acceptance by breeders organisations and farmers is high. A main problem is the sustainable use of endangered AnGR. Further characterisation of production traits and special product properties of endangered AnGR is needed.

CHAPTER 2 ANALYSING THE CHANGING DEMANDS ON NATIONAL LIVESTOCK PRODUCTION AND THEIR IMPLICATIONS FOR FUTURE NATIONAL POLICIES, STRATEGIES AND PROGRAMMES RELATED TO AnGR

2.1 Review of past policies, strategies and programmes as related to AnGR

The increasing intensity of agricultural production in the 1960ies brought the need for high yielding modern breeds. Simultaneously management stabling and feeding conditions improved and a remarkable increase in production took place in a few years. The consequences were an uncoupling of animal breeding from the local production conditions. Properties like disease resistance and parasite tolerance were not needed any longer as well as the tolerance of the old breeds against weather conditions or bad or lacking feedstuffs. (Table 2.1.1).

With planned crossbreeding and the introduction of imported genetic material (Brown Swiss, Holstein Friesian) used widely by AI the old commercial type of cattle was changed rapidly into a modern dual-purpose type with emphasis on dairy farming. Breeding strategies modern breeding plans and promotion of the main breed Simmental brought a decrease in breed biodiversity. Only in some remote Alpine regions small populations of old autochthonous breeds survived.

The Tyrolean Grey cattle forms an exception. It is still integrated in a more or less intact local ecological social and economical production system. The special adaptation of the Tyrolean Grey to mountain pasturing in the high Alps together with intensive work of the breeders association kept the population numbers on an acceptable level.

In the other old cattle breeds population figures continued to decrease in addition to intensive crossbreeding. In some cases this led to the extinction of breeds. This was not seen negatively but as a sign of progress.

At the same time the draught horse lost importance for the farmers.

Population figures in sheep and goats were sinking rapidly as there was no market for the products any longer. Furthermore the image of these animals was very low they were classified as „animals for the poor farmer“.

The most radical changes developed in pig breeding. Consumers demands turned from the old lard type pigs to the modern meat type. The breeds Large White, German Landrace and especially Pietrain and Belgian White replaced the local gene pool in very short time. Today with the exception of the highly endangered Mangalitza and Turopolje pigs Austria has lost all autochthonous pig breeds.

The situation in poultry resembles closely the situation in pigs. The old self-reproducing dual purpose farmyard chicken was replaced by intensive hybrids in closed climate-controlled stables. Most of the autochthonous breeds were lost or are still bred by poultry fanciers for show only.

Austria changed from a country depending on import in the 1950ies to an exporter of agricultural products. Where formerly production was linked closely to the amount of feed produced on farm lower costs for concentrates made the use of imported feed possible and cheap. Farmers specialised their production. Today intensive pork and poultry farms are situated mainly in regions with grain production in the northern, north-eastern and southern basins. The hilly Pre-Alps, Alpine foothills and other highlands are the centres of cattle production.

2.2 Analysing future demands and trends

In accordance with the European Agricultural Model Austria developed a model of an ecological, sustainable and competitive agriculture containing a focus on development of rural areas.

Besides producing food and other agricultural products the Austrian agriculture makes significant contributions to the public welfare. Until recently this surplus value of traditional farming was taken for granted. With falling product prices and structural changes in farming these services need to be quantified and paid for.

Economically the integration of the Austrian agriculture and Food Industry into the EU-market was a success. Agricultural exports increased more than 13% in the year 2000 compared to 1999. 73,2% of Austrian agro-exports remain in EU, Germany and Italy being the biggest markets.

The unfavourable balance of trade of the agrarian sector has been decreasing since 1997 and was nearly at zero in 2002. There is still potential for Austrian products in the European market.

The home market for animal products is changing. Intensive production systems with high standards will continue to dominate the conventional market segment. Increasingly rapid structural changes could lead to ecological problems because of high stocking density in favoured areas. Policies should be devised to prevent a disconnection of animal production an available arable area in one region

Consumers demand food of animal origins to be safe, of high quality and moderate prices. As consumer organisations favour methods of integrated or organic farming there is a growing market for these products. A current trend to regionally typical products could be used for better product marketing.

Considering sustainable use of AnGR the National Strategy for Implementation of the Convention on Biodiversity demands increasing research in characterisation of AnGR.

2.3 Discussion of alternative strategies in the conservation, use and development of AnGR

Consumers demands will play a major role in implementing a sustainable use of AnGR. The market will decide the future of traditional farming in Austria. Although the majority of the consumers demand high quality food and low prices and do not care about the production systems a minor market for ecological products and products from organic farming has evolved. These consumers are willing to pay a bonus for animal welfare and protection of the environment.

Organic farming meets the demand for sustainability. The production is ecologically sound, makes good use of different landscapes and tries to maintain closed material cycles. The products are very popular and an increasing number of consumers is willing to pay a bonus. As the productivity in organic farming is lower than in intensive systems the product price has to be higher to cover costs. If the demand for organic products increases further more farms will change to organic production.

In accordance with the European agricultural policies the Austrian agriculture aims at more extensive production. This will be advanced further by national programs.

The high dependence on imported fuel is a problem in intensive farming systems. Animal husbandry cannot contribute significantly to the energy supply of the country. However energy use may be reduced by using appropriate technologies in planning of stables and management of manure.

Breeding only for high performance without regard to longevity, disease resistance or general fitness favours the animal production industries. Low prices for grain and other concentrates make non-physiologic rations especially for ruminants profitable and enhance the use of nutrients as feedstuff which could be used for human consumption.

Regarding the conservation of Farm AnGR Austria favours the *in situ* and *on farm* conservation taking into account the danger of genetic drift and loss of biodiversity (Tab. 2.3.1). It is recommended to further follow this strategy to keep Farm AnGR in production.

The *ex situ* – *in vivo* breeding in special farms, farm animal zoos and zoos is an important contribution to conservation plans completing *in situ* conservation schemes and acting as a living security storage.

Storage of genetic material *ex situ–in vitro* in gene banks (semen, embryos, somatic cells and DNA) is a necessity to prevent loss of biodiversity not only for endangered breeds. Currently only cattle has a complete semen archive. Future conservation strategies should include *ex situ-in vitro* storage of all kinds of AnGR.

The traditional Austrian agriculture cannot survive if animal production is valued only at the primary product level. Future policies should emphasise the links between agricultural production, cultivated landscape and society to raise public awareness in this sector.

All strategies to maintain a traditional, adequately structured, sustainable and competitive agriculture by developing rural areas have to be seen in the context of the economic system. Trade policy, the tax structure and subsidy systems all play a crucial role. Enhancing the trans-sectoral co-operation will be one of the most important items to reach the goals defined in the model.

CHAPTER 3 REVIEWING THE STATE OF NATIONAL CAPACITIES AND ASSESSING THE FUTURE CAPACITY BUILDING REQUIREMENTS

3.1 Animal Breeding in Austria – Organisation and Structure

Farm animal breeding in Austria with the exception of poultry breeding is done on farm. In cattle breeding as a rule replacements are grown on farm in pig breeding a more detailed system for commercial crossing is used. Horse breeding and breeding of sheep and goats is partly done by farmers partly in the hands of amateurs. Poultry breeding is not relevant beside breeding of show animals by enthusiasts.

The Federal Ministry for Agriculture, Forestry, Environment and Water Management represents matters of farm animal breeding and production on an international level. Austria is a member of the European Association for Animal Production (EAAP).

The central control and marketing organisation is the *Agrar Markt Austria* (AMA) also managing the central Austrian data base for cattle and developing similar data bases for pigs and small ruminants.

Farm animal breeding on a regional level is the responsibility of the Provinces. Each Province has legislation concerning animal breeding. The Agricultural Boards of the Provinces imply legislation regionally. The Agricultural Boards and the official and private breeders organisations co-operate in working groups (*Zentrale Arbeitsgemeinschaft der Rinderzüchter ZAR*; *Zentrale Arbeitsgemeinschaft der Pferdezüchter ZAP*; *Österreichischer Bundesverband für Schafe und Ziegen BZÖ*; *Österreichische Gesellschaft für Generhaltung ÖNGENE*; for details see Annex II). Breeders organisations of the Provinces usually are responsible for several breeds whereas private breeders organisations mostly are concerned with only one breed. These private organisations often are approved in several Provinces.

Eradication of epidemic diseases is regulated according to EU and national directives.

A central Agency for Food Security (AGES) was founded in 2002 to enhance the quality and security of agricultural products.

3.2 Assessment of national capacities

Austria has the know how, the technology and organisational structure as well as the research capacities to manage the conservation, use and development of AnGR.

With the implementation of the Convention on Biologic Diversity (CBD) and as a member of EU and FAO Austria is obliged to conserve the national agro-biodiversity.

The animal breeding organisations establish the breeding goals and breeding programmes for the breeds in charge and register and judge breeding animals. All breeding organisation use individual registration by computerised programs. In cattle all animals are registered by the AMA in the Austrian Cattle Data Base (ACDB). The ZAR registers all pedigree animals in a special data base linked with the ACDB containing supplementary performance data.

Other databases are in place for pigs and under development for sheep and goats. Breeders associations and farmers should be encouraged to make use of the multiple sources of data available on AnGR by employing the modern information technology.

In pigs, sheep and goats pedigree animals are registered by the breeders organisations. As most of the Austrian pigs and sheep are commercial crosses they are marked according to EU-regulations.

CHAPTER 4 IDENTIFYING NATIONAL PRIORITIES FOR THE CONSERVATION AND UTILISATION OF AnGR

4.1 National cross-cutting priorities

Based on the detailed analysis and discussion in Chapter 2 the following national priorities have been identified

- Development of the next programs for sustainable farming and preservation of cultured landscape
- Development of an emergency reaction plan in case of epidemic diseases with special regard to endangered AnGR
- Linking the existing national and regional databases for all breeds of farm animals and include them in international databases
- Establishment of an early warning system against genetic loss in indigenous AnGR
- Further development of the Austrian Gene Bank to ensure a complete genetic archive of AnGR .
- Further genetic and molecular characterisation of indigenous breeds with special regard to breeds that are endangered.

4.2 National priorities among animal species and breeds

For all endangered AnGR it is very important to continue the financial support in the framework of the ÖPUL-program.

In sheep a rapid exchange of Scrapie-susceptible genotypes will take place in the near future. A genetic documentation of the status quo in Austrian sheep breeds in the Austrian Gene Bank is needed.

Establish gene banking and a sustainable breeding program for Austrian poultry breeds to re-use them in agricultural production.

CHAPTER 5 FORMULATING RECOMMENDATIONS FOR ENHANCED INTERNATIONAL CO-OPERATION IN THE FIELD OF FARM ANIMAL BIODIVERSITY

Austria has signed the Convention on Biodiversity in 1995 and follows a National Strategy for the Implementation of the Convention on Biodiversity published 1997. The second evaluation of the Strategy has taken place in 2003/2004.

As a member of the EU Austria supports and contributes to development of Community policies that aim at conservation and sustainable use of genetic resources.

Austria recommends an international database on the contents of Farm AnGR gene banks to facilitate the completion of existing and the founding of new collections.

Austria recommends that international registers and conservation strategies for endangered breeds of Farm AnGR existing in more than one country are established.

Animal production is the most important sector of the Austrian agriculture accounting for nearly 55% of Gross Agricultural Output. Farm AnGR are an important resource in Austria. As the agricultural structure is changing rapidly new breeds are imported and an increasing number of indigenous breeds are endangered by crossbreeding or replacement. Since the start of conservation programs in 1982 populations of all highly endangered breeds are stabilised or increasing and no indigenous breed has been lost.

Austria has the capacities to conserve, use and develop Farm AnGR. Recording and calculation of breeding values is standardised following international guidelines and done by acknowledged organisations on Province level..

Austria abides by EU legislation concerning disease control, animal breeding, conservation use and development of Farm AnGR.

As a member of the EU Austria participates in the programmes for sustainable development of rural areas and conservation, use and development of Farm AnGR.

For endangered indigenous breeds conservation programs are in place. To further enhance conservation and utilisation of AnGR the following recommendations are made:

- Development of the next programs for sustainable farming and preservation of cultured landscape
- Development of an emergency reaction plan in case of epidemic diseases with special regard to endangered AnGR
- Linking the existing national databases for all breed of farm animals and include them in international databases
- Establishment of an early warning system against genetic loss in indigenous AnGR
- Further development of the Austrian Gene Bank to ensure a complete genetic archive of AnGR .
- Further genetic and molecular characterisation of indigenous breeds with special regard to breeds that are endangered.

Since conservation and sustainable use of AnGR is an international obligation Austria recommends that international registers and conservation strategies for endangered breeds of Farm AnGR existing in more than one country are established.

Annex 1 TABLES

Table 1.2.1 Land use and current trends (1000 ha)

Category	Area (1000 ha)	Area (1000 ha)	Current trend
	1990	1999	
Arable land	1300	1400	increasing
Permanent crops	70	70	stable
Permanent pastures	2300	1900	decreasing
Agricultural area	3650	3400	decreasing
Land area	7800	7800	
Total Area	8385	8385	

Table 1.3.1 Importance of livestock to the gross domestic product in agriculture (millions of \$US)

Activity	\$US (millions)	Data from Year
Livestock production (official statistics)	\$2	2000
Other agricultural production (official statistics)	\$1	2000
Best estimate of additional value of livestock	\$2	

Table 1.3.2.1 Human population in the country

Year	Total (millions)	Rural or Farming (%)	Urban or Non Farming (%)	Total
1990	8	8	92	100
1999	8	6	94	100
Average annual growth rate	0	-2		

Table 1.3.2.2 Distribution of livestock by production system (%)

Species	Production systems			Total
	Low input	Medium input	High input	
Cattle	0	5	95	100
Sheep	0	30	70	100
Goats	0	50	50	100
Horses	0	50	50	100
Pigs	0	5	95	100
Chicken	0	5	95	100
Turkey	0	5	95	100
Ducks	0	20	80	100
Geese	0	50	50	100
				0

Table 1.4.1 Breed Diversity (Number of Breeds)

	Number of breeds									
	Current Total		At risk		Widely used		Others		Lost (last 50 yr)	
Species	L	E	L	E	L	E	L	E	L	E
Cattle	12	18	6	8	3	2	3	8	2	0
Sheep	8	12	6	9	2	2	0	1	no data	no data
Goats	4	8	3	7	1	1	0	0	no data	no data
Horses	6	16	3	9	3	1	0	0	0	no data
Donkeys	1	0	1	0	0	0	0	0	no data	no data
Pigs	5	2	2	1	3	0	0	1	2	no data
Chicken	2	3	2	0	0	3	0	0	no data	no data
Turkey	2	3	2	0	0	3	0	0	no data	no data
Ducks	2	2	2	0	0	2	0	0	no data	no data
Geese	1	1	1	0	0	1	0	0	no data	no data

Table 1.4.2 Number of breeds for which characterization has been carried out (Number of breeds)

Species	At population level				At individual level		
	Baseline survey	Genetic distance	Breeds and crosses evaluation	Valuation	Performance recording	Genetic evaluation	Molecular evaluation
Cattle	30	0	30	no data	30	30	30
Sheep	17	7	9	no data	17	5	10
Goats	9	0	3	no data	6	3	5
Horses	0	0	0	no data	0	0	0
Donkeys	0	0	0	no data	0	0	0
Pigs	7	0	5	no data	5	5	7

Table 1.4.3 Number of breeds with current breeding strategies and tools being used (No. of breeds)

Species	Breeding goals	Breeding strategies		Tools				
		Designed	Designed and implemented	Individual identification	Recording	AI	ET	Genetic evaluation
Cattle	30	0	30	30	30	30	5	30
Sheep	20	0	20	20	20	0	0	20
Goats	12	0	12	12	12	3	0	12
Horses	22	0	22	22	22	5	0	22
Pigs	7	0	7	7	5	7	0	7

Table 1.4.4 Current number of breeds in managed conservation programmes

Species	Number of locally adapted breeds at risk			
	Total	Managed <i>in situ</i>	Managed <i>ex situ</i>	Both (<i>in</i> and <i>ex situ</i>)
Cattle	9	9	9	9
Sheep	7	7	7	7
Goats	4	4	4	4
Horses	4	4	4	4
Donkeys	1	1	0	0
Pigs	2	2	2	2
Chicken	2	2	0	0
Turkey	1	1	0	0
Ducks	1	1	0	0
Geese	1	1	0	0

Table 2.1.1 Relative importance of species within livestock products and services (%)

Species	Milk	Meat	Eggs	Fiber	Skin	Risk management	Fertiliser	manure	Draught	Culture	Recreation	Fuel	Feather	Environmental management
Cattle	90	44			100	0	50	0	25	10	0			70
Sheep	5	5		100	0	0	0		15	5	0			10
Goats	5	0		0	0	0	0		10	5	0			5
Horses	0	0		0	0	0	0	0	50	80	0			15
Pigs		38		0		0	40		0	0				
Chicken		13	100			0	10		0	0			0	0
Turkey		0	0			0	0		0	0			0	0
Ducks		0	0			0	0		0	0			0	0
Geese		0	0			0	0		0	0			0	0
Total	100	100	100	100	####	0	100	####	100	100	0	0	0	100

Table 2.3.1 Current number of breeds in managed conservation programmes

Species	Number of locally adapted breeds at risk			
	Total	Managed <i>in situ</i>	Managed <i>ex situ</i>	Both (<i>in</i> and <i>ex situ</i>)
Cattle	9	9	9	9
Sheep	7	7	7	7
Goats	4	4	4	4
Horses	4	4	4	4
Donkeys	1	1	0	0
Pigs	2	2	2	2
Chicken	2	2	0	0
Turkey	1	1	0	0
Ducks	1	1	0	0
Geese	1	1	0	0
Rabbits	no data	no data	no data	no data

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