The Bela Krajina Pramenka Sheep – Conservation Strategies

Danijela TOMAŽIČ

SUMMARY

The small ruminants have always been and will remain the most important group of farm animals in Slovenia. An important share of agricultural grassland can only be used for grazing, particularly by small ruminants. Due to the great diversity of landscape and many types of grassland in Slovenia, the small ruminant production developed well over past centuries. This article will describe the endangered Animal genetic resources (AnGR) from the Bela Krajina, a region in the southeast of Slovenia where the Bela krajina sheep are bred, suggest how to establish the value of the breed, discus what were the reasons for decrease in the population number and finally give policy recommendations for conservation.

KEY WORDS

sheep, resources, conservation, value, policy

INTRODUCTION

Slovenia, as one of the smallest European countries (Fig. 1), covers a total of 20,273 km^2. According to official statistics forest and woodland cover 56.5 % of the surface, which makes Slovenia one of the most forested countries in Europe and agricultural lands 38% (utilized agricultural area is 25.5%). The territory of Slovenia is geographically divided into four basic types of landscape - Alpine in the north, Mediterranean in the south-west, Dinaric in the south and Pannonian in the east. Due to the geographical diversity, there are different types of climate: Continental, Alpine and Mediterranean. Most of the country has a continental climate, with cold winters and warm summers (SORS, 2002). Arable land is not of good quality. To maintain land fertility farmers practice crop rotation and grow legumes (clovers) and forage crops. For these reasons the ruminants have always been and will remain the most important group of farm animals. An important share of agricultural grassland can only be used for grazing, particularly by small ruminants. Due to the great diversity of landscape and many types of grassland in Slovenia, the small ruminant production was well developed over past centuries.

University of Ljubljana, Biotechnical Faculty, Zootechnical Department
Groblje 3, SI-1230 Domzale, Slovenia
E-mail: danijela.tomazic@bfro.uni-lj.si

Received: June 13, 2003

BACKGROUND OF THE CASE STUDIES

This article will describe the endangered AnGR from the Bela Krajina (Fig. 1), a region in the southeast of Slovenia where the Bela krajina sheep (Fig. 1a) are bred. The beautiful landscape with its abundant karst springs, the unique culture and ethnology of towns and villages, important folk customs and the original culinary creations which were developed over the centuries, make this region interesting for tourists (Heritage trail, 2003). Sheep keeping is a traditional activity.

The decline in numbers of the Bela Krajina sheep population has been caused by:

- The selection of a few, highly-productive breeds of sheep and promotion of more productive livestock production - cattle;
- The growing trend of farmland abandonment.

Characteristic of the breed

The Bela Krajina Pramenka is an autochthonous sheep breed, which was once reared on the karst regions of Bela Krajina. The natural conditions are poor in this region and the sheep are quite small, weighing up to 50 kg; the rams weigh a few kilos more but rarely over 65 to 70 kg. Lowland animals are larger, while on karst terrain their weight may not even reach 45 kg.

The animals have long-fringed wool, which acts as good protection against the cold and rain but is not appropriate for manufacturing because all woollen products are consequently rough. Rams have extremely large horns, which are curled as the animals get older. Ewes may have horns too but they are short. The ewe is seasonally polyestric (lamb once a year). Litters are small, on average about 1.13 lambs. In the past negative selection occurred against twins, due to the rough conditions, without feed purchasing and with low quality pasture. Nowadays they have been preserved in the harshest of regions. Lambs are smaller and reach only 25 kg in their third or fourth month. The breed is known to have good carcass composition, very tiny bones and good quality meat (Grabrijan, 1996).

It was estimated that the Bela krajina sheep population in 1995 was around 200 and is slightly increasing. In 2002, 289 animals were included in in-situ conservation, 250 of these were pure breeding females. Almost every sheep breeder that has a Bela Krajina sheep is a member of the preservation program (Kompan et al, 2003). According to the FAO classification this means that the Bela krajina sheep is an endangered breed.

VALUES OF THE ANGR

The main objective of the economic valuation is to help policy makers identify the best level of economic efficiency amongst different management strategies. In order to allocate resources efficiently policy makers are obliged to make choices based on economic priorities. The conservation of animals that are no longer economically interesting to rear under present market conditions involves a certain cost to the community. If this cost is not met, these populations are faced with the threat of extinction. Policy choices must be made to prescribe which and how many breeds to conserve, along with the management strategies to implement so as to achieve conservation, via either in-situ or ex-situ approaches (Cicia et al, 2003).

Use values

Direct Use Values are placed on products that are consumed directly without passing through the market or as inputs to commercial activities (OECD, 1999). Direct consumption can include the value of a recreational experience (McNeely, 1988).

- Direct consumption - meat directly consumed by members of household,
- Trade – meat sold on the market;
- Input to commercial activities - meat traded through agro-tourism.

In order to evaluate meat for direct consumption, shadow pricing can be used. Home consumption and market price can be used to asses how much farmers would have to pay if the products were purchased. The Market Price Method can be used to determine the actual value of lambs sold on the market and meat traded through agro-tourism. If possible, the percentage of lambs sold for use in folk festivals and celebrations can be established. The final results can be compared with other breeds of sheep from the same region.

In order to evaluate the productive traits, carcass characteristics and meat quality should be compared between different breeds of sheep. Foraging ability and heat resistance can be compared between different breeds (same environment) in order to asses the adaptive traits of the local breed. This should be done during the period of highest temperature in the summer. Observing frequency of using shade or measuring the changes in rectal temperature can assess heat resistance.

Most of the benefits produced by local sheep in low production systems are captured by producers rather than consumers. In order to identify these benefits, the values of productive traits to local producers have to be determined. Choice modelling of producers' preferences for productive traits can be done with Contingent Ranking Method (CRM) between live weight gain, feed costs, heat tolerance and veterinary expenses.

Shadow pricing can be done in order to asses how much farmers would have to pay for manure,

Figure 1: Location of the country and region (STB, 2003)

Figure 1a: Bela Krajina Pramenka sheep (Grabrijan, 1996)

collected during the winter period and applied in their gardens.

Indirect Use Values derive from the function of ecosystem services. Species can play important roles in ecosystem function (e.g. prevention of soil erosion, provision of recreational – aesthetic value) that provide direct value to the wellbeing of humans at a local, regional and global level (Tacconi, 2000).

Values derived from Bela Krajina sheep are:

- Prevention of abandoned hilly karst from reversion to scrub – aesthetic value,
- Prevention of land degradation and fires; wood fires are frequent - forests and abandoned meadows are prone to fires that can spread over huge areas.
- Recreation value (animal fairs and tourism).

Shadow pricing can be used to asses the price of land clearance. Cost of the destruction caused by fire can be assessed. Comparison of soil characteristics could be done between overgrown areas and grazed areas. These methods for indirect values are all indirect, they do not rely on people's direct answers to questions about how much they would be willing to pay (or accept) for a change in environmental quality. The travel cost approach uses observed expenditures on travel to recreational sites. This approach has relevance for valuing ecotourism (Pearce and Moran, 1994) and can be used for the estimation of recreational value.

Option Value expresses a value approximating to an individual's willingness to pay to safeguard an asset for the option of using it at a future date (Pearce and Moran, 1994).

Option values for the chosen breed are:

- Adaptability to the harsh environment;
- Biodiversity.

The Opportunity Cost Approach can be used to asses if it is rationale to incorporate adaptive traits of the breed in future selection. Households which put most value on the local breed will be identified with Least Cost Valuation Methodology in order to identify a cost – efficient conservation method and this will be compared with results from CVM. The option value can be assessed using the CVM (Pearce and Moran, 1994). People can be asked how much are they willing to pay in order to preserve the breed for the future and farmers how much payment they are willing to accept in order to maintain the breed on the farm.

Non-use values

Existence Value is related to the possibility that the animal is associated with the cultural traditions of a given population, particularly at a time in which there is a strong revival of the traditions shaping the identity of populations in a given territory (Cicia et al, 2003).

The following values can be evaluated:

- Knowledge;
- Current traditional heritage specific for the region;
- Significance of cuisine.

People are willing to pay in order to conserve an important element of their historical memory as part of their regional identity.

Bequest value expresses the importance of the availability of the breed to future generations. While this component plays a key role in the case of wild species, the problem is more complex when related to domesticated animal breeds, which were selected by man himself in the past centuries, based on his own local and historical necessities.

Existence values and Bequest values can be assessed using CVM, which gives the most complete estimation of the Non-Use Values. Face to face interviews should be used in order to provide high quality data. A hypothetical scenario will be presented to the person being interviewed regarding the availability or absence of a breed for future generations and knowledge and cultural heritage connected with the chosen breed (Cicia et al, 2003). The respondent will be asked to quantify how much he/she would be willing to pay to conserve the breed in its natural environment.

IDENTIFYING THE PROCESSES OF DIVERSITY LOSS

Socio-economic determinants

The period after the Second World War was marked by major social and economic structural changes, and was most typically characterised by the following processes: a move away from agrarianism towards industrialisation and urbanisation and its consequent changes in lifestyle (INZ, 2003). Agricultural policy after the Second World War was to support the establishment of big industrial farm systems (owned by the state) which could fulfil the requirements of growing urbanization.

The period after 1950 was marked by the development of large estates, owned and run by the state and small private family farms. In 1950 the maximum size of a privately owned farm was 10 ha and in 1960, ownership of big machinery was prohibited (Pernek and Skof, 1995). All government agricultural investments and subsidies were reserved for state farms and general agricultural cooperatives. There were no resources to support private farms, land was abandoned and production declined, which resulted in migration. Migration had a direct influence on the agroecosystem due to abandonment of marginal areas. Pastures have remained uncultivated and the number of small ruminants has been reduced ten times compared to the number today. The most evident example of such processes today is Slovene Karst where more than 30,000 ha of agricultural lands have reverted to shrub, and the process has not yet finished (SORS, 2003).

Due to urbanization and increasing incomes there was an increased demand for meat. In the 1980s the agricultural sector performed inefficiently. The food distribution system was weak, farm incomes were low. The importance of the private sector as a supplier of farm produce was recognized in the 1980s by the federal government which devoted special attention and funding to agriculture. Government changed policy and started to subsidize development of private farms with credits, grants and market price support of livestock products, provisions and credits for housing, subsidies for modern and high productive breeds (Erjavec et al, 1998). While support was provided for the breeding of cattle, no financial or technical support has been put in place for sheep breeding. Farmers were also affected by price of land, availability and ownership of land, which had consequences in deciding which species to breed. That trend is still present today. Market forces encouraged farmers to abandon unprofitable breeds. Changing tastes and demands, consumer's preferences for other meat (pig, cattle and poultry) resulted in decreasing use of local sheep breeds. Continuous research and new findings in reproduction technologies (artificial insemination), modern veterinary services and modern husbandry methods, allow high animal density in limited land area. After 1990 production of sheep meat started to increase, influenced by the western societies, where quality lamb meat was very popular. However, pig, cattle and poultry meat had a higher market share, a trend that is still present today.

After independence in 1991, economic events in Slovenia entered the difficult transition period. Slovenia started to implement its own agricultural policy similar to Common Agricultural Policy (CAP) in 1991. Slovenian agricultural policy represents a combination of so-called "eco-social" and market concepts. Special emphasis was put on promoting sustainable development with ecological and social aspects. The most important budgetary policy measures were: direct price supports; input subsidies for agricultural products; and general services. Price support measures were again intended mainly for cattle and milk production in disadvantaged areas. Input support is oriented toward subsidising the purchase of breeding animals for cattle, pig, horses and more productive sheep.

In 1998 agricultural policy shifted from production linked subsidies to direct payments, which would adjust Slovenian agricultural policy, bringing it closer in line with the CAP. Direct payments, such as income aid for farmers, together with regional and rural development policies, are also gradually being introduced (Kozina, 1997).

The breeding programmes financed by MAFF, run from 1980 were focused more on the selection of highly productive breeds of sheep. The National Selection Centre included the Bela Krajina sheep in its recording and selection program in 1998 and that directly influenced AnGR inventories. Direct payments are defined for each pure-bred breeding animal.

Market opportunities still exist, as the Slovenian market has not yet become saturated with milk and meat of small ruminants. Producers of sheep meat are still poorly organized and the value of sheep meat represents 0.4% of total agricultural output (SORS, 2003). However, the increase in population of small ruminants from 30,000 in 1991 to 120,000 in 2001 is encouraging. Breeders are increasingly joining breeders' organizations, which enable better inventories, and looking after progress and promotion of these activities (Kompan et al, 2003). This will facilitate to presentation and marketing of products due to the lack of market forces.

Today the Bela Krajina sheep is included in in-situ conservation. 289 animals are bred on 14 farms (Kompan et al, 2003). Farmers receive payments that cover the loss of profit due to keeping less productive breed. Recording of productive traits, selection and reproduction for the Bela Krajina sheep is performed by the National Selection Centre.

Currently, the Slovene Agri-Environment Programme is being introduced. The main emphasis is given to maintenance of the countryside in a sustainable manner as a pre-condition for nature protection and economic viability of the rural community (Majcen, 2001). In addition, payments are made to holdings in mountainous, hilly and other less favoured areas, and provide an important additional source of income to farmers and hope for the future by influencing livestock keepers to increase the number of Bela Krajina sheep.

Biophysical determinants

Droughts occurring in the last 10 years brought new risks to farming. Drought can have serious negative effects on the production of hay and cause shortages of pasture.

Abandonment of land leads to the loss of diversity, wood fires are frequent, climate is changing (moisture) and lands are impervious and hostile due to abundant shrubs. The more forests and meadows are abandoned the more imminent danger of fires that can spread over huge areas.

IMPACT OF BIODIVERSITY LOSS ON LIVELIHOODS

The Bela Krajina sheep has important traits for the harsh environment and low input system in which is reared today. Loss of the breed would have the following influence on livelihoods:

- Human capital is depleted through losing human skills and knowledge that originated from past generations for maintenance of the breed. Migration of young people has depleted human capital in addition to changes in technology that require less labour.
- Social capital – During the loss of the breed that is adapted to the region, there was lower maintenance of the common resources and overgrowing occurred. By choosing more productive breeds, development and sharing of knowledge disappeared, damaging social capital. The loss of local breeds also affected community identity and reduced the ability of local communities to maintain their traditional lifestyles.
- Natural capital - losing the breed from the region and abandonment of land, which cannot be used for other production, will cause land degradation, overgrowth and fire. Natural capital was strongly depleted and resources were not used in a sustainable way.
- Physical and financial capital was depleted through a decline in the number of tourists and visitors to the region, which was not attractive due to the loss of traditional products and the un-aesthetic view of the region. Income from selling traditional products was lost.

With losing the breed livelihoods became more vulnerable to trends and shocks such as declining in market prices, changes in consumer's preferences, fire, drought and food security. More research has to be done on social relationships within and between livelihoods. Previous owners of the breed have to be included in order to establish impacts of loss.

POLICY RECOMMENDATIONS RELATED TO ANGR CONSERVATION

General objectives for AnGR conservation policy in the future can be national or international in nature, and sometimes a combination of both:

- Stimulating ex situ conservation;
- Stimulating in situ conservation;
- Defining the value of genetic diversity;
- Stimulating nature and landscape management to use local breeds;
- Monitoring and characterisation of genetic diversity;
- Knowledge and technology development;
- Stimulating public awareness;
- Stimulating desired production systems;
- Stimulating international cooperation.

Short term policy recommendations

Priority should be given to decrease market protection and support for intensive production system in cattle

and the encouragement of alternative production systems with endangered breeds. Subsidies could be given to farmers who want to change their breed to the endangered breed. Government is currently financing breeding programmes and extension services and they should encourage changes in breeding goals, design of breeding programmes and the establishment of breeding programmes whose objectives are defined with the help of the farmers. Through the financing of conservation programmes, government should be encouraged to research and identify the problems contributing to the erosion of AnGR and in order to design cost-effective conservation programmes the economic value of AnGR should be established. Little or nothing has been done to describe the production systems in which the animals are bred and interactions within the agroecosystem. In the future, impact of the agricultural development projects on AnGR, socio-economic relationships and causes of AnGR loss should be assessed. In the future, high priority should be given to ex-situ conservation. In order to provide financial support and the expansion of gene bank activities, government should encourage cooperation with various stakeholders.

Long term policy recommendations

Nature and landscape management using local breeds

Local breeds should be employed more extensively for the conservation of culturally important natural landscapes and semi-natural landscapes. Annual subsidies could be paid to farmers to maintain the natural flora in the karst region and prevent overgrowing. The Government's policy stimulates conservation of autochthonous farm animals in their environment; however cultural and historical elements within a landscape are not yet explored.

Awareness

The general public, consumers, farmers and various other stakeholders are still unaware of national and international objectives regarding biodiversity and the importance of biodiversity conservation, especially regarding farm animals. It is essential to increase communication on biodiversity, conservation, development and use of genetic diversity, for example by means of education and public information. Public information must improve in order to raise enthusiasm among potential breeders or hobby farmers, as well as to inform them regarding associated administrative obligations.

Benefit Sharing

It is important to understand and respect the extent and scope of the local people's intellectual property rights and local knowledge. Adequately addressing these issues will help enhance the national capacity for conservation and use of AnGR.

REFERENCES

Cicia G, D'Ercole E, Marino D (2003) Costs and benefits of preserving farm animal genetic resources from extinction: CVM and Bio-economic model for valuing a conservation program for Italian Pentro horse, Ecological Economic, Vol. 45, p. 445-459

Pearce D, Moran D (1994) The Economic Value of Biodiversity. Earthscan.

Grabrijan B (1996) The Bela Krajina sheep, Sodobno Kmetijstvo, Vol. 7, p. 12-15

Erjavec E, Rednak M, Volk T (1998) Adaptation of Slovenian agriculture to policy of EU, Ministry for agriculture, forestry and food, Ljubljana

Kompan D, Komprej A, Cividini A, Birtič D, Žan M (2003) Report for 2002: Slovenian autochthonous breeds of sheep, University of Ljubljana, Biotechnical faculty, Domzale, Slovenia

Kozina M B (1997) Report of national experience in reforms and adjustment, Ministry of Agriculture, Food and Forestry, Slovenia, http://www.fao.org/Regional/SEUR/public1/Slovenia.htm

Majcen M H (2001) Slovenia's new Agri-Environment programme, Agri-Environment Bulletin, Vol. 3, p. 2-3

McNeely J A (1988) Economics and Biological Diversity: Developing and Using Economic Incentives to Conserve Biological Resources, IUCN, Switzerland

OECD (1999) Handbook of Incentive Measures for Biodiversity: Design and Implementation, OECD, France

OECD (2001) Review of Agricultural Policies: Slovenia, OECD, France

Pernek F, Skof B (1995) Economic structure of Slovenia, University of Maribor, Law College, Maribor

SORS - Statistical Office of the Republic of Slovenia (2002) Statistical Yearbook 2002, Facts about Slovenia, http://www.sigov.si/zrs/eng/index.html

Tacconi L (2000) Biodiversity and Ecological Economics: Participation, Values and Resource Managment, Earthscan, London.

ZŽiv (2002) Livestock Breeding Act, Uradni list Republike Slovenije http://objave.uradni-list.si/bazeul/URED/2002/018/B/527162154.htm

ZKme (2000) Agricultural Act, Uradni list Republike Slovenije

EKO (2001) Regulation for payments for LFA http://objave.uradni-list.si/bazeul/URED/2001/034/B/522023151.htm

http://www.slovenia-heritage.net/ang/poti-05.stm (3 March 2003) Heritage trail through Dolenjska and Bela Krajina in Slovenia

http://www2.arnes.si/~ljinz15/documents/english/delo.htm, (3 March 2003) Institute of Contemporary History

http://www.slovenia-tourism.si/eindex.htm, (3 March 2003) Slovenian Tourist Board