Impact of changing socio-economic and cultural factors on the stability of co-operative large scale grazing systems

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Abstract

Co-operative livestock systems (CLS) in Europe have accommodated certain welfare institutions within their own institutional limits by providing livelihood security to people with very limited alternative possibilities. CLS also provide access equity and conflict resolution for their participants as a functional necessity. There are complex relations between the institutional systems and the modes of production including embedded cultural features making the production systems viable. Due to the increasing marginalisation of less favoured areas in Europe in which the CLS are mostly located, social, economic and cultural factors which influence these systems change considerably. While some factors have a positive influence, most exert negative effects on the maintenance of CLS.
The aim of this paper is to identify major cause-effect chains and to analyse their influence on the socio-economic stability of the systems. Four different systems were used for analysing these cause-effect chains, namely reindeer herding in Northern Fennoscandia[1], sheep farming in the Tatra Mountains/Poland, pre-alpine and alpine grazing in Upper Bavaria/Germany, and alpine grazing in the Biosphere Reserve Entlebuch/Switzerland. The findings provide a basis for discussion about effective means to stabilize and improve those threatened systems, acknowledging that the discussed factors have different influences on the CLS of the researched regions.

1. Introduction

Co-operative livestock systems (CLS) in Europe are historical systems, which often date back centuries. They are examples of the agricultural use of scarce resources under unfavourable conditions. Depending on the soil as well as climatic and socio-economic conditions specific systems developed mainly in marginal areas. Large-scale grazing has several important ecological impacts, in particular the development of open and semi-open landscapes in the forest regions of Europe. These landscapes offer habitats for many nowadays rare or even endangered animal and plant species.

Changes of the cultural and socio-economic conditions since the last century changed historical grazing regimes and therefore also the landscapes and habitats, which are depending on such systems. The EU-funded LACOPE-Project (Landscape Development, Biodiversity and co-operative Livestock Systems in Europe) researches those cause-effect chains and develops scenarios for the conservation and support of the CLS. The LACOPE project addresses a double set of problems, and accordingly two approaches; (1) whether grazing with reindeer, cattle, and sheep promotes biodiversity, and if so; (2) what are the socio-economic conditions for that the grazing systems in question have the capacity to sustain grazing at a level fostering biodiversity.

The interconnection between the ecological and the economical problem is the grazed area, shown as a blue dotted line in Figure 1. Socio-economic factors as well as the culture and history of the respective systems determine the current grazing parameters such as intensity of grazing, frequency of grazing and stochasticity of grazing, which in turn have an impact on the ecosystem. These interconnections are called cause-effect chains and differ often widely in the investigated systems (ROSENTHAL *et al.* 2003).

[1] Fennoscandia = Finland, Sweden and Norway

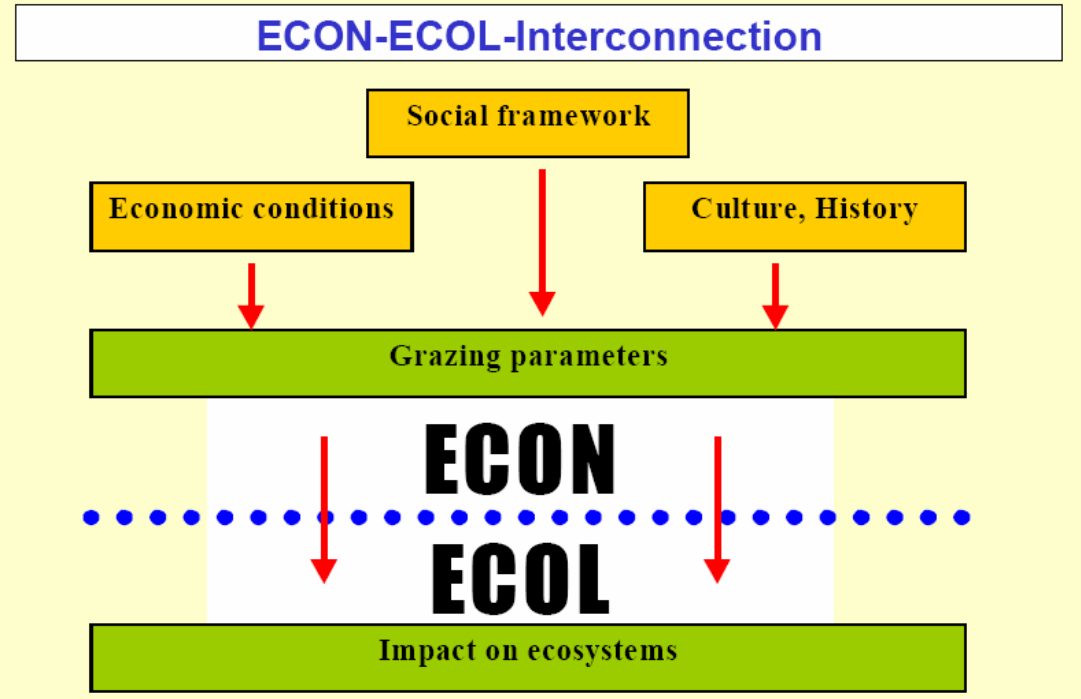

Figure 1: Cause-effect chain of socio-economic conditions on the grazing parameters and their impact on the ecosystem
Source: ROSENTHAL & NIEMEYER (2003)

The focus of this paper is on investigating the set of factors that contribute to either stabilization or destabilization of the CLS analysed including a broad set of social, economic, cultural and historic factors through literature studies and expert knowledge. Ecological aspects of the study will be only touched on to visualise the ecological relevance of the CLS and the desired developments in connection with the grazing regimes.

Important ecological indicators are the alpha-, beta- and gamma-diversity, which refer respectively to the number of species on a given spot, *i.e.* 10 sqm, the number of species on a homogeneously managed area (several spots) within the grazing unit[2] and the total number of species on a grazing unit.

Concluding the paper, different possibilities to support CLS in Europe are recommended based on the information gathered.

2. Background of the systems

2.1 Sámi reindeer herding in Sapmi

Reindeer management land-use

Sapmi[3], the homeland of the Sámi people, covers northern and middle parts of Norway, Sweden and Finland as well as the Kola Peninsula in Russia. It includes a border-crosssing area of reindeer management. Our case study area is situated in the Northern part of Sapmi over three countries, in a region from Kiruna (Sweden) via Kilpisjärvi (Finland) to Kautokeino (Norway).

[2] Undivided grazing area where animals can roam freely

[3] Sámiland

The total reindeer management area represents more than a third of the total acreage of each country. In total it encompasses around 44 millions ha over the three countries. The harsh climatic conditions of this north region impede most kinds of agriculture. Reindeer husbandry is one of the few agricultural activities that could subsist in the region and that permit an optimal utilisation of the land. Reindeer herding is conducted in huge dimensions over North Fennoscandia. The Sámi people have carried out this form of traditional husbandry for centuries. Reindeer husbandry was developed with the goal of providing subsistence to the herders and their families in the form of meat and milk products. During the last decades of the twentieth century the industry has specialised in the production of meat exclusively. The CLS of Fennoscandia supports a total number of 560.000 reindeer. The Management Units cover very large areas. In comparison the number of users (Sámi) and of animals involved on these areas is comparatively low per acreage.

Features of CLS

In North Fennoscandia reindeer graze the natural grasslands of the arctic and alpine tundra in the summer and the lichen grounds within the boreal zone in winter. Since these two landscapes are geographically separate, migration has to be conducted between the two areas. The main traditional Sámi way to use this land is to migrate seasonally between the continental inland and the mountain ridge, which are coastal areas in the very north. Traditionally this meant to a considerable extent the crossing of what from 1751 have been national borders. Due to the actions of the national states, particularly during the second half of the 19th century and most of the 20th this border crossing has been made increasingly difficult (AARSETH, 1989).

Each Sámi family privately owns the animals and the pastures are common for the whole group. The bottleneck of the system is the availability of winter pastures and their susceptibility to be grazed at inappropriate times (OKSANEN 1993, RISETH 2000, RISETH *et al.* 2004).

The herder co-operation was, and still is, based on a collective organisation via traditional family band/clan groups called Siida. The management unit is formally a collective organisation required by the national law (reindeer pasture district in Norway, Sámi village in Sweden and Paliskunta or co-operative in Finland). The membership in a local group of pastoralists is mainly based on kin's relation. The local groups of herders have acquired exclusive grazing right from times immemorial, later codified by government decision. The entitlement to graze is possessed by local groups of Sámi, independent of the land ownership and free of charge. These rights acknowledge the needs of their traditional livelihood.

Reindeer pastoralism is a social and economic system, in which the basis of the economy is formed by herds of reindeer where families follow the herd year-around. Their activities and economy are for the most tied to reindeer and reindeer products. (RISETH 2000:121, VORREN 1978:156-157).

History of CLS

In the last part of the 19th century a new ideology achieved supremacy in the twin kingdom of Norway-Sweden. Sámi reindeer herd management was considered inferior to the majority peoples' expanding agriculture, which resulted in increasing conflicts between farmers and herders. A political struggle by the farmers, supported by both local and central authorities gave rise to The Common Lapp Act of 1883, which had the clear objectives in limiting the extent and rights of the reindeer management. The law was initiated to reconcile interests

farther south between farmers and herders, as well as between herders on both side of the national border.

In the 1970s the Norwegian government began to use economic subsidies as a means to support Sámi herders, and to achieve more efficient meat production. Subsidies enabled the Sámi to build modern houses in or near a town/village. In a couple of decades, the production system changed from a subsistence pastoralism to a motorized and market-oriented industry. The reindeer management moved away from a nearly complete dependence on animal and human muscle power to a high degree of dependence on motorized vehicles. Such a development has more or less been parallel in all three countries.

As a total the Sámi have experienced many changes. During the last centuries, they have gone from hunting and trapping society, towards a society dominated by herding. In the 20th century, the Sámi herders went through overwhelming changes, with new laws and regulations, further encroachments and a speedy modernisation process. The Sámi people was included in the post war welfare system, provided with better living standards and higher income, plus education for the children. With the modern lifestyle and implementation of modern technology, the cost increased and as the herder's income could not match the cost, the result was serious financial difficulties (RISETH 2000). Often political goals are not successful because the actual practice of herding in the last decades, and earlier on, has illustrated that Sámi apply their own understanding of herding by interpreting and implementing rules and regulations in accordance with their own needs, interests and desires. What we see here is a classical conflict between old traditions and modern ways of thinking – a conflict having given the rise to disagreements and bitterness. Many Sámi herders feel that the regulations have gone too far, but on the other hand, few want to go back to the old way of living.

2.2 Cattle grazing in Upper Bavaria, German pre-Alps and Alps

Agricultural activities in the region

The agricultural land in the pre-alpine and alpine areas of Upper Bavaria is almost exclusively composed of grassland. The portion of rough grazing increases with the altitude. In the mountain belt the land is mainly covered by forests and predominantly used by public and private forestry. In higher areas of the mountain belt (1200-1600 m) the inclination increases, but especially in the upper part pastures interrupt the forests. At elevations between 1500 and 1800 meters pastures are relatively frequent.

The main agricultural activity of the region is dairy farming combined with beef production. The livestock is mainly composed of animals providing this double feature (Braunvieh and Fleckvieh pedigrees). On most farms the milking cows are kept indoors all year round. Mainly the young cattle and the heifers use the pastures. Noteworthy is that the region is one of the most productive livestock-systems in Europe (high density of animals, high quantity of milk quotas), however characterised by small-sized farms.

Features of CLS

Data gathered by HOFMANN (2000) during the "Allmende-Project" showed that from fifty-one farms examined, ninety-seven percent were involved in milk production. On average they keep twenty-three dairy cows, manage twenty-four hectares of private farmland and nine hectares of forest. The size of the common land varies from eight hectares open land for the smallest co-operative to 112 hectares for the largest. Most of the privately managed farmland

consists of intensively used meadows, which are cut three to five times a year. The figures are well within the regional average.

In the pre-alpine and alpine area of the CLS the animals are grazing in spring and autumn mostly on private grassland near the village, while they are fed indoors in winter. Summer grazing in the pre-alpine region takes place on co-operative pastures in the periphery of the village. In the alpine region they migrate to co-operative pastures at higher altitudes for the summer.

History of CLS

The history of CLS in Bavaria can be dated back to the 10th Century. The largest portion of the land used for agricultural purposes was the undivided "Allmenden" including forests, grasslands, paths and waterways. The rule was that everyone who had his own fireplace was entitled to a share in the common property, which usually was located in the mountain areas or in the vicinity of the village. This was an egalitarian system where no difference was made between serfs and landowners vis-à-vis the right to use the property – to the extent that serfs had their own fireplace.

Today the right to use the "Allmende" is bound to the farmstead. Historically, the right to use the common property was not tradable, however, in some districts one has decided to allow for limited trade of user rights for these properties. A system for the leasing of grazing rights was also in operation in some areas. In the villages that had common properties, a committee consisting of three or four elected eligible users of the common property was elected among all users to manage the property. The use of the property was strongly managed, as no users could intervene in the management of the property without consulting those elected to manage it. However, the period of industrialization of the 19th century caused structural and political changes to the CLS. Today, the area is marked by many of the same structural developments as seen in many agricultural communities in Europe.

2.3 Cattle grazing in Biosphere Reserve Entlebuch, Swiss Alps

Agriculture in the region

The case study area of Switzerland is situated in the Biosphere Reserve of Entlebuch in the Canton of Lucern. The surface of the CLS represents about eighteen percent of the Entlebuch Reserve, which corresponds to 7,000 hectares. The forest covers about twenty-five percent of the reserve and the unproductive area represents about seven percent. There are around 200 alpine pastures in the Reserve. The stocking density in the reserve is very low (REGIONALMANAGEMENT BIOSPHÄRENRESERVAT ENTLEBUCH 2002).

Most of the farmsteads of the region conduct cattle fattening; only a few have milk- and cheese production or sheep. Due to the low profitability of the dairy farming enterprises in the region, more and more farmers have ceased dairy farming and the heifers are no longer sent into the mountains. Cattle breeding have replaced dairy farming and were intensified in the valley.

The structure of alpine pastures

The sizes of the alpine pasture are very different and depend on their organisational form. The private ones are generally smaller and can have a size ranges from 50 to 130 ha. The co-operatives are much larger and their size comprises between 200 and 300 ha. The numbers of animals balance from year to year.

In the Swiss case study area pastures from the montane to the alpine zone are grazed. These alpine pastures are grazed by heifers, dairy cattle, suckler cows and sheep (order of importance) in the summer. In the spring the animals graze on privately owned pastures in the valley while they in the winter are fed indoor with forage conserves. For the alpine pasture the intensity of the land use (*e.g.* stocking density, grazing period) is fixed by the "Stocking Decision" ("Normalbestockung"). It is an authority founded in 2000 as a delegation body of the alpine land cadastre, which set limits for the management of alpine pastures on a cantonal level.

The alpine pasturing in form of CLS plays still an important role for the region. It cultivates the landscape and takes care of a unique culture with an old tradition, which attracts tourists and makes the region to a demanded tourist destination. Furthermore, the local economy can be strengthened with the regional products and labels. The attractiveness of the destination increases.

The history of CLS

The historical origin of CLS can be dated back to the 15th century. During the 18th century a co-operative Alp system was developed where involved farmers paid a dividend for each animal using the grazing land. At this point, CLS included cows, sheep and horses. Sheep were distributed to high altitude grazing lands, while cows were assigned to grazing lands that were the most nutritious. During the winter, animals were assigned to other farms, with indoor feeding. This is also the situation today. Some of the CLS are based on private agreements and are therefore regulated under private laws. Others are public grazing lands, and regulated by public laws. The co-operative system is weakened, as only 10 percent of the properties are common properties (WERTHEMANN & IMBODEN *1982)*. However, many of the collective institutions are still maintained today in the form of farmers associations that aim at preserving the Alp culture, which is a cornerstone in the regional identity. This identity has also been the source of commercial attention, as the label "genuine Entlebuch" is used for marketing purposes. The economic structure of alpine farming has gone through a modernization process as most farming. Today, farming is combined with other activities, as tourism has become an important industry in many farming communities.

2.4 Sheep grazing in the Tatra Mountains, Poland

Agriculture in the region

Co-operative organisation forms can be found in the whole region of the Carpathian Mountains in southernmost Poland. The Polish case study area lies in the Tatra Mountains and in the sub Tatra region[4]; both are situated in southernmost part of the Podhale region in the Carpathian Mountains. The pattern of land use in the Carpathian region is influenced by the poor soil conditions and the mountain climate. Due to the low fertility of the soils and the low level of fertilizer application in the region, the productivity of meadows and pastures is much lower than in most other regions of Poland. The competitiveness is comparatively limited. Furthermore, due to the extreme fragmentation of the agricultural land in the mountainous area caused by the absence of a land consolidation process, as it was the case *i.e.* in Bavaria, only grazing is a valid option to utilise the land. In the valleys (*i.e* in Podhale), potatoes and cereals are grown on better quality soils for own consumption.

[4] The case study area will be herein after referred to as "Tatra Mountains"

The arable lands in the valleys and close to the villages are also used as forage pastures and to produce hay and to smaller extent silage. In autumn these meadows are used as grazing lands for sheep when they return from the mountain pastures. A number of about 1,500 livestock holders can be found in the Podhale region owning a total number of approximately 20,000 sheep and additionally about a hundred head of cattle. The livestock owners are strongly dependant on the co-operative systems; 95 percent of the animals graze in the co-operative summer pastures of the mountainous area.

The total acreage used by the CLS in the case study area varies from year to year between 2,000 and 2,500 ha. It depends on the yearly activities of the landowners. Within the case study area, the grazing units range from five to 200 hectares with an average of fifty hectares (RYSZKOWSKI, 1997). The current management of the CLS is based on traditional patterns. Land of the CLS is used for summer grazing activities by the livestock holders of the foothill area of the CLS (the Podhale region).

Farmers living in the foothills of the Tatra Mountains, namely in the Podhale region, keep their livestock in spring and autumn on their private meadows near the villages. The livestock is mainly composed of 40 to 50 sheep plus a couple of cows. At the beginning of spring shepherds called '*baca*' collect the animals from the neighbouring farmers. Train or lorry from the Podhale region to the CLS alpine zone of the Tatra Mountains and to other regions of the Carpathian Mountains outside the case study area transports them. The livestock tended by the shepherd in the summer pastures are additionally composed of his own animals, accounting for roughly ten percent of the whole herd and animals of the summer pasture owners (KOPCZYŃSKA, 1962).

Within the CLS, the animals graze on privately owned parcels and on parcels commonly owned by the villages mainly in the Tatra National Park. Most of the privately owned land is fragmented into small parcels (<< 1 ha). The shepherd rents the private pastures and meadows for the summer. He often owns a part of the pastures too. The tenure and the management of the land are negotiated between the shepherd and the landowners. The compensation is dependent on the pasture area as well as on the number of grazing animals and their productivity. The facilities are in the ownership of the shepherd. The flock sizes herded on the summer pasture depend on the size of the rented pastures and on the attitude of the shepherds. It can range from 100 to 2.000 animals with an average of 300 sheep. Migration is profitable for the farmers of the Podhale region because they do not have the time to tend the animals in summer on their own and they can save forage for the winter.

The history of CLS

In the Tatra region, we find a co-operative livestock system, which date back to the 13th century. The main influence on CLS appears to stem from Wallachian settlers, arriving from the Ukrainian and Romanian border regions during the 14th and 15th centuries. This people traditionally practised sheep herding and a pastoral culture moving the livestock in yearly cycles between selected areas. A co-operative way of managing livestock, especially with the use of professional herdsmen, was included in the institutional foundation of this culture. Each mountain meadow was under the ownership of several owners. On the same meadow the herdsman looked after the sheep and cattle, belonging to the owners of the meadows. While professional herdsmen were minding grazing sheep, the animal owners were involved in other agricultural activities. The co-operative system, which was created by the Wallachians has persisted until today. However, over the centuries the increasing number of animals caused the areas used for their distinctive form of livestock management to move to higher altitudes. This is where we still find properties used for co-operative livestock systems.

Until 1868 the properties of some of the meadows were divided among the inheritors (the owners' children). From 1868 the division by inheritance was banned, because it led to a great number of the private properties division. Due to this division, nowadays nobody knows for certain who has rights for grazing. This is still problematic for areas located in high mountains, as nobody can claim a firm private property right. In some cases, these properties are considered state properties.

The CLS in the Tatra Mountains survived the forced collectivisation of Polish farms during the communist regime. The economy of the region has faced several turbulences. During the communist regime, especially shortly after WWII, the number of sheep in the region exploded due to a large demand for meat, milk and wool. Also, compulsory rotation between grazing lands in the Tatra Mountains and other areas was implemented. The grazing system also had to adapt to the fact that cattle farming became more economically important.

However, despite all these changes, the CLS still persists in the region. Every spring, between March and April, the herdsman, collects sheep from different farmers that he guides to the different grazing areas in the mountains. The organization of this institution is still based on oral contracts, and the pay consists of collecting and managing the milk produced by the sheep while in the baca's possession. One of the reasons why the CLS still persists in the Tatra region is related to the strong tradition.

3. Biodiversity aims

3.1 Sapmi

For people living at high latitudes, grazing animals, fish and marine mammals have always been the only significant renewable resources. Without these resources, no northern cultures could exist, because each culture requires an economical foundation. These resources are used in different combinations. Marine and sea-based riverine (salmon) resources dominate on coasts and in big valleys, grazing animals form the backbone of the economy of inland dwellers.

In prehistoric times northern areas used to be grazed by a diverse fauna including even really big beasts (mammoths, woolly rhinos and bison). Man has hunted almost all of them to extinction. In northern Eurasia, only reindeer survived. Understandably, many northern plants are adapted to grazed environments and many of our rarities are more or less grazing dependent. The group of rare northern plants includes many species obviously adapted to strongly fluctuating grazing pressure and accompanying physical disturbance, which is not so strange if one considers what kinds of animals roamed in the tundra of the Pleistocene.

An important aim is to integrate reindeer herding units across national boundaries, so that the lichen grounds of the dry inland would not be unnecessarily trampled in summer and the coastal mountains would get more grazing and thus better conditions for rare plants to thrive. Gradients of grazing intensity and stochasticity are likely to provide a bigger variety of habitat conditions and hence a higher gamma-diversity (ROSENTHAL & NIEMEYER 2003). This is especially true for calcareous rock outbreaks in the coastal, summer grazed mountain areas (OLOFSSON & OKSANEN, 2005).

3.2 Upper Bavaria

A major aim of large scale grazing in the study areas of Upper Bavaria is, to maintain a heterogenous mosaic of different successional stages (semi-open landscape) created by freely

roaming livestock (cows, horses). In order to guarantee a high stochasticity of grazing[5], large grazing units (> 50 ha) occupying several habitat types such as fens, transitional mires, peat bogs and mineral soils have to be maintained or re-established (ROSENTHAL & NIEMEYER 2003).

Desired developments are:

- The re-initiation/enhancement of grazing in mires in order to prevent extensive succession towards dense forests
- The stabilisation and/or restoration of large grazing units
- The impoverishment of nutrients on fertilised mineral soils

3.3 Switzerland

The study region is part of a Biosphere reserve and accordingly, the desired development aims at promoting solutions to reconcile the conservation of biodiversity with its sustainable use. The Biosphere reserve Entlebuch is internationally recognized, and nominated by the national government. Biosphere reserves serve in some ways as 'living laboratories' for testing out and demonstrating integrated management of land, water and biodiversity. Each biosphere reserve is intended to fulfil three basic functions, which are complementary and mutually reinforcing:

- A conservation function - to contribute to the conservation of landscapes, ecosystems, species and genetic variation;
- A development function - to foster economic and human development which is socio-culturally and ecologically sustainable;
- A logistic function - to provide support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development.

Entlebuch encompasses 395 km^2 of hills, forest, marsh, and the chalky karst formations of *Schrattenfluh*. UNESCO biospheres allow economic activities, which are compatible with preservation efforts and Sustainable Development. 2001, UNESCO has registered this unique landscape as Biosphere Reserve, one of 500 UNESCO Biosphere Reserves worldwide.

The conservation priority identified in the Biosphere Reserve Entlebuch is with the peat bogs, and mires, where the region has a national responsibility for maintaining these habitats. Further, the region has conserved a unique mosaic of different habitat types with some types of traditional land-use still practiced (ROSENTHAL & NIEMEYER 2003).

3.4 Tatra Mountains

The general conservational aim in Tatra and Sub-Tatra region in respect to large-scale grazing systems is to preserve high biodiversity at α (specific), β (habitat) and γ (landscape) levels (explanation see Section 1). This part of diversity is determined by the existence of semi-natural open and mosaic landscapes created by hundreds of years of mowing and/or sheep grazing on forest glades and alpine meadows. Similarities exist to the case of Upper Bavaria.

Desired developments are:

- stabilisation and/or restoration of large grazing units

[5] High stochsticity of grazing means that the probability of animals grazing on a large number of different spots on the grazing unit is high.

- maintaining (at some) or intensification (at other places) of natural fertilization
- succession control by abandonment/re-usage of particular areas in order to maintain stages of high-biodiversity level
- succession is restrained at places, where traditional land use is re-established

According to to-date observations in the Tatra and Sub-Tatra region, grazing (including large scale grazing) is in general highly positively correlated with biodiversity on every level (specific, habitat and landscape level) in comparison with other land use types (as cultivation or mowing) (ROSENTHAL & NIEMEYER 2003). No data is available however comparing large- and small scale ("private") grazing in this respect.

4. Factors affecting the CLS process

The cooperative livestock grazing system in Europe underwent various modifications as any other economic phenomenon in response to both external and internal factors. Some have a positive influence, but most have a negative effect on the maintenance of this system of management (CIURYK & NIEMEYER 2003).

4.1 External factors

Tourism

All over Europe, the cooperative grazing systems survived in marginal regions (deficient soils, difficult of access areas, low income of the population). Currently, however, some areas, especially in the mountainous terrains of Central Europe and sub-polar terrains of Europe, make up a very attractive tourist base. In the age of industrialization, the desire to "return to nature" has been increasingly observed. People from urbanized towns eagerly go over weekends or for holidays to those regions of Europe in which the landscape and cultural values have been preserved. It is observed that in all these regions there is the intense development of agro-tourism. The additional income from agro-tourism is important for many farmer households. However, this development has some negative consequences increasing wearing and tearing of nature. In Fennoscandia the use of outlying areas for recreation and tourism, for example, hiking, camping and building cabins, also have disregarded Sámi traditional use of these same areas as pasture or cultural landmarks (BEACH 1981:321-323; BERGSTRØM 2002:123, BERG 1994:51, LAAKSO 2002:52).

Subsidies

All over Europe, notably in the western industrialized countries, subsidies are an important component of agricultural income. Due to the adverse management conditions in CLS areas, this form of assistance is particularly important. The effect of direct and indirect subsidies in Germany is regarded as favourable. These subsidies concern mainly the production profitability. They do not include the productivity expenses resulting from the difficult conditions of farming. These subsidies come partly from European Union funds, partly from governmental fund. The domestic and EU subsidies for the use and maintenance of land make up the supporting factor for the existence of CLS and allow the farmers to stay on the terrains, which are agriculturally poorer. Moreover, they play an important role in stabilizing the CLS. The afforestation premiums granted by the EU in Germany negatively affect the CLS, since afforested land must not be grazed. So the pool of available forage resource is further depleted.

In Poland and Switzerland the subsidies are paid by the State. In Switzerland, both livestock and cheese production are subsidized. In Poland, small subsidies cover only a small population of animals regardless of the way they are used. In case of the sheep the amount of subsidies depends on the kind of herd. In Fennoscandia, subsidies also have a positive effect on the maintenance of the CLS system. In Finland and Sweden the subsidies are partly EU and partly national subsidies. In Norway the subsidies are national. In Finland the subsidy system requires a minimum number of animals to be eligible, and is thus considered unfair (BAYSSTMLF 2002, LAAKSO 2002, PAWLITZKI 2002).

Legal aspects

In most European countries, community grazing is subject to property rights resulting from private or social ownership of land. These rights have changed over the centuries, but in their present form they are not (fully) incorporated in national and EU legislation (Poland and Fennoscandia). In cases like these, centuries-old rights should be taken into account and the form of assistance should be left for competent local authorities to decide. A completely different issue is the fragmentation and small size of the in Poland, Switzerland and partly Germany farms. For the improvement of the economics of production, it is necessary to increase farm area. Legal sanctioning of land ownership and grazing rights in Fennoscandian countries is of particular importance. In Norway a law proposal (NOU 2001:35) is based on the traditional siida institution, which so far never have been included in the formal legal system. This will probably give incentives for more ecological use of the pastures.

4.2 Internal factors

Tradition

It is common knowledge that people living in very adverse conditions (poor soils, harsh climate, often malnutrition) could only survive in a community and thanks to cooperation in its widest meaning. These forms of coexistence have developed all over Europe as specific forms of culture and tradition. However, the majority of urbanized societies originating from exactly this environment do not identify themselves with this culture and tradition, which have been developed over the centuries. The processes of industrialization and intensification of production (also the agricultural one) mean that the people cultivating old customs and traditions are held in low regard. This, however, must not negate the importance of the phenomena of tradition and culture. Across Europe, there are many groups of people who uphold their traditions and customs mainly connected with CLS, as for centuries this system has made their survival possible. Currently they are found in most European countries (e.g. Poland, Switzerland, Norway, Finland, Austria, Germany and Sweden). The attachment to tradition and cultivation of old customs are factors decisive of CLS (STROHWASSER 2000, SOLEM 1970, RISETH 2000).

Economics of production

The economics of production is one of the major factors affecting the existence of CLS in Europe. Despite the low, or often no, profitability of farms, the cooperative grazing system decreases or eliminates the unfavourable economic relations (lower labour inputs). Generally, however, economic aspects exert a major influence on the CLS in Europe. The determination of people involved in the traditional CLS system means that economic conditions are not the most important at a given time (Poland, Fennoscandia). It must be also born in mind that the CLS system provides employment to the jobless (*e.g.* as shepards) or plays a role in a one of

several sources of income in many of the countries studied. As such, CLS have a very positive influence on public opinion. We should also mention the handicrafts, which use products from animals grazed in the CLS system. Various types of products made from wool, bones and horns provide employment to women and improve the economic condition of households. It concerns mainly Fennoscandia countries and Poland (CIURYK & MOLIK 1998, KARLSTAD & al., 2002, KOPCZYŃSKA-JAWORSKA 1962).

The majority of farmers involved in CLS in Europe receive similar prices for their products to the ones practicing more intense farming, in spite of considerably higher production costs. Although the forms of community grazing in Europe were established to minimize costs, they probably would cease to exist if left without financial support. The system of financial help for farmers should therefore be balanced in such a way that on one hand, they will not eliminate the farms and on the other, it will allow them to have a decent life. The production profitability is only the element (but a very important one), which definitely will determine the existence of CLS (PAWLITZKI 2002, SATZGER 2000).

Labour conditions

Regardless of the latitude, the seasonal grazing of livestock (CLS) throughout Europe has obliged people involved in this system to leave their abodes (villages) for long periods of time (several months). This fact causes that the shepherds lose contact with civilization and remain outside family, cultural and social life[6]. A major problem of sustainability of the system is the work overload, especially during peak seasons. The diminution of family labour is hardly compatible with the growing in size of the farms (PILLE 2002). This explains the high rate of risk of land abandonment and scrub development. In connection with the co-operative system a functional management is an important aspect to keep the workload as low as possible.

From the direct point of the farmers, the workload is one of their first constraints in terms of liveability, which is an essential aspect of sustainability (PAWLITZKI 2002). It becomes understandable that less and less young people are willing to cultivate the shepherding profession. They do not want to take up the difficult and full of sacrifices work on the farm. Therefore, the majority of them move out to the cities in order to look for a job not connected with the agriculture section. (CIURYK & MOLIK 1998, HOŁUB-PACEWICZOWA 1930,). In the EU countries the subsidies to the acreage of the grazing land is an encouragement to continue the CLS. Otherwise, the areas would be abandoned. Those subsidies may result in increased interest in this profession.

5. Prospects for CLS Development

Economics of production

The basis of all human economic activity is to obtain certain financial benefits. Currently in most countries of Europe, the profitability of agricultural production is systematically decreasing. The profitability of CLS production is declining to an even greater extent. In addition to humans, the CLS process also involves two main component parts: grazing areas and animals. Decreased profitability of animal production has led to considerable reductions in the populations of cattle and sheep in many countries (Poland, Switzerland and Germany, among others), which means that part of the areas which had previously been used for CLS remains ungrazed or is grazed with excessively low stocking densities per hectare. The issue of production profitability should not be left for the free market laws and mechanisms to

[6] In Sapmi the use of snowmobile and other vehicles have decreased this effect considerably.

decide. State and EU interventionism in its broadest meaning should ensure that the production is profitable enough to inhibit the reduction of animal populations in certain areas, and to ensure adequate remuneration to CLS participants.

In the researched cases, CLS begins to be favourably influenced by the growth of tourism and even more so by agro-tourism. The increased awareness of most European societies about health food produced in extensive and traditional systems and the desire to take some rest in rural areas have a positive influence on the economic condition of farmers.

In Fennoscandian countries this factor adversely affects the maintenance of CLS in its present scope. The development of modern intensive agriculture and tourist industry considerably limits and reduces the area of pastures. Reindeer farming requires that during the periods of rearing young, herds should be assured complete peace, which is hardly possible considering the increasing tourist traffic.

The European Union policy, which largely determines the economic processes, should therefore take special account of the specific nature, the needs and the management systems found in its member states. The interest in conservation of nature and landscape has recently been growing. If the demands of biologists will not give way to economic laws, it is thought that the cooperative grazing system in Europe will survive for a long time. There is simply no alternative to the active protection of unforested meadow and pasture complexes, which we want to leave for the next generations in their present form.

Desire to uphold tradition

As already mentioned, the first documented information about CLS in Europe dates back to the early 10th century., However, the processes, which shaped this form of grazing, are probably much older. It is known that both in the mountainous areas of Central Europe and in Fennoscandia, people involved in raising animals and in various forms of CLS were somewhat alienated from the rest of the community. This fact has led to the establishment of cultural ethnic minorities. Over the centuries, they created unique cultural traits concerning their dialect, dress, music, forms of behaviour and shepherding customs. These characteristics, shaped over the centuries, are very valuable and have helped to preserve the multiculturalism of Europe. Until recently, preservation of one's own cultural identity was regarded by the society at large as an archaic form attesting to the primitive nature of a community. Because of that, a large proportion of the younger generation continues to choose the "new and better" world in the cities. In the area of Fennoscandia, some shepherds became settled farmers and abandoned traditional forms of grazing management.

In Poland as well as Bavaria we can notice the constant emigration of young people to the cities. The considerable aging of rural dwellers observed all over Europe does not attest to the complete disappearance and lack of interest in upholding tradition (Kopczyńska – Jaworska 1962). Despite many difficulties, mainly economic and organizational ones, there are still people all over of Europe who continue and eager to uphold the traditions connected with CLS. This might be called a "hereditary burden". These people cannot imagine living in a different way to that they have inherited from their ancestors. Taking advantage of this fact, together with economic support and approval of environmentalists, should help to regenerate and develop the CLS system in Europe.

6. Conclusions

The cooperative grazing systems in Europe have a centuries-long tradition. The preliminary investigation of the CLS in the research areas reveals the differences of the systems

concerning their importance for the economy of the region as well as the factors affecting their stability. However, some similarities could be found, like the importance of subsidies for the survival of nearly all CLS. However, without the subsidies the existence of the CLS seems impossible in the long run. The analysis of factors stabilizing and destabilizing the CLS processes indicates the absolute need for economic intervention both on the micro (provincial and national governments) and macro (European Union) scale.

Defining the general aims and desired development of the CLS it can be summarised that the focus is on continuing the CLS in a way that is sustainable concerning socio-economic as well as ecological criteria.

Cooperative Livestock Systems are, even though they are a characteristic part of the landscape, put at risk by several factors, which differ between study areas. Those factors lead to a change in the grazing management (grazing parameters), which again affect the ecological stability of the system.

The conservation and/or re-initiation of the functioning of the CLS are the most crucial aims throughout all study areas in order to maintain the positive ecological effects of large scale grazing. In Tatra and Upper Bavaria the stabilisation and restoration of large grazing units are common aims. In Fennoscandia the free access to summer grazing areas is the most sensitive point.

The control of undergrazing (abandonment) and overgrazing is an essential issue for all study areas. Keeping the balance between over- and undergrazing is esp. necessary to maintain gradients of grazing intensity and stochasticity, which supports spatial mosaics of different succession stages and a high gamma-diversity. In landscapes where the forest succession is fast it is particularly important to admit the pasturing of forests and forest-like structures like in Tatra and Upper Bavaria. The impoverishment of heavily fertilised soils within a common, esp. the mineral soils in Upper Bavaria contributes to this issue as well.

Thus particular attention should be paid to the specific nature of each European region and their co-operative grazing systems. The culture-forming processes, which established themselves over the centuries within the CLS, must not be stopped. They are subject to some modifications connected with the technological advancement of societies, but efforts should be made to reduce the negative impact of the changes as far as possible.

Analysing the factors threatening the stability of CLS, the declining profitability of agriculture generally was identified as one of the main factors. As pointed out by MOREIRA (2003) it appears that state intervention is essential to avoid continuing marginalisation of rural areas. The future of CLS therefore seems to a considerable degree to be connected to public policy.

Generally the production income from CLS seems to be insufficient without additional income. This can be generated *i.e.* by tourism, wage labour or, most important subsidies as mentioned above. Often different combinations of income are necessary to secure the survival of the agricultural operation and thus CLS. In Bavaria other income sources are mostly a combination of tourism and subsidies, while in Poland the marketing of regional products plays a major role.

It is also worth mentioning that factors like tourism, which have a positive influence in some regions (Upper Bavaria, Poland and Switzerland), exert pressure on other systems as can be seen in the Fennoscandian case where increasing land utilisation by tourism causes disturbances.

Not only tourism but also other competing land utilizations occur as a threat to the stability of the CLS. This is mainly true in Fennoscandia. The industrial use and the extended infrastructure of modern society create a loss of pasture areas.

Beside the often-difficult external conditions, the labour conditions of the CLS are harsh and demanding in most of the study areas. Isolation and work overload frequently lead to land abandonment and recruitment problems.

Thus the future of the CLS is depending on mainly two factors namely economic profitability of the agricultural operation and the improvement of social conditions.

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