Bulletin UASVM, Agriculture 65(1)/2008
pISSN 1843-5246; eISSN 1843-5386

DIFFERENCES OF DEVELOPMENT PATTERNS IN CENTRAL AND EASTERN EUROPEAN MOUNTAIN REGIONS: HISTORY OF LAND USES AND LANDSCAPES IN THE SOUTHERN BLACK FOREST (GERMANY) AND THE CENTRAL APUSENI MOUNTAINS (ROMANIA)

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Key words: Black Forest, landscape, land use, regional development, Apuseni Mountains, subsistance production, transformation economy

Abstract The Southern Black Forest (Germany) and the Central Apuseni Mountains (Romania) are mountain ranges with comparable natural conditions for land use (montane climate, high precipitation, relatively steep slopes and less fertile soils). A comparison was made between the montane settlements of these two regions. Differences in colonisation time, changes of techniques, infrastructure, and access and integration into markets resulted in distinct patterns of people´s livelihood and landscape until today. Four phases of development could be distinguished, namely (1) subsistance production, (2) improved agriculture, (3) infrastructure development and easier access to markets, and (4) integration into European and global markets. The development in Black Forest can be described as being more continuous, whereas in the Apuseni Mountains the pase of subsistance production still today predominates, shaping the household economies and landscape structures. Only in the last 15 years, relatively fast processes of integration into the market begun, parallel to developments of the infrastructure. It can be expected, that the trends in land uses in the Apuseni Mountains within few years will lead to similar landscape patterns like in other European mountain ranges. It remains to be hoped, that many of the unique landscape features and habitats of the Apuseni Mountains can be preserved for the future.

INTRODUCTION

In central Europe, fertile soils under favourable climate were colonised by permanently sessile farmers already thousands of years ago, before and during Roman times (Küster 1999). Colonisation continued during the Middle Ages, and with increasing population pressure, farmsteads and settlements were founded also on less productive sites, e.g., under cooler climate, on steeper slopes, and less fertile soils. This general pattern holds for many mountain regions, including Black Forest in Germany (maximum elevation: Feldberg, 1495 m a.s.l.) and Apuseni Mountains in Romania (maximum elevation: Curcubăta,

1849 m a.s.l.) (Bleahu & Bordea 1967). However, differences in social and political frame conditions are causing different land use histories, landscapes, and livelihoods of the people.

In the Black Forest, the foundation of monasteries attracted new settlers during the high middle ages. They were provided with land, and had to contribute the tenth to the monasteries or landlords. In the following centuries, increasing population pressure resulted in a severe decrease of forest cover until the beginning of the 19th century. Thereafter, several waves of changes occurred (Liehl & Sick 1984; Schmidt U 1989, 2002; Schröder & Mohr 1997), lasting until today.

In the Moți region, remote areas were permanently colonised during the 19th century (Goia 2004). Until today, many elements of the early land uses still are practiced. Only since ca. 1970, and then after 1990, major changes can be recognised.

Aim of this study is a comparison of the land use history of the rural landscape in the montane elevation above ca. 800 m. Besides their similarities in topography and climate, these regions are different in terms of their land use history. During the last 18 years, the romanian economy was subject to "transformation" from a socialistic to a capitalistic economy. And today, both regions have to deal with increasing globalisation issues.

For both regions, four phases of development can be distinguished. They occurred in different time periods, durations, and intensities, depending from the region, and were overlapping to various degrees.

PHASES OF DEVELOPMENT

PHASE 1: SUBSISTANCE PRODUCTION

In all central and eastern European mountains, the livelihood of the people in former times was based on subsistance economy. As many as possible of the products needed were produced by the people themselves, and demanded a variety of different land uses and working activities.

Since the beginning of the colonisation, animal keeping and hay production were of relatively high importance, compared to the lowlands. Before specialisation begun, mixed farming systems with forest remnants, fields, meadows and pastures in various combinations shaped all agricultural landscapes, including the montane elevations of Black Forest and Apuseni Mountains (Auch 2006; Reif et al. 2003a, b; Ruşdea et al. 2005). The maintenance of these mosaic-like landscapes afforded a diversity of specific activities during all seasons of the year. All works were strongly imbedded in the course of the seasons, and in terms of their function they were strongly interwoven. Life was shaped by many strikebacks, natural catastrophs and misyields. Farmers permanently were forced to obtain additional sources of income. The permanent fight for existence also formed the social and cultural life of the people, their family and community structures.

AGRICULTURE

The farmsteads or villages were built in clearings of the forest (Goia 2005). Agriculture has been the economic lifebase, even in elevations up to 1000 meters and more. Gardens and fields were established on flat areas or gentle slopes, they provided the food base in form of cereals and vegetables, and were fenced as protection against grazing by animals.

Because of the humid climate and short vegetation periods, the cultivation of cereals was limited and risky. Rye (Secale cereale), oat (Avena sativa), barley (Hordeum vulgare) were cultivated in small fields, and vegetables in gardens. Fibre plants as linnen (Linum usitatissimum; Gothein 1892) or hemp (Cannabis sativa) were also grown. Gardens and fields were fertilised regularly, using the manure from animals which was essential at these times.

In many cases, alternate husbandry was practiced, i.e., fields were used for some years (Schwabe-Braun 1980; Reif et al. 2005). Thereafter, weeds like Rumex species have invaded, and during a sequence of years the fallows were used as meadow, where mowing allowed successful control of the weeds.

ANIMAL KEEPING AND GRASSLAND MANAGEMENT

A number of animal species were kept. Indispensable were cows (milk, cheese), sheep (whool), horses or oxen (work), pigs (consumption of food rests), and chicken. Large areas of meadows and (wood) pastures were needed. Animal keeping was based on pastures, were the animals spent most the time of the year, and meadows, where the hay for the winter period was produced. Pastures were located on less fertile sites, often shallow, skeleton-rich soils, or steep slopes. Meadows for hay production were established near the farmstead and also in some distance, but always on better soils (Brinkmann et al. 2008, in press).

During summer, the grassland, predominantly meadows, around the farmsteads was used for hay production. Meadows were fertilised with stable manure produced by cattle and horses from their own farm, and usually is unfermented. Maintenance works are being manually applied or by the help of animal harness. Mowing starts at the beginning of July and is manually performed. Grass drying is done on soil, and in the rainy years, large substances losses are registered, resulting a small hay quality. Mowing and drying the hay were time-consuming and lasted several weeks, and were particularly affected by rainy periods. In autumn, free aftergrazing was practiced with cows and horses.

During summer, many animals were brought to higher elevations, where they spent the summer free grazing on the large-sized, overgrazed common pastures and in adjacent forests, guarded by only few persons in small huts (“Viehhütte”; “Coliba” , “Alm”).

During winter, all animals remained on the farmstead. They had to find their food as long as possible on common grassland and adjacent forests, guarded by women or children.

In severe winters, shortage of hay during winter was frequent, and a more effective use of more distant grassland in form of meadows was necessary. In the Apuseni mountains, families established a second periodically used farmstead (“Mutatura”), where hay was produced during summer, and the animals and the caring families used to stay during the winter period for several weeks, until the hay was consumed.

This “semi-nomadic” behaviour originated, because in former times it was easier to bring the animals to another stable, instead of transporting hay across steep slopes or valleys to distant farmsteads. Because of this, in many European mountain regions dispersed farmsteads predominate, whereas closed settlements mostly were founded at lower elevations.

Another option to overcome shortage of fodder during winter or dry summer periods was pollarding. In both mountain ranges, ash (Fraxinus excelsior), hornbeam (Carpinus betulus) and oak (Quercus spec.) were the preferred species at lower to middle altitudes. In the Apuseni Mountains, pollarding is practiced until very recently. At higher elevations, pollarded individuals of spruce (for cattle) and fir (for horses and sheep) are characteristic landscape elements until today.

LIVELIHOOD

The unfavourable climate forced the farmers to base their economy not only on farming. Several other sources of income had to be used. However, not many options existed at former times, and included forest uses like timber, firewood, charcoal production, collecting resin (Schoch 1989), berries and mushrooms, rural craftwork which predominantly was based on wood, and in some areas mining. These activities allowed a small income and was needed to buy products from the lowlands, e.g., metal products or salt. The exchange

took place on local markets in the valleys, their settlements became administrative centers of the region.

PHASE 2: IMPROVED AGRICULTURE

New crops and techniques change the economy of the rural regions and the lifelihood of the people. The introduction of potatoes improved the livelihood substantially, and occurred in many European regions in the beginning of 19th century, including Black Forest and the Moti region.

In Black Forest, the first major changes occurred between 1800 and 1830. At these times the timber resources were heavily overexploited and reduced in size, and forests were depleted in nutrients because of wood pasture and litter raking (Schmidt U 1989). A relatively liberal forest law was implemented in the year 1833 and thereafter ("Badisches Forstgesetz"). In the following years, forest land was strictly separated from open land and its agricultural uses.

The sharp and clear separation between forest and grassland in Black Forest reduces the size of transitional habitats (fringes) to a minimum, whereas the still practiced wood pasture in the Apuseni Mountains allows a more continuous transition between forest and openland, creating a diversity of habitat niches.

After 1848, a first period of bancrupcies of farmsteads begun (Vetter 1968; Schmidt J 1994). At these times, the land use rights of the farms were converted to property rights, linked with high payments ("Ablösesummen") to the governmental administrations. Particularly at high elevations and less fertile soils, farmers were forced to give up, and a wave of emigrations started, lasting until ca. 1890. During this period, most common pastures in Black Forest were divided and privatised, and the majority of them was afforested with conifers, mainly spruce. Only in few regions in southern Black Forest, common pastures exist until today. Often they have changed through fertilisation, invasion of bracken (*Pteridium aquilinum*) or succession towards forest (Kersting & Ludemann 1991). Today, efforts are made to keep them open, and to preserve their floristic diversity.

Strict forest laws only could be implemented because the agricultural improvements released the pressure from the forest. Fallow fields were used more intensively by sewing legumes like clover (*Trifolium pratense, T. repens*). Many meadows on slopes became meliorated by irrigation and drainage systems ("natürlicher Hangbau"), which resulted in earlier melting of snow, fertilisation through using the sewage water of the farmsteads, and water supply during dry summer periods.

New agricultural techniques are becoming installed until today. The use of mineral fertilisers became frequent during the 20th century (Finckh 1976; Schilling 2000). Since ca. 1830, "Thomasphosphat" became a side-product of steel production, and could be traded on the newly developed railway lines. In the 20th century, mineral fertilisers (NPK) became available, and rose the average yields substantially (Dierschke & Briemle 2002), but also caused productive meadows and pastures with low species diversity. Since the 1970ies, different techniques of silage production were developed. Since then, storage of grassland yield became more weather-independent. In the 1980ies, new varieties of maize became available, which are raised also at medium elevation and can be used to produce silage.

Since ca. 1965, cattle were kept more and more litterless, and producing liquid manure. Liquid manure could be distributed easier, and production was intensified on parcels which were not fertilised before.

In the Apuseni Mountains, only few improvements were introduced to modify the agricultural production. Until today, traditional agriculture characterized by extensive

exploitation of agricultural land and with activities in general performed manually or with the help of animal force are still practiced. Intensive handwork, absence of use of mineral fertiliser, poorly developed plant and animal breeding characterise the rural production (Brinkmann et al. 2008, in press; Pacurar 2005; Ruşdea et al. 2005). These uses practiced for a long time have generated a specific cultural landscape with a high phyto-diversity. Grasslands and arable land are fertilized only with stable manure produced in their own farmstead. Pesticides are not used. Hay meadows are mown once or maximum twice a year, and on pastures a free grazing is being practiced. In the last years, the grass cutting has started to be performed mechanized with machines subsidized by the Ministry of Agriculture (Gârda 2007). The effect of mechanized mowing introducing is the abandonment of hay meadows which are not adequate for this way of use (uneven hay meadows, with many rocks at the surface etc.). Precisely these sites are the ones with high phyto-diversity, which probably in the future will be abandoned. Grassland sites abandonment can occur as result of depopulation of the area, the high age mean and low price of animals which sensitively "de-stimulates" the farmers (Păcurar et al. material in course of publication). Grasslands' rending valuable through agri-tourism or for medicinal plants collecting could save them from abandonment.

PHASE 3: INFRASTRUCTURE DEVELOPMENT – EASIER ACCESS TO MARKETS

The construction of roads and railway lines allowed a better exchange of products and increased integration into the market (Maurer 2002; Sautter 1999). The households had not any more to produce all goods for their daily need by themselves, but could specialize on the more profitable products under their climate. This led to an huge change of landscapes, separating them into regions with predominantly cultivating wine, cereals and crops (low elevation), and grassland and animal keeping (mountains) (Ellenberg 1996). But elements of subsistence production still remained important as lifebase, farming systems still were mixed.

In Black Forest, major changes started to occur after ca. 1880 (Bund 1997; Mohr & Stadelbauer 2001; Schmidt 2002). Farmers specialised more and more on dairy production. Agriculture, being always risky before, was abandoned, except few small parcels for own consumption, and the fields disappeared between ca. 1880 and 1950. The landscape became dominated by grassland ("Vergrünlandung").

Beneath farming, forestry and craftwork, tourism developed towards the end of the 19th century (Vetter 1968). The construction of railway lines facilitated local trecking tourism, and since ca 1900 ski tourism begun. After ca 1935, the construction of a touristic road ("Schwarzwaldhochstrasse") allowed tourism by cars. Since ca 1955, horse riding holidays for families with children developed.

In the villages of Apuseni Mountains, access on roads still was problematic until recently for many villages. Agriculture provided the economical base of people´s livelihood until the 1970ies. Afterwards, only small fields and gardens were maintained for subsistence production, and most cereals and corn were imported from the lowlands (exchange with vats and vessels). Since ca. 1995, not regulated exploitation of timber increased the monetary income of many rural families, fields and gardens more and more were converted to grassland. Horse-driven wagons were used at least until very recently, and in remote villages still are the predominant vehicles for transport. Only since ca. 2000, few farmers were able to buy private cars and trucks, after they have earned sufficient money from timber extraction and sale.

PHASE 4: INTEGRATION INTO EUROPEAN AND GLOBAL MARKET

Integration of local economies into European and global market enforces international adjustment of prizes. Disadvantaged regions are exposed to increased competition, the value of products of their working time decreases. This leads to a reduction of incomes, to emigration from remote villages, and to search for economical alternatives for the remaining people.

Since the 1950ies, the national economies in "Western Europe" were increasingly integrated into the developing European market. The raising productivity of the industrial sector reduced the agricultural incomes. To compensate these effects, it became policy to promote mechanisation and specialisation of farming, to increase the size of the farms, and to meliorate the soils ("Mansholt-Plan"). From that time, dairy production was subsidised in the mountains, and agriculture and meat production in the lowlands.

In Eastern Europe, the so-called socialistic system was part of a competing economic system (COMECON), in which governmental decisions were fixing the prizes and incomes, and not market mechanisms.

In Black Forest region, in a second period of bancrupcies the number of farms decreased again. The remaining farmers again had to specialize, increase in size, and intensify production.

The grassland was treated with increasing amounts of mineral fertilizer. Animal breeding was improved through community-owned breeding bulls. The local cattle races "Hinterwaelder" and "Vorderwaelder Vieh" were replaced by more productive races and became threatened, unless they were subsidised since 1990.

Marginal land was meliorated until the 1970ies by draining, de-stoning and fertilising. Valuable habitats of the traditional cultural landscape disappeared, many species of oligotrophic grassland, swamps, mires and wetlands were endangered.

The number of cows per farmstead as well as the milk production per cow increased, whereas the prize of milk for the farmers decreased to only ca. 29 cent per liter in 2006. New techniques in stable construction and milking were developed, which could be afforded only by large-sized farms. Many people gave up or became "weekend-farmers", often practicing labour-extensive systems with cattle or set stocking with goats, thus contributing to keep the landscape open. The remaining ones had to grow, and to produce with low costs. Only recently in 2007 milk prices increased to ca. 43 cent per liter, and decreased again remarkably in april 2008 to ca. 33 cent per liter (Börnecke 2008).

Because of decreasing income from farming, a large area of marginal land was afforested, mostly with spruce. In northern Black Forest, communities exist with 80% forest cover (Enzklösterle). The loss of openness due to afforestation became a public issue. More and more farmers obtained subsidies or indirect payment for societal services, i.e., landscape preservation or nature conservation.

Additionally in the 1990ies, big storm damages and falling wood prizes created new problems. Today, the remaining farmers in Black Forest tend to live from a combination of animal keeping and grassland management, forestry, rural tourism, and often additional income from external sources is used to maintain the farmstead.

In the Apuseni Mountains, the agricultural potential was regarded as marginal during the Ceausescu period (until 1990). Therefore the farmers were allowed to keep their small-sized private property of 2 to 3 ha as their lifebase. The ancient subsistence production was tolerated to persist, and little effort was made to improve the production system. Only forests and the high pastures were socialised. Attempts were made to fertilise the high pasture, but were not very successful. The forests were intensively used by clearcut systems, but were strictly protected.

After 1990, a phase of relative “anarchy” followed. Less governmental control allowed an overexploitation of timber resources, providing relatively large monetary incomes the participating farmers, whereas poverty increased in households of elderly people who could not work as hard.

Very recently (since ca. 2005), remote farmsteads became abandoned, and less productive grassland is being only extensively grazed, or even not used any more.

THE FUTURE

In future, globalisation of markets will increasingly determine the rural economies and shape the landscapes. Agricultural production will have to compete with farmers from other countries under more favourable conditions, e.g., New Zealand for dairy products, or Argentina for meat production. Direct subsidies for farming products tend to become reduced. Societal or environmental services will be increasingly appreciated by additional payments, as it is foreseen in the “Cross Compliance” policy of the European Union.

In less favourable regions including mountains, the role of farming can be expected to decrease (Börnecke 2008), and forest surface will increase through natural succession or afforestation. The continuation of farming in less favourable regions depends from (1) political support, including direct financial payments, promotion of specific branches for certain regions, e.g., dairy production, and support for infrastructure; and (2) from the engagement of the rural people to continue farming with creativity, and search for new products and market niches. The willingness of rural people to continue their lifestyle and livelihood must not be underestimated.

It can be assumed, that more finances for services of farmers for landscape management and nature conservation can be obtained in a rich country (Germany), compared to a poorer land (Romania). With financial support, farming can be maintained even in less productive regions, including mountains. With time, the labour-intensive milk production will be reduced in the mountains, giving way to labour-extensive productions, e.g., for meat, and organisation of work, e.g. through associations.

In the Black Forest, farming already had lost its importance in a continuous process since decades, and today the people live from other sources of income. Therefore, people will remain to live in more or less all places. This implies the maintenance of at least side-farming for to keep open the area around the buildings. Structure and species composition of forests and openlands already have changed strongly (Wilmanns 2001).

In the Apuseni Mountains, the majority of the people still live from farming and forestry. But huge changes have occurred since 1990, and will continue to influence the lifebase of the people in the next few years. Increasing economical pressure, not compensated by public payments, will force people in remote regions of Romania to emigrate to the lowlands and cities. In the Apuseni Mountains, subsistance production as base for livelihood soon will loose its function. The incomes of the families from farming will remain low. In the nearby future, only market-orientated production will remain. The unregulated exploitation of forests has already started to decrease. Since 2005, large grassland parcels as fallow and abandoned remote or small farmsteads can be observed in the Apuseni Mountains. First farmsteads became abandoned, and the high pasture “Poiana Horea” is abandoned since 2007.

Table 1: Landscape development in the Southern Black Forest, Germany, and the Central Apuseni Mountains, Romania

	Southern Black Forest	**Central Apuseni Mountains**
General situation, frame conditions		
	ca. 2000 km^2 ca. 60 % forest	
Climate and soil	$\leq$1495 m a.s.l. $\leq$2200 mm precipitation suboceanic climate gneiss, granite, porphyr, sandstone acidic soils	$\leq$1880 m a.s.l. $\leq$1450 mm precipitation subcontinental climate all geologies large variety of soils
Natural Vegetation	*Fagus* and *Fagus–Abies* (west), *Abies-Fagus-Picea* (east), Picea >1300 m	*Quercus*, *Carpinus* (low altitude), *Fagus-Abies-Picea* (montane), *Picea* >1300 m, *Pinus mugo* $\geq$ 1750 m
Phase I: Colonisation and subsistence production		
Colonisation	10^{th} to 13^{th} century: Colonisation initiated by monasteries	Since 19^{th} century: permanent farmsteads in higher elevations of the Moti country
Settlements in Valleys	Villages and cities, providing services and supply (market, administration)	
Settlements in the mountains	Dispersed farmsteads	Small villages ("cring"), dispersed farmsteads
Farmstead	1 large house, containing all elements and functions for livelihood of people and animals	Many buildings, each having its specific function
Use of meadows and pastures in different elevations	High pasture for young cattle (june to October), huts for herdsmen ("Viehhütte")	Seasonal homestead "Mutatura" in the mountains above the farmstead High pasture (may to july) for the majority of the animals; huts for herdsmen ("coliba")
Fiber crops	Cultivation of *Linum usitatissimum* until end of 1900^{th} century (GOTHEIN 1892)	Cultivation of *Linum usitatissimum* until ca. 1930 *Cannabis sativa* cultivated locally until recently (e.g., whip production)
Pastures	Grazing of young cattle on "common" ("Grinden", Allmendweiden) or private mountain pastures ("Sommerbergweide")	Grazing on "common" high mountain pastures ("Poiana")
Forest pasture (silvopastoralism)	Since 16^{th} and 17^{th} century increase of conifers through forest "devastation" Forest pasture until 19^{th} century	Forest pasture widely practised until today
Lopping	Locally lopping of *Fraxinus excelsior*, *Carpinus betulus* until 19^{th} century	Elevation <800m: Lopping of *Fraxinus excelsior* until today Elevation >800m: Lopping for winter fodder of *Fagus sylvatica* until ca. 1950, of *Picea abies*, *Abies alba* until recently

Forest products	Timber, firewood Resin collection until ca 1870; revival during the 1. world war Berries, mushrooms Charcoal, potassium (glass production!)	Timber, firewood Resin collection until 1990 Berries, mushrooms
Export of timber and fuelwood	since ca 500 years; rafting until ca 1920	Difficult, low relevance
Craftwork	Pledging, weaving, woodcarving	Vat, vessel production, weaving
Export of craftwork	Clocks (18^{th} – 19^{th} century)	Vats, vessels (until the 1990ies)
Phase II: Improved agriculture	**1800 – 1880**	
Introduction of potatoe	Beginning ca. 1750	19. century
Animals kept in stables during winter ("Stallhaltung")	Since ca. 1820 Increase of amount of manure (for fields)	Animals kept outside, during night and strong frost periods in stables
Melioration of sites, intensification of grassland Use as two-cuts meadow with aftergrazing	Irrigation of meadows ("Hangbau" der Hausmatten) = doubling the yield	-
	Clover cultivation instead of fallow (alternate husbandry)	-
	Seed cleaning	
Introduction of new crops, plant breeding		-
Separation between agricultural land and forest	early 18^{th} century (forest law 1833) Creation of a sharp ecotone instead of a continuous transition and its habitats	wood pasture practised until today
Change of property rights	Land use rights converted to property rights, combined with payments	
Privatisation of common pastures	19^{th} century; but many common pastures in Southern Black forest exist until today	Common pastures continue to exist
Population density and Migration	Emigration from farms on unproductive sites since ca. 1848, ending 1890	
Phase III: Improved infrastructure	**1880 - 1950**	**Since the 1990ies**
Improved infrastructure and access to markets Decrease of local prize of cereals Increased marketing options of dairy products, meet, animals	19. century: Railway, roads to remote villages Specialisation of local industries (clocks, textiles)	Since ca. 2005: Metal roads even to remote settlements
Electricity	Between 1900 and 1925	In mountain villages only in the 1990ies

Agriculture	Until ca 1880: Shifting cultivation until ca 1970, often in form of alternate husbandry ("Feldgraswirtschaft") Cultivation of *Secale cereale, Avena sativa*	Alternate husbandry until 1963, and relictic to the 1990ies Cultivation of *Secale cereale, Avena sativa, Hordeum sativum*
Common pasture	Privatisation. Intensification of grassland, or afforestation. Remnants in Southern Black Forest ("Allmendweiden")	Large extensive grassland still existing today
Specialisation on grassland ("Vergrünlandung")	Since ca. 1920, but intensive after 1960 Use of manure and mineral fertilizer	Since 1970ies Only use of manure
Specialisation on cattle raising, milk production	Since ca. 1920	-
Reduction of fields	1850 – 1900 - 1950	1900 – 1950 (- today)
Decreasing number of pigs	Since 1950ies	-
Settlements	Late 18th century: Expansion of settlements in valleys Abandonment of remote farmsteads	Expansion of settlements in the valleys since ca. 1970 Abandonment of farmsteads since 2005
Population density and Migration	Part-time farmers working in cities; population increase in urban areas including the valleys	Emigration since ca. 1970ies Declining population density
Tourism	Since ca 1887 (railway "Höllentalbahn"): Local trecking tourism; since ca 1900 Ski tourism (VETTER 1968). Since ca 1935: Road construction for tourism ("Schwarzwaldhochstrasse"), tourism by cars. Since ca 1955: Horse riding holidays.	Since several decades
Forested area	Since late 18th century afforestation with conifers ("Reutfelder", common pasture, less fertile sites)	Conversion of forest to grassland until recently
Forest structure	Clearcuts of mixed forest replanted with spruce	Large clearcuts replanted with spruce
Abandonment of agricultural land ("fallow")	First phase between 1848 and 1890	(no equivalent)
Phase IV: Integration into European and global market	**Since 1950**	**Since the 1990ies**
Size of parcels, accessibility	Field clearing ("Flurbereinigung") since 1950ies	(no equivalent)
Mechanisation	Tractor, machines replaced horses: cutter bar-, rotary mower	Few hand mowers since ca 2005
Mechanisation	manure- and mineral fertiliser spreader, loader wagon hay blower, round bales (hay)	(no equivalent)
Mechanisation - milking	Milking machines, milking installations, rotary milkers	(no equivalent)
Orchards and gardens	Disappearing since the 1960ies	Reduced use since ca 1995, still existing

Grassland management	Meliorations (drainage, destoning) Mineral fertiliser	No significant changes
Animal feeding	More and more silage instead of hay Cultivation of maize for silage Feeding with concentrate	No significant changes
Animal keeping	- Decreasing milk production - specialisation on meat production - direct marketing - extensive farming for landscape - decreasing number of farmers	Traditional timber stables replaced by new ones, built with boards, eternit roofs
Techniques of animal keeping	Manure replaced by liquid manure and slurry	(no equivalent)
Abandonment of agricultural land (”fallow”)	Second phase after 1950 Afforestation with spruce Natural succession towards forest	Since ca. 2006 Less fertile pastures, steep slopes abandoned since 2006 Mountain pasture “Poiana Horea” abandoned in 2007
Forests and forestry	Soil acidification since ca 1980 Catastrophic storm damages since ca 1990 - liming of forest soil - forest conversion to mixed stands and selection forest, no clearcuts	- Tendency to reduction of clearcuts - unregulated timber extractions in unsustainable way by the rural population
Tourism	Stagnation of tourism - searching for „events“ - large investitions: skiing, nordic walking, „wellness“ hotels - „Nature Parks“ should promote tourism	Increasing tourism - rural and ecotourism, skiing - Apuseni Nature Park
Nature Conservation	Loss of light-demanding species of oligotrophic sites, destruction of their habitats	Fallows of oligotrophic grassland since 2005, otherwise no significant changes
Subsidies, direct payment	“Landschaftspflegerichtlinie” MEKA	(no equivalent)
“Cross compliance”	Since 2005	In the beginning

CONCLUSIONS

In mountain landscapes, land uses, livelihoods, and landscape structures have changed permanently, and continue to change (Küster 1999). However, the driving economical and political forces and frame conditions today are changing with increasing velocity, compared to former times, when habitat continuity could last for centuries (Groth & Bressi 1997; Klijn & Vos 2000).

In all mountain ranges, human colonisation caused strong modifications of the landscape. Species composition and structures of the forests strongly were altered. Subsistance production resulted in a depletion of nutrients of the wooded and open pastures, and local accumulation of nutrients through animal droppings near the stables, causing extremely eutrophic soils with nitrophytic vegetation, and maintenance of fertility on the meadows. In total, the diversity of landscape structures and habitats increased, causing a

distinct pattern ("Eigenart" der Landschaft; e.g., Otte et al. 2008) which today is recognized by many people as "beautiful".

In Black Forest, 200 years of changes have permanently reduced the numbers of farmsteads, increased the forested area, and improved the livelihood of the (remaining!) farmers and completely altered the landscape structure and habitat conditions.

In the Apuseni Mountains, relatively few changes occurred during the Ceausescu period and before. Many traditional structures and land use practises remain there until today, and form an unique landscape pattern harbouring a diversity of habitats with endangered species. The traditional landscape elements, structures and species compositions still exist to a large degree. Only in the recent 10 years, similar trends as in Black Forest during the 19th and 20th century can be detected, endangering the heritage of this cultural landscape.

At present, the economical driving forces seem to push the land use system and the landscape pattern in Apuseni Mountains towards the same direction, which happened in Black Forest previously. After ca. 15 years of less regulated forest use, the timber resources of large areas are depleted, and agricultural productivity did not change much. Only rural tourism has proven to provide additional income.

Young people have left and will continue to leave the countryside. Since ca. 2005, the first farmsteads have become abandoned, marginal grassland is not being used any more, endangering the existence of the oligotrophic grassland as a characteristic landscape element. The traditional buildings, e.g., timber-framed stables with roofs thatched with branches of spruce and juniper mostly are replaced by eternite roofs.

Hopefully we all will be able to realize the severity of these losses early enough. In recent times, European and global frame conditions were of increasing influence upon the economical situation and societal structures in the mountain regions. "Unproductive" landscape elements tend to disappear, e.g., fields, orchards, wetland meadows or swamps. Particularly challenging will be the maintenance of low-productive openland habitats, e.g., oligotrophic, species-rich grassland communities.

The so-called "optimisation of production" in forestry and farming homogenizes the landscape and depauperates it of structures and species compositions. This process is very advanced in the Black Forest region. Because of these deficits, efforts are being made to support societal and environmental services of farmers ("cross compliance", nature conservation measures), to generate added value of their products, to improve the marketing of the region and tourism, e.g., through establishing "Nature Parks".

In the Apuseni region, the livelihood and lifestyle of the people will change completely in the nearby future. It remains to be hoped, that the Moti people will begin to realize of and to be proud on their still existing, but endangered rural heritage. To preserve the relicts of traditional landscape elements and habitats, combined efforts are needed by all stakeholders of the region. The process of the decline of the rural regions could be slowed down or halted in future through improvement of the infrastructure, and establishment of jobs in rural areas.

Specific measures of regional development, implemented together with the administration of "Apuseni Nature Park", have to find solutions to combine traditional land use practices, landscape elements and historic buildings with improvements of the economical and societal situation of the people (Abrud & Turnrock 1998; Reif et al. 2008).

Rural tourism will be a potential for "attractive" regions, whereas "normal" villages will loose their young population in nearby times. Increase of farm sizes, mechanisation and specialisation will allow only a limited number of farmsteads to survive. The collection of

Arnica montana as medicinal plant, local processing and direct marketing could also be a key element in preserving oligotrophic grassland through utilisation (Michler et al. 2005).

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