© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Land-use change in Yaylas of the eastern Black Sea mountains, Turkey

Mehmet Somuncu, Nevin Akpınar, Nilay Çabuk Kaya, Ekrem Kurum & Tanyel Özelçi Eceral

Abstract

This paper evaluates changes in land use/land cover in the yaylas of the Eastern Black Sea Mountains, Turkey, by comparing two aerial photographs from 1973 and 2004. Based on a research in three provinces of the Eastern Black Sea Region, 30 yaylas of four different types have taken as a sample. Maps of each yayla (for 1973 and 2004) have been produced by Geographic Information Systems (GIS). The maps show an increase in coverage by settlements, forests and road networks, and decrease in pastures. Consequently, mountain pasture ecosystem has faced with deterioration process with the passage of time.

Keywords: land use change, mountain pastures, Alps, eastern Black Sea Mountains, Turkey

1 Introduction

Land use describes the way and the purposes for which human beings employ the land and its resources. Land cover refers to physical characteristics of the land including human-made structures, which make up the earth's landscape. Historically, land use and cover changes have occurred primarily in response to population growth, technological advances, and economic opportunity. Human activities have directly or indirectly modified the natural environment. This is due to the fact that production demands by humans cannot be fulfilled without modification or conversion of land cover. Of the challenges facing the earth over the next century, land use and cover changes are likely to be one of the most significant issues (Alemayehu et al. 2009; Verburg et al. 2009).

Functionally, mountains play a critical role in the environmental and economic processes of the planet (Funnel & Parish 2001). The degradation of mountain ecosystems threatens to seriously worsen already existing global environmental problems including floods, landslides, and famine. Climate change, pollution, armed conflict, population growth, deforestation, and exploitative agricultural, mining, and tourism practices, are among a growing list of problems confronting the "water towers of the world," prompting warnings that catastrophic flooding, landslides, avalanches, fires, and famines will become more frequent and that many unique animals and plants will disappear (Price et al. 2004). Therefore, many studies have focused on land use/land cover change process on mountains in the world to understand land use/land cover change-related ecological, economic and social problems.

Academic studies about land use/land cover change in mountainous areas in different parts of the world such as in Europe (Coelho et al. 1999; Garcia-Ruiz et al.

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

1996; Hostert 2010; Monteiro et al. 2011; Mottet et al. 2006; Müller & Sikor 2006; Poyatos et al. 2003; Trakolis et al.1999), in Asia (Merzliakova & Sorokine 1999; Sikor & Truong 2002; Wilson 2006; Yongnian et al. 2003), especially in Himalayas (Bajracharya et al. 2010; Gautam et al. 2002; Gautam & Watanabe 2004; Sen et al. 2002; Wakeel et al. 2005; Xu 2008; Zomer et al. 2001), in Africa (Bezuayehu & Sterk 2008; Moges & Holden 2009; Kull 1998; Takle & Hedlund 2000; Zeleke & Hurni 2001), in North America (Galicia & Garcia-Romero 2007) and in Middle East (Al-Bakri et al. 2008) have been carrying on, through which important results and insights have been gained.

After 1990's, land use alterations from forests to other uses have occurred rapidly and widely in Turkey. Parallel to this process, research about land use/land cover change in the country has been increasing (Alphan 2003; Başkent & Kadiogullari 2007; Berberoglu & Akin 2009; Sıvrıkaya et al. 2007). The mountainous areas of the East Black Sea Region in Turkey are the area where noteworthy transformation of land use/land cover has been occurring (Atasoy & Bıyık 2006; Özden et al. 2004; Sıvrıkaya et al. 2007; Somuncu 1997, 2010a, 2010b). The aim of this study is to determine the change in land use/land cover in this mountainous area among the years 1973 and 2004.

This study is part of a project on "*A Study on Assessment of Changes in Land Use and Function of Mountain Pastures in the Eastern Black Sea Region*." The study area was chosen mainly because (1) The region, being one of ecologically global important areas including parts of Georgia, Azerbaijan, Armenia and Northern Caucasus of the Russian Federation, is located in the *Caucasus Hot Spots* and cover a total area of 532,658 km^2 (Critical Ecosystem Partnership Fund 2003). Furthermore, the region has been declared as one of the 200 important ecological areas of world by the World Wildlife Foundation (WWF). The Eastern Black Sea Mountains are exceptionally important for their biological diversity in the region, (2) since 1950s, the region has experienced a rapid change in land use patterns, in the functions of mountain pastures and in the lifestyle of local people, (3) these changes in land use and function of yaylas have ecological, economic and social effects.

2 Study area

The Eastern Black Sea Region is located in the north-eastern corner of Turkey (Figure 1). The region with mountainous shoreline, covers 36,837 km^2 (4.7% of the country) and has a population of 2.6 million (2009 census). The Eastern Black Sea region consists of seven provinces; including five provinces, Ordu, Giresun, Trabzon, Rize and Artvin, located along the eastern coast of the Black Sea, and two inland provinces, Gumushane and Bayburt. The border with the Republic of Georgia forms the eastern boundary of this region. It exhibits great diversity in geological structure, topography, climate and vegetation cover.

Within the region, high mountain ranges run parallel to the Black Sea coast in the north with undulating plateau on the southern foot of the mountains. High ridges trending east-west rise abruptly from the Black Sea coast, and the coastal plain is

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

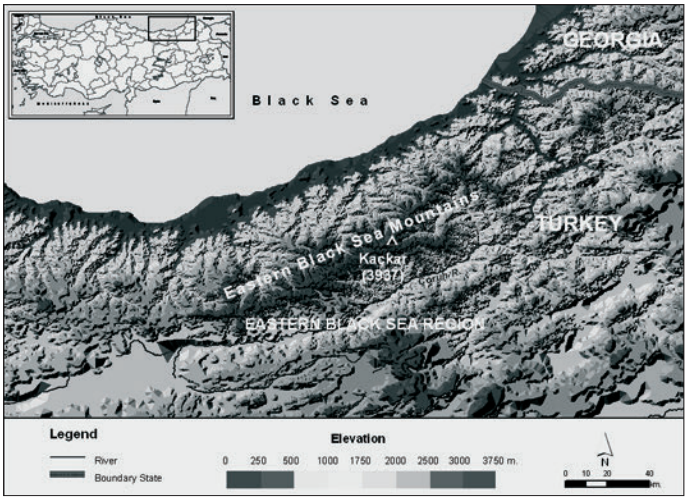

Figure 1: Location map of the Eastern Black Sea Mountains.

thus narrow. The mountain ranges get higher, narrower, and steeper toward the eastern area. Less than 50 km from the coast, the Eastern Black Sea Mountains rise to more than 3,700 m, with a maximum elevation of 3,932 m in the Kaçkar range, one of the steepest topography in the world (Japan International Cooperation Agency & State Planning Organization the Republic of Turkey 2000).

Climate of the region is highly humid with annual rainfall of 2,000 to 2,500 mm. Thus country's densest forests grow in this area. In addition, the area is hard to access due to its distance from developed areas and harsh topographical conditions (Somuncu & İnci 2004).

Cropping land is scarce in rural areas of the Eastern Black Sea Region due to its mountainous and uneven topography. For this reason, livestock husbandry has been an important economic activity for centuries. Seasonal migration (transhumance, German: Almwirtschaft) between low lying villages and high mountain pastures has been an integral part of rural life in the region. Herders living in the region use the highlands for pasture and for hay making for winter fodder. The Turkish word *yayla* (Alp; German: Alm; French: Alpage)refers to a place where farmers go to spend the summer; it is either a residence on a mountaintop or a summer pasture (Özden et al. 2004).

"Mountain plateau" and "summer pasture" are the dictionary definitions of the word but they tell only part of the story. Yayla is derived from the verb *yayılmak* (to spread out or disperse), as in the action of a grazing herd of goats, sheep or cattle, but the *yayla* is much more than a meadow to the locals. It is home for the summer, almost always successive summers, and *yaylalar* (plural) belong to particular villages whose individual livestock owners. In fact, most towns and villages in the Eastern Black Sea Region have their *yayla,* the upper limit for this being around 3,000 meters. The transhumance begins with the hot weather that comes in early summer, and in those cool *yaylas* the herders will live in wood or stone cabins, to return again to their villages with the approach of autumn (Dubin & Lucas 1989; Somuncu 1989).

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Table 1: Population of the eastern Black Sea Region in 1950 and 2009.

Year	Urban population		Rural population		Total population
	Number	%	Number	%	
1950	184,660	11	1,548,386	89	1,739,046
2009	1,430,775	55	1,170,554	45	2,601,329

There are over a thousand yaylas in the Eastern Black Sea Region. This traditional transhumance system has experienced a great change since the 1950s to present day (Somuncu 2010).

Starting from 1950s, a large number of people have immigrated to urban centers due to insufficient economic resources, leaving elderly people and livestock in rural areas, which has affected transhumance activities in these areas (Table 1).

However, a great increase in recreational activities has been observed in these mountain pastures from 1990s onward. Moreover, due to the expansion of tourism industry policy of the central government, tourist activities have also gained momentum in some mountain pastures and have turned them into important tourism centers with increased tourism investments. This is also bringing a rapid change in land use patterns and functions of yaylas and life style of local people. The changes in traditional transhumance activities have decreased already fading animal herding and production. Significant increase in infrastructures with investment on unplanned construction of new roads is very obvious. A serious increase in construction of illegal second homes in these areas has also emerged. Domestic tourism is rising and transforming to an attractive mass tourism in the region. This shift has resulted in changes in environmental, socio-economic and cultural values.

3 Material and methods

The population of the research is 1,161 yaylas in 7 provinces (*Trabzon, Rize, Artvin, Giresun, Ordu, Gumushane and Bayburt*) in the Black Sea Region. However these yaylas are not homogenous in terms of their functional characteristics. Therefore, with the information gained from the related authorities and from the fieldwork realized at the beginning of the research, the yaylas in the region had been categorized in four groups according to their properties (Table 2).

Selection of the yaylas as sample of the research is based on the development level of provinces where these yaylas are located. The seven provinces which the yaylas locate take place in different socio-economic development levels according to the Socio-economic Development Index developed by the State Planning Organization (SPO) in 2003. The Index of SPO group the provinces of the country in five levels, where the most developed provinces take place in the first level. The determination of the sample according to the development index level provides to pursue the effect of different socio-economic development levels on the situation of yaylas. The effect of development level has taken as an independent variable in

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Table 2: Yayla groups and characteristics in the eastern Black Sea Region.

Group of Yayla	Properties of Yayla
1. Group of Yaylas	Access is difficult, partly abandoned and is being used as mountain pasture, mostly yaylas in high elevation (> 2,000 m).
2. Group of Yaylas	Access is good in some places, function as mountain pasture is partially altered, yaylas that are being used for livestock grazing and recreation by local people.
3. Group of Yaylas	Access is easy, function as mountain pasture largely lost and yaylas are being used as recreational purposes by local people.
4. Group of Yaylas	Access is easy, mostly low-areas, function as mountain pasture has completely lost; yaylas are being used for recreational purposes by local people as well as for tourist purposes.

the choice of sample, supposing the possible effects of social structure on human and natural environments.

The provinces in the Black Sea Region in which the yaylas locate take place in third *(Trabzon, Rize, Artvin)*, fourth *(Ordu, Giresun)* and fifth *(Gumushane, Bayburt)* level of development. From each level, one province has been selected as a sample in which there are more yaylas than the others. Accordingly, Trabzon, Giresun and Gumushane are determined as the sample provinces. Then, the yaylas of the selected provinces have been categorized in four groups according to their properties defined in Table 2. From these groups the sample yaylas have been selected. From each province 10 yaylas, totally 30 yaylas are selected from the four groups successively, one yayla from the group which has the lowest number of yayla, two and three yaylas from the following groups, and 4 yaylas from the group which has the higher number of yaylas (Table 3).

The aerial photographs were used to determine the land use changes occurred in yaylas during course of time. The aerial photos taken on different dates were obtained from the General Command of Mapping (Turkey) in TIFF format. Out of these aerial photos the first one is in scale of 1/23,000, and taken in 1973; the second one is in scale of 1/35,000, and taken in 2004. Also, numerical land models were produced by using topographic maps that were in scale of 1/25,000. In order to rectify the aerial photographs the coordinates of the check points were calculated with local measurement methods. Erdas Imagine LPS was used in rectification of the photos. ArcInfo GIS 9.3 was run to calculate areas of gains and losses and to determine land use/land cover changes between 1973 and 2004 in each of yaylas.

To investigate the changes that occurred between 1973 and 2004, three major land use/land cover categories were distinguished: pastures, forests, and yayla settlements (Table 4). In addition, changes during the years 1973 and 2004 were determined through characterization of building and road network as points and lines respectively on GIS medium. The present study consisted of the interpretation of aerial photographs supported by the field work. All of the 30 yaylas in research area were visited thoroughly for on-site observations.

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Table 3: Sample yaylas and their properties.

Province	Yayla (Alp)	Group of Yayla	Altitude	Area (Ha)
Trabzon	GeyikliYaylasi	I	2144	66.5497
	EskaleYaylasi	I	2058	498.2312
	SimeneYaylasi	I	2080	114.2246
	YaylabaşıYaylasi	I	2014	341.1813
	IşıklarYaylasi	II	1826	951.8532
	DüzköyYaylasi	II	1840	522.3378
	AlazlıYaylasi	II	1931	547.9534
	KaradağYaylasi	III	1875	276.4843
	HırsafaYaylasi	III	1712	261,6911
	HıdırnebiYaylasi	IV	1404	381.921
Giresun	GöktepeYaylasi	I	2149	445.3004
	PancarbeleniYaylasi	I	1980	672.1887
	ŞeyhYaylasi	I	2025	558.7169
	PazarsuyuYaylasi	II	2000	468.2634
	GöbelYaylasi	II	1965	607.6389
	KurtulmuşYaylasi	II	1875	367.3957
	EğriçarıkYaylasi	II	1800	113.7474
	BektaşYaylasi	III	2070	267.5985
	KümbetYaylasi	III	1734	1,019.725
	KulakkayaYaylasi	IV	1624	50.0468
Gumushane	KazikbeliYaylasi	I	2335	545.023
	AlistreYaylasi	I	2208	541.1508
	GölcüğezYaylasi	I	2225	218.7895
	ÇekümceYaylasi	I	2224	300.0616
	AktaşYaylasi	II	2187	168.4652
	DavunluYaylasi	II	2212	711.8006
	KadırgaYaylasi	II	2292	1,084.71
	ŞahmelikYaylasi	III	2200	431.8638
	ErikbeliYaylasi	III	1700	133.8021
	DörtkonakYaylasi	IV	1950	228.8906
Total				12,897.6065

4 Results

The total area of 30 yaylas under research is 12,897.6 hectares. A major portion of the study area was consisted of pastures during the period between the two photographs (1973–2004). An analysis of 31 years period of 30 yaylas shows 0.8% reduction in grazing area from 10,723 hectares in 1973 to 10,620.27 hectares in 2004 (Table 5). The reason of decrease in grazing area is originated from expansion of forests and residential areas in the yaylas. It is found that the area covered by forests has increased by 0.6% (from 2,136.894 hectares in 1973 to 2,215.449 hectares in 2004). In fact, there is decrease of forest area in some places while increase in others.

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Table 4: The three land use/land covercategories for which changeswere detected for the periodbetween 1973 and 2004.

Land use/Land cover	General description
Pastures	Opened areas by cutting the trees from the forests, large part is found in Alpine areas above 2,100 meters.
Forests	Areas covered by trees forming closed or nearly closed canopies; predominant species are *Picea orientalis* and *Pinus sylvestris*
Yayla settlements (Alps)	Areas composed of small and/or scattered settlements; mostly located on the slopes or at the foot of the highlands

The reasons of increasing forest areas may be the reduction of livestock activities. In addition, because of heavy rainfall regime, the natural forestation and vegetation affect should also be considered in this increase. The rough topographic structure of the increased forest areas is also important in this respect. It is seen that the decreased forest areas are generally on the flat areas near the encampments. It was proven that some villagers removed the trees to produce fuel wood in these areas. (Atasoy & Bıyık 2006).

Settlement areas comprising of houses and other buildings in the yaylas of the area has increased from 37.66 hectares in 1973 to 61.889 hectares in 2004 by mean of 0.20% (Table 5). It is confirmed that the most important factor of spatial enlargement of these areas is accelerated development of tourism and related construction activities during 1990s started from 1980s. Construction of second homes in yaylas and start of gradual increase in the number of tourist resorts have led to the expansion of settlement area. Investigation shows an increase in number of buildings in the yaylas from 5,380 in 1973 to 8,210 in 2004 by mean rate of 152.6 % (Table 4).

The change in constructions occurring in the yaylas is not only in terms of growing number but also in pattern and texture. The buildings that were built until 1973 were usually made of wood and stone, in the form of simple houses, for function of livestock activities. During field observations it is found that the size of buildings that were constructed until 1973 was around 60–70 m^2 on average. In later years, especially since 1990 the construction pattern started to shift towards concrete and multi-storey buildings, second homes and tourist resorts for tourism and recreation activities. The average covered area of these buildings is about 90–100 m^2.

Another change in research area has occurred in the road network in the yaylas. The road network in all 30 yaylas has increased due to development of tourism and recreation from 377.193 km in 1973 to 516.534 km in 2004 by rate of 136.94% (Table 6). Main reasons of the increase in road network are provision of access to the newly built houses; continue construction of old roads, provision of transit connections to other yaylas in the area and transportation to grazing area. Increasing number of buildings and road network expansion in the yaylas has caused a decrease in pasture areas.

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Table 5: Categories of major land use/land cover changes during 1973 and 2004.

Land use/ land cover categories	1973 land use/land cover (ha)	% of land use/land cover 1973	2004 land use/land cover (ha)	% of land use/land cover 2004	Difference in land use/ land cover 1973–2004 (ha)	Change in landuse/land cover 1973–2004 (%)
Pastures	10,723.054	83.1	10,620.27	82.3	–102.784	–0.8
Forests	2,136.894	16.6	2,215.449	17.2	+78.55	+0.6
Yayla settlements	37.66	0.30	61.889	0.50	+24.22	+0.20

Table 6: Changes of building and road network during 1973 and 2004.

Land use categories	1973	2004	Difference in 1973–2004	Change in 1973–2004 (%)
Building number	5,380	8,210	2,830	+152.6
Road network (km)	377.193	516.534	139.347	+136.94

5 Discussion and conclusions

Starting from the 1950s until today a big change has taken place in the land use/cover of yaylas and their function. The first dimension of this change is decline of livestock as an economic activity and consequently reduction of transhumance. One of the reasons is, from 1950s, migration from the rural areas of highlands to the region's coastal urban areas and large metropolitan areas, such as Istanbul, Ankara and Izmir have increased. Especially since the beginning of the 1980s, due to the application of wrong policies in agriculture, villagers did not generate expected income from the livestock and consequently gave up transhumance activities at a significant level. Therefore, human population and the number of livestock have decreased largely in yaylas; even some yaylas have been abandoned completely. Transhumance is continued as a tradition rather than an economic activity in majority of the villages in the region and is being carried out by elderly population with fewer animals (Doğu et al. 1994; Somuncu 1997, 2010a, 2010b; Tunçel et al. 2004). This situation makes the fertile and extensive yaylas uninhabited and creates regression in animal production.

The second dimension of change in the yaylas and transhumance activities started at the beginning of the 1980s. Because of natural and cultural attractiveness of the region comprising highlands and yaylas, recreation and tourism demand has increased. The main factors of this increase include high growth rate of urban population, relative increase of the prosperity level in the country and consequently development of local tourism (Grötzbach 1984; Seckelmann 2002). Due to changes in tourism patterns since the 1980s, the recreation/tourism activities, initially concentrated in coastal areas, began to turn towards areas with more natural beauty like mountains, forests and yaylas. The highlands and yaylas of the Eastern Black

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Sea Region with rich natural and cultural beauty has become a new destination to meet this demand. Therefore, the yaylas, once used to graze livestock are now being used for recreational purposes; and have started to transform into tourism centers (Özden et al. 2004).

In the early 1990s, Ministry of Tourism began to work on opening up the tourism centers at the highlands and yaylas of the region. In this context, 16 yaylas have been declared as tourism center by decision of Council of Ministers; this has become the turning point of large scale changes in use and function of the yaylas (Somuncu 1997; Özden et al. 2004). Today, many yaylas in the Eastern Black Sea Region have become a part of process of change in this direction.

The development of yayla tourism and ecotourism in the Eastern Black Sea Region are among the strategic objectives of the Ministry of Tourism. In the Action Plan 2007–2013 and Tourism Strategy of Turkey 2023, prepared by the Ministry of Culture and Tourism. Eastern Black Sea Region and its yaylas have taken important place in tourism development and diversification efforts of the country. In these strategies, the development of ecotourism and rural tourism are targeted; as a large area, ranging from Samsun in the Central Black Sea Region to Hopa in the eastern end of Eastern Black Sea Region, has been determined as *"Corridor of Yayla Tourism"* in terms of regional destinations and planning work related to the area (Ministry of Culture & Tourism 2007).

Recreation/tourism demand in the yaylas of the region increases every day along with demand oriented works to meet these needs. New easier ways to approach the yaylas are constructed; tourism related businesses and services are provided. Moreover, construction of second homes in the yaylas is illegal and irregular construction and concretion is continued (Özden et al. 2004). Although this situation has lead spatial and functional changes in the yaylas but the issue is not so limited. Because many problems have risen related to this transformation period and land use changes in yaylas.

These changes in land use and function of yaylas have economic, social and ecological effects. Tourism in the yaylas provides money inflow and has increased the income of the villagers. Since tourism is a service-based sector that requires more manpower, the development of tourism creates new job opportunities for local people. The employment of women is another positive effect related with tourism. Along with the development of tourism in the yaylas, local women have begun to work in touristic enterprises belonging to their families. Thus, the role of women who before were engaged only in housework and agricultural activities has changed. This is only one side of the coin. On the other side, there are also negative consequences of changes in use of the yaylas such as ecological, social and economic pressures. As a result, the mountain ecosystem is being damaged (Somuncu 2010a, 2010b).

The development of tourism/recreation usage over against the deterioration of mountain pasture function in the mountainous areas of the Eastern Black Sea Region reflected in environmental, socio-cultural and economic issues can be highlighted by the following points:

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

1. Environmental Issues:

- Increase in construction activities in the yaylas;
- widening of the old roads and construction of new ones for transportation to yaylas, result in damage to ecosystem particularly the endemic flora and fauna;
- decrease in pasture area due to the expansion of settlements and road network;
- destruction of natural landscape in the yaylas;
- solid and liquid waste management problems emerged due to lack of municipal management in the yaylas;
- noise and air pollution problems due to the increased number of motor vehicle related to tourism and recreation.

2. Socio-cultural Issues

- Gradual increase in construction causing change and damage to the vernacular architecture;
- change and deterioration of traditional rural life-style;
- conveying urban elements to yaylas through tourism/recreation;
- more commercial human relationships due to spread of tourism/recreation activities.

3. Economic Issues

- Declining livestock activity as a result of increased rural-urban migration and development of tourism in the region;
- adverse effect of entrepreneurs from big cities which are of outside the local area on the local economy.

Land use/cover change and thus the relational problems aroused in the yaylas of the Eastern Black Sea Region's mountainous areas are not only specific to this region. The transformation in the region has similarities with the other mountainous regions in Turkey (Sevgi 1984; Somuncu 2005) and in the world. Especially the change in the land-use in Alps and Pyrenees are the best examples. (Garcia-Ruiz et al. 1996; Godde et al. 2000; Gomez-Ibanez 1977; Mottet et al. 2006).

The development of tourism in the European Alps had already begun in the 18th century, when artists, writers, poets, and member of the aristocracy travelled for educational, religious and health reasons. Around the beginning of the 19th century, climbers began to explore the peaks of the Alps. Tourism as a mass phenomenon started in the second half of the 19th century, with the first railroads crossing the Alps (Funnel & Parish 2001; Godde et al. 2000). Therefore, the use of many European highland pastures declined after the mid-nineteenth century. In villages where population or economic activity such as tourism has increased, the alpine pastures often have been grazed less intensively, converted to ski slopes, or even abandoned. Herders' summer cabins have been remodeled into vacation homes for urban dwellers (Gomez-Ibanez 1977). Alpine regions changes became most notable after Second World War. The governments of Austria, Switzerland and Germany have been particularly active in providing support for tourist development as part of a programme to bring employment to mountain areas. In France, however, much of the investment

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

in ski resorts has depended heavily on private capital. The countries of the Alpine region are all major players in the tourist business nowadays (Funnel & Parish 2001).

A similar process has been lived in Pyrenees. First, transhumance has been deteriorated due to the socio-economic reasons and then the tourism development in the mountain pastures has followed (Gomez-Ibanez 1977; Garcia-Ruiz et al. 1996). Although the positive effects of the declining traditional transhumance system and the development of tourism in the mountain pastures is acknowledged, the adverse effects in terms of environmental and socio-economic issues are also discussed in different studies (Funnel & Parish 2001; Garcia-Ruiz et al. 1996; Godde et al. 2000).

The results of this research indicate that the land use change process in the yaylas of mountainous areas of the Black Sea Region resembles very much to the land use change process lived in Alps and Pyrenees in terms of its attributes, however in a different time period. In the research area, the change in the land use and the function of the yaylas date back to 1950s. First the yaylas had been vacated and in 1980s tourism/recreation have started to develop, in the beginning 1990s the yayla tourism have been accelerated by the policies of the Ministry of Tourism.

In Turkey until the beginning of the 1990s, the coastal areas were the top destination for a large number of people during their summer vacation. However, this preference has started to shift towards the mountain areas. Nowadays, mountainous regions of the Eastern Black Sea Region, especially the yaylas have become popular vacation spots for domestic tourists. It is expected that the region will attract more visitors in the future along with development of infrastructure, transportation, communication, accommodation as well as with increase in the standard of living of the country's population. As a result, part of the rural population gains in economic power and they have expressed their satisfaction with this development. However, if tourism-related development continues in an unplanned manner, the already deteriorating natural and cultural environment might be damaged irrevocably. A number of similar situations and experiences have been observed in different parts of the world, for instance in the Alps and Pyrenees.

Acknowledgements

This work has been supported by the projects: "A Study on Assessment of Changes in Land Use and Function of Mountain Pastures in the Eastern Black Sea Region" (SOBAG/109K079) financed by the Scientific and Technological Research Council of Turkey (TUBITAK).

References

Al-Bakri, J.T., M. Ajlouni, & M. Abu-Zanat 2008: Incorporating Land Use Mapping and Participation in Jordan: An Approach to Sustainable Management of Two Mountainous Areas. *Mountain Research and Development* 28: 49–57.

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Alemayehu, F., N. Taha, J. Nyssen, A. Girma, A. Zenebe, M. Behailu, S. Deckers & J. Poesen 2009: The Impacts of Watershed Management on Land Use and Land Cover Dynamics in Eastern Tigray (Ethiopia). *Resources, Conservation and Recycling* 53: 192–198.

Alphan, H. 2003: Land-Use Change and Urbanization of Adana, Turkey. *Land Degradation & Development* 14: 575–586.

Atasoy, M. & C. Bıyık 2006: Spatial and Temporal Variation in Distribution of Pasture and Highlands: A Change Detection Analyses Based on Aerial Photographs. *XXIII FIG Congress*, Munich: 1–10.

Bajracharya, B., K. Uddin, N. Chettri, B. Shrestha, & S.A. Siddqui 2010: Understanding Land Cover Change Using a Harmonized Classification System in the Himalaya. *Mountain Research and Development* 30: 143–156.

Başkent, E.Z. & A.I. Kadioğullari 2007: Spatial and temporal Dynamics of Land Use Pattern in Turkey: A Case Study in İnegöl. *Landscape and Urban Planning* 81: 316–327.

Berberoglu, S. & A. Akin 2009: Assessing Different Remote Sensing Techniques to Detect Land Use/Cover Changes in the Eastern Mediterranean. *International Journal of Applied Earth Observation and Geoinformation* 11: 46–53.

Bezuayehu, T. & G. Sterk 2008: Hydropower-Induced Land Use Change in Fincha'a Watershed, Western Ethiopia: Analysis and Impacts. *Mountain Research and Development* 28: 72–80.

Coelho, C.O.A, T.M.M. Carvalho & A.J.D. Ferreira 1999: Land-Use Changes in Portuguese Mountain Areas: Past, Present and Future. In: Price, M. (ed.): *Global Change in the Mountains*. New York: 123–124.

Critical Ecosystem Partnership Fund 2003: *Ecosystem Profile: Caucasus Biodiversity Hotspot*.

Çakır, G., C. Ün, E.Z. Baskent, Z. Köse, F. Sıvrıkaya & S. Keles 2008: Evaluatıng Urbanization, Fragmentation and Land Use/Land Cover Change Pattern in İstanbul city, Turkey from 1971 to 2002. *Land Degradation & Development* 19: 663–675.

Doğu, A.F., İ. Çiçek, G. Gürgen, H. Tunçel & M. Somuncu 1994: Göller (Hunut) Dağında buzul şekilleri, yaylalar ve turizm. *Ankara Üniversitesi Türkiye Coğrafyası Araştırma ve Uygulama Merkezi Dergisi* 3: 193–218.

Dubin, M. & E. Lucas 1989: *Trekking in Turkey*. Hong Kong.

Funnel, D. & R. Parish 2001: *Mountain Environments and Communities*. New York.

Galicia, L. & A. Garcia-Romero 2007: Land Use and Land Cover Change in Highland Temperate Forests in the Izta-Popo National Park, Central Mexico. *Mountain Research and Development* 27: 48–57.

Garcia-Ruiz, J.M. T. Lasanta, P. Ruiz-Flano, L. Ortigosa, S. White, C. Gonzalez & C. Martı 1996: Land Use Changes and Sustainable Development in Mountain Areas: A Case Study in Spanish Pyrenees. *Landscape Ecology* 11: 267–277.

Gautam, A.P., E.L. Webb & A. Elumnoh 2002: GIS Assessment of Land Use/Land Cover Changes Associated With Community Forestry Implementation in the Middle Hills of Nepal: A Case Study in the Kangchenjunga Conservation Area (KCA). *Mountain Research and Development* 22: 63–69.

Gautam, C.M. & T. Watanabe 2004: Reliability of Land Use/Land Cover Assessment in Montane Nepal. *Mountain Research and Development* 24: 35–43.

Godde, P.M., M.F. Price & F.M. Zimmerman 2000: Tourism and Development in Mountain Regions: Moving Forward into New Millenium. In: Godde, P., M.F. Price & F.M. Zimmerman (eds.): *Tourism and Development in Mountain Regions*. New York: 1–25.

Gomez-Ibanez, D. 1977: Energy, Economics, and the Decline of Transhumance. *Geographical Review* 67: 284–298.

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Grötzbach, E. 1984: Spatial Structure and Development Prospects of Tourism in the Black Sea Region of Turkey. *Ege Coğrafya Dergisi* 2: 198–207.

Hostert, P. 2010: The Carpathian Mountains in Transformation. *Mountain Research Initiative Newsletter* 5: 6–8.

Japan International Cooperation Agency & State Planning Organization of the Republic of Turkey 2000: *The study on the regional – plan for the Eastern Black Sea Region in the Republic of Turkey (DOKAP) Final Report*, Turkey.

Kull, C.A. 1998: Leimavo Revisited: Agarian Land Use Change in the Highlands of Madacascar. *Professional Geographer* 50: 163–176.

Merzliakova, I. & A. Sorokine 1999: Land-Use Changes and Decision Making: the Pamiro-Alai Case Study. In: Price, M. (ed.): *Global Change in the Mountains*. New York: 152–154.

Ministry of Culture & Tourism 2007: *Tourism Strategy of Turkey 2023*. Publication Number: T.R. Ministry of Culture and Tourism Publications 3090. Ankara.

Moges, A. & N.M. Holden 2009: Land Cover Change and Gully Development Between 1965 and 2000 in Umbulo Catchment, Ethiopia. *Mountain Research and Development* 29: 265–276.

Monteiro, A.T., F. Fava, E. Hiltbrunner, G.D. Marianna & S. Bocchi 2011: Assessment of Land Cover Changes and Spatial Drivers Behind Loss of Permanent Meadows in the Lowlands of Italian Alps. *Landscape and Urban Planning* 100: 287–294.

Mottet, A., S. Ladet, N. Coque & A. Gibon 2006: Agricultural Land-Use Change and its Drivers in Mountain Landscapes: A Case Study in the Pyrenees. *Agriculture Ecosystems&Environment* 114: 296–310.

Müller, D. & T. Sikor 2006: Effects of postsocialist reforms on land cover and land use in South-Eastern Albania. *Applied Geography* 26: 175–191.

Özden, S., E. Atmis & K. Menemencioglu 2004: Negative Effects of Recent Unplanned Expansion on Highland Ecosystems in Turkey. *Mountain Research and Development* 24: 303–306.

Poyatos, R., J. Latron & P. Liorens 2003: Land Use and Land Cover Change After Agricultural Abandonment. *Mountain Research and Development* 23: 362–368.

Price, M.F., L. Jansky & A.A. Iatsenia (eds.) 2004: *Key Issues for Mountain Areas*. New York.

Seckelmann, A. 2002: Domestic tourism – a chance for regional development in Turkey. *Tourism Management* 23: 85–92.

Sen, K.K., R.L. Semwal, U. Rana, S. Nautiyal, R.K. Maikhuri, K.S. Rao & K.G. Saxena 2002: Patterns and Implications of Land Use/Cover Change. *Mountain Research and Development* 22: 56–62.

Sevgi, C. 1984: Adana İlinin Kuzeydoğu Kesiminde Yaylacılık. *Ege Coğrafya Dergisi* 2: 177–197.

Sıvrıkaya, F., G. Çakır, A.İ. Kadıoğulları, S. Keleş, E.Z. Başkent & E.S. Terzioğlu 2007: Evaluating Land Use/Land Cover Changes and Fragmentation in the Camili Forest Planning Unit of Northeastern Turkey from 1972 to 2005. *Land Degradation & Development* 18: 383–396.

Sikor, T. & D.M. Truong 2002: Agricultural Policy and Land Use Changes in Black Thai Commune of Northhern Vietnam, 1957–1997. *Mountain Research and Development* 22: 248–255.

Somuncu, M. 1989: The Kaçkar Mountains of the Eastern Black Sea Coast. *Image of Turkey,* 26: 18–23.

Somuncu, M. 1997: Doğu Karadeniz Bölümünde Yayla-Dağ Turizminin Bugünkü Yapısı, Sorunları ve Geleceği. *Ankara Üniversitesi, Türkiye Coğrafyası Araştırma ve Uygulama Merkezi Dergisi* 6: 273–315.

Somuncu, M. 2005: *Aladağlar: Yaylacılık ve Dağ Göçebeliği Konusunda Bir Araştırma*.Gündüz Eğitim ve Yayıncılık, Ankara.

© Institut für Interdisziplinäre Gebirgsforschung (Institute of Mountaun Research)

Somuncu, M. 2007: Sustainable Tourism in the Kaçkar Mountains National Park, Turkey. *III. International Seminar on Mountain Tourism: Sustainable Tourism in the Montane Protected Areas, Building Partnership between NGOs' and Managers of Protected Areas, Seminar Report*, Sucha Beskidzka, Poland: 20–23.

Somuncu, M. 2010a. The Dilemma in Turkish highlands: preservation of natural and cultural heritage and tourism development – A case study of the Eastern Black Sea Region. *Proceedings of the 2nd International Conference on Heritage and Sustainable Development* 1: Evora, Portugal: 431–440.

Somuncu, M. 2010b: From Mountain Pastures to Mountain Resorts: Land Use Change in the Eastern Black Sea Mountains, Turkey. *Mountain Research Initiative Newsletter* 5: 9–12.

Somuncu, M. 2011: Sustainable Development in the Eastern Black Sea Mountains: Present State and Perspectives. In: Zhelezov, G. (ed.): *Sustainable Development in Mountain Regions: Southeastern Europe*. New York: 215–225.

Somuncu, M. & A. İnci 2004: Balancing protection and utilization in overcoming inaccessibility: a rural development model in mountainous area of Turkey. *Mountain Research and Development* 24: 307–311.

Trakolis, D., P. Platis & I. Meliadis 1999: The Ecological Importance of Mount Voras, Northern Greece, and Land Use Changes in the Prospect of Sustainable Development. In: Price, M. (ed.): *Global Change in the Mountains*.New York: 142–144.

Tunçel, H., G. Gürgen, İ. Çiçek & A.F. Doğu 2004: Doğu Karadeniz Dağlarında yaylacılık. *Fırat Üniversitesi Sosyal Bilimler Dergisi* 14: 49–66.

Takle, K. & L. Hedlund 2000: Land Cover Changes Between 1958 and 1986 in Kalu District, Southern Wello, Ethiopia. *Mountain Research and Development* 20: 42–51.

Verburg, P.H., J. Van den Steeg, A. Veldkamp & L. Villeman 2009: From Land Cover Change to Land Function Dynamics: A Major Challenge to Improve Land Characterization. *Journal of Environmental Management* 90: 1327–1335.

Wakeel, A., K.S. Rao, R.K. Maikhuri & K.G. Saxena 2005: Forest Management and Land Use/Cover Changes in a Typical Micro Watershed in the Mid Elevation Zone of Central Himalaya, India. *Forest Ecology and Management* 213: 229–242.

Wilson, A. 2006: Forest Conservation and Land Use Change in Rural Northwest Yunnan, China. *Mountain Research and Development* 26: 227–236.

Xu, J. 2008: The Trend of Land Use and Land Cover Change and its Impacts on Biodiversity in the Himalayas. *International Mountain Biodiversity Conference on Biodiversity Conservation and Management for Enhanced Ecosystem Services: Responding to the Challenges of Global Change*, 16–18 November 2008, Kathmandu, Nepal.

Yongnian, Z. F. Zhaodong & C. Guangchao 2003. Land Cover Change and its Environmental Impact in Upper Reaches of the River, Northeast Qinghai-Tibetan Plateau. *Mountain Research and Development* 23: 353–361.

Zeleke, G. & H. Hurni 2001: Implications of Land Use and Land Cover Dynamics for Mountain Resource Degradation in the Northwestern Ethiopian Highlands. *Mountain Research and Development* 21: 184–191.

Zomer, R.J., S.L. Ustin & C.C. Carpenter 2001: Land Cover Change Along Tropical and Subtropical Riparian Corridors Within the Makalu Barun National Park and Conservation Area, Nepal. *Mountain Research and Development* 21: 175–183.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: IGF-Forschungsberichte (Instituts für Interdisziplinäre Gebirgsforschung [IGF]) (Institute of Mountain Research)

Jahr/Year: 2011

Band/Volume: 4

Autor(en)/Author(s): Somuncu Mehmet, Akpinar Nevin, Kaya Nilay Cabuk, Kurum Ekrem, Eceral Tanyel Özelci

Artikel/Article: Land-use change in Yaylas of the eastern Black Sea mountains, Turkey 71-84