

Full Length Research Paper

Agro-landscape Modification and Ecological Conditions in Adjara Region

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Abstract

Agro-landscape is the specific part of anthropogenic landscape where natural, ecological, agronomic, social and economic fields are combined with each other. Soil is one of the most important and leading components of the landscape. Adjara region is typical with its landlessness in Georgia. Agricultural land takes only 25, 1% of the territory. Obviously, lands suitable for cultivation are quite little and make only 9.04% of the whole ground fond. Agricultural lands have been extremely declined. Severe anthropogenic loading in already volatile relief and climate conditions caused soil changes and violation of geological balance. Due to these landslides, snow avalanches, soil erosions and others have become more active in recent years. The mentioned process takes place as in sea side as well in middle mountainous Adjara. Landslide damaged agricultural lands (at about 650 Ha), 30% of Adjara territory is in dangerous geological process zone. Anthropogenic loading 3, 2 times exceeds acceptable standards in mountainous Adjara. The goal of the research is to discuss tasks like forming of agro-landscapes, to study their ecological conditions, to use and protect soil resources in Adjara region.

Key Words: Agro-landscape; Soils; Ecological Conditions.

Introduction

Agro-landscape is the specific part of anthropogenic landscape where natural, ecological, agronomic, social and economic fields are combined with each other. It's advisable to distinguish subtropical agro-landscape in subtropical zone. Agro-landscape is natural landscape modified by anthropogenic factors on scientific basis which as well is the composed specific part of the agro-landscape. Subtropical agro-landscape is well expressed in subtropical zone of Adjara. Initially, here were cultivated plantations of industrial tea (1884), Tung (1895), Bamboo (1896), and Citrus (1897). 1350 Ha of tea plantation was in Georgia before the First World War and 1150 Ha from it took place in Adjara. The oldest plantations of tea, citrus and other cultures are met only in Adjara and they are more than 100 years old. (Palavandishvili Sh.-Nature of Adjara and Agriculture. Batumi-2006).

Inclination of slopes hinders maximum utilization of soils valid for agricultural activities. Due to this problem, installation of mechanisms in mountainous Adjara is quite difficult. 0.05 Ha of arable and 0.12 Ha of cultivated soil come per capita in Adjara villages.

Soil is one of the main and leading components of the landscape. Adjara is mountainous region because of this erosion damages soil most of all. A significant part of the agricultural land is eroded and prevention of it is the most important event of soil protection. Improper usage of mineral fertilizers and chemicals, industrial waste and also excessive grazing cause great damage of the soil in Adjara region. The basic objective of the research is to analyze main disturbing problems in formation of agro-landscape and to set rational and systematic prospective for its development.

Materials and Methods

Adjara region is typical with its landlessness in Georgia. Agricultural land takes only 25, 1% of the territory. Obviously, lands suitable for cultivation are quite little and make only 9.04% of the whole ground fund [data from Adjara Geological Department]. Serious changes have been made in Ground Fond structure during last 40 years, table N 1 is the evidence of this. Quantitative indicators of agricultural lands are different according to the regions in Adjara, thus structural dynamic of agricultural lands is in progress with different quality also. (Data of Ministry of Agriculture of Adjara Autonomous Republic).

As it is shown in the table, agricultural lands have been significantly declined. The decrease in the little period of time is caused due the following basic factors:

- Barren lands have been abandoned by the partial reform of soils related to transfer of public lands in private structure.

- Part of agricultural lands lost their productivity in conditions of high slope and as a result of erosion-denudation processes, so they are used with other purposes.
- Agricultural lands are impacted by landslides as a result of geodynamic factors. Landslides damaged 785 Ha only in Khulo region, i.e. 18, 2% of total arable lands.

Table 1. Dynamic of Agricultural Lands of Adjara Autonomous Republic in 1970-2010 (Ha).

	Year	Total ground fund in Ha	Agricultural Lands	Among them			
				Arable	Perennials	Meadows	Pastures
Kobuleti	1970	72000	19860	1780	11965	315	5800
	1990	72000	21058	2236	12216	–	
	2010	72000	19552	2229	8635	302	8386
Khelvachauri	1970	43000	11396	1450	8240	41	1665
	1990	43000	11263	1209	8322	41	1691
	2010	43000	9977	1508	6889	29	2033
Keda	1970	452000	6050	3046	771	200	2033
	1990	452000	6056	3074	741	202	2033
	2010	452000	5093	2466	293	162	2172
Shuakhevi	1970	588000	3065	3065	160	2181	10474
	1990	588000	2561	2561	152	2563	10187
	2010	588000	1643	1643	37	2287	10513
Khulo	1970	71000	27634	5726	138	4880	16870
	1990	71000	23446	3272	55	3238	16881
	2010	71000	23760	2463	45	4379	16873
Total in Adjara	1970	29000	80820	15067	21274	7617	36862
	1990	29000	76266	12352	21491	6044	36379
	2010	29000	72862	10309	15899	7159	39495

Source: Data of Ministry of Agriculture of Adjara Autonomous Republic

Agro-landscapes took 25, 1% of the total Adjara territory in 2000, among them-9, 1% of cultivated lands and 3, 5% of arable ones. The main reason of landlessness in Adjara is the fact that only 0,005 Ha comes per capita, when it is 0, 14 Ha all around the country. Such low indicator of arable lands is also caused by the fact that the category of lands takes a little part in seaside regions. The most part of arable lands are met in mountainous Adjara where erosion-denudation processes and declining of productivity take place. (Paghava N.Z.- Modification and Classification of Adjara anthropogenic landscapes. Geographic magazine of Georgia N5, Tbilisi 2006. Pg. 86-89).

The main task is to use existing land resources rationally and reasonably, considering the fact that arable lands are maximally utilized and there is not any chance to increase them. The following works can be done regarding to this:

- Additional channels to be installed against erosion-denudation processes in order to avoid downpour and temporal flows.
- Traditional method of land protection to be recovered- terracing of slopes as one of the basic means against erosion.
- Slopes inclined more than 10 - 12° not to be cultivated by using machines/ mechanisms. Plowing of slopes inclined above 25° must be limited also. Planting of perennial crops must be prioritized in such places.
- Raising of land productivity must be done mainly on the base of using organic fertilizers; crop rotation must be done on the same slopes and etc. (Paghava N.Z.- Natural-Anthropogenic Landscapes of Adjara. Batumi-2006).

Past practice showed that maximum utilization of land resources and non-industrial exploitation led to the negative results. Therefore, urgent actions must be taken for optimization of land resources as a reliable guarantee of both economic and ecological effectiveness. Severe anthropogenic loading in already volatile relief and climate conditions caused soil changes and violation of geological balance. Due to these landslides, snow avalanches, soil erosion and others have become more active in recent years. The mentioned process takes place as in sea side as well in middle mountainous Adjara. In total 177 villages have been affected by landslides and 51 are in zone of danger. (Data of Adjara Geological Department. Batumi-2010).

Nowadays, when our country is affected by economic crisis, population started assimilation of foothills and preparing wood for heating. All these made erosion processes more active. Territory of Adjara is one of the most difficult regions in Georgian ecosystem in a view point of dangerous geological processes, development of natural disasters and their results. Agricultural lands (650 Ha) were affected by landslides, more than 1200 houses were destroyed, at about 8000 residential houses are in dangerous zone, at about 160 different bridges were destroyed, roads (340 km) of central and local importance got out of order. 30% of Adjara territory is in the zone of dangerous geological development processes. Anthropogenic loading 3, 2 times exceeds acceptable standards in mountainous Adjara.

Results and Discussion

Severe anthropogenic loading on natural complexes in both agricultural and recreational purposes, in already volatile relief and climate conditions caused soil changes and violation of geological balance. Due to these landslides, snow avalanches, soil erosions and others have become more active in recent years. The mentioned processes take place as in seaside as well in conditions of

mountainous Adjara. Several families had to change their residential area in Kobuleti and Khelvachauri. Sometimes land sliding takes place on the slopes (village Chaisubani, Kobuleti region) as a result stable house becomes totally destroyed.

Dangerous geological processes were always expressed in Adjara. However they became more active in the last decade and is taking more and more dangerous character. Activation of these processes is related to the well-known earthquake in 1988. Statistical balance being formed during the centuries has become destroyed and all these caused a number of disasters with huge material loss and even fatal consequences. Landslides damaged agricultural lands (at about 650 Ha), 30% of Adjara territory is in dangerous geological process zone. Anthropogenic loading 3, 2 times exceeds acceptable standards in mountainous Adjara. (Data of Adjara Geological Department. Batumi-2010).

Conclusion

It is essential that complex, engineering-geological and water-conservation research works to be conducted in the zones prone to geological danger, otherwise this will cause deterioration of geological balance and local geo-dynamic processes will be spread all over the region. As a result, the above mentioned circumstances will totally deform ecosystem in Adjara region and it will not be able to manage public, agricultural and other factors rationally and reasonably.

Adjara is a mountainous region, therefore its ecosystems and agricultural lands are in quite unreliable conditions in a view point of stability. The circumstance is much complicated by human agricultural activities as well causing important changes in whole ecosystem and leading to total degradation of soil cover in the most cases. The latter has negative impact on ecological condition of the environment, namely it causes destruction of soil cover, vegetation, water pollution and etc.

Permanent settlement and agriculture take 30% of whole territory of Adjara. At the same time it should be mentioned that Adjara is densely populated in comparison with the other regions, on average 124 people come in 1 square km and in some areas (seaside zone) 500-800 people in 1 square km. (Putkaradze M.Sh., Ananidze M.A., Ecological problems of land resources utilization in Adjara. /"Innovation technologies and environmental protection." Kutaisi-2012. Pg. 198-200).

Special engineering-geological researches must be conducted in order to reveal areas damaged by natural disaster and to determine the quality of their activation. Landslide cadaster must be created, reflecting the elements and phases of landslide activation and all these must be done in order not to decrease agricultural lands and to improve the quality of agro-landscape.

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