



Current Environmental Situation in Gjirokastra Region. Risks, Factors and Consequences

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Keywords: *environmental management, main factors, risks, consequences, erosion*

ABSTRACT

During the last years, environmental damages have been observed in the research area of our study. These phenomena require without doubt a proper administration of natural areas. Natural risks have accompanied the human being all his life, therefore the interest for preventing them have been active since the earliest times. By natural risks we mean those natural phenomena with harmful and considerable physical, economic and social consequences. Among them we mention geological risks (earthquakes etc) geomorphologic risks (slides, collapses, erosion) and climatic risks (flooding, long period droughts, frosts and fires) etc. On the other hand, environmental consequences have happened under the impact of social factors; they can be direct or indirect, short time or long time, reversible or irreversible ones. Beside the natural factors (climate, structure of land, inclined and high terrain, hydrographical network etc) we also underline interventions of human beings that have intensified the degradation of terrain in this area.

1. INTRODUCTION

After a short presentation on the region's geographical position, the authors analyse the situation of the geographical environment, the risks and damages observed under the influence of natural and human factors. The authors identify the triggering factors and their effects on the environment, according to their content or origin. From the administrative perspective the territorial organization Gjirokastra region consists of three districts: Gjirokastër, Përmet and Tepelenë. In accordance with their origin the factors are classified into natural and human (anthropogenic). Natural risks comprise geological risks, geomorphologic risks, and climatic risks. After 1990, the damage determined by human activity has become more evident than before in this territory. This negative environmental situation in Gjirokastra region is the main resultant of urbanisation, rural exodus and lack of environmental policies. The acknowledgement of the causes of natural risks is important in order to establish the most appropriate measures solve the related environmental issues.

Hence, the main objectives of the study are the following:

- to contribute to the identification of the natural conditions of the region under study to understand factors affecting natural origin in its environment;
- to identify the main factors that cause the damage by origin;
- to synthesize the results of studies by defining the extent of the environmental damage;

A good environmental management will be better in favour of sustainable development in this region.

2. THEORY AND METHODOLOGY

The identification of the situation, environmental risks and their associated consequences is a significant measure because it is much better to prevent than to cure. The importance of the study lies in a better knowledge of the condition and performance of the environment in this region and in the

identification of problems created by various factors. We aim to propose models for a good environmental management based on a close collaboration between the local, central and regional authorities, because a well managed environment is an important factor for wellbeing and safety today and in the future for the people, his activities and livelihood.

The main methods we used are well-known in the scientific literature and are appropriate to the case study: a) the method of transversal survey (chronological facts). According to this method we analyzed the situation of environment in the region during a 50 year period of time; b) the comparison method that helps us compare the situation of natural environment and to identify the differences or the scale of damages; c) the cartographic method used to localize the changes occurred during this long period. By using these methods has enabled us to achieve the outcomes of research, to issue findings and realistic suggestions.

3. GEOGRAPHICAL LOCATION AND NATURAL CONDITIONS OF TERRITORY

The region is situated in the south of Albania, positioned in the south western part of Balkan Peninsula. It is bordered with Greece by a bordering line of about 60 km away from Ioannina, and 160 km away from the Iogumenica Bay. The geographical coordinates of Gjirokastra region are as follows: the northern extremity, at 40°31'00" northern geographical latitude, the southern extremity at 39°47'6" northern geographical latitude. The change is of 44'54" or with a maximal longitude north-south of 82 km. The eastern extremity it is situated at 20°37'00" eastern geographical longitude and the western extremity it is situated at 19°45'00" eastern geographical longitude. The change is of 52'00" or latitude west-east 74 km (see figure 1). The administrative territorial organization of Gjirokastra region consists of three districts: *Gjirokastër*, *Përmet* and *Tepelenë*. Tectonically, the construction of this territory consists of anticline and syncline creases stretched on North West-South East direction (see figure 2) and lithologically it consists of carbonic formations.

According to hypsometry the distinctive feature of the territory under research is the predominance of hilly-mountainous landforms (see table 1). We can observe high values of horizontal fragmentation of 3-5 km/km² on most of the surface, around 50.0% on the right side of Vjosa River. The Mediterranean influences give particular features of mild wet winters and hot dry summers. The territory is distinguished for significant quantities of annual average rain that exceeds 2000 mm/year, unequal

spreading of rain along the year and the intensity of rain.



Fig. 1. The map of geographical position of Gjirokastra region [12].

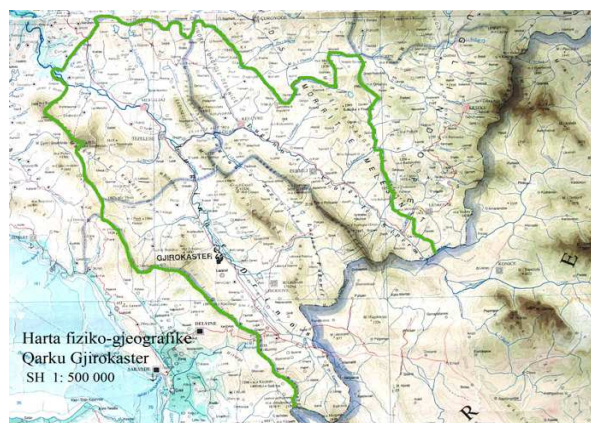


Fig. 2. The geographical- physical map of Gjirokastra Region [13] (completed by V. Duri).

Table 1. Structure of surface of Gjirokastra Region according to altitude.

UNITS	< 300	301-600	601-1000	1000-1500	>1500	Total
Region	14.8	23.8	31.0	26.3	4.1	100.0
Gjirokastër	15.9	21.0	29.6	25.9	7.6	39.5
Përmet	10.1	23.4	35.4	28.4	2.7	32.2
Tepelenë	18.6	28.2	27.9	24.3	1.0	28.3

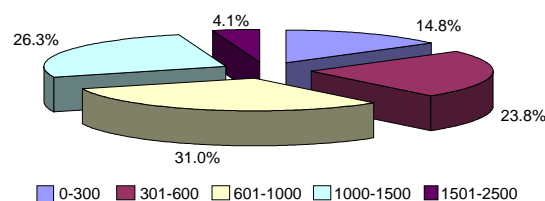


Fig. 3. Structure of surface of Gjirokastra Region according to hypsometry.

As a distinctive feature, not few are the cases when the rain quantity is particularly high (see figure 2), in areas where hills and mountains dominate (here the rainfall lasts for 24 hours, which is equal to the quantity that usually falls within one or two months together).

Gjirokastra region is characterised by a rich hydrographical network that belongs to Vjosa River. Drino is its largest affluent. It collects smaller streams and torrents that flow directly or indirectly into Vjosa River. The general length of hydrographical network is 872.75 km. Features of territory, lithology, climate and hydrographical system have predefined the opportunities and contrasts that this environment possesses.

4. ENVIRONMENTAL SITUATION IN GJIROKASTRA REGION. RISKS, FACTORS AND CONSEQUENCES

The ecological assessment of the area under research aims to introduce and highlight the system of values and conditions it has and to define the measures of intrusions in the nature, along with the triggered consequences.

4.1. Geological risks

The activation of neo-tectonic movements inducts massive collapses of formations affecting also the infrastructure and buildings on it. Such phenomena are found in the area of Gjirokastra castle (movement of blocks is activated several times thus risking the slide of the castle and quarters Pllakë and Pazari I Vjetër, in the area of Zagori – Poliçan – Çatistë, Llongo – Koshovicë, Zhulat – Kolonjë, Erind – Saraqinisht, etc. [10]. These movements are activated even by different types of works or constructions that are done without any geological study on the territory where they are carried out. To make these natural risks more evident certain geological issues should be taken into consideration during constructions and works of different types.

4.2. Geomorphologic risks

Considerable, immediate and high cost damages are caused by the slope processes of (i.e. landslides, collapses, etc). Their activation is correlated with a complex of factors (climatic, litho-structural, tectonic and topographic). Collapses and landslides have become more common in the last 10-15 years, in which case despite the fact climate has become more capricious, it other triggering factors that also enhanced these processes are the degradation and cutting of forests, replacing of natural plants etc. Wrong economic policy to increase the exploitation surface even in those

sectors where geomorphologic conditions do not favour it has stimulated the degradation of land (i.e. collapse and slides of diluvia, accelerated erosion).

Landslide is one of the geomorphologic processes of the slope with noticeable consequences on environment and economy. Their stimulation along with natural factors (presence of large quantities of clay and water in the slopes) is also linked with the unrestrained anthropogenic activities affecting the environment. Landslide processes are present almost everywhere in hilly mountainous areas. Their terrain is formed on terrigenous sediments and they are reactivated especially during the intensive rains, a specific characteristic of the area under research. Among the most developed landslides we mention: Fushës Bardhës, Kaparjelit (Kurvelesh), Hosit, and Hormovës [7].

Landslides and collapses are geomorphologic risks. Conditions that favour these risks in the area under research are limy layers (that are broken under activity of physical conveyances), inclined terrain, intensity of rains etc. We can mention slides in several road segments such as: Tepelenë – Memaliaj, Bëncë – Lekdush, in area close to the coal factory in Izvor, Zhapokikës, Rabies, etc. [7]. In slopes and escarpments huge rocky masses move. In most of Vjosa valley, cones formed by collapses like the Gorge of Këlcyra are numerous. In case of slopes and rocky edges with an altitude of some to hundred meters different size stones are found collapsed at the foot of the western part of Griba, Çajupit (Mountain of Zheji), Bureto (Libohovë), at the foot of eastern slopes of Nemërçka (the area of Cirqeve), the Gorge of Këlcyra [5].

Erosion is another geomorphologic risk, invisible at the surface, but continuous and with negative consequences for the physical environment and the economic activity of human being. It is one of the main forms of degradation and devastation of land. Nowadays it is considered as one of the natural processes that are threatening humanity. Anyway, even this risk is conditioned by natural and human factors. It is presented as:

- *regular erosion* determined by the natural factors (presence of smooth formation, lack of flora), represented by irrigation superficial erosion;

- *accelerated or anthropogenic erosion* that is linked with activity of human society.

The area under research is distinguished for the high values of erosion. Among the most typical are the following: the Highland of Dangëllia, where territories that are degraded or devastated cover half of the surface and superficial erosion reaches the value of 7 mm/year; the area of Pogoni and Zagoria. Observations show that this surface tends to increase quickly in the future. In Gjirokastra region the highest norm of erosion is about 52 tons/ha/year and it occurs in area A: Shkodra, Tropoja and Saranda [9].

During the period 1960-1985 considerable measures against erosion were taken for the protection of the land, which gave positive effects to reduce or eliminate over-flooding of land determined by some powerful stony torrents in the inhabited areas. Among them we distinguished the White torrent in Përmet, torrents of Çullo, Manalat and Lazarat in Gjirokastër. During intensive raining periods these torrents cause blocking and damaging of roads (especially on the road segment Tepelenë - Memaliaj in Iliras village, at the bridge of Bënça, Hormovë, etc), affect the land where agricultural products are cultivated (on both sides of Vjosa, Drino rivers), fill up and damage water courses etc. In many of territories this phenomena is stimulated by irresponsible actions of people on forest plants and herbs.

4.3. Climatic risks

As a natural phenomenon, climate has more visible and immediate effects on natural and urban environment. It seriously damages dwelling places, connection roads, agricultural lands, and socio-economic works. Among the climatic risks the effects of rain are the most present and effective in the area under research.

The annual average value of rain precipitations goes up to 1400 – 2000 mm with an average value for Gjirokastra region of 1500 mm. Their concentration in the half cold season of the year and the high intensity that characterise them (storms), cause rivers to overflow plots on a considerable part of the land. They damage communication networks or broke protection embankments, and fill up water courses. One of the biggest flooding (from the economic damage point of view) was that of December 1971, caused by the overflow of Vjosa river as result of intensive rains that continued up to 2-3 days without interruption [7]. Dimensions, level and intensity of these risks from spatial and time perspective are not the same. This depends not only on natural factors but also on the level and the way the human beings intervene or use a certain element of natural environment.

4.4. Damages from human activities

The use of land has been and still is an actual problem of special importance. This is because these forms of use in general and cultivation in particular come into certain interference with the natural phenomena in the area, thus noticeably affecting different ecosystems. From several different examples we have reached the conclusion that: human being as a factor has been one of the main factors that have a significant impact on nature. By his activities he has caused deep changes to ecosystems that resulted in changes continuously increasing up to degradation. The

human being that uses nature to survive in life, being aware or not of his actions becomes one of the main factors in the modification of nature [10].

Environmental consequences occurred under the impact of social factors can be direct or indirect, short-term or long-term, reversible or irreversible ones. Thus, among the natural factors (climate, structure of land, inclined and high terrain, hydrographical network) are also present other unstudied interventions of human beings that intensified the degradation of land in this area.

4.4.1. The increase of agricultural land in mountain areas

The economic activity of human being has increased over time, and at the same time they have caused an increase in geomorphologic processes of slopes such as: landslides, erosion and environment degradation and alteration of specific ecosystems. Their stimulation is linked with the irresponsible activities of people like ploughing of the land on the slopes and on the back part of forests and valleys with effects on the environment. Self-isolation policy brought up the necessity to provide and supply all the needs of people especially on grains, based on their own forces.

In the situation of domination of hilly - mountainous land the ongoing process has increased the surface of cultivated land on the slopes, a process that it was encouraged by the watchword "*to go up the hills and mountains and turn them into fertile lands as plains are*". Around 40.0% of the new land resulted from the terrains with inclination of more than 20°, meanwhile it is known the fact that the limit at which natural plants can be replaced with cultivated plants is that of 13° inclination. Ever since the motto of new lands was put in use, damages that natural plants have caused are already visible there where natural ecosystems were replaced with agricultural products and this triggered even more the revitalisation of erosion. To erosion it was also added the overcrowding of population in some hilly areas that were disposed to be affected by erosion.

The concentration of over 45% of dwelling places and 35% of population at altitudes of 300-600 m, that correspond to the level of evergreen plants as well as the governmental policy to control and stop the free movement of population have determined the overcrowding of hilly areas with people that practice agriculture as their primary activity. This population's need for accommodation, fire wood and use of primary activity of their life (agricultural activity) were solved in most of the cases by increasing the pressure on natural environment seriously damaging the specific plants. In some places this category of plants has completely disappeared and been replaced by fruit trees [1]. We cannot find such continuity in other cases but this

process is still found in blurred forms. At this level, will consider it stressful in case of contact with urban and rural environments and sensitive in areas where there should be intervened in regenerating and increasing the green areas of cities or just reforestation. In the fight against land erosion, it was never given a primary role to these plants but to climate, waters, people's health (especially) and natural environment in general. In case of oak forests damages are lighter because they are away from the inhabited areas. In these areas their reproduction and natural development is not damaged.

The mining industry (of phosphorous and coal) and that of raw materials for construction triggered environmental problems. Stone quarries in Dropulli area (Dervician, Goranxi, Jorgucat etc) are accompanied by denudations, deformations of views covered with a lot of dust. Such situations are created by the mines of Fushë-Bardhë and Gusmar (in district of Tepelenë) even accompanied by problems of no sustainability in the occupied areas [10].

4.4.2. Damages during transition period

To the negative consequences of the past those of transition period are also added:

a). Disorganization of economic and industrial structure, overcrowding of cities, depopulation or demographic pressure in urban and pre-urban areas, and ecological insufficient awareness of population are the key factors that damage nature nowadays.

b). Urbanisation process (all over the country) even in the area under research is done with quick steps under conditions of new social, economic and political factors. This increase of urbanisation is linked closely with mechanical movement of the population from village that determines and stimulates permanent needs for new dwelling places, infrastructure and management of environmental offer. Such an unpredicted movement of population within the region (emigration to large urban centres) and outside the country (very present in this area) is accompanied by negative phenomena such as: leaving the agricultural land uncultivated (this affected the decrease of fertility as it happened with Dropulli plain etc), occupation of agricultural land with constructions and infrastructure, damaging of green areas and specific ecosystems or revitalization of natural phenomena with a quick action.

Further consequences of the above mentioned environmental changes in the area under research:

a). Modification of biodiversity has occurred due to the abandonment of agro-systems as the result of dissipation of cooperatives and farm systems, where moving of people as the result of emigration was accompanied with abandonment and no cultivation of agricultural lands, thus being at risk to be deserted. This was accompanied by an increase of harmful plants

and insects for the agriculture. A typical case is the increasing presence of migrant grasshopper that caused damages to the products that are cultivated on that land. Problems on the ownership of the land and its division resulted in the diminution of fertility of the land in use [2].

b). During this period of transition the lack of control on illegal activities like: discriminating cut of trees, allowance of graze for livestock, fire in the forests have brought decrease of protective plant coronas and loss of biodiversity in these area (as it is in the suburbs of Gjirokastra city, on the border with Lazarat, the forest between Libohova and Nepravishta, the area of Hllomo, Kardhiq). Ratio cutting-growing results in 1.3:1 in favour of cutting, whereas at country level this inventory is mostly negative 4:1. Degradation of forests in this region is more severe in district of Permet whose biggest part consists of forests [8]. In 1993, it was established the Environmental Regional Agency for the assessment of environmental impact in Gjirokastra region. Their studies showed that the green area per person was very small. This phenomenon has been more noticeable in Gjirokastra city from 12 m³ to 3 m³ per person this having broken the morpho-bioclimatic balance, which is accompanied by intensification of erosive – denudation processes [2]. This because the forest is one of the most effective tools for fighting against erosion and for revitalization of bare and degraded terrains that are hotbeds of the erosion [9]. The destruction of forests close to the residential areas was accompanied by eruption of rocky and muddy torrents at times of intensive rains, damaging roads and inhabited areas (most typical cases are those overflows of territories on both banks of Drino river), dwelling places, blocking of national roads, filling of lower beds of torrents, disappearance of vegetation.

c). The damage of plant covering is caused by numerous fires that often occur nowadays. They bring damage to forest life, to the organic material of the land, uncovering the land. In such conditions very quick erosion occurs that causes degradation of the terrain forming the so-called badlands. This makes that not only old bases of erosion be reactivated in many sectors but also new active ones appear. Except for the badlands in Dangellia area, such areas can be found in some hilly areas at altitudes up to 800m like the hilly territory Luftinë-Krahas (it is a typical case of erosion as result of widespread of clay layers and intensification of cultivation works on the slope), Lekël, Fushë-Bardhë, Zhulat, Hormovë, on the right slope of Vjosa, in area of Topovë-Poliçan-Skore, close to the city of Gjirokastra [3]. Without measures against erosion these areas will remain symbols of areas in danger and difficult to be used. In such conditions it is urgent to become responsible on forest cutting according to the law and find ways to revitalize them. A noticeable decrease is

noticed also in medicinal, aromatic plants and other plants with economic value. Their gathering with the purpose of earning money has brought a lot of damages. Many of them were completely deracinated from the roots as for example: tea, laurel, hawthorn etc.

d). During the transition period, even mechanical destructions became evident especially on fruit trees in the study area along Drinos Valley, in hilly areas of Krahës, Kalivaç, Lazarat. Deciduous forests of Sotira, Prongjia are deforested for raw materials. In case any protective measures are not taken, the actual rate of erosion is increasing and very soon the areas planted with fruit trees and olive trees will turn into badlands and hotbeds for erosion. Along with the degradation of plants directly or indirectly, another factor that is attributed to it is illegal hunting and diminution of rare wild animals in this area. Degradation of oak forests, shrubs and valleys during transition period is the result of overgrazing. During the last years the increase of livestock number (conditioned by the trade demand, the significant emigration of population of good tradition in livestock breeding) has reinforced the livestock breeding, fact that increased the pressure on plants and further on its use and degradation. The research on the disciplinary problem of hazing and its practice on proper scientific basis is proved even more necessary in these areas since it is conditioned by an agricultural economy more focused on livestock breeding.

e). The non-fulfilment of land privatization process is specified as another negative factor affecting environment. Non-solution and non-fulfilment of this problem naturally decrease the interest of the owner to protect the land and prevent from any conditions of degradation. Land privatization and its division into small parcels will determine the decrease of waters and even erosion etc.

f). The negative effect of the human factor is noticed even in their relation with water. Fortunately many of the cities in the region are close to rivers. But if we see the problem from the relationship the community creates with the river, they are not always positive. In the city of Gjirokastra, the relationship created between Drino River and the community is moving between destiny and misfortune. The reason is that crowds of people who migrate from one region to other and their settling in the downtown part of the city for more mobility and facilities in infrastructure etc, have developed a certain relationship with the river. The constructions close to the river bank increased and all along the uncontrolled connection of sewages and superficial waters of numerous production activities, urban waste, construction of many petrol stations and car washing places, the erosion of the river beds as a result of increasing demand for raw materials for construction activities. All interventions have changed the physical-bio-chemical elements of the water and

narrowed the riverbed and indirectly brought consequences like the tendency to reduce biodiversity [4]. Vjosa and Drino riverbeds are turned into a real store place for the urban waste that has narrowed the riverbed and is an obstacle for the flowing of water creating problems and overflowing of urban and suburban areas during the maximal rainy times [3]. The fact that in Gjirokastra City not a small number of birds of Corvus family or crows are co-living with the community, it shows that they have left the previous shelter (as the result of non-cultivating the land with corn) now having found as food resource the different sufficient urban waste that is thrown on the river banks. There is no other view to the river banks except for food and construction waste taking form of islands etc. There should be really advisable that places that are predefined to collect the waste to be placed 35 m away from water sources and about 15 m away from superficial waters [3].

The growth of water plants (as result of salts thrown in the river) using oxygen and iron of the waters had reduced the possibility to place animals there. The reduction of organisms that are the last part of food chain especially vertebrates (fishes, amphibians, reptiles birds and mammals) has urged the increase of insects even of harmful ones. A similar problem but reversible in time exists even at the tourist point of Viroi as the result of uncontrolled constructions and increase of pollution level. In this lake along Drino river seagulls could be seen before, while now when the lake and especially the river are polluted they are rarely seen, this being an indirect sign of pollution. They are very sensitive especially in relation with poisonous substances that gather in their body causing sterility, which results in reducing their number. The same phenomenon is noticed in case of fishes that are reduced in number (as result of water pollution and destruction of places where they deposit their eggs, or because of removing sands and gravels in uncontrollable way). Therefore, the situation of fauna in danger results in the following: mammals 22.5%, birds 5.3%, fishes 45.5%, amphibious 100% [6].

g). Air pollution is also present and it is especially linked with the overflowing of old cars that caused the creation of *car cemeteries* (close to the national road) turned into hotbeds for environment pollution. The fight to put air pollution under control has not started yet, meanwhile that issue of increasing pollution after the '90s is really sensitive.

h). Through uncontrollable increase of urban and non-urban areas the socio-demographic factor has caused physical and moral stress in the last years. Despite the fact that there are no proper researches of this issue, cities show *urban diseases* like noise and pollution from the cars. In Gjirokastër, on the 2-3 m wide cobblestone streets there are counted more than 10,000 cars, 50.0% of which are old.

i). Due to natural factors but also due to improper maintenance many monuments of great tourist and ethnographical value are ruined. For example, uncontrolled interventions in the suburbs of Gjirokastra castle have stimulated big size collapses that put this attraction with of historical value at risk. The same happens to the territories outside the urban plans.

All factors with impact on environment make the problem more complex, and it should be acted against it by legal provisions that would limit negative actions of the community members on the environment. If not, the later development will require the use of the concept of eco-economy according to which economic development has to be in harmony with sustainable environmental development. Nowadays inhabitants are acting with environment as capitalists were acting with their workers a century ago. Therefore, it is important this mentality to be changed without causing environmental catastrophes [3]. All effects and consequences of interventions on environment today create the environment situation, that should be rather called environmental diagnose more than transition.

5. RESULTS AND DISCUSSION

Natural risks from *geology*, *geomorphologic* and *climatic* are adding more risks to that of human factor. After the important political, social and economic changes (after 1990) it was observed an extensive damage to the environment, especially caused by the human factors. The damages caused by human factors have been greater during a short period as compared to natural factors, especially during the transition period.

Urban spaces resulted more damaged as compared to the rural space due to the increase of immigrant population. The city was found unprepared to handle the significant number of the population in such short time. The urbanization process is the most important factor nowadays and it is always associated with environmental consequences. For this issue the best thing to do is to approach carefully the population growth in urban area.

Along the numerous human factors that cause many damages to the environment, we also distinguish the lack of environmental policies to protect it. All the factors with impact on environment make the problem more complex. So it is necessary to increase institutional and individual responsibility.

6. CONCLUSION

Planning of the area should be understood as an ability of society to use it in a rational way in order

to be in harmony with natural resources, economic, social and cultural potential, with the social structure that presupposes growth of wellbeing, with ecological principles that would save and protect the environment. The protection and well management of natural environment certainly should not be far from the consideration of cultural monuments, history and nature. In favour of this purposes we should apply a public information measure through brochures and leaflets with the best views on great values. They should consist in given data for the area analysed, itineraries that should be followed during visits, monuments, values, their importance and current situation.

A special attention should be paid to the support and improving of abilities of local authorities for the administration of natural resources that they are responsible of, especially for the planning of territory and practices of land use. The role that administration should have is very important for the protection of nature. They should take more direct responsibility in this direction because the protection of values of a territory serves directly to its economic development. Attention should be focused on limiting degraded terrains through forestation and other anti-erosive measures, careful selection of collection place and recycling of the waste of different origin, in careful opening of stone-quarries or other sectors of river areas where is going to be used gritty earth, creation of new relaxing and entertaining places for the community etc. The aim and attention of local population should be focused in stopping without doubts the loss of biodiversity progressing to the sustainable development of natural resources to keep the vitality of the land and different types of habitats. It's necessary to minimize also the consumption of irreversible wealth in support of economic activity for the secure wellbeing of population.

7. ACKNOWLEDGEMENTS

The decision to research the environmental situation in Gjirokastra region was taken due to the changes that have occurred in this area since 1990 (due to political and economic changes in Albania). This analysis of environmental issues carries out the identification and analysis of factors and consequences. For this purpose, the support of the other authors (academics, economics, and demographers) and especially the collaboration with specialists in this field was needed. A great support was given by the geologists of the Geological Regional Office in Gjirokastra district. Their professional opinion with scientific value has been very important not only to identify the causes but also to prevent the aggravation of the environment problems in this territory.

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