

## Scientific Assessment and Scientific Use of Natural Resources in the Border Region of Has As An Opportunity for Its Sustainable Development

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### Abstract

Our article focuses on peripheral and *Border Region of Has*. It appreciates the large natural assets and provides its scientific exploitation ways as opportunities for development.

The natural resources provide good opportunities for social and economic development. Sustainable development in this area requires conducting more detailed studies clearly to define strategy for this development.

This study is based on recent studies of regional geography, population, environment and economy of Western and Albanian authors, studies and new concepts of evaluating and usage strategy of natural resources in the mountain areas.

For scientific analysis and conclusions have been used statistical data from central and local state authorities. Of particular interest are the data provided by the frequent expeditions, which were organized during direct observations in the field, conversations, consultations and surveys with residents made by various specialists and governors. Processing, classification and interpretation of the data was made through recognized statistical and geographic methods.

This study is the first to focus on the *Border Region Of Has* and among the first in our country.

It helps in detailed scientific knowledge of the problem on this rather peripheral region and throws his idea that its sustainable development requires to concept it as a single as whole with the stretch in Albania and in Kosovo.

Such conception of this regional unity helps in knowing to use scientific knowledge of natural and human resources, creates very good premises for sustainable social, economic and environmental development

**KEYWORDS:** transboundary Region of Has highlands, natural resources, sustainable development, ecotourism, etc.

### 1. The role of the geographical position of the *Has* border region in sustainable development.

*Has Border Region* lies northeast of the country and continues outside in the republic of *Kosovo*. In north as boundary serves Junk mountain and *Erenik*<sup>1</sup> river flow, branch of the *White Drin River*, in the Northwest is divided by district of *Tropoje* the upper flow of the *Skatina* river, in the west is divided by the district of Puke with the artificial *Fierza* lake,

<sup>1</sup> R. Çavolli Regional Geography of Kosovo, Pristina 1997. 419 pp.

<sup>3</sup> Ibid.

<sup>4</sup> V. Shtylla. Roads and Bridges old Albania. Tirana 1998 p 79

while in the south and southeast is divided by the district of *Kukes* by the unified *Drin valley*, on the east and Northeast as frontier serves the *White Drin River's valley*. *Has Highlands* has an area of 725 km<sup>2</sup>, of which 353 km<sup>2</sup> in *Albania* and 372 km<sup>2</sup> in *Kosovo*<sup>2</sup>. The region presents specific terms of administrative organization as it works differently in the two countries. In *Albania* it works with the district of *Has* comprising *Krumë* municipality, municipalities of *Golaj*, *Fajza*, *Gjinaj*. In *Kosovo* operates in *Gjakova* and *Prizren* municipality.

*Has Border Region* has functioned as a whole from the earliest periods until 1913 when it was divided into two states, and eventually closed the border in 1949 by former *Yugoslav Federation*.

- The *Has Highland Region* in all periods (excluding the years 1994-1999) has played the role of a bridge between our country and other parts of the *Kosovo Ethnic Groups* and beyond in the *Balkans*.
- The favorable geographical position especially expressed during the Middle Ages with the operation of the North road<sup>3</sup> linking *Shëngjin* with *Nish* and the further inland of the *Balkan Peninsula*.
- With the separation of boundaries in 1913 remained abroad two gravity centers of the region, *Djakovica* and *Prizren*, once these centers played an important role for the trade development. However, trade and economic relations continued to be preserved with *Shkodra* although at low levels due to natural barriers.
- From 1913 - 1949 *Has Highland* played the role of a link but at low levels due to the political changes that were made.
- The role of the geographical position of the *Has Highlands* ceased to exist in the years 1949 - 1999 as a result of the complete isolation of the country as a consequence of the policy of self-isolation that the communist state followed. This affected negatively the socio - economic development of the region.
- After 90's, especially after *Kosovo* was declared as an independent state on 17 February 2008 the role of the favorable geographical position is being reactivated and this as a result of the operation of the *Durres-Kukes* highway.

From the above analysis we come to the conclusion that the geographical location of the *Border Region of Has* despite obstacles at different times, appear as a favorable factor for sustainable development in the context of the establishment and functioning of the euro region of *Prizren*. Above From the analysis we come to the conclusion that the Geographical location of the *Border Region Of Has* despite obstacles at different times, appears as a favorable factor for sustainable development within the establishment and functioning of the euro region of *Prizren*

## 1. The impact of natural conditions in the sustainable development of the region

### 2.1 Geological resources and landscape construction as an opportunity for sustainable development

*Has Border Region* is made up of diverse formations, in most of the magmatic rocks and limestone, and holes are filled with deposits represented by clay, sub-argyle, conglomerate<sup>4</sup> etc. Formations of this area build different structures: magmatic - mass (continuation of *Kam - Tropojë* Massif) which also continues in the *Has-Kosovo* region, limestone building syncline of *Vlahn, White Drin Valley*<sup>5</sup>, *Molas* and terrigenous type of graben structures etc..

Geological construction, conditions also the rich diversity of landscapes and offers natural resources: chrome metallic minerals (*Perollaj Vlahen, Krumë, Babaj Boka*)<sup>6</sup> in which already exploitation has continued by foreign and domestic companies, iron-nickel (*Myç – Has, Vranisht*), copper (*Golaj, Nikolic*) and decorative stones associated with ultrabasic rocks. There are many construction subjects related to limestone, clay, etc.

The landscape of the *Has Border Region* is hilly, mountainous and is more pronounced in the *Albanian* side, as 400-800 m height occupies 66% of its total area. The landscape is diverse both in terms of morphological and morphogenetic: mountain ridges, plains, pits, valleys<sup>7</sup>. The diversity of landscape elements is associated with the construction of lithological and especially with the fragmentation of geological structures. The landscape is characterized by large hypsometric amplitude (1721m). It extends from 268m (*Fierza Lake Mirrors*) to 1989m above sea level (*Mount Pashtrik*).

The landscape of the area is characterized by large horizontal cleavage, from 3 to 5km/km<sup>28</sup>. This relates directly with the dominance of magmatic rocks and molasik ones with the poor permeability rate. Especially this morphometric parameter of the relief takes great value in *Kruma* pit (4-5 km/km<sup>2</sup>), while the karst plateau of *Has* gets smaller values, from 0.3 to 1 km/km<sup>2</sup>. The energy of the landscape appears quite different, because this area is dominated by small to medium values from 50-200 m/km<sup>2</sup> up to 300-500 m/km<sup>2</sup>. This refers to the small increases and to the strongly destruction of the ultrabasic tectonic blocks.

Simultaneously in this region we encounter with the diverse landscapes such as karst landscape with the diverse forms that dominates the plateau of *Has* consists of the upper limestone crete and stands for the greatest degree of differentiation tectonic compared to the other units. It's most characteristic phenomenon is the enormous development of karst processes in the development of which have helped the new lifting tectonic movements, the *White Drin* tectonic breaks, and of river *Kruma* and syncline structure<sup>9</sup>. Are exactly the secessionist tectonic breaks that gave the plateau of *Has* differentiating character between the decreased JP part and that of the most raised *Pashtrik* part in VL. In *Has* plateau karst is generally young and has created some contrasts in relief. Karst

<sup>4</sup> Gj. Gruda. Geographical Studies No. 4 (physical and geographical features, the highlands of Gjakova and Hasit). Tirana, 143 pp.

<sup>5</sup> R. Çavolli Regional Geography of Kosovo, Pristina 1997. 419 pp.

<sup>6</sup> N. Meçaj, M. Dida Kukes Region Tirana 2004. 103pp

<sup>7</sup> Gj. Gruda. Geographical Studies No. 4 (physical and geographical features, the highlands of Gjakova and Hasit). Tirana 1990, pg 14

<sup>8</sup> ibidem

<sup>9</sup> Gj. Gruda. Geographical Studies No. 4 (physical and geographical features, the highlands of Gjakova and Has). Tirana 1990. 147 pp

phenomena have led to the formation of a myriad of forms to the extent of karst Uvala<sup>10</sup>. Karst forms between the top of *Tregtan*, *Domaj* of *Qyteza* (half southwest of plateau), have rich forest cover with oak and beech, which give it a unique natural beauty. There is no lack of historical and cultural values, as in the top of the *Qyteza*, are found traces of an ancient settlement<sup>11</sup>.

In karst forms predominate ellipse-shaped funnels 25-60 m in diameter and 2-7 m depth, while dolina are 80-200 m in diameter and 20-35 m depth. Dolina and funnels group that lie between the top of *Domaj* and *Qyteza* form a typical elliptical uvala to the length of 4.7 km long and 1.5 km wide. In the north coast of rock (*Rrase*) and the tip of the *Qyteza* lies the typical landscape of dolina in the evolution of which have impacted the *Leshnica* river and the *Gjinaj* one. The greater development of karst landscape is among the top of the *Pashtrik* and that of *Qyteza*, funnels and dolina here are grouped into two major uvalas the one of *Kruma Highlands* and *Cahan*. The latest one is simultaneously the largest uvala and the most developed one in the *Has*<sup>12</sup> karst plateau. (*Pigeon Cave*, *Cave Yard*, *Two Doors Caves*, *Caves Dajlani*, *Bogdani Ponds*, etc.) some of these caves hold and the status of protected areas which have great value tourism other forms of karst relief are karst - wells and is worth mentioning among them the well known one in the village of *Cahan* the *Shepherd Well* to which legends are associated, the karst caves still unexplored (*Pigeon Cave*, *Cave With The Yard*, *Caves With Two Doors*, *Dajlani Caves*, *Ponds*, *Bogdani* etc.) some of these caves hold and the status of protected areas which have great value to travel.

While *Kruma* pit lies in the central part of the zone and has tectonic origin<sup>13</sup>. In general appearance it has the shape of a huge natural amphitheater, surrounded by wreaths of semi-mountainous landscape of hills, Which opens Southwest widely in the valley of the *River Drin*. That valleys, the streams run through this pit have not only managed to penetrate in the thickness of its molasiks but also through radical ultrabasic rocks, taking large thus horizontal fragmentation amounts of 3-5 km / km<sup>2</sup>. They start from the pit of tectonic-erosive and contact *Dobruna* between *Krumë-Vlahen*.

An important role in this region has the fluvial landscape which consists of valleys, such as the *White Drin River's*. Leaks of which have different levels of erosion. In the upper sectors they lose the authentic features of the valley this because the inability of water leaks to transport coming materials from the slopes. While in the lower sectors take the form of a typically "V"-art<sup>14</sup>.

In conclusion we can say that the diversified geological construction conditions also the diversity of landscapes and offers natural resources such as minerals, metallic chromium, iron, nickel, copper, ornamental stones, etc. which create opportunities for their use and therefore for the sustainable development. Hilly - mountainous region character creates

<sup>10</sup> Ibidem, Qiriazi P, Sala S, V Melo, F Bego, Laci S. Albania karst ecosystems. Tirana 1999.

<sup>11</sup> Përzhita L. Kukës Archaeological Survey

<sup>12</sup> Gj. Gruda. Geographical Studies No. 4 (physical and geographical features, the highlands of Gjakova and Has). Tirana 1990

<sup>13</sup> P. Qiriazi Physical geography of Albania. Tirana 2001. 175pp

<sup>14</sup> Gj. Gruda. Geographical Studies No. 4 (physical and geographical features, the highlands of Gjakova and Has). Tirana 1990

opportunities for development of animal husbandry as the area is noted for raising sheep and goat. Also in the *Has* border region meet different landscapes, such as valley, karstic, erosive, anthropogenic, in which the population of the area operates, creates opportunities for development of diverse nature tourism also makes chance for living.

## 2.2 . Climatic resources for sustainable development

The climate has transitional character from the pre-mountainous *Mediterranean*, to the to the climate with continental impact, hot long dry summers also, severe winters with significant amounts of snow are characteristic. Factors operating in the formation of regional climate are: Extension in the northeastern part of the country, distance from the sea, mostly hilly- mountainous landscape, the wider opening from the northeast to the northwest etc<sup>15</sup>.

The distinguishing climate feature of this area is the significantly observed change in the distribution of rainfall and temperature. Average annual temperature arrives at 11.4<sup>0</sup>C (*Krumë*)\*. If compared with the annual average temperature our country change varies from 2.1<sup>0</sup>C- 6.1<sup>0</sup>C. The main cause of this change is the height and of its northeastern position, that significantly condition the impact of the continental climate that comes from within the *Balkan Peninsula*.

In monthly distribution of temperatures is seen that January is the coldest month with an average of 0.4<sup>0</sup>C - 0.9<sup>0</sup>C. Absolute minimums also meet in January, upon reaching the - 19<sup>0</sup>C for the station of *Kruma*. the highest temperatures meet during July and August, with very few changes, 21<sup>0</sup>C and 22<sup>0</sup>C for the station of *Kruma*. Absolute maximum was recorded in city of *Kruma* in July with 38.6<sup>0</sup> C<sup>16</sup>. The average amplitude of temperature values for the *Has Highlands* is great 21.4<sup>0</sup>C.

Frosts have a major impact on the cultivation of different crops during the vegetation period, as well as in all activities of the population, from data for average values of the start and end of the period of frost appears that this area is characterized by a relatively large period of frosts. They constitute a common occurrence during the cold period of the year. Frost days range from 80-85 days per year.

Average of precipitation per year is 900 - 1000 mm. The region under study is part of the territories that receive precipitation below the national average. This is because at west it is surrounded from high mountains, on which the majority of the moisture of wet air masses coming from the west and southwest is discharging. Rainfalls have irregular. *Mediterranean* mode, with 60-65% of them falling into the cold half of the year<sup>17</sup>. A part of the precipitation falls in the form of snow, which focuses mainly during winter (from December to March), forming a solid layer. Decadic average of snow thickness here

<sup>15</sup> Gj. Gruda. Geographical Studies No. 4 (physical and geographical features, the highlands of Gjakova and Has). Tirana 1990

<sup>16</sup> Academy of Sciences. Climate Atlas of Albania. Tirana 1976  
□ The data are only for part of the region within the borders of the Republic of Albania

<sup>17</sup> P. Qiriazhi Physical geography of Albania. Tirana 2001. 176pp

reaches 10 -15 cm. Particularly is distinguished the second decade of December until the third decade of February.

Climate of *Has Border Region* has a great importance to sustainable development as it creates favorable conditions for the development of curative tourism as well as for cultivating a variety of crops. Frosts and amplitude of the temperature does not diminish the important positive role of climate in opportunities of agriculture development.

### **2.3 Water resources for sustainable development**

Hydrography of the region is poor as a result this relates to: country's below rainfall average of 900-1000mm and the construction of terrigenous and less permeable ultrabasic formations. The presence of karst, terrigenous and ultrabasic terrains, entails significant changes of spatial hydrography and water resources. At the first, there are underground water resources, while the surface is poor that the *Has* in *Albania* is entitled *The Dry Has* and in terrigenous and ultrabasics hydrography is rich at surface flow, especially at the *Republic of Kosovo* where the region takes its name *Soft Has*.

The presence of a number of water leaks as that of the *White Drin River, Erenik, Kruma, Vlahn, Skatinë* as well as karst resources where the most important is that of the *Kruma Vrella*. The source of *Kruma* originates at cracks of tectonic - karst southwestern slopes of the *Has Plateau*. This fountain is characterized by karst regime source depending on rainfall, especially snow. The annual average flow reaches 500-600 liters / sec<sup>18</sup>. Its waters are used to supply the *Kruma* city with drinking water. There are also other sources: *Spahija, Harhulla, Domaj*, but with smaller dimensions a part of which has the status of natural Monuments.

Among the artificial water facilities we mention aquifers and irrigation such as reservoir of *Plan (Llakajve), Dobruna, Qarri* etc, which together with the aforementioned river waters meet the needs for irrigation during the dry season.

In conclusion, the presence of rivers, streams and lake water affect a wide range of sources to sustainable development that meets the needs of the region's drinking water supply for the region, tourism development and agricultural development

In conclusion, the presence of rivers, streams and lake a wide range of sources of water affect to sustainable development of the region that also meets the needs of the region's drinking water supply, tourism development and agricultural development.

### **2.4 Land Resources for Sustainable development**

The variety of conditions and factors conditioned pedogenetik variety of land which, as throughout the country, especially in the vertical direction change. In this regard differ histosols lands, forests and pastures auburn. Formation of land cover in the *Border Region Of Has* has become largely by the ultrabasic rocks and partially destroyed rather in those of terrigenous limestone, in a mostly hilly, mountainous landscape, rainfall not rich enough to spill the eluvit transport, poor permeability and rich vegetation cover. In

<sup>18</sup> P. Qiriazhi Nature Monuments Albania, CD electronic edition, 2005

particular formation in maternal directly affected by salts magnesian enrichment in almost all types of its lands<sup>19</sup>.

Histosol lands have significant stretch and extend from about 300 m to 900-1000 m above sea level. Found especially in *Kruma Pit* and through the valleys of streams. They are histosol and mountain pastures. The former comprise the majority of agricultural land in the pit extend *Kruma* streams and valleys of *Vlahn*, *Rosman* etc. Their distinctive features are: property in magnesian salts, due to the dominance of ultrabasic formations. Their reaction is weak acid, are rich in nitrogen and humus but low in phosphorus. Histosol mountainous lands occupy the majority of herbal oak floor heights of about 900-300m to 1000m above sea level. Their formation and development of the ultrabasic rocks and eluvium the influence of biochemical factors have made them very rich magnesian salinity. In this generation part and the pink lands which lie mainly in the karst plateau of *Has* the village of *Cahan to Kishaj*. They are formed by clays collected at the end of uvala and dolina karsts.

Brown forest lands or beech forests lie in height 1000-1400 m above sea level and have very little stretch. Thickness their profile is directly related to the slope of the slope. They have shallow profile in northwestern slope of *Pashtrik*, top of *Aplas*, *Gajrep*, whereas *Has* plateau have deep profile. These placed mainly on the part ultrabasic rocks lime and plant cover fully represented by oak floor. Are rich in humus 12-14%, have a grainy structure, saturated with bases and neutral reaction. Their particular is that they have significant amounts of nitrogen and potassium, along with other nourishing elements that make the land more fertile than the first.

Pasture soil lie in the vicinity of the top of the *Pashtrik* heights 1400-1900 m above sea level. They are covered almost entirely by alpine laying bare just *Pashtrik* peak crest.

In conclusion, the diversity of land in the *Border Region of Has* expressed by many in the vertical direction provides for the cultivation of a variety of crops, especially fruit trees.

### **2.5 Floristic and fauna resources for sustainable development**

Forested areas in the *Has Border Region* occupy about 62%<sup>20</sup> of the area, especially in the *Kosovo* region making it the most important element of landscape. In this region three plant floors meet one of oak, beech and alpine pastures.

The oak herbal floor prevails, due to the prevalence of hilly landscape. This girdle starts from about 300 m altitude and reaches up to 1000-1100 m. The main tree representing this girdle plant is: oak and bush. The latter one is widespread and forms realm, while in many sectors is coupled together with oak. Formation of sub oak forest level consists of savory with sensational development in territories without high vegetation.

The beech plant floor is amazingly small, 2.5% of the total surface area<sup>21</sup>. It focuses entirely on the karst of *Has Plateau*. We find the most complete, wider and the top Areal

<sup>19</sup> Gj. Gruda. Geographical Studies No. 4 (physical and geographical features, the highlands of Gjakova and Has). Tirana 1990

<sup>20</sup> R. Çavolli Regional Geography of Kosovo, Pristina 1997. 419 pp.

of this floor between the *Qyteza, Rrasës Domaj* of the coast, it should be noted that beech is not very developed due to insufficient humidity of summer.

Alpine pastures floor has very limited scope and incomplete development. It focuses entirely on top of *Pashtrik* and resembles quite the southern *Mediterranean* alpine-style.

In this region finds favorable conditions a variety of animals. This proves the existence of many individual species, from the lowest to the mammals. Differentiated according to distinctive habitats; oak animal world, are: wild rabbit, fox, wild boar, wolf, partridges, woodcock, crow, woodpecker and swallow etc. In beech band meet the rare mammals such as grizzly bear, wild cat, wild goat, eagle, owl, nightingale, etc., to alpine pastures and sobering water habitats are found some fish species: carp, trout in the cold sobering waters. In the *Has Border Region* are found some kind of medicinal plants among which we mention the lime, thyme, chamomile, hollyhock etc.

In conclusion we can say that, the study area is characterized by a representative cross-section of the world's plant species along with the animal world but also other elements of landscape form interesting and diverse ecosystems: oak forest ecosystems, alpine pastures, oak, degraded ecosystems, etc., that have scientific value of ecological tourism.

## 2. Conclusions

Among the potential nature of *Has Trans Boundary Region* are:

The geography of the *Border Region of Has* situated in the oldest street crossings that connect the *Balkans* and the *Adriatic* offers many great opportunities for sustainable development.

Diverse geological construction which relate to the variety of the minerals such chromium which is used by private, foreign and national companies.

Very healthy climate best combined with a rich variety of flora, fauna constitute significant potential high value for tourist area.

We can encounter with many beautiful and picturesque landscapes as karst landscape of the *Has Plateau* with the characteristic forms, karst caves still not good explored (*Pigeon Cave, Caves Yard*, etc.). In the *Has Border Region* has been a considerable number of objects declared a protected area such as the *Cave of Pigeons*, beech of *Red Liken*, *White Drin Rivers Canyon* etc.<sup>22</sup>.

Sustainable Development of *Has border region* requires its conception as a single piece with stretch in *Albania* and *Kosovo*. Such conception of this regional unity will help in scientific knowledge and use of natural and human resources, will create much better premise for the sustainable social, economic and environmental development

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<sup>21</sup> Gj. Gruda. Geographical Studies No. 4 (physical and geographical features, the highlands of Gjakova and Has). Tirana 1990

<sup>22</sup> P. Qiriazhi Nature Monuments Albania, CD electronic edition, 2005.

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