

CONVERSION OF THE HYDRO-CLIMATIC RESOURCES IN TOURISM ATTRACTORS IN ROȘIA MONTANĂ-ABRUD MINING AREA

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ABSTRACT. – Conversion of the hydro-climatic resources in tourism attractors in Roșia Montană-Abrud mining area. This paper aims to analyze water and climate resources from Roșia Montană-Abrud mining area and to emphasize the necessity to transform these resources into tourism attractors. The most significant water resources are the anthropogenic lakes called "tăuri" which represent elements of great originality created for mining purposes. The first man-made lakes were created in order to activate the stamping mills used to grind the auriferous ores and occurred in this area since ancient times. These lakes have had an fundamental role during the millenary mining exploitation until the middle of 20th century, after which they had lost their significance during the industrial process, as a consequence of the 1948 nationalization. Previous research identified traces of a big number of lakes, out of which there are active only 9 in the present. Although these lakes play no role in modern mining, they have a high cultural value which can be capitalized through tourism activities. The mentioned area, due to its altitude, is also appropriate for practising mountain climatic therapy. Given the fact that water and climate resources inherently have a significant role when concerning outdoor activities, Roșia Montană-Abrud area is suitable for recreational nautical tourism, winter sports and mountain cure, but one has to consider that hidro-climatic resources are also important for rural tourism, agritourism, ecotourism etc., for which reason it is imperative to be provided adequate tourism planning and tourism promotion in order to capitalize them properly.

Keywords: lakes, mining, climate, touristic capitalization

1. INTRODUCTION

Roșia Montană-Abrud is a well-known mining region located in Alba county. It is part of the Metalliferous Mountains (which belong to Apuseni Mountains) and of the Golden Quadrilateral, important auriferous mining area located between Baia de Arieș-Zlatna-Săcărâmb-Țebea localities. One of the distinctive elements of the millennial mining at Roșia Montană are represented by the anthropogenic lakes built for mining purposes. The first man-made lakes of this type have appeared in large numbers since ancient times, but only a small number are active in the present.

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The man-made lakes along with the low mountains climate and depressionary climate which characterize the area are the main hydro-climatic resources to be used for tourism purposes. Even if most of the hydrographic network is irrelevant in terms of tourism because of acid mining waters and heavy metals which come from the underground mining galleries, waste dumps, tailings ponds and mine quarries which are spreaded in the area, the artificial lakes created form mining purposes are only little affected by the former mining activity.

2. CHARACTERISTICS OF THE HYDRO-CLIMATIC RESOURCES

2.1. Water resources

The *anthropogenic lakes* called "tăuri" from Roşia Montană have been built since ancient times in order to ease the mining activity. These lakes are the only man-made lakes created to help the grinding of the auriferous ores by using stamping mills (Duma, 1998).

The water accumulated in this way has been used to ensure the functioning of the numerous downstream stamping mills throughout the whole year, preventing gold exploitation cessation during droughts.

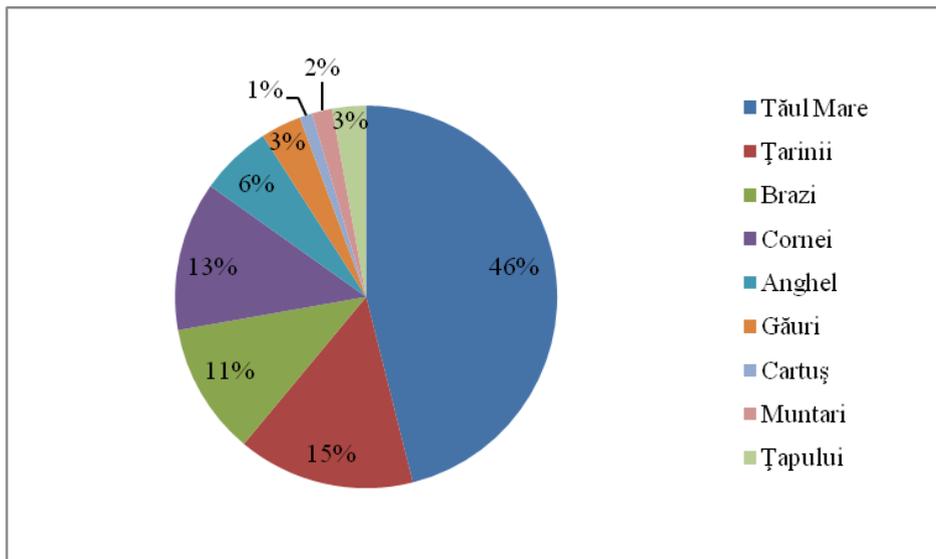


Fig. 1. The surface of Roşia Montană lakes (tăuri)

The anthropogenic lakes which are currently active have been built since the 18th century as a consequence of the state intervention. The lakes were cleaned and prepared in order to enhance their capacity and thus improve their economic efficiency. During the middle of the 18th century were documentary attested for the first time the following lakes: Tăul Mare (1740), Tăul Orlea (1745) and Tăul Seliștei (1752). The result of the efforts made to rehabilitate and improve the

functionality of these lakes was a tremendous growth of the stamping mills number which has almost doubled in just 15 years (from 119 in 1757 to 226 in 1772) (Sântimbrean, 1989).

Nowadays there are only 9 active lakes out of the 69 lakes of this type whose traces were identified through the remaining earth dams and through vegetation. According to the surface they occupy the nine lakes are the following: Tăul Mare, Țarinii, Cornei, Brazi, Anghel, Găuri, Țapului, Muntari and Cartuș. Considering both the surface and the volume of water embedded, Tăul Mare lake is the largest, as it occupies 46% of the total surface (Fig. 1) with an area of 32,210 m² and about 65% of the total volume of water. At the opposite one an found Găuri, Muntari, Țapului and Cartuș lakes which cover together an area of only 9% of the total (Bătinaș, 2010 after Aquaproject, 1995).

As a consequence of the nationalization in 1948, the anthropogenic lakes from Roșia Montană have lost their primary role as important elements in the mining process. In the present most of them are abandoned and affected by clogging and eutrophication processes (Bătinaș 2009, 2010).

Below are described the main anthropogenic lakes from Roșia Montană, considered in the order of their size and relevance for tourism.

Tăul Mare lake (Fig. 2) is located in the North-Eastern part of Roșia Montană and its water sources come from the streams belonging to Rotundu, Vârșuri and Șulley massifs. The lake has the present form since 1788. Due to its large size, it is one of the most suitable for practising nautical tourism. An impediment in this respect is represented by the poor accessibility.



Fig. 2. Tăul Mare lake



Fig. 3. Țarinii lake

Țarinii lake (Fig. 3) is located on the right side of Roșia Valley, near Jig-Văidoaia plateau, where takes place every year the FânFest festival. This lake takes its water from the homonymous stream. Although the second largest lake, tourism activities are discouraged also by a difficult access. Nearby the lake one can find Țarina guesthouse, owned by one of the main opponents of the RMGC project.

Corna lake (Fig. 4) can be found at the top of the Corna Valley and South-Eastern side of Cârnic massif. Tourist attractiveness is enhanced by the proximity of the Piatra Corbului protected area. The access is rather difficult and follows the same way as in the case of Brazi lake. The degree of clogging and eutrophication so that the lake needs important rehabilitation measures.



Fig. 4. Cornei lake



Fig. 5. Brazi lake

Brazi lake (Fig. 5) is located in the Southern part of Roşia Valley and in the North-Eastern side of Cârnic massif, at a short distance from the old center of Roşia Montană. At the present moment Brazi lake is the only which has touristic facilities, being populated with fish (but fishing is forbidden) and equipped with boats and camping areas. Brazi lake is the closest to the the old town of Roşia Montană and also the most accessible.

The hydrographic network of this mining area is part of the Arieş middle catchment area and is quite small concerning both length and flow rate. The main river is Abrud and its small tributary streams: Roşia (Foieşului) Valley, Corna Valley. Săliştei Valley, Vârtopului Valley etc. The most important tributary river is Roşia (Foieşului) Valley which crosses Roşia Montană from East to West and joins the Abrud river at Gura Roşiei.

Most part of the hydrographic network is affected by pollution resulted from mining. One of the main polluters is the tailings pond located in Săliştei Valley which is a major source of acid mining waters and heavy metals: Cu, Pb, Zn (Şenilă et al. 2006) Cd, Fe and Mn, and also the acide mining waters from Bucium-Izbita mining area, which pollute Abrud river (Bătinaş, 2004, 2006, 2010).

2.2. Climate characteristics

Climate features in Roşia Montană-Abrud are characteristic for the low mountains and depressionary areas. The dominant movement of air masses is from the South-Eastern, and the number of calm days is insignificant. The annual average temperature recorded at the meteorological station from Roşia Montană beetwen the years 1983-2007 is 5.4 °C, and the annual amount of precipitation for the same period is 776.2 mm. A large number of days with fog was also recorded:

148.2/year (Moldovan et. al., 2012). Also, thermal inversions are frequent, as reflects the structure of vegetation.

Most part of the out-door activities are strongly influenced by climatic conditions, which are of great importance both in summer, when tourism activities that are most influenced are hiking, hang gliding and paragliding, and hivernal season, when the primary factor for sports winter is the amount and form of precipitation, reflected by the snow layer.

3. HYDRO-CLIMATIC RESOURCES AS TOURISM ATTRACTORS

Hydro-climatic resources are usually important elements for practising tourism activities and often become major tourist attractors. Considering that nautical tourism can be practiced anywhere there exist areas covered with water covered, this tourism form is considered at European level as a significant element in the economy of any country (Luković, 2012), while the snow layer is also important in economic terms in the countries whose relief and climate are appropriate for practising winter sports.

According to an analysis of the touristic potential of the hydrography of the Arieş river upstream of Buru, the anthropogenic lakes from Roşia Montană received 4 points out of 100 points allocated for the whole mentioned catchment area (Cigher, 2011).

3.1. Recreational nautical tourism

Nautical tourism is considered in general as being of great importance, due to the abundance of areas covered by water: oceans, seas, lakes, rivers and canals. In countries which have natural aquatic boundaries as ocean or sea, for example the Mediterranean, countries, maritime nautical tourism is a significant source of income. As a consequence, at the initiative of nautical tourism networks of France and Spain appeared in 2009 The Federation of European Tourism Nautical Destinations, FEDETON, in order to promote maritime nautical tourism, but also nautical tourism on inland waters.

The presence of the 9 anthropogenic lakes in Roşia Montană justify the practice of nautical tourism by activities such as boating, swimming, recreational fishing and sportive fishing. Despite the existing potential in this regard, nautical tourism is very little practiced in the area in the present as a consequence of multiple reasons, such as the phenomenon of clogging and eutrophication, lack of touristic facilities, poor roads, the presence of RMGC company which discourages tourism development and lack of tourism promotion.

In addition, the lack of knowledge respecting the historys of these lakes and of their fundamental purpose, many people believe these lakes reprezents tailings ponds containing cyanide, which is completely false. This is the reason why we highlight the fact that in Roşia Montană has never been used cyanide

during ores exploitation process and therefore it is impossible to be found any cyanide in the lakes.

In order to increase chances of nautical tourism to develop the area it is imperative to be removed clogging and eutrophication and to be provided the appropriate touristic facilities, as boats. Another important step consist in helping fish populations to grow in order to encourage recreational and sportive fishing. Touristic signposting and improving the quality of roads, along with tourism promotion are equally important elements.

Currently, only Brazi lake holds minimal facilities for the practice of nautical tourism, being the only one which has a few boats. Despite the fact it is populated with fish, fishing is prohibited. Other lakes lack completely any kind of touristic facilities and fish population is very low, and the lack of signposting often makes them difficult to be found by tourists.

3.2. Winter sports

Considering the fact that Roşia Montană-Abrud mining area is a mountainous region, winter sports can not be neglected. In the area there can be found 2 ski slopes, one of them in Corna dedicated to the memory of the multiple national champion Andrei Țanțoș and another natural slope of about 2 km length located in the South –Western of Abrud town, on Șturț hill. Although the last ski slope lacks touristic facilities, it is frequently attended by the members of the sportive club from Abrud and by other people from neighbourhoods.

Other natural slopes for skiing or sledging can be found in the upper part of Roşia Montană, near Rotundu, Șulley and Letea massif and Tăul Mare lake. Unfortunately, in recent years snow layer is quite thin and therefore winter sports are threatened. Moreover, one have to take into consideration the competition represented by the existence of some better ski slopes such as those from Arieșeni resort.

3.3. Mountain cure

Mountain cure represents a good way to improve the health and to strengthen the body through direct contact with nature. Roşia Montană-Abrud mining area belongs both to sedative bioclimatic and mountain tonic bioclimate and it is particularly recommended for various diseases, especially those of the cardiovascular system and respiratory system. Negative ionization and the presence of aerosols have also a particularly beneficial impact on human health.

In Roşia Montană-Abrud area, sedative bioclimate characterize depressionary areas: Roşia Montană depression, Abrud depression, Corna depression while mountain tonic bioclimate can be found on massifs: Rotundu, Cârnic, Cârnicel, Ghergheleu etc.

3.4. The importance of hydro-climatic resources for other forms of tourism

The importance of hydro-climatic resources is vital for most forms of tourism, not only for those mentioned above. Firstly, the artificial lakes play an important role in diversifying the landscape and biodiversity, which makes Roșia Montană special compared to other mining places in the country, deprived of such aquatic oasis. Equally, these lakes have a high cultural value that can not be ignored. The presence of these lakes and of the countless traces proving the existence of such lakes since the beginning of mining in the area transforms Roșia Montană into a space with an unique cultural value.

As a consequence, hydro-climatic resources of the area have great importance for cultural tourism through cultural value of lakes, for ecotourism due to the particular biodiversity, for rural tourism and agritourism through the resources which can be used in agriculture etc.

4. CONCLUSIONS

Roșia Montană-Abrud mining area has important hydro -climatic resources that can be capitalized through various types and forms of tourism, such as: recreational nautical tourism, winter sports, mountain cure etc. Water resources, such as the artificial lakes called “*tăuri*” have on the same time a valuable cultural significance.

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