



# **The Healing Waters of Srebrenica in the Function of the Development of Tourism, Agriculture and Economy**

**Edin Ramić<sup>1</sup>, Ensar Salkić<sup>1</sup> and Besim Salkić<sup>1\*</sup>**

<sup>1</sup>*Faculty of Technology, University of Tuzla, Bosnia and Herzegovina.*

## **Authors' contributions**

*This work was carried out in collaboration among all authors. Author ER designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors ES and BS managed the analyses of the study. Author BS managed the literature searches. All authors read and approved the final manuscript.*

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## **ABSTRACT**

Srebrenica, this small town in the northeastern part of Bosnia and Herzegovina, has been described for centuries as a picturesque place, rich in healing waters, ores, and diverse cultural heritage. Today, Srebrenica is a symbol of suffering and suffering, but also of missed opportunities for the renewal of life and economy in this area.

In the work we present, we deal with potentials that can renew life in the Srebrenica area. Thanks to its unique and very abundant natural resources, Srebrenica has been inhabited since ancient times, presumably since the Illyrians. Guber mineral water was used as a medicine for the treatment of skin diseases even before the arrival of the Romans in this area. The first written traces of mineral springs near Srebrenica were made by the Turkish travel writer Evlija Čelebija in the 17th century, traveling through BiH, and the Austro-Hungarians bottled the mineral water of the Spa "Guber" and sold it throughout the monarchy ("Guber-voda"). Mineral water has been bottled and exported since 1887. In 1886, the first scientific research of mineral springs was carried out in the area of the municipality of Srebrenica, when Viennese researchers recorded the existence of 48 mineral springs. Special attention of the Austro-Hungarian researcher prof. Dr. Ernes Ludwig

\*Corresponding author: E-mail: [besim.salkic@untz.ba](mailto:besim.salkic@untz.ba);

was attracted by water from the source of the Velikog or Crni Guber, whose analysis was an excellent combination of minerals for the treatment of anemia.

In 1956, the Federal Ministry of Health of the SFRY and the Federal Institute of Medicines Commissions from Belgrade declared Crni Guber water a medicine. Thus, Crni Guber water is the only water that has been declared a medicine in the former Yugoslavia.

In the pre-war period, the total annual income of Banja Guber ranged from 1,200,000 to 1,500,000 US dollars. The company operated successfully until the last war in which, due to the war, there was a complete or partial destruction of certain facilities.

The aim of this paper is to determine the potential impact of Srebrenica medicinal water resources on the development of tourism, agriculture and economy.

Development of health tourism, increase of accommodation capacities, integration of agricultural producers and other activities enables rural development. By increasing the number of newly employed workers, household budgets, but also the overall economic development of Srebrenica, water could renew life in this area again.

*Keywords: Srebrenica; healing waters; tourism; rural development; life.*

## 1. INTRODUCTION

The life, culture, prosperity, well-being and power of all civilizations are tied to water. This best illustrates the emergence of ancient civilizations around rivers. Life by the water and with water is an inspiration to ordinary people, travelers, businessmen, poets. All of them perceive water and water sources as places of life, work, treatment and development.

Water is an essential resource for all life on the planet. Water resources in most countries of the world are under unprecedented pressure. The importance of water as a resource was also recognized by the UN Assembly, which, by a decision of the UN General Assembly at its session held on March 22, 1993 in Rio de Janeiro, declared this day World Water Day.

Water has a direct impact on agriculture and food production, so water management is crucial to achieving food safety [1].

Bosnia and Herzegovina ranks first in the region in terms of water quantity and purity and seventh in Europe, but this resource is poorly used.

Thermomineral waters are warm medicinal waters that are often enriched with minerals.

Bosnia and Herzegovina boasts many springs of mineral and thermal waters that have been used for centuries for medicinal purposes. The use of thermo-mineral waters in our area is related to the distant past and dates back to the ancient Greeks and Romans, who even then realized their healing properties.

Bosnia and Herzegovina is also known for its sources, radioactive mineral waters, which were used in the early historical period and were exploited in the treatment of various types of diseases [2].

The primary importance in spa centers is the provision of health services and the organization of tourist activities. Today in Bosnia and Herzegovina, 15 spas are active and registered as "health centers" [3].

In the Sarajevo valley is one of the oldest spas in Southeast Europe, there is Terme Ilidža with a source of thermo-mineral sulfur water, with a temperature of 57.5°C.

In Olovo is the Aquaterm Spa with a source of oligomineral (with a little salt) healing water.

In Fojnica, at the source of thermo-mineral water, there is the spa Aquareumal. This source is characterized in relation to other thermal waters, low water mineralization, with a significant presence of radon as a source of radioactivity that is within the allowable values.

The first written documents about the healing properties of the mineral water that springs in the central Bosnian town of Kiseljak date back to the 14th century. Today, there is a filling station in Sarajevo Kiseljak and a spa.

Banja Ilidža in Gradačac uses natural thermal-mineral water which is alkaline, carbonate, sulphate and weakly muriatic, with a special presence of sodium, calcium and magnesium. Water is slightly radioactive with radon content, which is used in the treatment of many diseases.

And some of the most healing springs are certainly the 48 springs of Guber-voda in Srebrenica. Of the 48 sources, 16 have been scientifically tested for their healing properties. Thus, some springs were given popular names such as Ljepotica, Mali guber, Očna voda, Crni guber, Velika and Mala kiselica [4].

Srebrenica mineral springs were known two millennia ago, as evidenced by inscriptions from 220, on the remains of a large Roman bath on Gradina (Sase) near Srebrenica.

It is assumed that the Srebrenica mineral springs were used by the Illyrians to treat skin diseases even before the arrival of the Romans in this area. The first written traces of mineral springs near Srebrenica were made by the Turkish travel writer Evlija Čelebija in the 17th century, traveling through BiH.

Spa and health tourism in Srebrenica has a long tradition. In Srebrenica, Guber mineral water has been used as a medicine since ancient times. All over the world, even in our country, spa and health tourism is closely connected with agricultural production. There are several points of contact between tourism and agriculture. First of all, it is the consumption and need for food in tourism. Consumption of agricultural products encourages rural development, ie improves the standard of living in rural areas. There is a mutual connection of agriculture with rural tourism and agritourism. There are more and more people who want to spend their vacation on one of the farms where they can prepare food for themselves, participate in certain works and achieve a mutual relationship with the environment.

The science of the healing application of mineral waters, muds and sea baths is called balneology. Before using mineral springs, it is necessary to do their analysis.

The first scientific research related to the mineral springs of the Srebrenica area was carried out back in 1886, when Viennese researchers recorded the existence of 48 mineral springs. Special attention of the Austro-Hungarian researcher prof. Dr. Ernes Ludwig was attracted by water from the source of the Great or Black Guber, whose analysis was an excellent combination of minerals for the treatment of anemia.

The second analysis was done in 1953 by prof. Stanko Miholjić from Zagreb and the third in 2005

dr. Almir Pašagić. The results of these three analyzes show a fairly large identity, which means that the composition and characteristics of "Guber vode" have not changed for over 100 years [5].

Based on the first scientific research on the health values of Srebrenica mineral springs, at the end of the 19th century the Austro-Hungarian company "Henrik Mattoni" carried out the first catchment and began exploitation and bottling of water as a medicine for clinics in Sarajevo, Zagreb, Belgrade, then exported to Great Britain, Denmark, the Netherlands, Sweden and America. After the withdrawal of the Austro-Hungarian monarchy and unfavorable economic conditions between the world wars, both in the whole of BiH and in Srebrenica, significant projects stagnated.

During the Austro-Hungarian monarchy, as early as 1887, Black Guber mineral water was bottled and sold throughout Europe, but also in Africa and America. During 1901, the company "Mattoni" from Vienna exported a record 236,544 bottles.

The Srebrenica area is characterized by numerous ore deposits of Pb-Zn sulfide and several sources of iron-sulfate mineral waters [6].

Guber-water contains iron in divalent form, which is only drunk in its natural state with prescribed medical therapy and has been scientifically verified for the treatment of various diseases. It treats hypochromic anemia, essential hypochromic anomalies, lack of appetite, general weakness, weight loss, exhaustion, fatigue, asthenia, neurovegetative disorders, chronic skin diseases, rheumatism, multiple sclerosis, etc.

Dr. Pašagić states that today three and a half billion people have reduced reserves of iron in their blood.

Scientific research by experts Mihalić, Blažević, Ciglar and Marie on the quality of Srebrenica mineral springs resulted in the conclusion "Mineral springs of the spa Crni Guber in their composition represent a unique set of minerals in the optimal ratio, which act equally in anemic conditions and after 10 days of drinking significantly increases the number of red blood cells."

It is an indisputable fact that the waters from the area of Srebrenica are healing, but now the

question is how to use it in order to rebuild the destroyed and war-torn Srebrenica.

Before the aggression in 1992, Srebrenica generated large revenues, recording up to 90,000 overnight stays and an annual income of around three million dollars.

The population of Srebrenica mostly lives in rural areas without secure and permanent employment.

The main incentive for the survival and further development of the rural population is the possibility of earning money through the use of available resources.

The population remains living in some areas if they have a secure existence, ie if they are given the opportunity to earn money through the use of available resources. The industrial plants in Srebrenica were destroyed by the war, the renewal of the industry and the employment of the population are not going as desired. For these reasons, it is necessary to develop those branches of the economy that use natural resources such as tourism and agriculture.

Family farms near tourist areas should be developed as mixed by source of income. More than 90% of productive agricultural potential is owned by small family farms. The orientation of agriculture to family farms is conducive to the development of various forms of tourism: rural tourism, agrotourism, health tourism, hunting tourism, sports tourism and other forms of tourism [7].

The experiences of others show that it is better to encourage domestic and our diaspora investments with the great support of the state and local authorities.

Foreign capital, driven exclusively by high profits, devastates natural and cultural resources (Italy, France), leaving only a crumb to the domicile population [8].

By combining the work of farm members in agriculture and tourism, it is possible to achieve maximum profit.

Tourism needs year-round agricultural products, and agriculture needs consumers [9].

The able-bodied population in Srebrenica is largely unemployed, so there is a need to maximize the tourist potential through the connection between tourism and agriculture. In

this way, jobs would be created at home. The rural population would be retained and the pressure on cities and their infrastructure would be reduced. The modern approach to agriculture has created the so-called "multifunctional agriculture" which has multiple roles, such as: production (food, raw materials), economic (processing), ecological (sustainable development), demographic (employment), as well as new roles (rural tourism). Such a wide range of agricultural functions provides the rural population with the opportunity to use them as its potential for further progress and prosperity.

Multifunctional agriculture and integrated rural development can lead to significant positive changes in society.

The development of rural areas in the late 1990s became an EU priority. Structural funds for rural development are being formed with an emphasis on integrated rural development and regional management, and later on multifunctional agriculture.

EU Rural Development Policy 2007-2013. dodine relies on:

1. increasing competitiveness in the agricultural sector,
2. Improving the quality of the rural environment, through incentives in land management
3. improving the quality of life in rural areas [10].

The Alpine region is the most famous example of the use of rural tourism in the development of rural areas. Austria and Switzerland stand out in particular, generating annual revenues of \$ 7 billion, relying on the development of accommodation facilities in the countryside.

In France, rural development began in the 1950s when they founded the National Union of Rural Households.

With the founding of the Tourist Association for Rural Tourism in Paris in 1974, it represents the beginning of professional dealing with this type of tourism. The union employs 600 workers with 42,000 members who own accommodation facilities.

Experiences in this field are being implemented in Bosnia and Herzegovina through the establishment of PRECs with the support of the French Embassy and the MFR (Association of

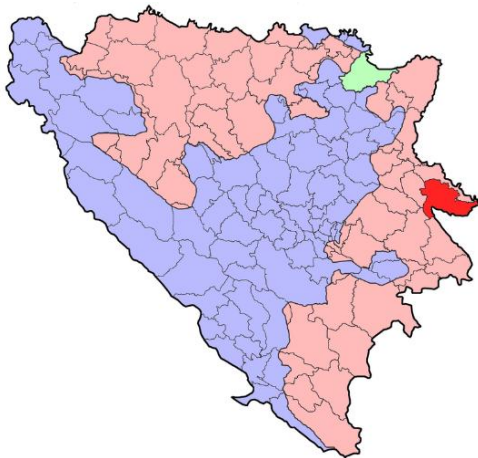
French Family Rural Centers), PREC (Family Rural Education Center) was first established in Živinice according to the experience and model of French family rural centers. This education center helps farmers from the Tuzla region, especially young people, to develop agricultural activities and fight against emigration from the countryside.

4 more such centers are in the process of formation (Srebrenik, Osmaci, Kladanj, Celic)

## 2. METHOD OF WORK

In researching and presenting known knowledge and acquiring and presenting one's own knowledge from methodological procedures will use the following known scientific methods of analysis, synthesis, description, explanatory, classification, comparison, compilation, generalization.

The municipality of Srebrenica is located in the northeastern part of Bosnia and Herzegovina, in the central part of the Drina River, Latitude: North 44 ° 3 '55 .01 "(decimal decimal 44.0652800) Longitude: East 19 ° 18 '58" (decimal 19.3161100), it has a total of 53,340 hectares of land, of which 19,930 ha are categorized as agricultural land, of which 11,136 ha is arable land.



**Fig. 1. Slika broj 1. Location of Srebrenica municipality in Bosnia and Herzegovina**

## 3. RESULTS AND DISCUSSION

Population migration caused by economic, courteous, social, health or some other reason in

the period from 1948 to 1991 ranged from approximately 390-500 inhabitants per year, which is about 10% of the negative migration balance of the region of Northeast Bosnia.

Forced migration in the period 1992 to 1995 caused by the war led to the outflow of 28, 255 inhabitants from the area of the Municipality of Srebrenica.

Migration or mechanical movement of the population affects the size of the total population and its spatial distribution, the birth rate and mortality rate, and the population structure of a particular area [11].

**Table 1. Population of the Municipality of Srebrenica**

Parameters	1991.year	2016.year
Population density (inhabitants / km <sup>2</sup> )	69	22
Number of citizens	39 953	11 698

Bearing in mind that most of the potential of the Municipality of Srebrenica is precisely in natural resources, this creates conditions for the production of certain products and the provision of specific services.

The population of this region has traditionally been engaged in agricultural production and with the collapse of the war-induced industry, agriculture is an important sector of economic development and a substitute for employment. The size of the holdings is a limitation because most of the holdings are small and on average 2.6 ha and there are about 10,000 of them.

According to the sources of the Republic Bureau of Statistics, land ownership is presented in Table 2.

Family farms form the basic structure of agricultural production in the municipality. Most of the registered farms are non-commercial and not market-oriented, but the number of farms and the area of registered land is increasing from year to year.

Table 3 gives an overview of registered farms.

The most important branches of agricultural production are: Livestock (sheep, cattle, poultry, pig farming), fruit (berries and woody fruit); farming, vegetable growing (cucumber, paprika, greenhouse production, beekeeping.

In order to achieve quality, yield and competitiveness on the market, agricultural producers join cooperatives and associations. Thus, in the municipality there are cooperatives and associations of agricultural producers, as follows:

Cooperatives: OPZ "Srebrenica", OPZ "Potočnica", OPZ "Agrobrest", OPZ Drina Plod Srebrenica.

Associations: Association of beekeepers "Skelanka", Association of beekeepers "Osat", Association of women "Podrinje 1", Association of citizens "Drina.

The healing waters of Srebrenica were the basis for the development of tourism, especially spa. In the 1990s, an average of 1,700 overnight stays were realized in one day.

In the last ten years, the municipality of Srebrenica has been visited by more than 50,000 visitors a year. It should be emphasized that the visits are mostly of a one-day nature. The average number of overnight stays per year is about 2,000 and is shown in Table 4.

So what was realized per day per day in the nineties is now realized at the level of the year. The drop in visits and overnight stays has dropped drastically. The reasons are multiple because the previous facilities were devastated, there is no adequate supply and many other reasons.

The economic development of the municipality should be linked to spa tourism and the exploitation of medicinal and mineral water. The resumption of spa tourism would have a multiple effect on the local economy, especially in tourism. The interest of the diaspora should be used to visit the Potočari Memorial Center, then the Guber Spa and other sources of healing water.

One of the ways to increase and improve the tourist offer is certainly rural tourism.

Rural tourism represents different types of tourism that develop outside urban areas, in free areas or villages. Although the 1994 OECD report (Ciani,1999) proposes the division of rural areas into four basic forms (agrotourism, ecotourism, adventure tourism and rural tourism),

**Table 2. Classification of land by property sectors**

Ownership	Total	Arable land	Orchards	Meadows	Pastures	Forests	Barren
<b>Private</b>	23.583	10.984	633	3.388	1.886	6.434	<b>258</b>
<b>Socially</b>	29.693	147	5	198	2.689	25.402	<b>1.252</b>
<b>Unorgan.</b>	64	5	1	3	16	31	<b>8</b>
<b>Total</b>	<b>53.340</b>	<b>11.136</b>	<b>639</b>	<b>3.589</b>	<b>4.591</b>	<b>31.867</b>	<b>1.518</b>

**Table 3. Number of registered agricultural holdings**

Year	Comercial	Non-comercial	Total	Total registered area in ha
<b>2014.</b>	5	337	342	<b>447</b>
<b>2015.</b>	10	472	482	<b>597</b>
<b>2016.</b>	<b>11</b>	<b>620</b>	<b>631</b>	<b>735</b>

**Table 4. Tourist arrivals and overnight stays**

Year	Num of arrivals	Domestic tourists	Foreign tourists	No. of overnight stays	Domestic tourists	Foreign tourists
<b>2008.</b>	283	153	130	592	353	<b>239</b>
<b>2009.</b>	319	177	142	588	324	<b>264</b>
<b>2010.</b>	637	316	321	1.078	525	<b>553</b>
<b>2011.</b>	896	277	619	1.496	387	<b>1.109</b>
<b>2012.</b>	757	302	455	1.308	503	<b>805</b>
<b>2013.</b>	830	313	517	1513	739	<b>774</b>
<b>2014.</b>	946	383	563	1579	634	<b>945</b>
<b>2015.</b>	<b>1245</b>	<b>422</b>	<b>823</b>	<b>2145</b>	<b>606</b>	<b>1539</b>

it is possible to distinguish almost twenty different forms of rural tourism, depending on the characteristics of each area, and a combination of attractive factors that serve to promote the area [12].

Almost all members of the household can be involved in rural tourism activities and can sell their products as final, and the economic profit is much higher.

In Greece, the main product of rural tourism is bed and breakfast with accommodation in traditionally furnished rooms with traditional breakfast, often based on local products [13].

#### 4. CONCLUSIONS

The need for regional connections in order to create a more attractive tourist offer

1. Necessarily investments in the education of tourist workers
2. Promotion and development of spa and eco-rural tourism
3. The development of tourism encourages the consumption of agricultural products
4. Tourism creates opportunities for better and more complete use of labor in rural areas;
5. Rural tourism and agritourism are new, increasingly sought after, forms of tourism
6. Open an office Family Rural Educational Center through which the offer of agro-rural tourism would be expanded
7. Add traditional dishes of the Eastern Podrinje to the tourist offer.
8. At the initiative of the Municipality of Srebrenica, plant orchards of indigenous fruit varieties and include them in the offer to tourists

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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