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Administrative Aspects Regarding the Valorisation of Geothermal Waters for Balneological Purposes in Bihor County, Romania

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Abstract: This study aims to analyse the development of the balneological phenomenon in Bihor County generated by its administration, consequent of which, a classification of rural settlements and new tourist resorts has been made. The objective is to identify the current trend in the exploitation of the balneological potential of the localities in Bihor County. A comparative analysis has also been carried out between the influence of the political regimes on the exploitation of geothermal water sources at the level of rural settlements and new tourist resorts during the last five decades. The comparative analysis has revealed that the development of the balneological phenomenon has been carried out sequentially. This sequence has been influenced by the political environment and the administrative factor from the period before and after the Revolution. In the period before the Revolution, all balneological sources were managed by the public administrative factor; they were maintained and kept functional, until the Revolution of 1989, against the background of a stable political environment. In the post-Revolution period, when the decision and involvement was sometimes undertaken on a small scale (private administration), and where the interest in development was focused exclusively on the valorisation of the balneological resources, it can be said that capitalist policy favourably influenced the evolution of the balneological phenomenon at the level of rural settlements and new tourist resorts. We have concluded that the capitalist period has been favourable because, when the thermal baths were found to be unanimously managed by the public administration, they were functional in greater numbers at the rural level as compared to the post-revolutionary period. We have not analysed any "policy" documents in order to make this statement.

Keywords: geothermal water; balneology; wellness and SPA; development; administration; rural settlements; Revolution of 1989; Bihor County; Romania

Citation: Ciurba, A.-P.; Haidu, I.; Ianc, D. Administrative Aspects Regarding the Valorisation of Geothermal Waters for Balneological Purposes in Bihor County, Romania. *Sustainability* **2023**, *15*, 10320. https://doi.org/10.3390/su151310320

Academic Editors: Alina Badulescu, Constantin Bungău, Delia Mirela Tit, Jin Luo, Cosmin Mihai Vesa and Dorina Camelia Ilieș

Received: 29 April 2023
Revised: 26 June 2023
Accepted: 27 June 2023
Published: 29 June 2023

1. Introduction

Bihor County is very rich in geothermal and mineral waters, and it can rely on their quality and quantity. The balneological phenomenon is based on the important aspects that contribute to the sustainability of the exploitation of geothermal resources, influenced by their administrative apparatus. There are many factors that influence the development of the balneological resource, such as economic factors (prices, income of the population, tourist offer), social factors (free time), educational factors (level of education, desire for knowledge), administrative factors (facilities and services), etc. In our study, we considered the administrative factor because it is directly involved in the sustainability of the balneological resource through the diversity and quality of the offered services, the cost of the services, the appropriate promotion, and the implementation of financing projects. A

high-performing administration adapted to the changes of the present, but especially of the future, is necessary and essential for the development of balneological resources.

Bihor County has had a long history of exploiting geothermal water. Several previous studies have reported on geothermal resources and their recognition, health, well-being, and sustainability [1–3]. The development in rural localities, for the exploitation of geothermal water, began in the 1960s–1970s, as a result of prospecting carried out to identify hydrocarbon resources. In Bihor County, there are 60 localities with geothermal resources. This comes from the geothermal deposits with the perimeter at the level of the localities with balneological resources [4]. Among the localities with geothermal resources, excluding the established resorts (Băile 1 Mai, Băile Felix, Stîna de Vale, and Băile Tinca), several studies have been carried out, and we have found only 12 localities (Mădăras, Tămășeu, Săcueni, Sarcău, Chișlaz, Livada de Bihor, Sînicolau de Munte, Alesd, Beiuș, Marghita, Sântandrei, and Oradea) which capitalize on this resource for several purposes: leisure, balneological treatment, in the skincare industry, as a heating agent, and fish farming. At the scale of rural settlements, it is known that the sustainable development and well-being of the inhabitants is closely linked to economic productivity and tourist attractiveness [5,6]. The tourist attractiveness of the villages in Bihor County has been greatly favoured by its geothermal water resources and balneological potential [7,8]. One of the important aspects that contribute to the development of the balneological phenomenon in Bihor County is its administrative factor. The practical importance is demonstrated by its need of economic development, industrial production, policy application, and overall increase [9,10].

In Romania, the exploitation of geothermal water for heating purposes is supported by the Thermal Energy Law no. 325/2006 [11], which establishes the general framework for heating systems and aims to encourage the use of sustainable energy sources, through which special mention is made of the geothermal energy. According to this law, all heating systems must be public possession. However, the procedure allows for a concession to a functional private company or a public–private association [12]. These types of geothermal energy have an appreciable economic and also environmental price because of the exploitation of the Earth's natural warmth, which is an economically and ecologically attractive substitute source of energy that can satisfy the growing demands of the 21st century [13]. When it comes to using geothermal energy, the University of Oradea is the only university campus in the world that uses geothermal water as a heating agent, for sustainable purposes. This organization, along with other nine universities, is a member of the European Universities for Sustainability Alliance (EU GREEN) [1]. The benefits of thermal waters in the treatment of skin conditions such as psoriasis, atopic dermatitis, and seborrhoea [14] influenced by their richness in minerals and trace elements with established dermatological indications can justify the use of geothermal water in the skincare industry [14].

The entire evolution of capitalization, from the communist to the capitalist period, was connected to administrative changes and political goals focused on a fast capitalist exploitation of thermal baths. Initially, there were many failures as no investments were made in the development or the functional maintenance of the thermal baths, which led to a state of dereliction. Then, gradually, some entrepreneurs found a way to capitalize on the potential of thermal baths through permissive and encouraging legislation, although the state intervened timidly to support the balneological progress.

The objective is to identify the current trend in the exploitation of the balneological potential of the villages, towns, and cities from Bihor County.

Literature Review

Tourism contributes to the positive experience of both tourists and local residents [15] but it also impacts the economy, contributing to the economic development of destinations [16–18]. The sustainability, challenges, opportunities, and advantages of wellness and spa tourism are supported by the quality of the environment and resources [19]. The principles of sustainable tourism provide evidence of how integrating public health principles

into destination management, destination policy, local politics, activities, and destination capital can deliver positive outcomes [20].

Tourist destinations that have the ability to become or remain attractive for wellness tourism need safety, good prices, nature-based activities, cultural attractions, a temperate climate, traditional therapies, healthy local cuisine, authenticity, sustainability, low pollution levels, and health tourism facilities, services, and experiences [19].

Studies on the role that health and wellness tourism plays in the sustainable development of the territory, by facilitating and contributing to the quality of life of communities, have demonstrated its success when it combines the different interests of the locals and of the visitors and it observes the natural, cultural, and economic resources of the territories [21–23].

Nature tourism occurs in areas where certain natural resources and climate can clearly influence well-being levels. Several studies report on the importance of balneology and the use of thermal waters for health and the role of health tourism in improving the quality of life, as well as on the facilities in health tourism and the inherent challenges in managing them in a profitable and sustainable way [24–26].

Geothermal tourism is an intensive practice worldwide, and opportunities related to geothermal bathing centres (SPA) are emerging for municipalities and administrations that decide to introduce them [27]. Water is the symbol of health tourism through its two major components—spa tourism, and wellness tourism—by supporting leisure or treatment tourism [28].

The concept of wellness is understood as the sum of all experiences located within the destination that promote health and well-being, including the holistic enrichment of tourists' physical resources, such as mineral waters, enhanced by other services such as hotels, restaurants, entertainment, and cultural activities [29].

There are many articles that analyse the cost-effectiveness of spa therapies with regard to various pathologies that also analyse patient reimbursement services after a spa therapy, and conclude a positive impact on patients' health and their own perception of their quality of life [30–34].

As the use of geothermal water in heating, Romanov and Leiss (2022), report in their study the recent developments in the construction sector, in the field of geothermal technology for heating. This indicates trends for more sustainable and environmentally friendly geothermal water supply systems for heating [35]. More studies have discussed the alternative use of geothermal water; in addition to balneology, it is used as a dermatological treatment in the cure of various conditions, through its anti-inflammatory effects and acceleration of the healing process [36–39]. Another form of valorisation that has not been researched enough is the application of geothermal energy in different areas of the agricultural sector, such as irrigation, heating of greenhouses and soil, drying of agricultural products, and cultivation of algae [40,41]. Regarding the use of geothermal water for fish farming as a source of cheap and clean energy in sustainable development, this would allow fish to grow at optimal temperatures throughout the year, which would result in the best environment conditions for rapid growth, as shown by several studies [42,43].

2. Materials and Methods

Bihor County is located in the northwest part of Romania. The advantage of the county's location in North-West Romania is that it is a border county from an economic spectrum, which offers multiple possibilities for development and collaboration. The morphological support is arranged in three relief steps (plain, hill, and mountain). Due to its geographical position, Bihor County belongs to the moderate temperate-continental climate, with an average annual air temperature that decreases with altitude: from 10.5 °C in the plain area, 8–10 °C in the hills, and 7–2 °C in the mountains [44]. As an administrative-territorial division, Bihor County has 101 territorial administrative units, grouped as follows: 10 cities, 18 suburban localities, and, in the rural area, 91 communes (with 430 vil-

lages, including commune residences). In our study, we included the localities with the balneological resources.

For this study, we collected data by terrain as well as bibliographic documentations. Field documentation included approaching and reviewing each location and administrative entity, by visiting the location, inventory of the restoration infrastructure, accommodation, treatment, and leisure infrastructure. We conducted an interview with the administrative representatives of the balneological source (mayors, private administrators, locals). We filled in the "Thermal water location sheet" at each location visited (Appendix A). A total of 10 interviews were conducted at the 10 less popular locations in Bihor County. The questions represent the items in the Location Sheet. Thus, we analysed the real situation of the balneological source. The interview consisted of questions about the history of the thermal baths, up to the Revolution of 1989, their evolution, and the form of administration until now, as well as the analysis of the current situation of valorisation of the balneological resource. Bibliographic documentation was carried out by collecting data from a literature review in Scopus, Web of Science, PubMed, and ScienceDirect involving health tourism documents, renewable energy, balneotherapy, wellness and spa, and administration. Based on the practical approach from the field and the bibliographic analysis, we claim that the evolution of the balneological phenomenon is influenced by its administrative factor, analysing the development of accommodation, restoration, leisure and treatment infrastructures. For this purpose, we present the hypothesis that the development of the balneological phenomenon at the level of rural settlements and new tourist resorts in Bihor County is conditioned by the involvement of the administrative factor in the prioritization of this sector, but also by the form of its administration—public or private. This hypothesis is verified by analysing the development of the balneological phenomenon generated by its administration, starting from the moment of the initial arrangement until the Revolution of 1989, and from the Revolution to the present. As mentioned by Cornea (2007) [45] in his study on the influence of the existing political regime on the administration of the respective state, the major differences in the way of organization and functioning of the administrative system were dictated by two categories of political regimes—non-democratic and democratic. As a result, we analysed the development of the balneological phenomenon generated by its administration, with the aim of highlighting the impact of the change in ownership due to the transition from socialism to capitalism. We developed and used the methodology for classifying rural localities and new tourist resorts, depending on the current status of exposure to the balneological resource, which is as follows: the classification of new tourist resorts of national and local interest with a specific balneological classification of localities that valorised balneological resource; the classification of localities with a balneological resource that utilized geothermal water before the Revolution of 1989; classification of localities with an unused balneological resource; the classification of rural settlements with a balneological factor as well as the new tourist resorts with a balneological factor in Bihor County, according to the form of administration, in the pre- and post-revolution period, and up to now.

3. Analysis of the Development of the Balneological Phenomenon According to the Administration Type

3.1. The Evolution of the Types of Administration in the Case of Balneological Resources of Local Interest

In Romania, until the Revolution of 1989, the form of administration of balneological resources was exclusively public. The impact of the change in ownership through the transition from socialism to capitalism, for some balneological locations, meant the transfer of the old administrative units of the balneological sources from state property to private administration (Figure 1). They were taken over as a management location (by concession), and their form of administration did not lead to any investment—only to exploitation. The management did not increase the capital; they only increased wages and invented expenses, which led to bankruptcy and ruin. The transition period in Romania can be divided into two phases: the first phase was dominated by rapid, predominantly destructive privatization

that lasted from 1990 until 2000; the second phase covers the period 2001–2004 and was characterized by the privatization of large companies that occupied strategic positions in the Romanian economy. The return of property confiscated under communism completes the privatization process. During this process, fraud caused serious damage to the economy and to society alike. Middlemen exploited bribes to make tremendous profits, many of which were costly [46]. This was most likely one of the causes of the unsustainability of rural thermal baths. The administration of the balneological resources in rural localities and new tourists resorts with balneological factors in Bihor Country, from the Revolution of 1989 to the present day (2023), has been predominantly managed by private administrative factors, accounting for 61% of the total. This percentage has positively influenced the performance of balneological resources in the mentioned localities.

The form of administration of the spas from the Revolution of 1989 to the present is represented by 61% private administrative factors and 39% public administrative factors.

At first, the local community looked after the balneological water springs in a very simple manner. Afterwards, the Agricultural Production Cooperatives took them in administration, and managed them until the end of the socialist period, in 1989. After the 1989 Revolution, the country's return to capitalism generated an unclear background for the entire national tourist area, with questionable privatizations within this sphere of interest. These were accompanied by a lack of clear government policies regarding the Romanian balneological heritage, which meant that the spa towns and villages were left close to ruin [47]. Along with privatization, enterprise advanced and diverse internally (in 2010, Government Decision No. 120/2010 was issued regarding the list of investment programs and projects in tourism, sources of financing for technical documentation, and works of execution of investment programs and objectives in tourism, as well as the approval of the eligibility criteria (www.turism.gov.ro (accessed on 16 January 2023)) and external (European funding) financing source were initiated. A few of those localities thrived, certainly, where the administrative factor was involved and concerned with their evolution and improvement by adding modern accommodation structures (three-star hotels, three-star guest houses, wooden cabins, wooden houses, cand ampsites): Sânicolau de Munte, Sarcău, Mădăras, and Livada de Bihor. Other sites have been permanently maintained to function even today: in Chișlaz, Săcueni, and Tămășeu. However, with the land transfer process, a few of the thermal baths entered the authority of individuals (Rabagani commune), who solicited the local authorities to destroy the thermal baths, or they were sold to firms. Others remained in the property of the local town halls, but failed to remain functional due to high operating costs, having fallen in disrepair: Mihai Bravu, Valea lui Mihai, Cadea, and Ciocaia [48]. At the Bihor County level, in the period 2020–2022, in addition to the 4 established balneological resorts (Băile 1 Mai, Băile Felix, Stîna de Vale, and Băile Tinca), 13 localities (Oradea, Beiuș, Ștei, Marghita, Salonta, Mădăras, Borș, Vadu Crișului, Săcuieni, Bratca, Șuncuiuș, Pietroasa- Budureasa, and Padiș), following the feasibility study, met the criteria for certification as local level tourist resorts according to the annexes to Government Decision no. 852/2008 [49]. Of these, eight resorts (Oradea, Beiuș, Ștei, Marghita, Salonta, Mădăras, Borș, and Săcueni) have balneological resources. The status of a tourist resort facilitates their access to European funding axes; thus, we can foresee a positive development in their future.

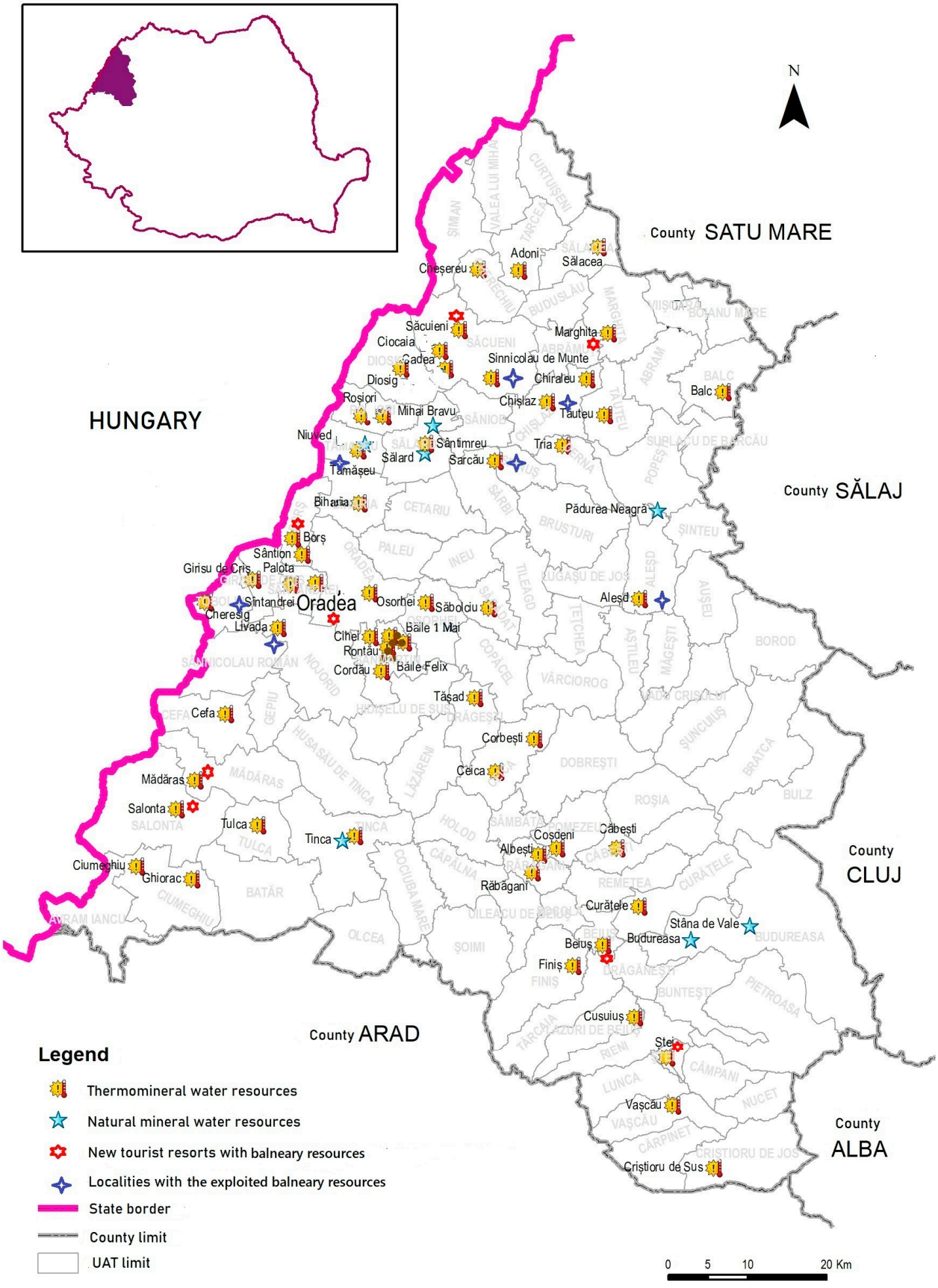

Figure 1. The current status of the valorisation classes of geothermal sources for balneological purposes. Sources: based on own survey, 2023.

3.2. Ways of Alternative Exploitation of Geothermal Water at the Rural Level and in the New Tourist Resorts

At the rural level, from the development of balneological resources until the Revolution of 1989, in addition to individual consumption and rudimentary and recreational balneological purpose (Mădăras, Sarcău, Tămășeu, Săcuieni, Sînicolau de Munte, and Chișlaz), since the 1980s, geothermal water has been used for heating (Oradea, Livada de Bihor). From 1985 until 1989, it was used in the fish industry, serving the largest station for rearing fish in thermal water in Europe (Livada de Bihor). Today, in Bihor County, geothermal water is used for fish farming in Sântandrei.

In the period following the Revolution of 1989 and until today, new boreholes have been drilled, both in the rural localities (Sântandrei) and in urban ones (Oradea, Beiuș, Ștei). After the Revolution of 1989, the number of localities that use geothermal water for heating increased (Beiuș, Livada de Bihor, Oradea, and Săcuieni). This proved to be a profitable and renewable source, which has contributed to the extension in the internal economics due to the low price of GCAL, which has also led to an increased thermal comfort for the population. As the balneological resources were under the supervision of a stable administration, new workplaces were created, which participated in the growth of the local economy by taxes paid, and as a result, contributing to the improvement of the quality of life of the villagers, through the accumulation of capital [50]. The geothermal water has also been used in agriculture, serving the local tomato greenhouses (Livada de Bihor, Roșiori). At Livada de Bihor, the greenhouses operated from 2006 to 2014, and in 2022, a tomato production restarted. Another niche for the exploitation of geothermal water, starting in 2021, is in the skincare industry (Beiuș, www.beyuscosmetics.com (accessed on 12 January 2023)). The exploitation of geothermal water in the skincare industry from Beiuș, through product and process innovation, has contributed to economic growth by creating jobs and increasing turnover through the sale of products. In addition, after the Revolution, the "wellness and spa" sector developed with geothermal water at the Elite Hotel and at the Nymphaea Aquapark in Oradea, along the Beiuș Lagoon, but also in the rural villages of Sarcău and Sânicolau de Munte. The town of Ștei has as a preliminary plan for the exploitation of geothermal water, the heating of educational institutions as well as the expansion, rehabilitation, and modernization of the balneology section of the Ștei City Hospital (SIDDU Ștei) [51].

3.3. Risk of Unsustainability of the Exploitation of Balneological Resources in Rural Localities

Lack of investment in the care of thermal baths, in order to keep them functional, has resulted in their derelict state or in their disappearance by demolition. That situation began with denationalization after the 1989 Revolution, when the thermal baths came under public or private management, and irrespective of financial support or lack of interest in their value, they were allowed to disappear or to fall into oblivion: Cadea, Mihai Bravu, Valea lui Mihai, Rabagani, Ciocaia, and Balc. This is due to the administration's lack of prioritization of local public projects, which implies that a recreation base in a rural locality does not have priority over sewage infrastructure, water supply, or the paving of village roads. The threats that endanger the sustainability of geothermal water exploitation in rural localities could be administrative risks; risks of unpopularity or risks of depopulation of villages. Administrative risks could be a cause of the unsustainability of the exploitation of geothermal waters by changing the administrative factor, especially towards the private one, which pursues a profit too fast by increasing the fees without increasing the quality of services. The risks of unpopularity could be a cause of unsustainability due to not modernizing the infrastructure, and so they have finally become unattractive for tourists, who are becoming more and more informed. The risk of depopulation of villages, determined by the migration of the young population towards localities with educational and entertainment potential, which determines perspectives and opportunities for development, could determine the unsustainability of capitalizing on the rural balneological potential.

4. Results

Following the analysis of the development of the balneological phenomenon generated by its administrative factor, we can classify the localities according to their current status of exposure to the balneological potential (Figure 1).

4.1. Localities with Simple Pools That Used Geothermal Water before the Revolution of 1989

In all these localities (Mihai Bravu, Răbăgani, Valea lui Mihai, Cadea, Balc, and Ciocaia), the balneological resource was identified in the period 1960–1970, during which, geological prospecting works were carried out in order to identify oil or deposits of natural gas. The works highlighted the presence of valuable geothermal sources, which were exploited for balneological purposes by the local residents of that time. Through their own initiative and effort, they constructed swimming pools. Even if these were simple pools with thermal water, their connection to the hydrographic network or the sampling of cooling water required works that referred to adductions, discharges, or delimitations of weir pools [52]. The administration of the balneological source in these rural locations was assigned to the Agricultural Production Cooperatives, and they managed them until the Revolution of 1989 [48]. After this period, against the backdrop of an unstable political environment, the process of privatization began, the thermal baths were managed by various management teams, and due to the fact that there was a low interest, low experience or insufficient financial aid, they remained in disrepair.

4.2. Localities with Previously Valorised Balneological Resources

In all localities with previously valorised balneological resources (Aleșd, Livada de Bihor, Sânicolau de Munte, Sarcău, Chișlaz, Tămășeu, and Sântandrei), the balneological resource was divided after development, from the 1970s, for the administration of the Agricultural Production Cooperatives or the municipalities (Aleșd), until the Revolution of 1989. At that time, these thermal pools were among the few, even the only, forms of recreation, especially in rural areas. Since the Revolution of 1989, these resources have been managed by different forms of public or private administration.

Aleșd is a city that capitalizes on geothermal water through a borehole that was drilled between 1979 and 1981 and which feeds two entities for therapeutic and recreational purposes: the thermal baths and the day centre for the elderly. The administration of the balneological resources belongs to the public sector. It has as a forecast plan for the valorisation of the hydro-therapeutic resource for the purpose of renewable resource for energy efficiency and the rehabilitation and modernization of the Aleșd Thermal Baths [53].

Livada de Bihor is a rural locality that has used geothermal water as a heating agent since 1980. Since 1985 it has served as the largest station for fish rearing in thermal water in Europe. In 1982, the thermal bath was built, which operated until 2007. Then, starting from the same year, the geothermal water served the local tomato greenhouses, until 2014. The restart of the thermal baths took place in the year 2020, when it was leased to a local private company and improved with a three-star accommodation structure and restaurant structure. Now, the administration of the balneological site is both public and private. As a preliminary plan for developing the balneological potential, 1500 sq m of land has been purchased in order to expand the thermal baths, by an indoor pool, an outdoor pool, and a boarding house (thermal baths administration).

Sânicolau de Munte is one of the few rural localities, which, with the privatization after the Revolution of 1989, developed the local balneological potential by improving the old thermal baths, by building an accommodation infrastructure, from caravans, wooden houses, to a three-star hotel, holding a capacity of 64 people. It also has a restoration infrastructure for 100 people and a modest balneological area. In addition to these local thermal baths, the Thermal Balneological- Beauty Medical Centre KRE was established in the summer of 2022. The administration of the balneological locations is managed by private factors.

Sarcău is a rural locality in Bihor, which has had thermal baths since the 1970s. Four years after the Revolution of 1989, it became the Adorianis Complex, with a complex treatment base, equipped with equipment, through an accelerated development process specialized and provides medical assistance and treatment, accommodation structure consisting of two modern three-star guesthouses and a villa; conference room; balneological structure; and a restoration structure. The administration of the balneological resource at the level of Sarcău locality has been carried out by a private factor, since 2003.

Chișlaz is a village with balneological resources that uses geothermal water at the local thermal baths. After the Revolution in 1989, the thermal baths came under the administration of a private company, until 2010. Since that period until present day, it has been managed by a public entity

Tămășeu is a village that has had mineral water since 1887, highlighted with the opening of the Oradea-Valea lui Mihai railway. The hydrothermal resource has been exploited since the 1960s. This was bottled for sale under the name Lithium, then Tămășeu. Today this well flows freely. At the level of the locality, the geothermal water is utilized at the thermal baths, which has been operating since its arrangement by the locals, in the 1970s. The administration of the balneological source is carried out by a private factor. As a preliminary project to capitalize on the balneological resources, 10 hectares of land have been purchased and the project has a treatment base with accommodation and a water park.

Sântandrei is a village that has been using geothermal water for fish farming since 1993, which is when the drilling was carried out. The administration of the balneological source is carried out by a private factor. As a preliminary plan for the development [54], a project is proposed for the establishment of a treatment base and leisure thermal baths.

4.3. New Tourist Resorts, Towns, or Villages of National and Local Interest with Balneological Specificity

Bihor County has a total of 13 new tourist and balneoclimatic resorts (Oradea, Beiuș, Ștei, Marghita, Săcueni, Mădăras, Salonta, Borș, Vadu Crișului, Bratca, Șuncuiuș, Pietroasa-Budureasa, and Padiș). Eight of these tourist resorts have resources with a balneological factor (Oradea, Beiuș, Ștei, Marghita, Săcueni, Mădăras, Salonta, and Borș). These localities were certified as tourist resorts during the period 2020–2022 (Table 1). The resorts are new due to their certification as tourist resorts in the period 2020–2022.

Table 1. The new tourist resorts with balneological potential of Bihor County.

Locality	Year of Certification as a Tourist Resort	Interest Level	Resort Type
Oradea	2022	National	Balneological and balneoclimateric
	2020	National	Tourist
Marghita	2022	Local	Tourist
Săcueni	2021	Local	Tourist
Salonta	2021	Local	Tourist
Borș	2021	Local	Tourist
Beiuș	2020	Local	Tourist
Ștei	2020	Local	Tourist
Mădăras	2020	Local	Tourist

Source: based on own survey.

Oradea is the seat of Bihor County, which acquired its status as a tourist resort of national interest [55] in 2020 (H.G. no. 377/2020) [56], through the central historical area and along Crișul Repede river. It was certified as a balneological and balneoclimatic resort in 2022 (H.G. no. 898/2022) [57]. In the area of the municipality, geothermal water is used for heating, leisure (Nymphaea Thermal Water Park, Ioșia Thermal Baths, thermal pools (hotels) and recently, for balneological purposes (Elite Hotel). The administration of the balneological facilities is both public and private. As a forecast plan for capitalizing on the

balneological source, the development of the Ioșia Thermal Garden [58] can be found in the municipality's project portfolio.

Marghita is the municipality that has been certified as a tourist resort of local interest since 2022 (H.G. no. 910/2022) [59]. The geothermal water is used for therapeutic purposes (at the "Dr. Pop Mircea" Municipal Hospital, balneology section) and for leisure at the Hotel—Complex Thermal Baths. The administration of the balneological is both public and private. According to the Integrated Urban Development Strategy [60], it has projects for the realization of a balneological tourism complex and rehabilitation of a new baths with a pool covered with geothermal water for the winter period and an outdoor thermal garden.

Beiuș is the municipality that was certified as a tourist resort of local interest in 2020 (H.G. no. 1073/2020) [61]. The main use of geothermal water is in heating, designating it as the only city in the country in which the heating agent is made exclusively on the basis of geothermal water—a fact that has given it the name of the Green City (www.primariabeius.ro (accessed on 12 January 2023)), secondary for leisure (baths with thermal water) and in the cosmetics industry (www.beyuscosmetics.com/ro/ (accessed on 12 January 2023)). The administration of the balneological is public and private. As a preliminary development plan, it has a project that foresees the valorisation of the hydro-therapeutic resource by building a complex water park based on the local geothermal water resource and the local tourist potential [62].

Ștei is an urban locality that obtained the status of tourist resort of local interest in 2020 (H.G. no. 887/2020) [63]. The city of Ștei has balneological resources that are currently unused. Geothermal water drilling was carried out after the 1989 Revolution. The management of balneological resources belongs to the public administration. As the expected exploitation of geothermal water [51], it has projects in order to improve energy efficiency, expand, rehabilitate, and modernize the Ștei balneology section.

Săcueni is a locality certified as a tourist resort of local interest in 2021 (H.G. no. 343/2021) [64]. The geothermal water is used for heating (in institutions) and leisure (the thermal baths in the locality). The administration of the balneological is both public and private. As a prospective exploitation it has a project that provides for the exploitation of geothermal water by building a balneological/healing centre [65].

Mădăras is a rural locality that was certified as a tourist resort of local interest in 2020 (H.G. 1073/2020) [61]. The geothermal resource is used for recreation (Mădăras Thermal Baths). The administration of the balneological source is carried out by a private factor.

Salonta and Borș, municipality of Salonta and the village of Borș, have been certified as tourist resorts of local interest: Borș in 2020 (H.G. no. 887/2020) [63] and the Municipality of Salonta in 2021 (H.G. no. 343/2021) [64]. These localities have thermal waters that are currently not being exploited. As a preliminary plan for the exploitation of geothermal water, it provides projects for the establishment of Thermal Complex Borș, an extension of the Hotel Iris to include a treatment base, conference room, and balneological centre [66] and in Salonta for the development of a thermal balneological-baths complex [67].

4.4. Localities with Untapped Balneological Resources

At the level of Bihor County, there are 44 localities that have untapped geothermal resources. A part of this forms the reserve balneological fund, and in many localities there are boreholes: 37 thermal water boreholes (Adoni, Albești, Biharia, Borș, Căbești, Cefa, Ceica, Cheresig, Chișereu, Chiraleu, Cihei, Ciumeghiu, Corbești, Cordău, Coșdeni, Criștioru de Sus, Curățele, Cusuiuș, Diosig, Finiș, Ghiorac, Girișu de Criș, Oșorhei, Palota, Rontău, Roșiori, Salonta, Săcădat, Săbolciu, Sîntimreu, Sîntion, Ștei, Tășad, Tăuteu, Tria, Tulca, Vașcău); 3 mineral water boreholes (Tămășeu, Sălard, Sîntimreu), and 3 mineral water springs (Tinca, Budureasa, Voivozi (holiday village Pădurea Neagră)).

4.5. Forms of Administration and Capitalization of the Balneological Potential in the Pre- and Post-Revolution Period

After the arrangement of the balneological sources in the thermal pools in the pre-Revolution period, in some villages (Sarcău, Livada de Bihor, Săcueni, Sânicolau de Munte, Mădăras, Chislaz, Tămășeu, Mihai Bravu, Cadea, Rabagani, Balc, and Ciocaia), these were assigned to a local public administrative forum (Agricultural Production Cooperatives). At the level of urban localities (Oradea, Marghita, and Alesd), the balneological sources were also managed by the public administrative factor—but by the town halls. In the post-Revolution period, both the balneological resources at the level of the rural localities and the urban ones came to be managed by public and private administrative factors (Table 2).

Table 2. Forms of administration and capitalization of the balneological potential in the pre- and post-revolution period.

The Locality with a Balneological Potential	The Form of Administration during the Period 1970–1989	The Form of the Balneological Valorisation until the Revolution of 1989	The Form of Administration from the 1989 Revolution to the Present (2023)	The Form of Valorisation from the Revolution of 1989 to the Present (2023)
Mădăras	Public	Leisure	Private	Leisure
Tămășeu	Public	Leisure	Private	Leisure
Săcueni	Public	Leisure	Private	Leisure
Sarcău	Public	Leisure	Private	Therapeutic/leisure/ Spa
Chișlaz	Public	Leisure	Public	Leisure
Balc	Public	Leisure	Private	Heating
Livada de Bihor	Public	Leisure/agriculture/ Heating/fish farming	Public/private	Leisure/heating
Mihai Bravu	Public	Leisure	Private	Heating
Ciocaia	Public	Leisure	Public	Heating
Cadea	Public	Leisure	Public	Heating
Sînicolau de Munte	Public	Leisure	Private	Leisure/spa
Răbăgani	Public	Leisure	Private	Demolished
Aleșd	Public	Leisure	Public	Leisure
Beiuș	The drilling was carried out after the Revolution of 1989 (2003)	Leisure	Private/public	Heating/leisure/ Skincare Industry/SPA
Marghita	Public	Leisure	Public/private	Leisure/therapeutic
Valea lui Mihai	Public	Leisure	Public	Heating
Sântandrei	The drilling was carried out after the Revolution of 1989 (1993)		Private	Fish farming
Oradea	Public	Leisure/heating	Private/public	Leisure/therapeutic/ Spa/heating

Source: based on own survey.

5. Discussion

The characteristic of the balneological phenomenon in Bihor County is based on important aspects that contribute to the sustainability of the exploitation of the geothermal resource, influenced by their administrative apparatus. These aspects are related to the characteristics, starting with the geothermal resource, which is easily exploited and is present in many localities of the county, the need for tourism, the need for treatment and the need for leisure.

Based on the above classifications, we made a comparative analysis of the exploitation of the geothermal resource in the rural localities and the new tourist resorts of Bihor County, from the development to the Revolution of 1989 and from the Revolution of 1989 to the

present (Figure 2). The comparative analysis parallelizes the variables formed by the forms and the number of forms of valorisation of the spa source (thermal heating, agriculture, leisure, treatment, spa, fish farming, mineral water spring, thermal water drilling, mineral water drilling) and the public or private administrative factor involved in its exploitation during the period of the 1970s until the Revolution of 1989, and from the Revolution to the present.

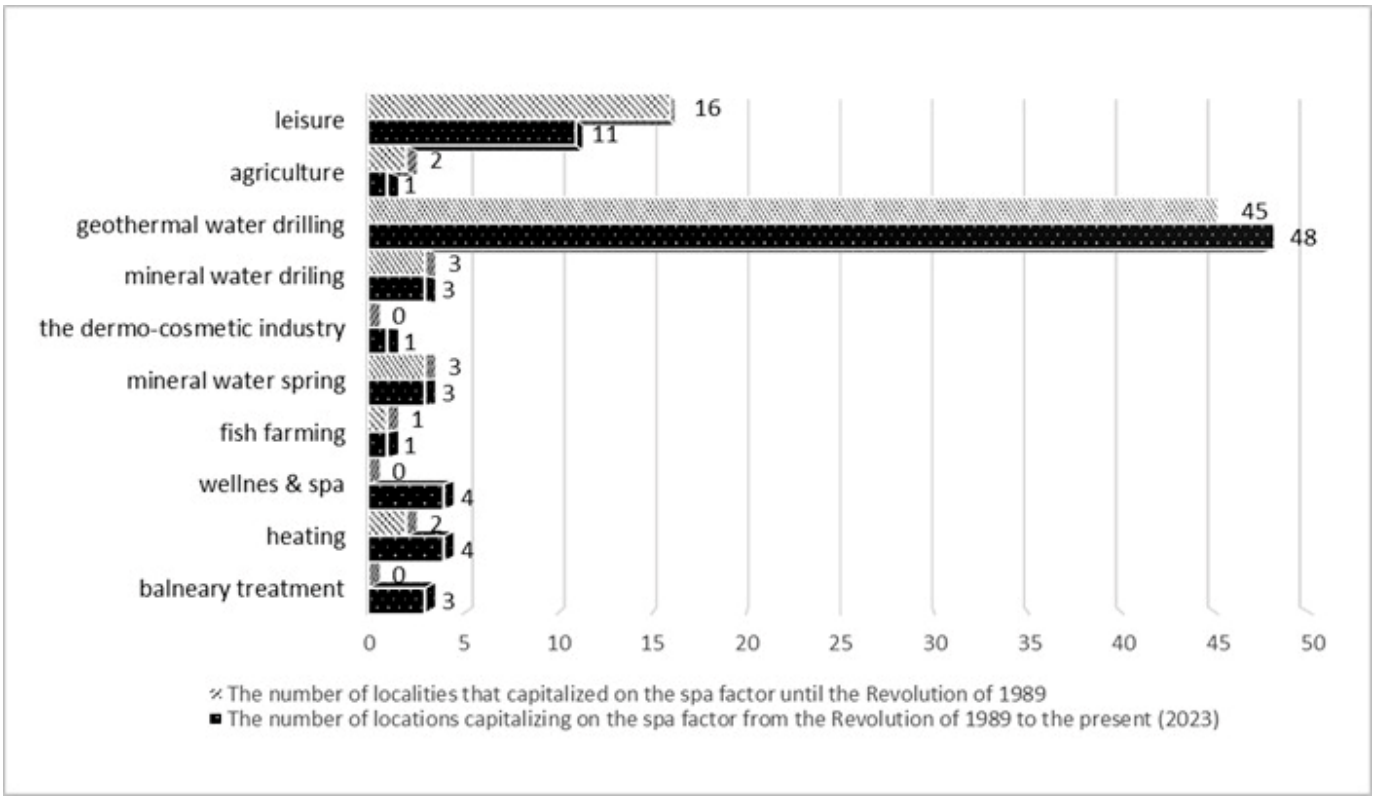

Figure 2. Comparative analysis of the exploitation of the geothermal resource in the rural localities and in the new tourist resorts of Bihor County, from the development to the Revolution of 1989, and from the Revolution of 1989 until the present day. Source: based on own survey.

Based on this, we have identified a development of the balneological phenomenon during the democratic period, as the number of localities exploiting geothermal water for the purpose of balneological treatment, wellness, and spa and thermo-cosmetic uses has increased. New forms of exploitation of geothermal water, which took shape after the Revolution, are in the balneological sector, wellness and spa and in the skincare industry. However, while some balneological resources developed, or were established, starting with new drilling, other balneological resources remained in ruins. From the Revolution to the present (2023), with the exception of Oradea, two new thermal baths have been built, in Beiuș and Sânicolau de Munte for leisure. In addition, new thermal water boreholes have been drilled (Ștei, Beiuș, and Sîntandrei).

Rural balneological localities support balneological tourism of local and, less often, regional importance, relying on a series of exploited tourist resources [5]. After 1990, the political, economic and legislative changes generated the necessary premises for the relaunch of the rural touristic phenomenon. According to Matei's statement, in Bihor County, rural localities such as Sarcău, Sânicolau de Munte, Mădăras, Livada de Bihor, and Chișlaz, support local tourism. For example, in Sînicolau de Munte and Livada de Bihor, there are over 3000 tourists per year, and the taxes that come from tourist services contribute to the local budget. In Sarcău, where the accommodation base has a much larger accommodation capacity (two guesthouses and a three-star villa) (see Tables 3–5) there seems to be a much higher contribution to the development of local tourism. Firdaus and

Hardjosoekarto (2021) [68] highlights the fact that the local administration is capable to fulfil all the attributes in the evolution of tourism (coordination, planning, regulation, entrepreneurship, stimulation and promoting, the role of tourism and the protecting interests). Thus, in Bihor County, the local administration proves to be able to fulfil its functions in the development of tourism, as demonstrated by the achievements completed by it: heating with geothermal water in Beiuș, Livada de Bihor, and Săcuieni. There are also future projects for the development of new balneological resources, some of which are the development of the Ioșia Thermal Garden, in Oradea; the construction of a balneological tourism complex and rehabilitation of a new baths with a covered pool with geothermal water for the winter period and an outdoor thermal garden, in Marghita; water park with geothermal water in Beiuș; energy efficiency, expansion, rehabilitation and modernization of the Ștei balneology section; building a balneological/healing centre in Săcueni.

Table 3. The accommodation infrastructure of the thermal baths.

Locality with a Balneological Resource	Camping Number of Places	Wooden Houses Number of Beds	Equipped Rooms Number of Beds	Tourist Guesthouse 3 *** Number of Beds	Villa Number of Beds	Hotel 2 ** Number of Beds	Hotel 3 *** Number of Beds	Total Beds
Beiuș							24	24
Chișlaz		43						43
Livada de Bihor	12	8						20
Sînicolau de Munte	8	64					12	84
Mădăras	4		22					26
Marghita	60	100				100		260
Sarcău				48	28			76
Tămășeu	none							
Aleșd	none							
Săcuieni	15	32						47
Total	99	247	22	48	28	100	36	580

** and *** indicate the number of stars. Source: based on own survey.

Table 4. The restoration infrastructure of the thermal baths.

Locality with Balneological Source	Restaurant Number of Places	Terrace Number of Places	Snack-Bar Number of Places	Total
Aleșd	200	50		250
Beiuș	200	300		500
Marghita	200	50		250
Săcueni	100	100		200
Chișlaz		20	30	50
Sarcău	60	50		110
Tămășeu	100	50		150
Sînicolau de Munte	100	140		240
Livada de Bihor	30	170		200
Mădăras		20	20	40
Total	990	950	50	1990

Source: based on own survey.

At the level of the localities with the balneological resource, excluding Oradea, Băile 1 Mai, Băile Felix, Băile Tinca, and Stîna de Vale) we have centralized 10 localities with balneological resources exploited for balneological purposes. In 8 of these locations, we found an existing accommodation infrastructure with a total number of 580 beds. The restaurants infrastructure is present in each of the locations where the balneological resource is exploited, with a total of 1990 places. SPA services can be found in 4 locations, and the treatment site owns 3 of the 10 locations studied.

Table 5. The leisure and treatment infrastructure of the thermal baths.

Locality with Balneological Source	Leisure Base				Treatment Base
	Thermal Pools	Playground	Sports Field	SPA	Treatment Procedures
Aleșd	x	x			Balneotherapy Physiotherapy Electrotherapy
Beiuș	x	x		x	
Marghita	x	x	x	x	Balneotherapy Physiotherapy Electrotherapy
Săcueni	x		x		
Chișlaz	x	x	x		
Sarcău	x		x	x	Balneotherapy Physiotherapy Electrotherapy Lymphatic drainage Magnetodiaflux
Tămășeu	x				
Sînicolau de Munte	x	x	x	x	
Livada de Bihor	x	x	x		
Mădăras	x				

x—indicates the existence in the endowment. Source: based on own survey.

According to Cohen's study (2001) [69], the purpose of the private administration is to be more effective than public administrations, due to the influence of the profit. From the political and historical backgrounds where the privatization comes from, three streams of privatization theory have appeared. The first stream maintains that private administration is superior to public administration. This fact also emerges from the comparative analysis of our study regarding the evolution of the balneological factor influenced by the type of administration. At the level of some of the rural localities, where the balneological resource is managed by private administration, the improvements are consistent, in the form and quality of the services, with accommodation structures classified with three stars, treatment, and balneological sites and even the establishment of new open-air swimming pools and baths (Sânicolau de Munte and Beiuș).

Our article demonstrates the fact that the current trend of exploiting the balneological potential of the villages in Bihor County is in the direction of tourism, leisure, balneological treatment, wellness, and spa.

We do not detail the very old rural balneological resorts (Băile Felix, Băile 1 Mai, Băile Tinca, and Stîna de Vale), as extensive studies have already been conducted on these resorts, and they are widely known [70–73].

As strengths of this study, we have highlighted balneological localities that are less known as well as the forms of administration of spa resources that have not yet been researched.

A limitation of this study is the susceptibility of the administrative factor to provide information and the delivery of incomplete answers from the administrative factor.

The topics discussed in our study are also found in several international scientific papers. Thus, the use of geothermal water in heating is also reported by Romanov and Leiss (2022) in their study [35]. In his article, Donati (2022) mentions the management of swimming pools, a theme that is also found in our study [52]. On the topic of the importance of balneology and the use of thermal waters for health, as well as on the role of health tourism and management, there are several studies [25,26,74]. The valorization of geothermal energy in different areas of agriculture is also discussed in studies such as Kępińska, 2021, and Skrzypczak et al., 2021 [40]. The new forms of valorisation of geothermal water outlined after the Revolution, wellness and spa, and the skincare sector are also discussed in other research [36–39].

These studies addressed health tourism facilities and their profitable and sustainable management, or developments in geothermal technology. In contrast to these, we addressed the importance of involving the administrative factor in the exploitation of geothermal water.

The results so far have shown that it would be worthwhile to implement a quantitative procedure for evaluating the administrative aspects capable of influencing the way geothermal waters are used for balneological purposes. Nevertheless, the quantitative modelling of social and economic processes, which to the greatest extent are influenced by numerous political factors, is always very difficult. Sandu (2011) [75] developed a local human development index for Romanian villages, which could be a variable cause, but besides that, the degree of dependence on the exploitation of geothermal waters should be quantified depending on the nature of the involvement of the administrative factor. Such an approach could be the objective of further studies.

6. Conclusions

The development of the balneological phenomenon at the level of rural localities and the new tourist resorts in Bihor County, proved to be conditioned by the involvement of the administrative factor in the prioritization of this sector. It was concluded that at the level of rural localities, where the sewage infrastructure, the drinking water network, or the asphalting of roads is almost non-existent in some places, the development of a leisure base would be among the few, or even the last priorities of the local public administrative unit. In many cases, barely functional pools under the auspices of the former Agricultural Production Cooperatives, after the Revolution of 1989 and by changing the form of administration to a private one, benefited from important financing, which led to the creation of three-star balneological complexes: Sarcau, Sânicolau de Munte, Beius, etc. The weight of the forms of private administration of the balneological sources is higher, a fact that denotes the modern forms of exploitation of geothermal water, existing in this type of administration.

The comparative analysis revealed that the development of the balneological phenomenon, from the development until now, was carried out sequentially. This sequence was influenced by the political environment and the administrative factor from the period before and after the Revolution. In the period before the Revolution, all balneological sources were managed by the public administrative factor. They were maintained and kept functional, until the Revolution of 1989, as there was a stable political environment. In the post-Revolution period, when sometimes the decision and involvement was undertaken on a small scale (private administration), and where the interest in development was focused exclusively on the valorisation of the balneological factor, it can be said that capitalist policy favourably influenced the evolution of the balneological phenomenon at the level of rural settlements and the new tourist resorts in Bihor County. A high-performing administration adapted to the changes of the present, but especially of the future, is necessary and essential for the development of the balneological phenomenon.

In the development of the spa resource before the 1989 Revolution, capitalization was based on state investments, which were directed to cities. Nowadays, there are local entrepreneurs, and the free market is more involved in capitalizing. Valorisation is favourable because there are private investors, who use their own financial sources, thus being more involved in the development of the spa site that they manage.

Author Contributions: Conceptualization and designed the experiment, A.-P.C. and I.H.; methodology, A.-P.C. and I.H.; validation and data curation, I.H. and D.I.; resources, A.-P.C.; writing—original draft preparation, A.-P.C., I.H. and D.I.; writing—review and editing, supervision, I.H. and D.I. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data sets supporting the conclusions made are included in this article.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Location with thermal waters sheet
1. Name/public/private property.
2. Access roads (roads DC, DJ, DN; railway, airport, etc.).
3. Public transport.
4. Current water, sewerage, electricity.
5. Thermal water source:

- Spring water temperature;
- Drilling: how many drillings, the depth of the drilling, the year the drilling was executed, the temperature of the water, if the well supplies only the strand or something else;
- Test report (thermal water analysis report);
- Some photos of the spa complex, etc.

6. The existence of studies and documents that testify the presence and value of natural cure factors (mineral waters, mud, therapeutic lakes, salt mines, bioclimate, etc., from a qualitative and quantitative point of view).
7. Constitution of the ecological, hydrogeological, and sanitary protection perimeters of the natural healing factors, in accordance with the legislation in force.
8. First aid point and means of transport for medical emergencies.
9. Pharmaceutical point.
10. Spa medical assistance, as applicable, accredited in accordance with the legal rules in force.
11. Basis for the valuation of natural therapeutic resources.
12. Arrangements and equipment for revival services in built spaces, rooms for maintenance (fitness and others).
13. Arrangements and equipment for the practice of sports/leisure (water sports, tennis, football, etc.).
14. Baths: establishment of the baths, total area, how many pools, depth of pools, water temperature, other facilities at the beach, other information.
15. Treatment base (what it consists of).
16. Tourist reception facilities.
17. Hotel, motel, guesthouse, villa, camping, number of places to stay, number of stars, flowers, daisies.
18. Dining space (terrace, restaurant, number of seats).
19. Arrangements and equipment for outdoor relaxation and walking (pedestrian roads, promenade places).
20. Playgrounds for children.
21. Signage with orientation and information indicators, printed, electronic or web site, etc.
22. Landscape park.
23. The organization of tourist, cultural, sports events (repeatable on a calendar basis if applicable).
24. Tourist information and promotion centre (with permanent staff to exclusively serve the centre if necessary).
25. Basis for the valuation of natural therapeutic resources.
26. Arrangements and equipment for revival services in built spaces, rooms for maintenance (fitness and others).
27. Arrangements and equipment for the practice of sports/leisure (water sports, tennis, football, etc.).
Source: based on our own survey.

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