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Holiday Climate Index: Urban—Application for Urban and Rural Areas in Romania

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Abstract: Nature, landscape, relaxation, and outdoor activities are important motivations when choosing rural destinations for vacations. Therefore, when selecting a rural area as a vacation destination, we assume that climate features are important. We investigated the appropriateness of the holiday climate index: urban (HCI:urban) in quantitatively describing the relationship between climate and tourism fluxes in such destinations. We employed data from 94 urban and rural tourist destinations in Romania and correlated the monthly mean HCI:urban values with sectoral data (overnight tourists) for 2010–2018. The results show that weather and climate influenced tourism fluxes similarly in rural and urban destinations, supporting the hypothesis that HCI:urban may be used for rural areas as well. The information derived from HCI:urban may be useful for tourists when planning their vacations as well as for tourism investors in managing their businesses and reducing the weather and climate-related seasonality in tourism fluxes.

Keywords: environment; destination image; Romania; tourism climate index; urban/rural tourism

Citation: Velea, L.; Gallo, A.; Bojariu, R.; Irimescu, A.; Craciunescu, V.; Puiu, S. Holiday Climate Index: Urban—Application for Urban and Rural Areas in Romania. *Atmosphere* **2022**, *13*, 1519. https://doi.org/10.3390/atmos13091519

Academic Editor: Andreas Matzarakis

Received: 6 September 2022
Accepted: 13 September 2022
Published: 17 September 2022

1. Introduction

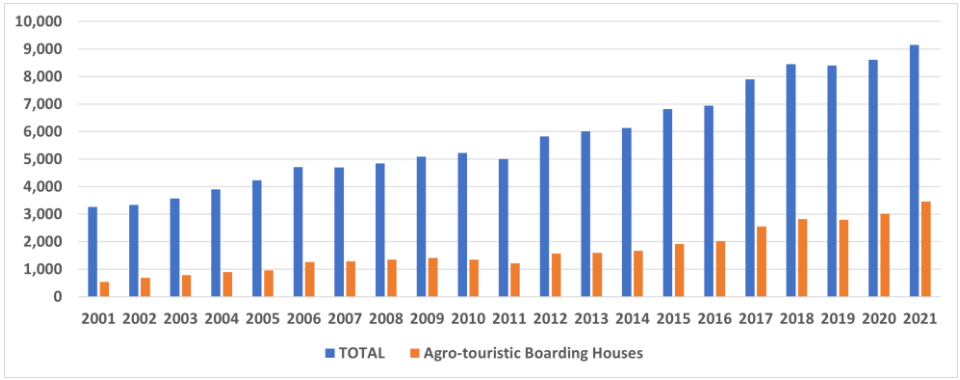
Tourism is an important economic sector; it accounted for 2.9% of Romania's GDP in 2019 [1]. The number of tourists—both residents and non-residents—has increased in recent years. This trend is encouraged by national tourism strategies [2,3]; for example, providing financial support for Romanian citizens to spend their leisure time at Romanian destinations; improving accommodation infrastructure (particularly at spa (balneary) destinations) [4], and participation from representatives of the Ministry of Entrepreneurship and Tourism (MET) at international events (aimed at increasing the visibility and attractiveness of Romania's tourism destinations).

Tourism, along with its economic benefits, contributes to an improved quality of life for tourists by providing extended opportunities for leisure in different settings/environments, opportunities to gain skills [5], or contributing to personal development [6], e.g., through social and cultural interactions. The well-being of residents may be also positively impacted at economic and sociocultural levels, although negative impacts have also been identified [7–9].

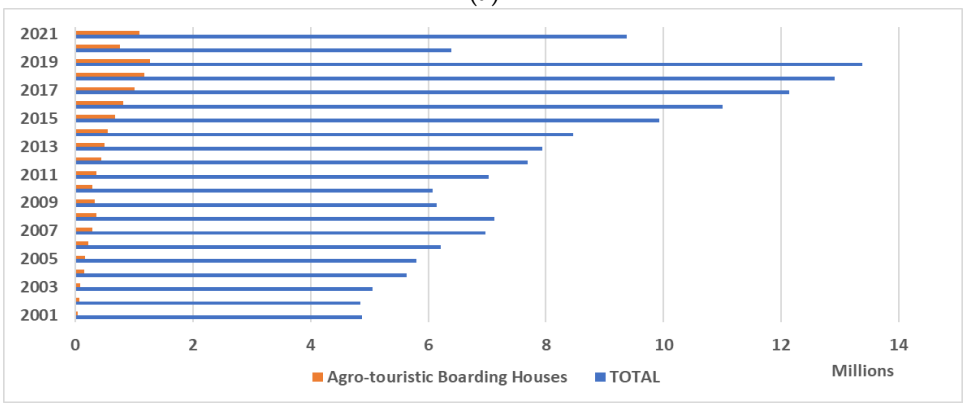
Rural tourism has become increasingly attractive in recent years. UNWTO defines rural tourism as "a type of tourism activity in which the visitor's experience is related to a wide range of products generally linked to nature-based activities, agriculture, rural lifestyle/culture, angling and sightseeing. Rural Tourism activities take place in non-urban (rural) areas with the following characteristics: (i) low population density, (ii) landscape and land-use dominated by agriculture and forestry and (iii) traditional social structure and lifestyle". When tourists opt for rural destinations, they are typically motivated by a large

palette of options, such as the desire to escape from urban/usual environments [10,11], cultural interactions [12], enjoying nature [11–13], and outdoor activities [14,15]. Furthermore, rural tourism may be associated with wellbeing [11,16,17].

In Romania, rural tourism is gaining more attention from both tourists and investors. For example, data from the National Institute for Statistics reveal that the number of agro-tourism boarding houses at the country level has increased from 536 units in 2001 to 3460 units in 2021 (Figure 1a), representing almost 38% of total accommodation units in the country. Moreover, the number of tourists accommodated in these types of units increased 26 times in the same time interval, compared to almost 2 times for all accommodated tourists in all types of accommodation units in the country (Figure 1b). We should note that, according to the NIS, an agro-tourism boarding house is defined as wellbeing, 'an establishment of tourist reception with an accommodation capacity of up to 8 rooms, in the rural area, operating in the citizens' dwellings or in independent buildings and which provide tourist accommodation and conditions for preparing and serving meals in special set up places and the possibility to attending to the household's activities'.



(**a**)



(**b**)

Figure 1. (**a**) Touristic reception establishments with functions for tourist accommodations; (**b**) number of tourists accommodated (in the structure of tourist reception). Data source: National Institute for Statistics.

Studies on the motivations of tourists choosing rural areas in Romania are quite limited; however, they highlight that tourists opting for rural areas are interested in relaxation, countryside knowledge, enjoying rural life [18], variety, quality of services [19,20], outdoor activities, tourism adventures, and hiking [20]. According to the authors of [20], "security and safety" are important attractiveness elements for rural destinations, most likely in the context of the COVID-19 pandemic, as this feature was not previously accounted for among the motivation drivers in such destinations.

Although the motivation for choosing a particular destination has multiple facets, it should be noted that nature, landscape, and outdoor activities are some of the most

important motivations regarding rural destinations. This suggests that the weather and climate of a rural destination are important in the vacation planning process and, thus, to the tourism flux of the destination throughout the year.

The latest research developments aim to quantitatively describe the relationship between climate and tourism, specifically by targeting destination types—urban (HCI:urban, [21], beach (HCI:beach [22]), climate index for tourism [23], and winter sports destinations (e.g., ski climate index [24]). Other studies using climate indices for tourism (e.g., tourism climate index [25]) focus on describing the climate's potential in relation to tourism at a more general level, without specifically taking rural areas into account. Overall, for rural areas, limited data on the use of tourism-oriented climate indices applicable for these types of destinations are available.

Most data that are ready-to-use and easily accessible for tourists on weather, climate, and other environmental aspects, are not too specific, usually referring to well-known meteorological parameters (air temperature, precipitation, sunshine duration) and are in the form of monthly means and extremes. However, tourists may benefit and are interested in information assembled from several meteorological parameters, which are able to give (overall) more concentrated indications of the weather characteristics suitable for outdoor leisure activities. An example of such information is provided by HCI:urban [21], addressing, in particular, meteorological and climate aspects relevant to tourism in urban areas. It describes, in a synthetic form, how suitable the weather conditions are for outdoor leisure activities (e.g., sightseeing). Nevertheless, the large variety of leisure activities that may be conducted in the open air leads one to question if this index may be relevant for destination types other than urban destinations (particularly rural destinations).

Although HCI was developed with a particular focus on the urban environment, outdoor activities are important for tourism in rural areas as well, as previously shown. For this type of destination, climate condition impacts may be even more important than for urban destinations, due to the characteristics of the touristic attractions relating to this type of destination (e.g., ethnography, food and wine, cultural traditions, etc.), as well as the more limited offer of spending time indoors.

By interpreting HCI:urban in a broader sense, describing climate/weather conditions for outdoor leisure activities in any destination, we explore how appropriate the index may be for quantitatively describing tourism intensity in rural areas.

To investigate this hypothesis, we relate HCI:urban to the sectoral data via the number of overnight tourists spent at a destination, as provided by the National Institute of Statistics in Romania in the TEMPO database [26] for 2010–2018. The results may provide valuable information for tourism investors to help reduce their business reliance on climate conditions, through well-oriented measures (e.g., for specific months when the outdoor conditions are less attractive).

2. Materials and Methods

We analyzed 94 localities in Romania (Figure 2), of which, 41 are cities and 53 are rural localities, the latter are included in the list of touristic destinations of national or local interest produced by the Romanian Ministry of Entrepreneurship and Tourism [27]. The cities included in the study are the county seat municipalities for all counties in the country, except for Ilfov County, for which the country capital Bucharest was used as the county seat municipality. The selection criteria for the touristic rural destinations were as follows: (1) to be included in the official list above; (2) to have an independent administrative status (e.g., village, city); (3) to have a population of fewer than 10,000 inhabitants if their administrative status was 'city'; (4) not be associated with mountain sports facilities (i.e., ski slopes); (5) to have sectoral data available (e.g., overnights) for at least half of the months in the period considered. With these conditions, we assume that selected rural destinations fulfilled the general definitions of UNWTO for rural tourism.

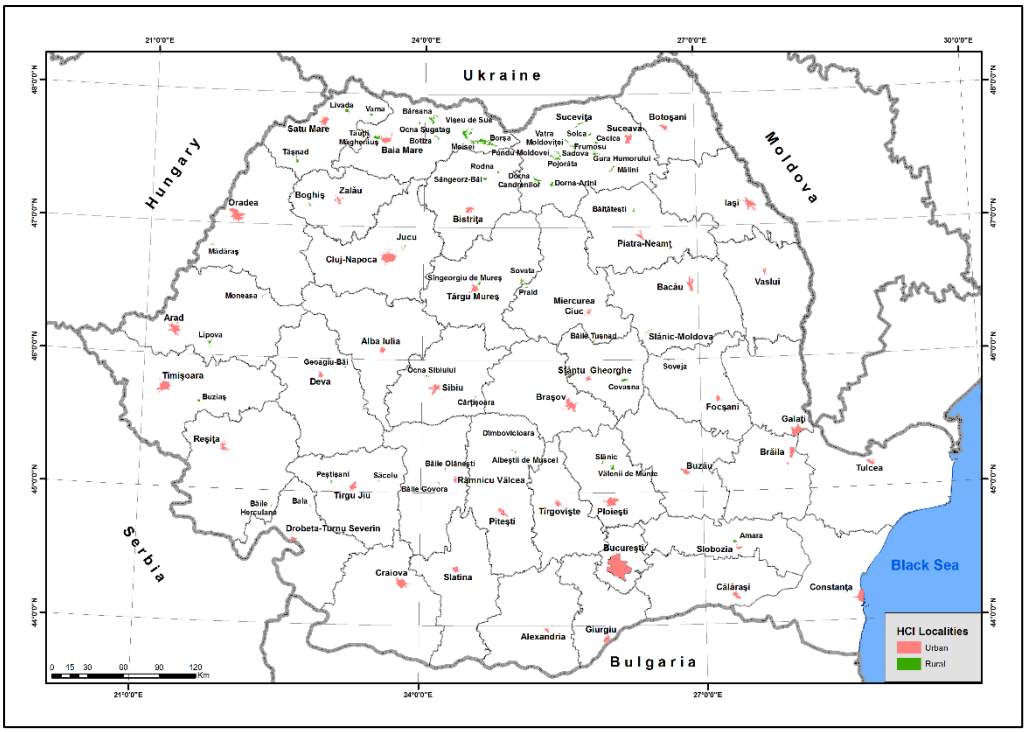


Figure 2. Map of the selected touristic destinations.

As shown in Figure 2, the selected localities are distributed over almost the entire country; therefore, they experience different climatic nuances. Romania's climate is transitional temperate–continental, marked by some oceanic, continental, Scandinavian–Baltic, sub-Mediterranean, and Pontic climatic influences. Thus, in western–south-western regions (Banat and Oltenia historical regions), the Mediterranean nuance is felt, characterized by mild winters and a richer rainfall regime, especially in the autumn. In Dobrogea (seaside area), the Pontic nuance is manifested, with rare but torrential rains. In the eastern regions of the country, the continental character is more pronounced. In the northern part of the country (Maramureş and Bucovina), the effects of the Scandinavian–Baltic nuance are more evident, determining wetter and colder climates, with frosty winters [28]. Nevertheless, in this study, the climate characteristics of selected localities were synthesized through the HCI:urban index, which includes, along with the 'objective' climate features, the subjective perceptions of tourists concerning the destination's climate (i.e., by allocating scores to different weather parameters, threshold values, or a combination of parameters).

The study employed reanalysis data and sectoral data about tourism in Romania; we focused on the period from 2010 to 2018, when sectoral data were available. The analysis period ended in 2018 as a consequence of the temporal cover of one of the main datasets used, namely UERRA, which ended in July 2019 (no further updates are foreseen).

The climate aspects were investigated with the use of the HCI:urban index, which targets the general outdoor leisure activities in urban areas (e.g., city tours, sightseeing, etc.), and aims to characterize how suitable the local climates are for such activities. The rating scale of the index comprises seven classes of climate condition suitability—from unfavorable to ideal—for these types of touristic activities (Table 1). The index has been employed in several studies to assess the strengths of the relations between local climates and tourism flow in urban areas (e.g., [29,30]), in the context of the current climate period, or for future periods (e.g., [31,32]). To the best of our knowledge, the HCI:urban index has not been applied so far to rural areas in particular.

Table 1. HCI rating system (after Scott et al., 2016).

HCI Values	Climate Suitability Classes (HCI Rating)
90–100	Ideal
80–89	Excellent
70–79	Very good
60–69	Good
50–59	Acceptable
40–49	Marginal
30–39 20–29	Unacceptable
10–19 9–0	Dangerous

The HCI:urban index, computed for each selected locality, is derived from data provided by the regional reanalysis dataset UERRA [33] for 2 m of air temperature, 2 m of relative humidity, total cloud cover, and 10 m of wind speed; total precipitation was provided by the global reanalysis dataset ERA5-Land [34]. Both datasets are available from the Copernicus Climate Data Store. The two datasets have different spatial resolutions (11 km for UERRA; 0.1 × 0.1 deg for ERA5-Land) and different grids. Therefore, grid points from ERA5-Land were allocated to each grid point in the UERRA dataset based on the minimum distance conditions and assuring that the ERA5-Land grid point was characterized by a land–sea mask of at least 0.75. This led to a set of pair grid points from the two datasets, associated with each selected locality, and separated through distances of less than 10 km.

The HCI:urban index was computed based on the definition from [21] where the thermal comfort aspect is expressed through the effective temperature index given by Missenard's formula (e.g., [35]):

$$E = T - 0.4(T - 10)(1 - RH/100)$$

where T is the air temperature in degrees Celsius and RH is the relative humidity, in percent. In the framework of this study, the 2 m air temperature and relative humidity from the UERRA analysis at 12 UTC were used as proxies for daytime conditions.

The sectoral data used to substantiate the appropriateness of using the HCI:urban index for both urban and rural destinations were provided by the National Institute of Statistics in the form of the monthly number of overnight tourists registered for a destination, independent of accommodation type, and covered the period 2010–2018. The data refer only to officially registered accommodation units with at least 10 beds; for the purpose of this analysis, all types of accommodations (e.g., hotels, camping, agrotourism, etc.) were considered. It should be noted that, as shown before, for some rural touristic localities considered in the study, the data were available with gaps for the period of analysis, nevertheless covering at least half of the period.

The time series of sectoral data and monthly mean values of HCI:urban were employed to evaluate the intensity of the relationship between the two parameters for the period 2010–2018, using Pearson's correlation coefficient. In assessing the strength of the relationship, we followed [36], considering that a correlation coefficient in the range of 0.3–0.7 indicates a moderate strength in the relationship, while a value above 0.7 indicates a strong relationship between two variables.

3. Results

The strength of the correlation between weather characteristics and overnight tourists in urban areas varied between the selected cities, with correlation coefficients ranging from 0.137 (Ploiesti; not significant at 0.1 level) to 0.778 (Piatra Neamt). Among the cities

where weather may be seen as a relevant determinant for tourism fluxes, there are, as expected, seaside cities (Constanta, Tulcea), and cities where tourism is characterized more by cultural attractions (Arad, Alba Iulia). Overall, for 32 cities (82% of the selected urban destinations), the correlation coefficient was above 0.3, suggesting that weather features at destinations have at least a moderate influence on the tourism flux. However, for 18 of these destinations (43% of the selected urban destinations), the correlation coefficient was below 0.5, corresponding to less than 25% of variance explained by climate conditions for the intensity of the tourism flux. It is worth noting that in this category, the first 10 most populated cities (marked in italics in Table 2) enter, except for Constanta, which is located at the seaside and for which touristic data from Mamaia resort are also included. This suggests that the motivations of tourists traveling to these cities are related to other types of activities requiring traveling. For example, [37] showed that in Cluj-Napoca city, only 12% of interviewed tourists traveled for leisure purposes, other motivations were 'personal interest, followed by professional training, business and cultural motivation'. A similar finding is shown in [38] for Brasov city, where visits to friends or relatives and business were among the top motivations for tourists. This is in line with conclusions from other studies (e.g., [39,40], suggesting that in urban areas, weather characteristics have limited impacts on tourist trips at the moment of the trip, though tourist satisfaction may be affected).

Table 2. The correlation coefficient between the monthly mean HCI and monthly mean number of overnight tourists, for 2010–2018, for urban destinations.

No.	City	County	Correlation Coefficient (HCI, Overnights)
1	Alba Iulia	Alba	0.634
2	Arad	Arad	0.728
3	Pitești	Argeș	0.481
4	Bacău	Bacău	0.455
5	*Oradea*	Bihor	0.485
6	Bistrița	Bistrița-Năsăud	0.609
7	Botoșani	Botoșani	0.377
8	*Brașov*	Brașov	0.299
9	Brăila	Brăila	0.594
10	Buzău	Buzău	0.448
11	Reșița	Caraș-Severin	0.511
12	Călărași	Călărași	0.396
13	*Cluj-Napoca*	Cluj	0.451
14	*Constanța*	Constanța	0.756
15	Sfântu Gheorghe	Covasna	0.299
16	Târgoviște	Dâmbovița	0.252
17	*Craiova*	Dolj	0.254
18	*Galați*	Galați	0.462
19	Giurgiu	Giurgiu	0.331
20	Târgu Jiu	Gorj	0.552

Table 2. *Cont.*

No.	City	County	Correlation Coefficient (HCI, Overnights)
21	Miercurea Ciuc	Harghita	0.607
22	Deva	Hunedoara	0.561
23	Slobozia	Ialomița	0.674
24	*Iași*	Iași	0.413
25	Baia Mare	Maramureș	0.503
26	Drobeta-Turnu Severin	Mehedinți	0.443
27	Târgu Mureș	Mureș	0.327
28	Piatra Neamț	Neamț	0.778
29	Slatina	Olt	0.247
30	*Ploiești*	Prahova	0.137
31	Satu Mare	Satu Mare	0.463
32	Zalău	Sălaj	0.578
33	Sibiu	Sibiu	0.545
34	Suceava	Suceava	0.435
35	Alexandria	Teleorman	0.237
36	*Timișoara*	Timiș	0.341
37	Tulcea	Tulcea	0.700
38	Vaslui	Vaslui	0.448
39	Râmnicu Vâlcea	Vâlcea	0.670
40	Focșani	Vrancea	0.305
41	*București*	București	0.422

A large range of the correlation strengths was found for rural destinations; the correlation coefficients varied from −0.08 (Malini) to 0.822 (Moneasa); however, we should note that for four localities (Albestii de Muscle, Fundu Moldovei, Malini and Vama), the correlation coefficient was not statistically significant at level 0.1. One explanation is that all four localities presented low accommodation capacities, as they had one or two registered accommodation units until 2014 and even in 2018, as in the cases of Vama and Albestii de Muscel. On the opposite end, in Moneasa, the number of accommodation units varied between 10 and 21 during the period analyzed, thus assuring a larger accommodation capacity.

A total of 40 localities (75% of the 53 selected rural localities) presented correlation coefficients of at least 0.3, indicating a moderate/strong relationship between climate conditions and tourism flux. The percentage was close to the one found for urban destinations, which supports the hypothesis that the HCI:urban index may be appropriate to quantify the relation between climate conditions for outdoor activities and the intensity of tourism fluxes in rural destinations. Furthermore, for 13 localities, this relationship is strong (correlation coefficient of 0.7 and higher), suggesting that climate conditions are important factors influencing the annual cycles of tourism fluxes in these rural destinations. It is interesting to note that these 13 localities (along with the other 13 rural destinations, marked with 'b' in the last column of Table 3) are known in Romania as spa resorts (balneary destinations) due to the presence and exploitation of curative, therapeutic natural factors (e.g., mineral and/or thermal waters, mineral muds, moffetes). Overall, for 19 (out of 26) balneary destinations, the climate conditions explained at least 25% of tourism flux variabilities (corresponding to a correlation coefficient of 0.5). This result agrees very well with the

characteristics of balneary tourism in Romania, where light outdoor activities are essential components of such vacations (e.g., [41]).

Table 3. The correlation coefficient between the monthly mean HCI and monthly mean number of overnight tourists for 2010–2018, for rural destinations. As an alternative destination type, balneary tourism is denoted by the letter 'b' in the last column.

No.	Rural Destination	County	Correlation Coefficient (HCI, Overnights)	Alternative Destination Type
1	Albestii_de_Muscel	Arges	0.020	
2	Amara	Ialomita	0.770	b
3	Baile_Govora	Valcea	0.781	b
4	Baile_Herculane	Caras-Severin	0.742	b
5	Baile_Olanesti	Valcea	0.812	b
6	Baile_Tusnad	Harghita	0.686	b
7	Bala	Mehedinti	0.656	b
8	Baltatesti	Neamt	0.784	b
9	Barsana	Maramures	0.426	
10	Bazna	Sibiu	0.475	b
11	Boghis	Salaj	0.582	b
12	Borsa	Maramures	0.448	
13	Botiza	Maramures	0.216	b
14	Buzias	Timis	0.721	b
15	Cacica	Suceava	0.430	b
16	Cartisoara	Sibiu	0.430	
17	Covasna	Covasna	0.805	b
18	Dambovicioara	Arges	0.429	b
19	Dorna Arini	Suceava	0.457	
20	Dorna Candrenilor	Suceava	0.534	
21	Frumosu	Suceava	0.455	
22	Fundu Moldovei	Suceava	0.118	
23	Geoagiu	Hunedoara	0.785	b
24	Gura_Humorului	Suceava	0.553	
25	Jucu	Cluj	0.166	
26	Lipova	Arad	0.296	
27	Livada	Satu-Mare	0.262	
28	Madaras	Bihor	0.404	
29	Malini	Suceava	-0.080	
30	Moisei	Maramures	0.284	
31	Moneasa	Arad	0.822	b
32	Ocna_Sibiului	Sibiu	0.574	b
33	Ocna_Sugatag	Maramures	0.502	b
34	Pestisani	Gorj	0.069	
35	Pojorata	Suceava	0.538	

Table 3. *Cont.*

No.	Rural Destination	County	Correlation Coefficient (HCI, Overnights)	Alternative Destination Type
36	Praid	Harghita	0.596	b
37	Rodna	Bistrita-Nasaud	0.510	
38	Sacelu	Gorj	0.533	b
39	Sadova	Suceava	0.411	
40	Sangeorgiu de Mures	Mures	0.454	b
41	Sangeorz_Bai	Bistrita-Nasaud	0.759	b
42	Slanic_Moldova	Bacau	0.721	b
43	Solca	Suceava	0.297	b
44	Sovata	Mures	0.798	b
45	Soveja	Vrancea	0.271	b
46	Sucevita	Suceava	0.497	
47	Tasnad	Satu-Mare	0.666	
48	Tăuții - Măgherauș	Maramures	0.291	
49	Valenii_de_Munte	Prahova	0.350	
50	Vama	Satu-Mare	0.102	
51	Vatra Moldovitei	Suceava	0.476	
52	Viseu_de_Sus	Maramures	0.409	
53	Slanic	Prahova	0.702	b

4. Discussion

The wide range of correlation coefficient values for urban and rural localities may give some hints on the relative importance of weather and climate conditions as factors determining tourism at a destination. For example, for Timisoara—the fourth most populated city in the country—the correlation coefficient is 0.341, suggesting that tourism in this destination is not limited to good weather conditions, most probably due to other/additional tourism components (e.g., business, indoor attractions, and facilities for indoor activities). In other cases, a high correlation suggests that improving the offer for 'bad weather' conditions may reduce climate-related seasonality; for example, in the case of a balneary destination, Baile Herculane, the correlation coefficient is 0.742, suggesting that most overnight tourist trips take place during months with good weather.

The climate-related seasonality in rural areas is also confirmed by [20], which showed that respondents to their study questionnaire preferred to travel in rural areas during the summer. This may be due to climate conditions as well as institutional factors (e.g., summer school vacation).

Balneary destinations generally present a strong correlation between weather conditions and the number of overnight tourists, highlighting the strong seasonality due to the climate conditions of this type of tourism in Romania. For these destinations, in Romania, other factors may be involved as well in shaping climate-related seasonality, such as the moderate quality of services (e.g., [42,43]), outdated infrastructure [43,44], and limited tourism offers. Surugiu and collaborators [45] highlighted that tourism offers have the largest influence on domestic tourism demand at spa destinations, followed by the total monthly average incomes per household and the number of vouchers for spa treatments and leisure granted through state social insurance (the latter mainly targeting senior tourists). Considering that tourism infrastructure and treatment facilities in balneary resorts in Romania are, in general, not upgraded (to meet tourist requirements), and that

entertainment services are limited, climate conditions place considerable weight on the tourism fluxes in such destinations.

The tourism infrastructure in Romania is not uniformly developed, with some counties or regions showing much more pronounced development compared to others. These characteristics were highlighted by [46] and apparently have not changed significantly until 2021. According to the National Institute for Statistics, about 62% of all touristic accommodation units are located in 12 counties (out of 41). These counties are characterized by rich natural resources, such as relief (e.g., location in mountain/seaside areas) and spa resources (e.g., moffetes in Harghita, thermal waters in Sibiu), and/or cultural attractions (e.g., monasteries in Suceava, ethnography in Maramures). Rich cultural traditions and significant touristic potential are found in most regions, but in some cases, they are less capitalized by local authorities or private investors. A similar situation is found for agro-tourism boarding houses; thus, exclusively in rural areas, there are counties with more than 200 agro-tourism boarding houses (Brasov, Cluj, Harghita, Maramures, Suceava, Tulcea) and others with less than 5 (Teleorman, Olt, Ilfov, Ialomita, Giurgiu, Galati, Calarasi, and Braila). The spatial non-uniformity of touristic infrastructure may be present within the same county, as highlighted by [46]. As positive aspects, the comfort features provided by accommodation units are quite good, as three and four daisy units (the comfort category indicator for agro-tourism boarding houses) represented, in 2019, about 70% of all such establishments. The prices in agro-tourism boarding houses are generally lower than other accommodation structures, although they depend, as in the case of any tourism accommodation unit, on the touristic region, services offered, and the time of the year. The transport infrastructure at the country level still needs improvements in order to facilitate tourism development [47], although steps forward are constantly being registered. Despite hampering factors, rural tourism in Romania has a high potential for development [48] and is of interest for tourists and tourism investors, as shown, for example, by the change in the number of tourist accommodation units (beds) from 1994 to 2021 (Figure 3). We should note that balneary destinations, despite their wealth and variety of natural resources, observed quite significant decreases in their accommodation capacities, while urban and rural destinations (included in 'other touristic destinations' in Figure 3) faced a boost in this feature.

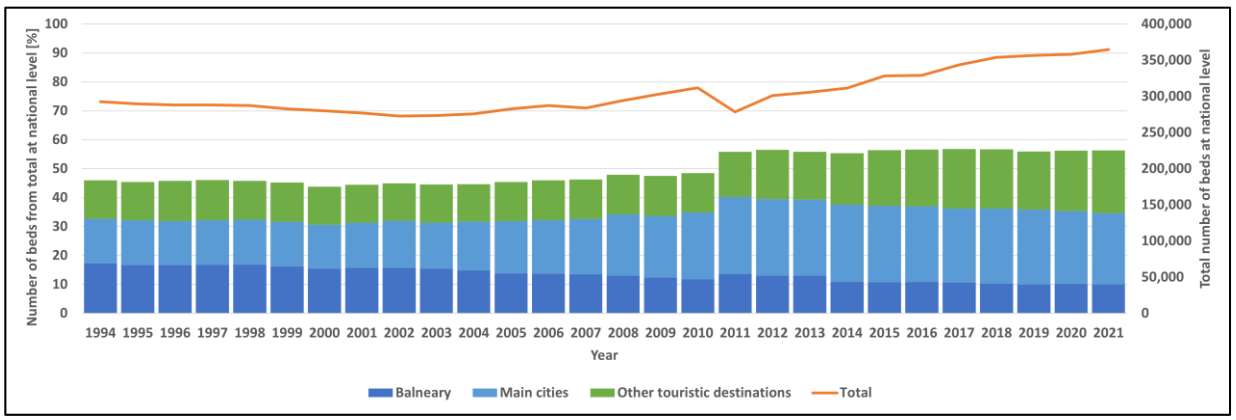


Figure 3. Percentage of the number of beds in accommodation units in various touristic destination types in Romania (bars), from the total number of beds at the national level (line) for 1994–2021. (source: processed data from NIS www.insse.ro, accessed on 29 June 2022).

Capitalizing on natural resources, including climate, may be one of the components of enhancing rural tourism in Romania, along with improvements in transport and tourism infrastructure. The Travel and Tourism Development Index (TTDI) assembled by the World Economic Forum [49], shows quite low scores for the natural resources sub-index in Romania (ranking 63 out of 117 countries analyzed). This indicator 'measures the available natural capital as well as the development of outdoor tourism activities' [50]

and 'captures how the natural resources are promoted' [49]. The assessment provided through TTDI shows that there is still room for improving various aspects relevant to tourism in Romania, including better use and promotion of natural resources (such as landscape attractivity, climate conditions, or therapeutic natural factors). Access to weather and climate tourism-oriented information, diversification of tourism offering to cover less pleasant weather conditions for outdoor activities, and better advertising climate-related opportunities associated with different periods of the year may contribute to establishing and/or reinforcing the destination images of rural and balneary destinations. In this context, HCI:urban may be of interest for tourists when planning vacations as well as for local authorities and tourism investors, as an additional tool to increase the tourist attractiveness of a locality.

5. Conclusions

We investigated the potential of the HCI:urban index in quantitatively describing the relation between local climate characteristics and tourism fluxes in rural destinations, employing sectoral data from 94 urban and rural tourism areas in Romania, while highlighting traits of urban tourism.

The results show that the HCI:urban index satisfactorily describes the annual variations of tourism fluxes, particularly in destinations where alternatives for spending time outdoors or during less pleasant weather conditions are limited (e.g., small cities, rural and balneary destinations); thus, it may be relevant for rural destinations. In particular, balneary destinations present strong correlations between local climate features and tourism flow, partially explaining the observed seasonality in these locations. On the opposite end, the most populated cities in Romania present low dependencies on climate features, which account for less than 25% of the seasonality of tourism flow.

The study findings are subject to limitations due to, e.g., the climate data (e.g., use of reanalysis instead of the measured data), methodology (e.g., climatic data based on the values in the grid point closest to the center of locality instead of using aggregated values based on multiple grid points), and even the definition of the index itself (e.g., not including specific tourist preferences for rural areas in terms of weather and climate features). Moreover, as the study is focused on Romanian touristic destinations, the findings may not be applicable to any rural touristic region, due to other factors influencing local tourism flow (e.g., social, economic, and political factors).

Nevertheless, the study highlights, within its limits, the appropriateness of the HCI:urban index applied to rural destinations; through this, it opens the door for improving/developing specific climate indicators for these types of destinations. Future work may take into account other environmental factors possibly influencing rural tourism, such as landscape traits and vegetation characteristics (e.g., [51]), and potentially include the findings in a specifically-designed climate–environmental index on the attractivity of rural destinations.

Author Contributions: Conceptualization, L.V.; data curation, A.I. and V.C.; formal analysis, R.B.; methodology, L.V. and R.B.; project administration, A.G.; resources, V.C. and S.P.; visualization, A.I.; writing—original draft, L.V.; writing—review and editing, A.G. and S.P. All authors have read and agreed to the published version of the manuscript.

Funding: This project received funding from the European Union's Horizon 2020 research and innovation program under the Marie Sklodowska–Curie Grant agreement no. 887544.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Publicly available datasets were analyzed in this study. These data can be found here: https://cds.climate.copernicus.eu, http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table (accessed on 29 June 2022).

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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