

ADDED VALUE OF CLIMATE AND ENVIRONMENTAL INFORMATION FOR AGRITOURISM

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Abstract

Capitalizing on the natural, cultural and anthropogenic potential for tourism in rural areas represents an important chance for local economy in Romania. Some of the main assets of a rural touristic destination are weather and climate conditions along with overall quality of services provided. Therefore, including climate and other relevant environmental information (e.g. on the greenness of the vegetation, low level of pollution etc.) in the promotion of agrotourism may contribute to a faster uptake of potential consumers/tourists and increase of overall success of the agritourist activity. In this line, we present a selection of such information tailored for tourism and customizable for specific locations which may positively contribute to building the image of the agritourist destination. The information, developed by the National Meteorological Administration, is currently available for 160 touristic locations in Romania, free of charge, through the web-based application WECTOU (Weather and Climate for Tourism) <http://wectou.meteoromania.ro/>. Personalized information is available as well as a larger palette of climate and environmental products, such that to answer efficiently the specific requirements of the user.

Key words: rural tourism, agrotourism, weather and climate, Romania, WECTOU

INTRODUCTION

Rural tourism has gained popularity in the last years as well as its subtypes like the agrotourism. Marian (2017) considers rural tourism as “an important form of sustainable tourism” [13]. Ana (2017) states that agrotourism is a newer term compared to rural tourism, the farm being “the main place for tourism”, thus satisfying a specific need of those tourists interested to feel the pulse of living in this environment [2].

Jensen *et al.* (2014) consider that agritourism have a double role for potential tourists - “recreational... and educational” and for the farmers to “diversify and add income” [11].

Lopez and Garcia (2006) appreciate that agrotourism is a way for the families living in rural areas to increase their income and, thus, develop their business [12]. The importance of agrotourism for the residents of the rural regions visited by tourists is also highlighted by Petrović *et al.* (2017) who mention as the

main advantage for farmers having “more money to spend” [19].

Ammirato *et al.* (2020) conducted a documentary analysis on the relationship between agrotourism and sustainability, showing that most literature they reviewed highlight the numerous benefits by this type of tourism for the sustainable development of that region, benefits that are in line with the goals of Agenda 2030: “reduction of poverty”, new jobs for people who could work in this domain, “gender equality” and the infrastructure development in the area [1].

The Farm-Based Education Network, Shelburne Farms, University of Vermont Extension (2019) published a guide for farmers working in agrotourism in order for them to be “successful”. Among the factors that influence their success, such as the quality of the products and services they offer, their competitive prices, marketing is also very important [28]. A marketing strategy that takes into account the 4 P’s of marketing

mix (product, price, promotion and placement) should be implemented by all these businesses that develop their activity in agrotourism in order to succeed. The role played by weather (which can influence the satisfaction received by the customers) is emphasized by the publication along with risk management.

Taking into consideration the role of weather in the number of people visiting a rural area with touristic potential, farmers should pay more attention to the climate and weather information tailored for tourism. These can provide valuable information that could be used in the promotional campaigns to attract visitors in the most convenient months, to schedule some activities for enhancing the satisfaction of tourists and also for implementing risk management activities to reduce unforeseen damage caused by changes in the weather.

Bagi and Reeder (2012) evaluate the factors that influence the decision of farmers to develop agrotourism activities within their facilities [5]. Among others, authors mention the importance of having access to weather information. Mpiti and De la Harpe (2014) conducted a research in which they showed that many “farmers... do not have access to... technologies” specific for this type of tourism [15]. In the last years, the climate and weather data became more easily available and distributed to the public in a friendly way on various websites or through mobile apps. These data can be useful for farmers to better plan their activities, to mitigate some risks and also better advertise their facilities to the potential tourists.

Local authorities should also be interested in developing agrotourism and support farmers investing in these activities because a rural region can thus become a brand well known among tourists.

Anabestani (2016) suggests a few guidelines for creating a brand from these regions: i) pay “attention to certain products” for which the region is known and also to farmers’ initiatives; ii) develop facilities and infrastructure; iii) maintain traditions and promote them among tourists [3].

The present paper introduces a series of climate and environmental information customized for all tourism actors (tourist, investors, local authorities) which may be incorporated in the touristic products by entrepreneurs in rural regions, potentially helping them to promote their facilities and attract visitors in a more efficient way. The research presents a free source of such information for Romania namely WECTOU web-based platform [30] that provides climate and environmental information tailored for tourism purpose in a friendly interface and an easy-to-understand language and developed by National Meteorological Administration (Meteo Romania).

Agrotourism in Romania

According to Ciobanu and Turek-Rahoveanu (2016), agrotourism in Romania has “the highest possibility of development”, because it is a new type of tourism that gained the attention of tourists in the last years, people wanting to try a form of tourism that connects them more with nature. The authors came to the conclusion that this important potential is not enough capitalized, there being problems related to the lack of financial resources that could be used to develop the rural regions, their infrastructure, create more facilities for tourists at a higher standard and have marketing budgets to promote it [6].

Sima (2018) explains why “rural tourism is not considered a representative product” for Romania, despite its high potential: factors at a macroeconomic level like the lack of vision regarding this subsector of tourism, the lack of communication between the actors involved and also the lack of funds for promoting this type of tourism, most people in these regions not having the resources or the knowledge for developing a marketing campaign that could increase the income by raising the number of tourists coming to that region [24].

Sima (2019) considers that the solution for the development of agrotourism in Romania would be more investments to create more entertaining activities for the tourists and still preserve the culture of the region (traditions, clothes, food, music) and marketing programs

to reach the potential tourists and grasp their attention and interest [25].

Avram (2015) also mentions the potential of this sector, highlighting that this is not sufficient and there is a need for implementing more projects in these regions and invest in the human resources that are employed in the facilities for tourists [4]. Nicula and Spânu (2015) appreciate that agrotourism should incorporate the principles of sustainable development and maintain the “natural and cultural heritage” of the beautiful regions in rural Romania [17].

Pop *et al.* (2017) notice the increase of the units and rooms in rural areas but emphasize that this is not a guarantee of reaching the important potential of agrotourism in the country. The solution mentioned by the authors is represented by a higher quality and more “entertainment activities” [20].

National Institute of Statistics (2019) published a report in which they show the number of agritourist accommodation facilities between 2016 and 2018 [16]. (Table 1).

Table 1. Evolution of agritourist facilities between 2016 and 2018

Agritourist accommodation facilities	2016	2017	2018
Number of units	2,028	2,556	2,821
Number of beds	37,394	44,499	48,574

Source: National Institute of Statistics (2019). Turismul Romaniei. Breviar Statistic. Bucharest: National Institute of Statistics Publishing House [16].

We notice an important increase of the number of units and beds between 2016 and 2018 - 39.1% and, respectively, 29.89%. This evolution proves the potential of this type of tourism in Romania but as Avram (2015) mentioned, this potential should be capitalized through investments [4].

Tenie *et al.* (2018) conducted an analysis of data between 2000 and 2016 regarding agrotourism in Romania and reached the conclusion that there is “an increase of 30 times in the number of arrivals” in agrotourism locations and the agrotourism units increased “more than 5 times”. The authors highlight the role played by marketing

and financial resources for the development of this subsector of tourism that has a great potential [27].

Furthermore, in the last year, due to the COVID-19 pandemic situation, agritourism attracted even more interest, as shown by the evolution of touristic overnights in 2020 compared to 2019 (Figure 1).

Slusariuc (2018) states that “relief, landscapes...weather”, among others, are variables that should be considered when creating a touristic product, contributing to the “authenticity” of the product [26].

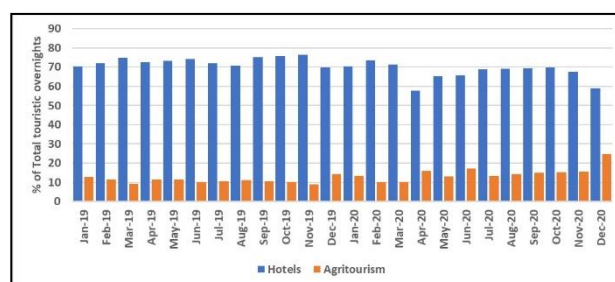


Fig. 1. Monthly data for touristic overnights in hotels (blue) and agritouristic accommodation facilities (orange) as percent from the total number (country level) during January 2019-December 2020.

Source: TEMPO - National Institute of Statistics database [28].

Ministry of Agriculture and Rural Development (2015) presented in its journal ‘Romania rurala’ an interview with Klaus Ehrlich who mentioned that the main weakness of the rural tourism in Romania is represented by the poor communication and marketing that fail to promote it to international markets [14].

The “weak promotion” is also mentioned by Răbontu *et al.* (2017) who give examples of good practices from the other European countries where rural regions are well known for their food, wine, traditions, music and so on and this should be the strategy for Romanian agrotourism too [21]. Gherasim and Gherasim (2017) highlight the importance of marketing courses for creating a better touristic product in rural areas as well as the need to invest in infrastructure, “preserve” culture and “offer leisure activities” and objectives of interest for the tourists [10].

Marketing is an important tool that can be used by owners of these facilities to promote

their products. Also, an important attention should be offered to other products or services that can enhance the satisfaction received by the tourists if used complementary.

WECTOU -A Web-based Platform for climate and environmental information for tourism

The idea of a single place, easy to access, that offers climate and environmental information targeting the four main types of touristic locations started from common questions one asks when planning the next holiday: 'If I go in December in this location, the kids will have the chance for snow plays/use the sleigh?', 'I want to go to a new/'undiscovered'/not so crowded place this year, but where?', 'My colleague went last year in July in this small, delightful village, with a lot of green areas, and she enjoyed an excellent weather for walking. If I go in April, what are the chances for such a nice holiday?'. WECTOU was built with such questions in mind and strives to help tourist in enjoying the beautiful touristic places in Romania. The application puts on the map 162 locations, out of which 50 are in rural area, 50 are urban locations, 45 are localities oriented more toward mountain tourism and 17 localities are situated at the seaside or in the Danube Delta. The information is derived from state-of-the-art climatological and environmental data from COPERNICUS Programme and it is based on 12 indices covering aspects like biometeorological conditions, long-term climate information, touristic conditions.

MATERIALS AND METHODS

WECTOU application offers three main types of information:

- information based on the weather of the last years (2000-2018) from Copernicus Climate Data Store (CDS) [7]. The climate information refers to thermal stress, number of days with pleasant/acceptable weather for outdoor activities, snow cover and snow depth, green cover, respiratory comfort and frostbite risk. This information is aggregated at monthly scale, using the data for the entire period considered.

- information updated daily or up to 10 days, using observations from meteorological satellites available from Copernicus Marine Monitoring Services (CMEMS) and Copernicus Land Monitoring Service (CLMS), for sea temperature, green cover and snow cover.

- forecast information for pollen and pollution (PM10) concentration levels and sunburn risk, available from Copernicus Atmosphere Monitoring Service (CAMS). The information presented through WECTOU is based on the numerical forecast for 'tomorrow' being aggregated in the form of daily mean, from hourly data, for the second day of the forecast. More detailed information on the indices used is available in the WECTOU application under 'Climate and environmental information -Description of indices' section or by contacting the authors.

The choice of indices included in WECTOU was underpinned by potential users/tourists' preferences, which are provided by several sources like the results of the questionnaire used in the market analysis prior and during the application development, scientific literature or results from European research projects targeting the tourism sector like EU-MACS, which show, based on interviews with stakeholders in European countries, highlight that information contained in indices like those on human comfort or useful in evaluation the climate suitability of a certain destination (e.g., HCI; snow information) are of interest [8]. Furthermore, studies at European level [9] highlight that tourists from the first five countries with the highest numbers of residents making outbound trips in 2015 list 'nature' and 'sun and beach' among the 5 top reasons for travelling, suggesting that additional environmental information (e.g., on scenery, certain vegetation type growing season etc.) may be relevant for tourism. For the rural tourism in particular, no specific indicator – either climate-based or environmental – has been identified as a practice, as the rural tourism is an emergent but still not well-defined type of tourism. Nevertheless, based on the scarce information available, general interests of tourists in the rural areas are closely linked to

the natural beauty of landscape (abundant vegetation/ crops/ forests/ snow cover during winter); thus, a specific indicator (Green Cover Index) has been built based on satellite-derived biophysical information provided by Normalized Difference Vegetation Index (NDVI) and it is provided through WECTOU. The application has been released on 30 June 2020 and it is currently in the market trial phase. The sustained communication and marketing campaign developed so far through social media, written and online press or personalized contacts with tourism investors (e.g., managers of accommodation units, local authorities, tourism agencies) made the application known to a large pool of potential users. Unfortunately, the limitations imposed by the COVID-19 situation brought a strong decrease in all tourism-related areas, all over the world. In Romania, in particular, as shown by National Institute of Statistics [17] in their report from 2021 that the number of overnight stays decreased by 51.6% in 2020 compared with 2019 (45.3% the decrease for Romanian tourists and 81.1% for the foreign tourists). The sanitary and socio-economic situation imposed strong limitations for tourism but also led to a much lower interest of the people in subjects/news related to tourism. In this context, the potential success of the WECTOU application, in terms of user uptake or its impact on touristic circulation or business outcomes, could not be evaluated so far.

RESULTS AND DISCUSSIONS

One of the climate information oriented on tourism and provided by WECTOU refers to the number of days with good/fair weather for outdoor activities. This information is derived from the HCI (Holiday Climate Index) indicator [22]. The index takes into account thermal aspects (i.e., thermal stress), precipitation, wind speed and cloud cover for every day; the combination of these weather parameters allows to compute a complex index which quantifies how pleasant is the weather for leisure activities outdoor. WECTOU application presents this information at monthly scale, in the form of

number of days with good and very good or acceptable/fair weather conditions for outdoor activities.

Figure 2 presents an example of this information for two rural localities- Săcelu (Gorj county) and Cheia (Prahova county).

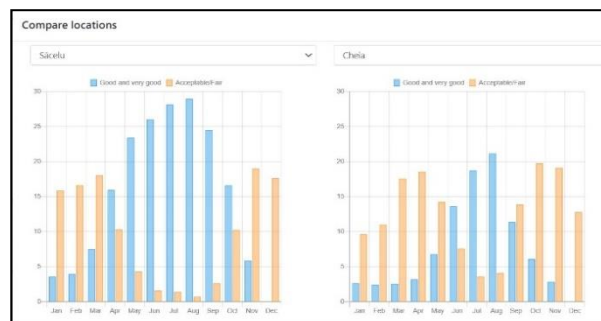


Fig. 2. Comparison of the index 'Weather for staying outdoor' for rural localities Săcelu (left) and Cheia (right) (comparison option is available for registered users of WECTOU application).

Source: [30].

The comparison shows that in April there are about 16 days with pleasant weather for outdoor activities at Săcelu, while at Cheia there are only 3 such days; similarly, during August at Săcelu almost all days are characterized by at least acceptable weather for staying outdoor, while at Cheia there are only 26 such days (about 5 days are characterized by 'bad' weather - not at least acceptable, e.g., too windy or too much rain for outdoor activities). This type of information may be used by the tourism investors in these areas either by adding the information to the 'image' of their product (e.g., 'The nice weather lasting from April to October allows relaxing activities outside') or by covering the 'bad weather' days with offers for indoor activities (e.g., wine testing; cooking demonstrations etc.).

Another potentially interesting information for tourists is the Snow Cover, which is provided through WECTOU at climatic scale (as average over the period 2008-2018, based on data available in CDS) and in Near Real Time (as average over 10 days and available from CLMS). This information is provided for cold season only- from October to April, in the form of number of days with at least 50% or 100% snow cover with respect to a 10x10km area including the locality of

interest (in climatic mode) or as 500 m in NRT regime.

We show in figure 3 an example of Snow Cover information for localities Moisei (Maramures county) and Soveja (Vrancea county).



Fig. 3. Comparison of the index ‘Snow Cover’ for rural localities Moisei (left) and Soveja (right). Source: [30].

At Moisei, during January, the entire area including the locality is, as based on 2008-2018 data, fully covered by snow; even in April there may be encountered up to 13 days with at least 50% snow cover, from which 9 days are characterized by 100% snow cover. At Soveja, January is also the month with most days with at least 50% snow cover (23 days), but in general during the cold season there are less days with snow cover, each month, than at Moisei. For both localities, the information may be used to promote the natural conditions of the touristic destination, either as e.g., ‘white winter’ (at Moisei) or as e.g., ‘days when you can taste the old white winters’.

An example of environmental information provided by WECTOU is the Green Cover Index (GCI), defined as the degree of greenery of the vegetation. GCI is a newly developed index within WECTOU aiming to provide environmental information for rural area. The underlying justification is based on the scarce information available regarding the rural tourism, which shows that general interests of tourists in the rural areas are closely linked to the natural beauty of landscape (abundant vegetation/crops/forests/snow cover during winter). Scientific literature exploring the user-knowledge from ‘ScenicOrNot’

crowdsourcing data (<http://scenicornot.datasciencelab.co.uk/>) also shows that ‘nature’ (e.g., vegetation extent, orography) is one important element for the subjective perception of a ‘scenic’ image, although it highlights that some built elements (e.g., building with historical or emotional load like castles or cottages) also have a contribution to the ‘scenic’ attribute of an image [23]. These findings suggested that satellite-based information regarding the vegetation characteristics -in particular the presence of green vegetation and its extent – may be used to derive environmental information of interest for touristic purposes in rural areas.

GCI indicator is based on Normalized Difference Vegetation Index (NDVI) which is derived from satellite observation and provided through WECTOU at climatic scale (as average over 2008-2018 period, based on data available in CDS) and in Near Real Time (as average over 10 days) based on data available from CLMS. NDVI index is used to assess whether or not the target being observed contains live green vegetation. In WECTOU, the NDVI is used to derive information on how much green vegetation is found in a certain area, defined as the area of the locality plus a 1km buffer around it. The GCI index is intended primarily for rural areas but at the moment it is provided for all localities included in WECTOU application.

In figure 4 we present an example of Green Cover index based on NRT information for period 1April- 3 October 2020 for localities Călăcea (Timis county) and Balványos (Covasna county).

It may be easily seen that at Balványos from June to September the vegetation is green in the entire area of the locality, while at Călăcea the maximum area of green vegetation (about 23%) may be expected during the last decade of July, the rest of the summer more greenish (e.g., less dense/dryer natural vegetation) is encountered. Just as in the previous example, this type of information may be used either to promote directly the advantages of the greenery for that locality or to mitigate the shortcoming of the scenery by highlight other alternative opportunities (e.g. spa facilities).



Fig. 4. Comparison of the index 'Green Cover' for rural localities Călăcea (left) and Balványos (right).
 Source: [30].

The information may be incorporated in the general description of the locality/facility or as part of promotional materials offered to tourists, as shown in example in figure 5 or even used to prepare/extend the offers for leisure activities (e.g., taking into account days with unpleasant weather for outdoor activities or with strong thermal stress).

These are just few examples of information available through WECTOU application, which may be exploited by investors and local authorities to strengthen the agritourism in their area of interest.

These types of information are freely available through WECTOU application. Additionally, more detailed information may be accessed through premium packages (e.g. adding your locality if not already in the application, climate data at sub-monthly scale, use original photos and descriptions linked in WECTOU to the host localities) depending on the package, these being customized for advanced users, investors and local authorities, as described in the 'Premium' section of WECTOU application.

Although the COVID-19 pandemic strongly affected tourism and decreased people motivation for travel, there is still interest for these activities. The market research revealed that WECTOU gave ideas to the users for choosing more isolated locations where they can spend their holidays of utmost importance during these times. Also, social-media (Facebook) promotion campaign taking place in February 2021 highlighted the users' interest in the information provided by WECTOU, as shown by the audience

monitored through Google Analytics (Figure 6).

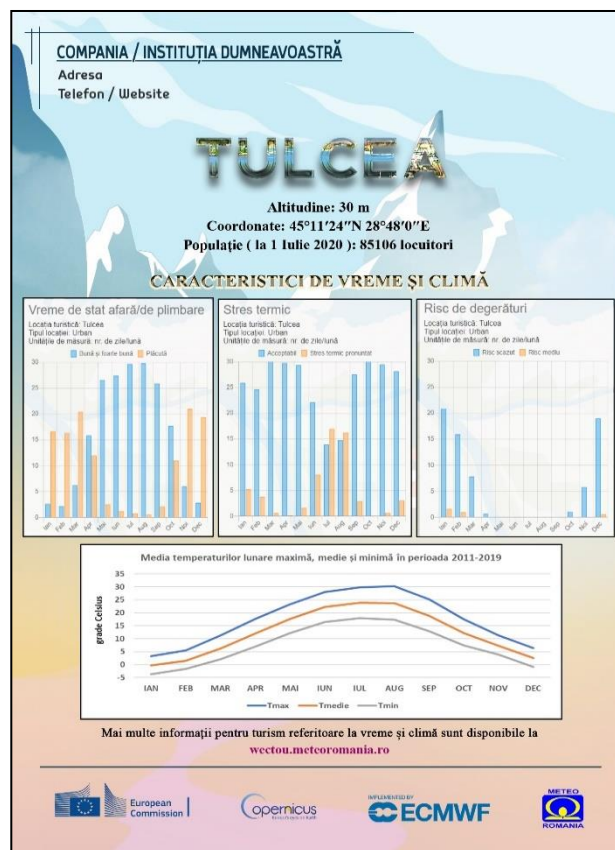


Fig. 5. Example of promotional material (in Romanian) using climate and environmental information from WECTOU application, developed by Meteo Romania. The flyer presented is customized for Tulcea city (urban destination).
 Source: [30].

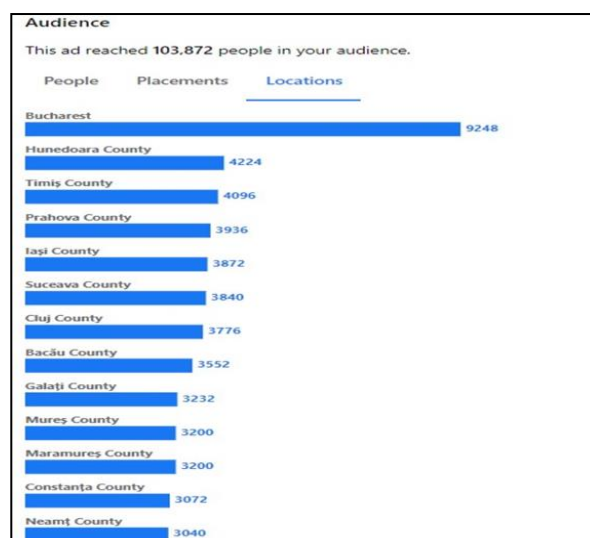


Fig. 6. Audience on Facebook – Locations, on Day 27 (during period 1-28 February 2021) of the Facebook Ad campaign.

It may be noticed that the main location of those that were interested in the ad promoting the WECTOU application is represented by Bucharest, followed by Hunedoara, Timis and Prahova counties which are important regions in Romania from a touristic point of view.

The interest on the information provided by WECTOU application is visible also from the current (and increasing) number of followers on social media channels Facebook (318), Instagram (44) and Twitter (12).

CONCLUSIONS

WECTOU can be used to enhance the value provided by agritourist structures by incorporating it in the marketing mix strategy. The main advantages come from the facts that this application is free and it is developed by Meteo Romania - the national responsible authority in Romania for weather and climate information.

Local authorities and owners of agritourist pensions can use the information provided by this application to better advertise their offer and, thus, attracting more visitors. For those who want more data, tailored for their specific location, there is the solution of using one of the premium packages available for this application or contact Meteo Romania for a personalised offer.

The possibilities are numerous. When defining their services for the tourists, they can include information regarding the indices provided by WECTOU to help tourists better schedule their holiday or their activities during their stay in that location. In this way, the touristic product has a greater value for the tourists and the satisfaction felt can be increased. On the long-term, income may increase too.

Entrepreneurs in agritourist locations or local authorities can incorporate data provided by WECTOU in their flyers or other promotional materials in order to include aspects related to weather and climate when promoting the village or the accommodation facility. Using a product developed by Meteo Romania can contribute to the reputation and image of the agritourist structure in the community but also at a local, regional and national level.

Weather is a factor considered by many tourists when choosing a location so helping them to choose wisely by being more knowledgeable regarding some indices like *weather for staying outdoor, thermal stress, respiratory comfort, snow cover, green cover, sea water temperature* and other indices that are offered by WECTOU is a great way to enhance the value of the touristic product offered in agrotourism.

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