

# Economic Effects of Geotourism in Geopark TERRA.vita, Northern Germany

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*Guest editors' note: In order to gain the necessary political and public support, geoparks have to demonstrate how they contribute to the socioeconomic development of their particular region. In addition to the other important tasks of nature protection, conservation of geologic heritage, and promotion of tourism, education, and research, geoparks have to evaluate the regional economic effects which are stimulated or increased through their activities. The results of the study presented in this paper demonstrate the considerable economic input through the activities of Geopark TERRA.vita, although no cause-effect relationship could be established due to the complex economic and political situation of the geopark.*

## Introduction

THE EVALUATION OF THE ECONOMIC EFFECTS OF SPECIFIC PROJECTS and/or institutions has gained considerable importance in sustainable regional development. Potential social, cultural, or ecological effects are usually not deemed sufficient reason for the political or financial support of private enterprise and/or government organizations. The demonstration of positive economic effects is an excellent option to increase public support.

Therefore, geoparks have to evaluate the economic effects of the parks themselves and of the activities stimulated or promoted by the parks. Direct effects are revenue/return, income or employment, that are directly generated by tourism in the geoparks and their immediate surroundings (e.g., lodging, dining). Depending on the quality of the database for a particular geopark, these direct effects can usually be calculated with a certain degree of confidence. Indirect effects are much more difficult to quantify, since they are estimated as a logical consequence of certain activities of the geopark or its infrastructure (Job et al. 2006).

Economic valuation of protected areas such as national parks has a long tradition, particularly in North America (WCPA 2002). Due to their homogeneity and clearly defined structure, the direct economic effects of national parks can be calculated fairly easily (e.g., entrance fees, charges for clearly defined visitor services, etc.). Geoparks—which in Europe are closely related to the nature park model—have a very different protection status than do national parks. This, along with the wide variety of goals of geoparks (education, nature protection, protection of the geologic heritage, research), as well as the close association between the cultural and natural heritage in nature parks, means that geoparks are usually much more heterogeneous than national parks. They are usually also much more heavily populated and without clearly defined borders and gateways. Therefore, the economic evaluation of nature parks/geoparks is much more difficult.

To date, no formalized method for the evaluation of the economic effects of geoparks exists (Dwyer et al. 2004; Job and Metzler 2005). In the following study of the economic effects of Geopark TERRA.vita in northern Germany (Figure 1), we propose a threefold approach that can serve as a tool box for various types of geoparks: (1) general statistical information provides a general idea of the importance of tourism in the area in which the geopark is situated, (2) added value analysis on the supply (offer) and/or the demand side provides specific information on first- and second-order expenditures of the tourists, and (3) specific data can be obtained through the sales and services of the park itself. Different combinations of these three levels should provide sufficient information even in a construct as complex as a geopark. Thus, the goal of this study is to evaluate the economic effects generated or stimulated by Geopark TERRA.vita using the triadic approach mentioned above.

### Geopark TERRA.vita

The nature park Nördlicher Teutoburger Wald, Wiehengebirge, Osnabrücker Land e.V. was created in 1962 as a protected area according to section 27 of the Federal Nature Conservation Act (abbreviated as “BNatSchG” in German). In Germany, nature parks are defined as large areas with a high diversity of species and ecosystems, which are characterized by manifold land use. These areas are to be developed and maintained in a homogeneous manner. The protection status within nature parks varies: most parts of a nature park consist of nature preserves (defined in section 26 of the BNatSchG) with a limited protection status, while some areas possess the highest possible protection status as nature protection areas according to section 23 of the BNatSchG.

In 2001, the Nördlicher Teutoburger Wald, Wiehengebirge, Osnabrücker Land e.V. Nature Park was accredited as the Geopark TERRA.vita and became a member of the European Geoparks Network. In 2004, TERRA.vita became a founding member of the UNESCO Global Geoparks Network. During the same year, the geopark was credited with the Viabone license, a much-sought-after label standing for the highest quality standards.

TERRA.vita is situated in a transition zone between the hilly-to-mountainous country of the central part of Germany (Deutsches Mittelgebirge) and the Northern German Lowlands. In an area of 1,220 sq km

Figure 1. Location of Geopark TERRA.vita.



it encompasses three landscapes: Teutoburger Wald (Teutoburger Forest), Wiehengebirge (Wiehen Hills), and Ankumer Höhen (Ankum Highlands). While the first two landscapes are characterized by the low mountain country of Mesozoic age, the Ankumer Höhen represent a terminal Ice Age moraine from the Saale glaciation.

The image of the geopark is primarily defined by its geological history, but also by the natural and cultural heritage connected with it. The geologic heritage is characterized by a small-scale sequence of rocks from the Late Paleozoic at Ibbenbühren, Hüggel, and Piesberg (primarily anthracite coal and quartzites of carboniferous age) through a complete sequence of Mesozoic deposits (Triassic, Jurassic and Cretaceous sediments) to the Pleistocene and Holocene sediments. Thus, visitors to TERRA.vita can easily walk or bike through 300 million years of the earth's history within a day. Associated with the geological history are some special features of the geopark: Dinosaur tracks at Barkhausen (Bad Essen), sinter terraces at Dissen, and the sandstone sculptures near Ibbenbühren ("Hockendes Weib").

The geological resources also provide the background for a long history of mining. Anthracite coal is still mined at Ibbenbühren, quartzite from the Piesberg (Osnabrück) is used for crushed rock, sandstone and limestone have been used as building stone for centuries, and the clayey component of the basal moraines supports a considerable brick and tile industry. To explain the geological history and the utilization of these resources to the general public, old mining buildings, shafts, quarries, etc. are used as exhibits. Another important aspect related to the geological past is the presence of health spas and baths in the Teutoburger Wald (Bad Iburg, Bad Rotherfelde, Bad Laer) and the Wiehengebirge (Bad Essen). Particularly, the brines from Jurassic deposits support a developing health and wellness industry.

The area around the city of Osnabrück has been settled since the first Neolithic people changed from hunting and gathering tribes to an agricultural society around 5500 BC. Since then, the archaeological evidence shows a continuous development through the Bronze and Iron Ages, the Migration Period, and the Middle Ages until today. The most spectacular historic sites in the area are the La Tene settlement Schippenburg near Venne, the site of the Varus Battle of 9 AD between three Roman legions and several Germanic tribes under Arminius at Kalkriese, the original site of the founding of Osnabrück by Charles the Great around 800 AD, and the Rathaus of Osnabrück, where the peace treaty at the end of the Thirty Years' War was signed in 1648. Another site of particular interest for tourists is the Kaiser Wilhelm Memorial at Minden. These key sites are used to show the cultural heritage of the area with events of national or even European importance.

The program of TERRA.vita is based on the particular geological, natural, and cultural heritage mentioned above as well as the potential of the landscape for recreational activities at the transition zone from the hilly-to-mountainous country to the Northern German Lowlands. Thus, hiking and bicycle touring, which show the natural and cultural heritage to best advantage, are the main activities promoted by the geopark. In addition to access to 2,300 km of hiking trails and 1,500 km of cycling paths along points of particular interest or scenic beauty (known as "TERRA.trails"), park rangers offer a varied program of guided tours with specific topics. The program is supported by a series of museums within the park, with the Schölerberg Natural Science Museum in Osnabrück, including TERRA.vita's information center ("TERRA.vision") as its focal point.

Administration of the geopark is complex, due to the fact that it is situated partly in the state of Niedersachsen (Lower Saxony) and partly in Nordrhein-Westfalen (North Rhine-Westphalia). This means that six administrative units from two Bundesländer (states) participate in managing the geopark, supported by their respective regional development, nature protection, and tourism agencies. Other partners of the geopark are environmental associations, environmental education centers, schools, and the University of Osnabrück. The seat of the geopark is at the Department of the Environment of the Osnabrück District.

The population density, the rather fragmented layout, the diverse landscapes and land uses, as well as the complex administrative situation, have to be considered when planning an evaluation of the economic effects of the geopark. An evaluation in such a complex environment is not comparable with that of a rather homogeneous national park and, thus, a more complex methodology has to be used in the analysis.

### Methods

**General statistics of the area** The official data on the economic effects of tourism in the area of the geopark are of limited use (Niedersächsisches Landesamt für Statistik 2007):

- The official data are collected along the political boundaries, that is, on a federal, territorial or communal level. Since the territory of TERRA.vita stretches across the political boundaries, only the communal level provides information with an adequate spatial resolution.
- Information on a communal level is limited with regard to tourism. Usually, only information on lodging with more than eight beds is provided, whereas no information is available about lodging with less than eight beds, or on dining or daily expenditures.
- The information is also limited with regard to the cause-effect relationships of this study, since no differentiation is made between economic effect of the geopark or other tourist attractions.

Therefore, the official data and additional studies carried out in the general area of the geopark (KTWE 2000; Niedersächsisches Institut für Wirtschaftsforschung 2005; Härtling 2006; IHK 2007; Sparkassenverband Niedersachsen 2007) could only be used as a comparative database.

**Added value analysis** An added value analysis is the method of choice when evaluating the specific economic impact of the geopark (for a discussion of other methods in impact analysis see Fletcher 1989 or Job et al. 2005). Ideally, the added value of specific endeavors is estimated by comparing the results from tourist counts and surveys (demand) with analyses of tourist-oriented services offered on a company-by-company basis (offer). The results of both the offer and the demand side can be compared, providing a more secure result from a relatively small sample. However, surveys of the offer side (e.g., dining, lodging) can only be effectively carried out in well-defined, relatively small areas (Härtling 2006). Due to the size and heterogeneity of TERRA.vita, an added value analysis on the demand side provides the more efficient tool to assess the economic importance of the geopark. Also, counts and

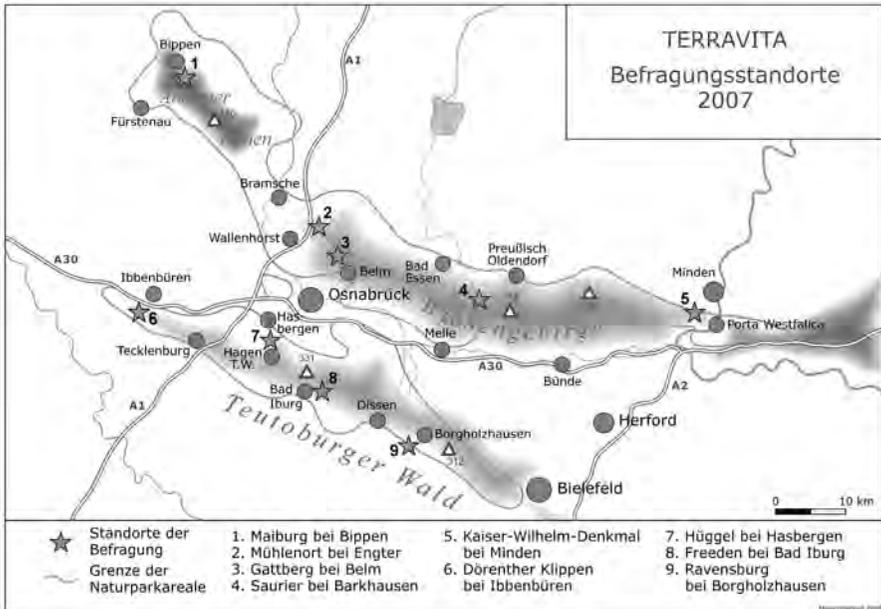
surveys of the tourists in the area can provide additional information, which can be useful for the management of the park.

In Germany, the method developed by Job et al. (2005; 2006) from the Department of Economic Geography in Munich serves as a blueprint for added value analyses in tourism. Due to the specifics of geoparks mentioned above, the method had to be adapted to TERRA.vita. Thus, counts and surveys with long, standardized interviews were carried out at nine sampling sites in the geopark while flash interviews were discarded. The interview sites (Figure 2) were chosen according to the following criteria:

- All three landscapes of the geopark should be represented according to their size and tourism potential.
- All administrative units should be represented according to their size.
- All sites should be of particular interest for tourists engaged in the activities promoted by the geopark.

Counts and surveys were carried out from 8 a.m. to 8 p.m. during the main tourist season (1 April–31 October 2007). This time span includes the Easter, summer, and fall holidays of Lower Saxony and represents the high season for the activities primarily promoted by the geopark (hiking, bicycling). The days for the counts and surveys were chosen for their representativity for the tourist season (weekdays, weekends, holidays). Based on the experience of previous studies, the results were then extrapolated to the entire year 2007 by adding 20% of the compiled data (Härtling 2006; Niedersächsisches Landesamt für Statistik 2006).

Figure 2. Sampling sites within Geopark TERRA.vita (marked with stars).



The standardized interviews consisted of an introduction with the reason for the survey, the affiliation and the assurance of anonymity as well as the formal data (interviewer, date, time, weather, additional observations). Only parts one and six of the interview deal with tourist expenditures, while the other parts refer to socioeconomic information related to other issues in parks management (for further information see Härtling and Meier 2008). In part one, the tourists are asked about the number of overnight stays (day-trippers vs. overnight tourists), the types of lodging utilized, and general costs for lodging and dining (categories only). In part six, the question was “How much money did you spend during your stay/your holidays?” and answers were broken down according to the following categories: lodging (overnight tourists only), restaurants, food shopping, general shopping, sports/leisure/cultural events, travel, visitors’ taxes, spa/medical, conferences/meetings, and additional services.

The comparison of information from parts one and six serves as a quality control for the statements of the tourists. It is important to note that in part one tourists are asked for general information in defined categories, while in part six exact quantitative data are required.

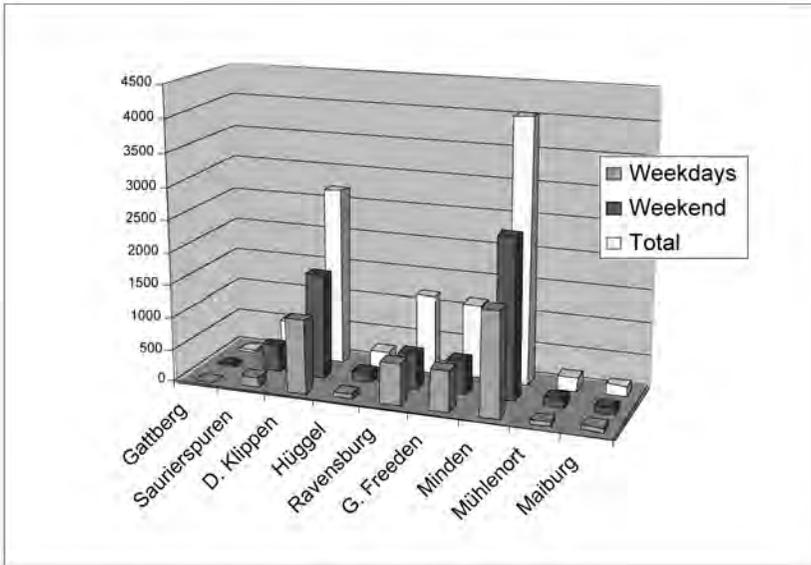
According to the method of Job et al. (2005; 2006), the numbers of tourists were extrapolated for day-trippers and for overnight tourists for the entire season. Then, the tourist numbers are multiplied by the total daily expenditure to determine the gross revenue. By reducing the gross revenue by the VAT (value-added tax) we gain an estimate of the net revenue. Since no data on the regional added value exist, those of comparative studies (IHK 2007) were used to calculate the first- and second-order economic effects by multiplying the net revenue by 0.55. This is very conservative and could, in reality, be as high as 0.70 (DWIF 2002; Tourismusverband Nordsee 2009). The employment effects can then be calculated by dividing the economic effects by the average income.

**Direct effects through goods and services** The direct economic effects from the sales of goods and services by the geopark are minimal: for guided tours, tourists are asked to give a small donation to the geopark. This small amount of money usually just covers the expenses of the park rangers, who work on a voluntary basis. There are also very few items (such as books, maps, and tour guides) sold at the Schölerberg Museum that can be related directly to the activities of the geopark. Thus, in contrast to the findings from national parks, this level of analysis can be discarded at TERRA.vita.

## Results and discussion

A total of 10,415 tourists were counted at the nine sampling sites during the twelve survey days (Figure 3). Most tourists were walking or hiking, while only about 10% of those questioned were bicycling. During weekends, the numbers were between 20–30% higher than during weekdays. As expected, the highest numbers were counted on Sundays. During the period 26–29 July 2007 July the counts were significantly lower, which was most probably due to bad weather: the weekend days (the 28th and 29th) were very cool and it rained continually.

Figure 3 also shows the considerable locational differences in the counts. While almost 40% of the tourists were recorded at the Kaiser Wilhelm Memorial at Minden, followed by the Dörenther Klippen (26%), the Ravensburg (12%), the Großen Freeden (11%) and the



**Figure 3.** Number of tourists counted at the nine sampling sites in Geopark TERRA.vita.

Saurierspuren (dinosaur tracks) at Barkhausen (6%), with the other four sites being well below 2.5%. Due to illness, no counts and interviews could be carried out at Minden from 26 to 29 July. Therefore, the dominance of the site at Minden is actually much higher than is depicted in Figure 3.

A total of 636 tourists participated in the standardized interview. The locational differences (Figure 4) are staggering: 50% of the interviews were carried out at the Dörenther Klippen and the Kaiser Wilhelm Memorial, with the other seven sites showed much lower absolute numbers. At the Maiburg and Gattberg sites, only four and five tourists, respectively, were interviewed. Of particular interest is the proportion of counts to interviews: At the Hüggel site, 30% of the counted tourists were also interviewed, while the proportion was 5–10% at most sites and only 3% at the Kaiser Wilhelm Memorial in Minden. The overall proportion is only at 6% of the entire sample (10% was the proportion aimed for).

Very few tourists were either willing or able to provide specific information on their expenditures as asked in part 6 of the questionnaire. Thus, the categorized numbers in question 1.5 were used to calculate the costs for lodging in hotels with more than 8 beds and the so-called grey lodging market (because no official statistical information is registered) of hotels, spas, apartments, etc. with less than 8 beds. On average, tourists spend 45.5 Euros (€) per day in these types of lodging, while lodging in youth hostels, campsites, or with relatives/friends was estimated at €19.6 per overnight stay.

The expenditure for lodging is considerably lower than that estimated in some other studies in this part of Northern Germany (IHK 2007; KTWE 2000; Table 1). This is in part due to the fact, that our study does not include high-priced tourism options such as city-

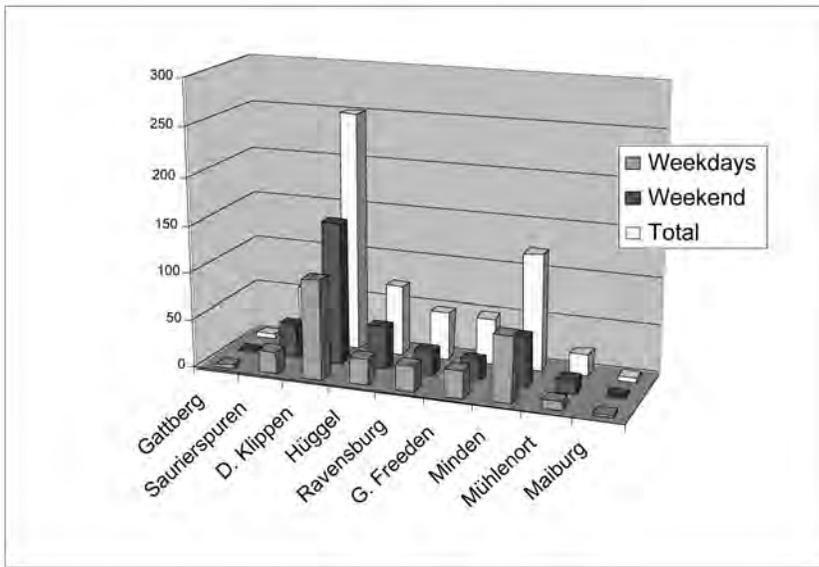


Figure 4. Number of tourists interviewed at nine sampling sites in Geopark TERRA.vita.

	This study	Regional study Osnabrück/Emsland (IHK 2007)	Hasetal (Härtling 2007)	Emsland (KTWE 2000)
Hotels (> 8 beds)	€45.5	€89.9	€41.5	€56.6
Hotels (< 8 beds)	€45.5	€47.7	€41.5	€40.1
Youth hostels / camping / relatives	€19.6	€19.6	n/a	€19.1
Daily expenditure	€36.1	€26.8	€24.1	€19.4

Table 1. Comparison of expenditures from studies of other tourist sites in northwestern Germany.

based, conference-related, or spa-focused tourism. The tourists interviewed came to the geopark primarily for activities such as hiking and bicycling, which do not require high-quality lodging. This is supported by the results of a similar study in a rural setting in the Hasetal, where activities in nature are promoted (Härtling 2006). The costs for lodging in youth hostels, campsites or with relatives/friends was comparable to those estimated in other studies in the area. The average for all types of lodging is calculated at €38.5.

In contrast, the daily expenditures (part 6 of the questionnaire: food, services, travel, etc.) are considerably higher than that in all other studies. This can, in part, also be explained by the motivation for coming to the geopark: tourists spend more money on bike rental, maps, tourist information, travels between hikes, and so on. Also, while the tourists spend relatively little money on lodging, good food at the end of a long strenuous day seems to be of major importance to them.

To calculate the gross revenue generated by tourists at the nine sites, the counts were extrapolated for the entire tourist season and differentiated between day-trippers and

overnight tourists. Thus, 100,000 tourists with at least one overnight stay and 134,000 day-trippers were estimated for the season of 2007 (numbers rounded to the nearest thousand). The counts are then multiplied by the daily expenditure to calculate gross revenue (Table 2). Thus, approximately €12.3 million in gross revenue was generated at the nine sites, resulting in a net revenue of €10.7

million and direct and indirect regional economic effects of close to €6 million. As mentioned earlier, the added value multiplier of 0.55% is very conservative. In fact, the first- and second-order effects could be as high as €7.5 million. Divided by the average income, we gain a number on the employment effects: approximately 300 FTEs (full-time job equivalents) are generated by the tourist activities at the nine sites analyzed in Geopark TERRA.vita. These FTEs equate to approximately 900 actual jobs generated or promoted by the geopark.

### Summary

This study of the numbers and expenditure behavior of tourists at nine sites in the Geopark TERRA.vita shows that the activities generated or promoted by the geopark lead to considerable economic effects in the region. However, this general statement has to be modified:

- The data represent only the nine sites where the counts and interviews were carried out. The data are based on such a great site diversity that they cannot be extrapolated for the entire geopark. However, due to the number of attractions in the geopark, it can be safely assumed that the numbers could be several times those given for the analyzed sites.
- It is not possible to prove direct cause-and-effect relationships between the activities of the geopark and tourist expenditure. Most dining and lodging facilities were already in place before the creation of the geopark. However, since only tourists engaged in activities promoted by the geopark were counted and interviewed, it can be safely assumed that the activities of the geopark contribute to the economic development of the region.
- The tourist profiles show that leisure and sports activities are the main reasons for coming to the geopark. Tourists spend relatively little money on lodging, but considerable amounts on dining and additional services.
- The triadic approach offers a tool box that can be useful for the economic evaluation of a geopark. In the case of TERRA.vita, only level two offered reliable data. Currently, further studies are being carried out to determine the usefulness of information from levels one and three.

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<b>Total counts</b>	234,000
<b>Day trippers</b>	€134,000 (x €36.10)
<b>Tourists</b>	€100,000 (x €74.60)
<b>Gross revenue</b>	€12,300,000
<b>Net revenue</b>	€10,700,000
<b>Economic effect</b>	€5,885,000
<b>Employment effects</b>	300 FTEs

**Table 2.** Calculation of the economic effects in the Geopark TERRA.vita. Numbers are rounded to the nearest thousand.

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