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Enhancing Regional Tourism Development in the Protected Areas Using the Total Economic Value Approach

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Abstract: This research aims to boost tourism development in natural protected areas through the classification of the tourism hiking trails based on biodiversity ecosystem services values. The Total Economic Value (TEV) approach was used as the main research method to estimate the monetary value of the various ecosystem resources in Abu Qubies Syrian protected area. Five main tourism hiking trails in Abu Qubies were identified in order to be classified based on the economic value of their ecosystem resources. The study findings highlighted the importance of protected areas in enhancing tourism activities, especially natural-based ones. Additionally, this research identified the most economically valuable tourism hiking trails in the reserve, thus providing a supporting tool for decision-makers regarding tourism development in protected areas. This study presents the importance of the conservation perspective of natural resources in protected areas without ignoring their physical monetary value that can help governments in boosting local communities as well as the national, regional and local economies.

Keywords: nature reserves; nature-based tourism; biodiversity; TEV; hiking; ecosystem services

Citation: Kabil, M.; Alayan, R.; Lakner, Z.; Dávid, L.D. Enhancing Regional Tourism Development in the Protected Areas Using the Total Economic Value Approach. *Forests* **2022**, *13*, 727. https://doi.org/10.3390/f13050727

Academic Editors: Panayiotis G. Dimitrakopoulos, Mario A. Pagnotta, Miklas Scholz and Arshiya Noorani

Received: 27 March 2022
Accepted: 4 May 2022
Published: 6 May 2022

1. Introduction

Protected areas represent significant importance in our world. According to The International Union for Conservation of Nature (IUCN), approximately 25% of the Earth planet (10% of the land and 15% of the territorial waters) are designated as various forms of nature reserves and national parks [1]. Additionally, the number and size of these areas have increased dramatically in the last 20 years [2]. Protected areas also have rich economic value due to their biological, cultural and environmental resources. All these aspects related to economic value have made these nature reserves the focus of various global economic sectors and industries, including the tourism [3]. Therefore, many protected areas have gained prominence as tourism destinations, especially with the expansion of nature-based tourism forms such as ecotourism, as well as the growing demand for outdoor tourism activities [4,5].

The relationship between protected areas and tourism as an economic sector can be described as a "complex" relationship [6]. The definition of the protected areas according to IUNC is "An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means" [7]. Within this previous definition, the concept of establishing the nature reserves seeks to achieve sustainable conservation and management of the rare ecosystem resources in these areas such as the natural landscape, unique ecosystem services, rare fauna and flora, local communities and cultural heritage [8,9].

Therefore, tourism and protected areas are mutually beneficial. For one, tourism seeks to create new tourism patterns/markets, cover the various needs of different tourists, increase the economic value of this important economic sector and increase its contribution

to the GDP of the nations. Additionally, the tourism industry seeks to use the protected areas' potential to boost economic opportunities by providing jobs for local communities, improving their living standards, increasing possible sources of funding for nature reserves and local societies and encouraging local goods and SMEs [4].

On the other hand, the continuing momentum that tourism creates for protected areas by exporting them as promising tourism destinations highlights the interest in conservation and maintenance of the natural values that nature reserves seek [10]. For example, protecting natural ecosystems and watersheds, creating economic values for underrated local natural resources, supporting environmental principles for visitors and locals, enhancing intercultural understanding, helping locals to learn foreign languages and improving their educational skills, transmitting conservation value and protecting the natural and cultural heritage of the countries; all these listed issues are considered as the most important benefits that protected areas reap from being considered tourist attractions [11–13].

This relationship between protected areas and tourism development has also highlighted the importance of achieving sustainability during using the various natural resources in the different kinds of nature reserves. With the emergence of the United Nations' Sustainable Development Goals (SDGs) in 2015 [14], tourism has been a major activity for sustainable development. Additionally, two of the main SDGs have been associated with protected areas: SDG No. 14 "Life below water" and SDG No. 15 "Life on land". Thus, the relationship between nature reserves and tourism activities has gained ground on the global stage in terms of realizing the goals of the sustainability approach.

Moreover, it is worth mentioning the recent impact of COVID-19 on the tourism sector, which is one of the most affected economic sectors. According to the Organisation for Economic Co-operation and Development (OECD) statistics, the global tourism sector deteriorated by 45% due to the pandemic in 2020 [15]. Moreover, the World Tourism Organization (UNWTO) reported that 100% of the countries involved imposed travel restrictions on tourism destinations, and 45% of global tourism destinations were completely closed to tourists because of this pandemic [16]. Accordingly, world tourism organizations and agencies have sought different tourism patterns to enhance tourism development [17]. Therefore, outdoor activities in nature reserves highlighted the importance of protected areas as global tourism destinations, which play a significant role in achieving the sustainability and prosperity of the global tourism industry [18].

Natural environmental resources in protected areas support numerous tourism activities, particularly outdoors ones. For example, walking, cycling, camping, hiking and wildlife observation, as well as diving and kayaking in the case of marine nature reserves [4]. Tourism hiking trails are one of the most famous recreational and tourism activities that support the sustainability paradigm in the tourism industry [19]. Tourism hiking trails are a link between nature and people [20]. Although hiking trails are considered recreational and leisure activities for people, they are currently one of the most important tourism products, especially after the COVID-19 pandemic [21]. Additionally, it is worth noting that tourism hiking trails have gained importance on the global stage because of their inexpensive infrastructure commensurate with the current deterioration and declining growth of the tourism industry globally, as well as the current tourism demand [20,22].

Despite the aforementioned importance of the relationship between protected areas and tourism as an economic activity, the negative impact that tourism may have on these areas must not be overlooked. Economically, the various tourism activities in the protected areas increase the demand for tourism products and services such as restaurants, hotels and other attractions. Thus, tourism activities lead to providing many basic services such as policing, safety, electricity, and health care, which in turn lead to higher taxes in these local areas that may be difficult for the locals to live and cope with [4]. In addition, the fact that the tourism sector is a fragile and seasonal one and the protected areas show a large dependence on this sector may lead to a reduction in their ability to control certain external factors such as natural disasters, climate change, changing tourist behavior and other economic and political crisis [4]. Consequently, this can affect the economic

stability of local communities in these protected areas. Socially, the tourism industry may have a negative impact on nature reserves by depriving the locals of their rights and freedom to make their own decisions and control their lives [9]. Additionally, tourism activities can cause a proliferation of many problems that disturb the locals' lives, such as overcrowding, vandalism, littering, crime, unpredictability and disrespect for local customs and traditions [23]. Environmentally, intensive tourism activities can have serious consequences for protected areas such as habitat loss, changing land uses, air pollution, increasing fire risk, flora and fauna damage, etc. [24,25].

Because of all these possible negative impacts that may be caused by the tourism development of nature reserves, good development plans and policies (economically, socially and environmentally) must be developed, pursued and accomplished, thereby reducing the impact of these consequences and enhancing the concept of the sustainable tourism development in protected areas [26].

Accordingly, this paper seeks to amplify the conservation of the environmental resources in the nature reserves with achieving their most economic use, through the classification of the tourism hiking trails in Abu Qubies. The Total Economic Value (TEV) was used as the main approach to classify the tourism hiking trails in Abu Qubies by valuing the ecosystem services. Thus, economic tools are given to decision makers to facilitate the adoption of the best development decisions that will enhance the concept of sustainable tourism development in Abu Qubies and the economic optimization of its natural resources.

2. Materials and Methods

2.1. Study Area

Abu Qubies natural protected area is located on the coastal eastern mountain range of the Syrian governorate Hama (see Figure 1). Moreover, Abu Qubies has a strategic location linking three Syrian governorates (Latakia, Hama and Tartus), with an area of 11,000 hectares and an altitude ranging from 230 to 1370 m above sea level. Abu Qubies was declared as an environmental protected area by the Syrian Ministry of Agriculture and Agrarian Reform (MoAAR) in 1999, with the aim of protecting biodiversity in the Syrian western region and for conducting environmental scientific research projects and studies [27]. According to the United Nations Development Programme (UNDP) in Syria and the Global Environment Facility (GEF), only three Syrian protected areas (out of 115) play a significant role in preserving biodiversity in Syria, and Abu Qubies is one of them, in addition to Al Frunloq and Jabal Abdul-Aziz [28].

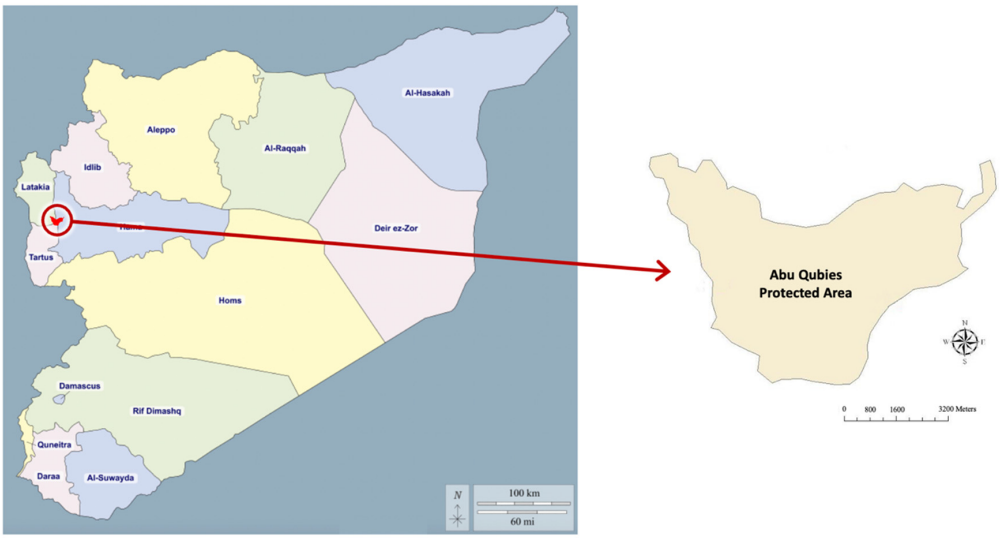


Figure 1. Abu Qubies protected area, Syria (case study).

A range of factors were considered before choosing the study area, both national and local. Regarding the national level, the 115 Syrian wilderness reserves cover a surface of 1,132,286 hectares, making up a total of 10.2% of Syria's territory [29,30]. Additionally, these Syrian protected areas are highly valuable in terms of biodiversity, being a habitat for about 70% of the country's unique endangered plant and animal species [31]. Although the importance of the protected areas in terms of both biodiversity and economic value, they have not contributed effectively to the Syrian economy. According to the Syrian National Bureau of Statistics for 2002, all different kinds of Syrian protected areas contribute just 0.01% of the Syrian GDP, taking into account all economic sectors. Such a scarce economical relevance is often associated with a notable neglect of environmental conservation issues.

On the local level, Abu Qubies has rare different features that make it suitable for this research proposal and gives it a qualitative significance away from other Syrian protected areas. For example, Abu Qubies has a distinct geographical location, being an important area in the migratory trails of birds and a habitat for many birds included on the list of endangered birds by BirdLife International [32]. Furthermore, Abu Qubies has many cultural values that can enhance tourist development within it, such as Roman monuments, the remains of a fortress called the Abu Qubies Castle at 550 m above sea level, a group of local villages and several religious shrines. Additionally, Abu Qubies well represents the western Syrian landscape and the Mediterranean basin region. Where the natural vegetation cover of the Abu Qubies is characterized by valuable biodiversity and distinctive ecosystems, with a series of different species of plant communities, making it a rich natural heritage [33,34].

The key ecological features of Abu Qubies include birds (e.g., the endangered Syrian eagle and other 102 species of birds for which the protected area represents a bottleneck during their migration) [35], natural plants (e.g., more than 300 tree, shrub and herb species) [34], mammals (e.g., artiodactyls and hyenas) [36], reptiles and amphibians and unique land uses (see Figure 2).

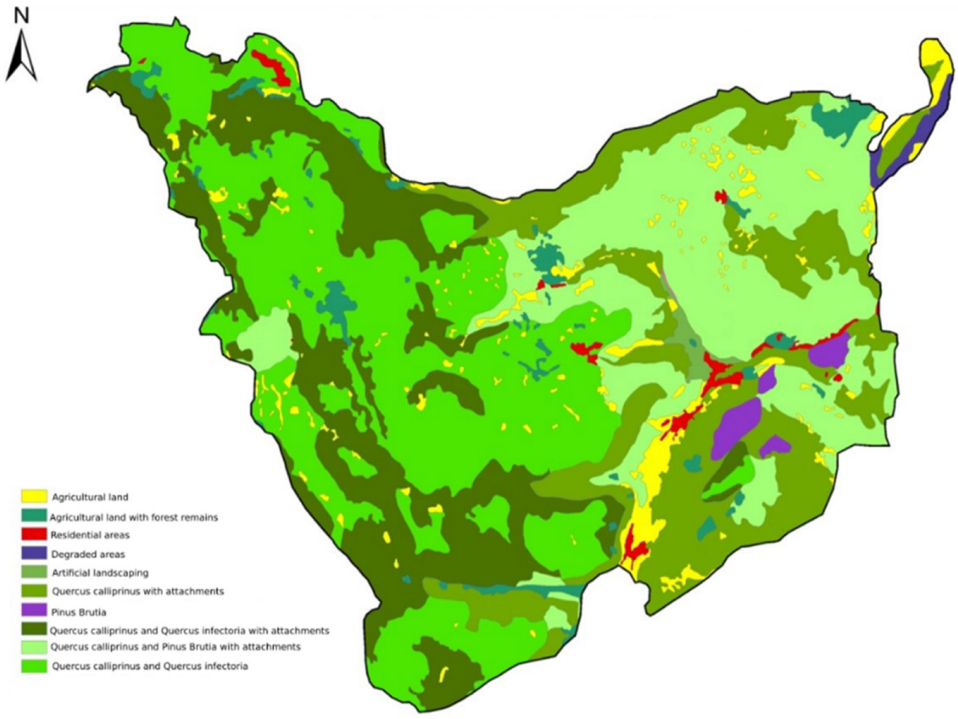


Figure 2. Land use and land cover in Abu Qubies as a unique ecological feature.

Consequently, this research selected Syria in general—and the Abu Qubies protected area in particular—to present the idea of how to optimize the economic dimension of

ecosystem services' value in the tourism development sector while preserving the area's unique natural resources.

2.2. Research Method

This research basically aims to classify the tourism hiking trails in the Abu Qubies by valuing the ecosystems services, therefore providing helpful tools for decision-makers that will promote the sustainable management of the protected area's resources and optimize the economic value of its ecosystem services provided by biodiversity. The research method combined two main stages: (I) identify the tourism hiking trails in Abu Qubies and (II) calculate/estimate the ecosystem services' values in the Abu Qubies protected area by using the Total Economic Value (TEV) approach. Different software and analytical tools are used in order to apply this proposed research method such as on-site observation, Geographic Information System (GIS) and Earth Resources Data Analysis System (ERDAS).

2.2.1. Stage (I): Identify the Tourism Hiking Trails in Abu Qubies Protected Area

At this stage, the tourism hiking trails of Abu Qubies were identified by relying on two major data sources: the Syrian Ministry of Agriculture and Agrarian Reform (MoAAR), as well as the researchers' on-site observation and interview with the director of the protected area. According to MoAAR, the Abu Qubies has five main tourism hiking trails. The first trail is "Sheikh Ali Majdal-Beer Eljabal", located in the south of Abu Qubies and considered one of the longest tourism hiking trails with a length of 7.7 km. The second trail is "Abu Qubies-Mshta Elbeer", located in the north of the protected area and considered the second longest trail with a length of 6.8 km. The third trail is "Ras Alshareh-Sheikh Hatem", located in the west of Abu Qubies and is 6.3 km long. The fourth trail is "Sheikh Abdullah-Beer Eljabal", located in the middle of the protected area, which is 3.9 km long. Finally, the fifth trail is "Abu Qubies-Beer Eljabal", which is located in the middle of Abu Qubies and considered the shortest tourism hiking trail in the area with an average length of 1.4 km. Additionally, all information related to the five tourism hiking trials in Abu Qubies was confirmed by the researchers' on-site observations. Moreover, the researchers conducted a comprehensive interview with the Abu Qubies director to identify more about the hiking trails in Abu Qubies, especially with his expertise that was based on his scientific knowledge and his organization of approximately 390 trips in these hiking trails with different groups such as environmental experts, locals, tourists and international organization delegations from 2012 to 2020. Figure 3 shows the five tourism hiking trails in Abu Qubies.

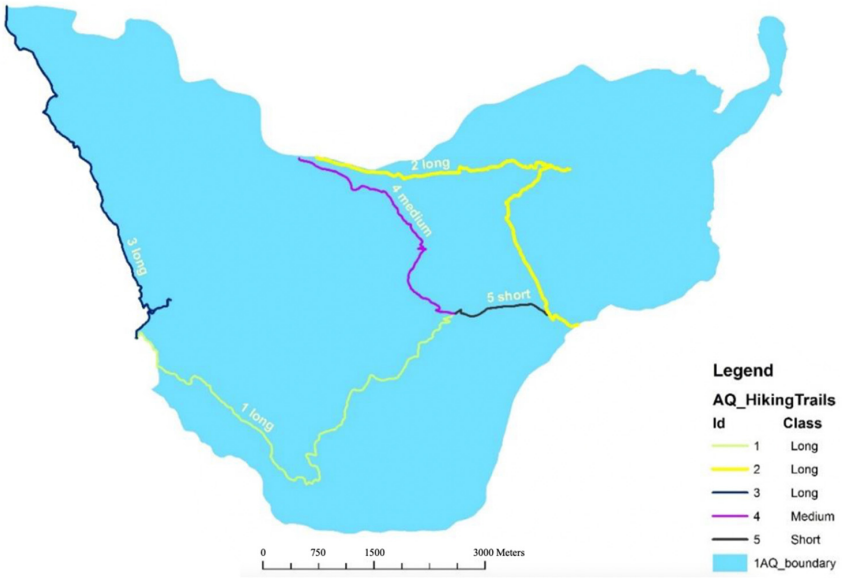


Figure 3. Tourism hiking trails in Abu Qubies protected area.

2.2.2. Stage (II): Valuation of Abu Qubies Protected Area Ecosystem Services

After identifying the five main tourism hiking trails in Abu Qubies in the first stage, this stage focuses on calculating the ecosystem services value in Abu Qubies using the Total Economic Value (TEV) approach, which included determining the most valuable hiking trail among these five tourism hiking trails. TEV approach is a framework that seeks to identify the monetary value of various natural resources in any ecosystem [37]. The Total Economic Value approach's concept is based on the idea that every service or good has unique attributes, some of them are physical and easy to measure, while others are more difficult to define. Therefore, TEV is the summation of all attributes of different goods and services, not only the quantifiable ones [38]. Additionally, it is worth mentioning that the TEV is interested in measuring both sides of different goods and services in any ecosystem: willingness to pay (WTP) and willingness to accept (WTA). WTP represents the monetary value of obtaining an ecosystem service, while WTA represents the monetary value of avoiding loss [39].

In order to conduct the Total Economic Value approach in this research, its main components should be identified first. TEV's main components vary slightly from one economist to another, but generally comprise the following: use-value (UV) and non-use value (NUV) (see Figure 4).

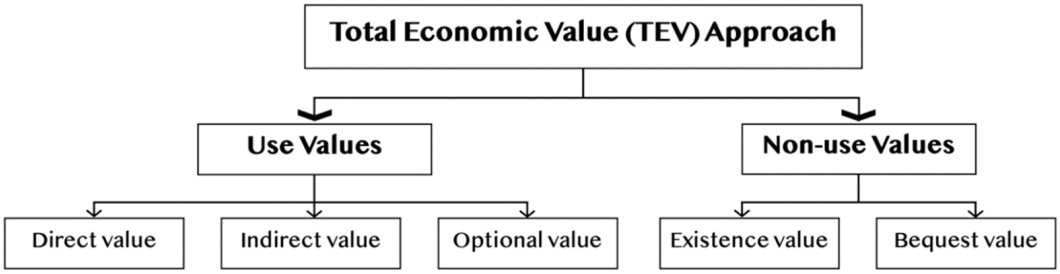


Figure 4. Main components of the Total Economic Value (TEV) Approach. Source: adapted from (Nature Conservancy et al., 2004; Pascual et al., 2015; Tinch et al., 2019; UNEP, 2010).

Use value (UV) includes three main components: direct use (monetary), indirect use and optional value (OV). Direct use, also known as consumptive use-value, originates from services or goods that can be extracted and consumed directly. In addition, direct use value refers to the different products of any ecosystem that are easily quantified and recognized by analyzing and monitoring market interactions [40]. For example, timber and harvest crops such as fruits and herbs are considered as direct use value products in forests and other natural reserves. Furthermore, other non-consumptive goods can be classified as direct use value such as hiking or camping, even if people who enjoy these activities do not consume any of the natural resources in these forests or reserves [41]. All these goods that belong to direct use value are tangible, can be quantified and have real value. Compared to indirect use products, direct ones commonly have observable quantities and their price can be also traced, which facilitates their measurement and calculation. Regarding indirect use, which is known as a functional value, it originates from ecosystem ecological sound products and services. Unlike direct use products, indirect use services are difficult to identify clearly and explicitly in different marketplaces. Thus, measuring these indirect use services is difficult compared to the direct ones [42]. For example, stunning landscapes in natural reserves are considered as indirect use values, where people can enjoy their visual aesthetic without diminishing the pleasure of others and without having to pay any kind of material or monetary value for it. Finally, the optional value (OV) goods or services, which resemble the concept of an insurance policy, represents the future use of certain goods and services (whether direct or indirect) at a time when they may not seem important. In other words, the optional value refers to the potential of creating a future value from using any tangible or intangible natural goods or services [40,41].

The non-use value (NUV), which is known as passive use, originates from the idea that any natural ecosystem must be preserved and protected. This non-use value consists of two main types: existence value and bequest value. Existence value is obtained from the fact that an ecosystem resource exists, even if people do not utilize it or intend to use it [43]. For example, in marine environments, many organizations and aquatic conservation associations seek to protect some marine species from extinction. In order to do that, they raise donations from people, who in one way or another help even if they may never see these marine species. Regarding bequest value, it comes from the fact that people should ensure the potential of using any current ecosystem resources for future generations [44]. Therefore, what people pay or act to achieve this conservation of natural resources is considered as a bequest value. Generally, it is difficult to measure the non-use value which keeps it a challenging step when valuation the ecosystem resources and applying the Total Economic Value (TEV) approach.

Subsequently, the Total Economic Value (TEV) approach is the summation of use value (UV) and non-use value (NUV) in any existed ecosystem (see Equation (1)). Thus, TEV's output is frequently considered as natural capital since it includes the whole value of the ecosystem resources [40,42,43].

$$TEV = UV + NUV \quad (1)$$

It is worth mentioning that the practical application of the TEV approach relies heavily on the available data. Thus, there are many practical methods and measures to calculate the ecosystem services such as Market Price Method, Social Cost Method and contingent Valuation Method (CVM) [45]. The market price is a method that determines the value of ecosystem services by looking at the prices of different commercial goods and services that are purchased and sold in the markets [46]. According to the US National Academies, social cost of carbon (SCC) estimated the monetized value of different damages caused by one-ton increases in CO_2 levels [47]. These damages include damage from natural disasters such as flooding, human health, agriculture productivity changes and other nonmarket damages such as that happened in the ecosystem services [47]. The SCC monetized value is estimated to be in the range of USD 10/tCO_2 to USD 1000/tCO_2 [48]. In our case, the used value was USD 75/tCO_2 according to the average global price used by the Syrian Ministry of Local Administration and Environment. Additional details about the calculation process of SCC can be found in [49]. Finally, the contingent valuation method (CVM), which is a survey-based technique that expressed the idea of willing to pay for sustainable use of natural resources or the avoidance of losing them [50]. All these methods are used to measure the ecosystem services values in the Abu Qubies protected area. Regarding the used method to classify and rank the tourism trails, the Zonal Statistics tool was used. It is a spatial analysis toolbox that calculates specific statistics values in a certain zone (cell) which are represented as inputs for raster data and creates a table of outputs and statistical features such as mean, median, minority and majority [51]. Figure 5 presents the concept of using the zonal statistics tool in this research.

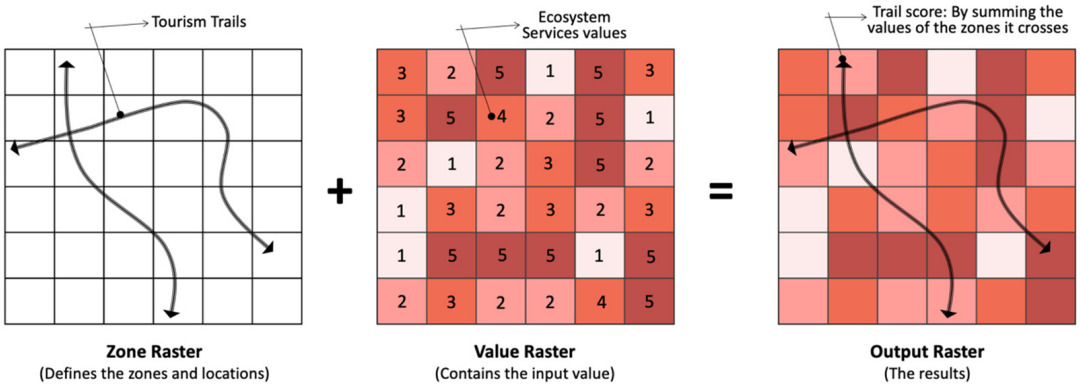


Figure 5. Zonal Statistics Tool concept. Source: based on [52] by researcher.

3. Results

The TEV approach adopted and conducted depends on the different goods and services in Abu Qubies protected area. Regarding the use value, the direct use value is represented by various goods and services such as wood products (wood products—fruit trees), other non-timber products (honey—thymus plant), while the indirect use value is represented by carbon reduction. In addition, the optional value which represented by pharmaceutical industries from different medicinal plants such as Laurus and orchids. Regarding the non-use value in Abu Qubies, this is represented by two types of goods and services that represent natural-based tourism and community-based tourism (CBT) such as endangered species, landscapes, heritage and cultural resources and local and agricultural products. All these goods and services are introduced in detail as follows.

3.1. Use Value in Abu Qubies Protected Area

3.1.1. Direct Use Value

The direct use value in Abu Qubies is represented by two main goods: wood products and non-wood products. Regarding the wood products, these are composed of two elements: hardwood/firewood and fruit trees. The market price was the selected measurement method to estimate the valuation of these two elements as they are considered commercial goods and transformative services. At the market price of USD 70.67/ton, the total value of wood was estimated to be USD 201,890 [52–54]. While the main examples of the fruit trees in Abu Qubies are *Malus trilobata* (wild apple), *Crataegus azarolus* (hawthorn), olive, *Pyrus syriaca* (Syrian pear) and *Prunus ursina*. The production of these fruit trees is estimated at approximately 4500 kg/year at a price of up to USD 0.38/kg, with a total value of about USD 1730.76. The non-wood products include honey, thymus and plants that are used in the preparation of medicines and pharmaceutical industries such as Laurus nobilis and orchids. The honey production from Abu Qubies was about 500 kg/year at an average price of USD 9.61 per kg, bringing the total value of the honey produced from the protected area to about USD 4807.69. Thymus production was 200 kg/year at an average price of USD 5.76/kg for a total value of about USD 1153.84. Laurus is a forest plant and its importance comes from its use in the medical and industrial industries (soap), its production in Abu Qubies is estimated to be 50,000 kg/year at an average price of USD 0.43/kg, so its total value was USD 21,634.61. For orchids the total production was around 100–150 kg/year at an average price of USD 28.84/kg, with a total value of USD 19,038. This orchid production is commonly sold to nearby medicine laboratories. By adding these monetary values of honey, thymus, Laurus and orchids, the total economic price of non-wood products in Abu Qubies protected area was USD 5961.44.

3.1.2. Indirect Use Value

The indirect use value in Abu Qubies is represented by Carbon reduction as an environmental dimension of natural resources in this protected area. By using Social Cost of Carbon (SCC) as a measurement method to estimate the expected damage caused by releasing one additional ton of CO_2 into the atmosphere, the total value of Carbon reduction in Abu Qubies was USD 2,450,000 [27,47,49,53].

3.1.3. Optional Value

The optional value in Abu Qubies protected area represents the willingness to pay to guarantee the availability of the ecosystem services for future use by the individual. In fact, option value cannot be accurately estimated for ecosystem services in the Abu Qubies Reserve. The option value represents the economic difference between the net benefits of optimal and non-optimal decision-making because it ignores the gains that can be achieved by delaying the decision and learning during this delay period. Therefore, estimating the option values requires the presence of two strategies, and each of them is evaluated with the aim of making the best decision. Consequently, option values cannot easily be calculated separately and added to the benefit-cost equation [55].

Table 1 represents the estimated values of goods and services of use value in Abu Qubies, while Figure 6 presents a graded color map of the estimated values of goods and services calculated in (Table 1).

Table 1. Monetary values of ecosystem use value in Abu Qubies protected area.

TEV Approach Classification (Use Value)				Valuation			Measurement Method
Value Classification		Category	Good/Service	Monetary Value ($/year)	Total ($/year)	%	
Use Value	Direct Value	Wood Products	Hardwood/Firewood and fruit trees	203,620.76	235,543.81	8.77	Market Price
		Non-wood Products	Honey and Thymus syriacus	5961.44			
			Laurus nobilis and Orchids (plants)	25,961.61			
	Indirect Value	Environmental Dimension	Carbon reduction	2,450,000	2,450,000	91.23	Social Cost of Carbon (SCC)
	Optional Value	Not estimated					
Total Valuation of Use Value in Abu Qubies Syrian Protected Area				2,685,543.81		100	

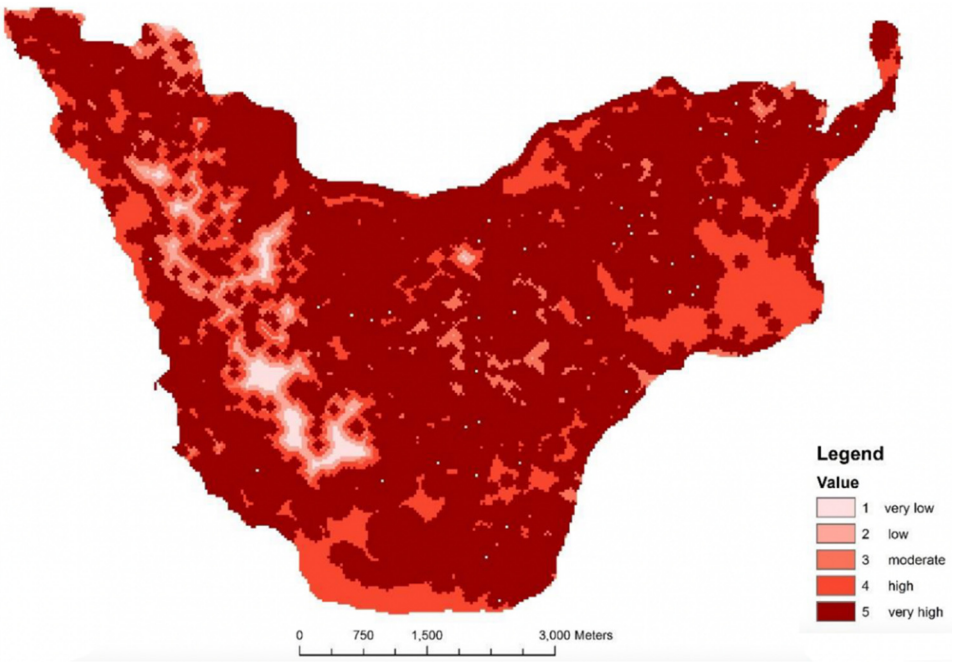


Figure 6. Graded color map representing Abu Qubies' use values (direct and indirect).

3.2. Non-Use Value in Abu Qubies Protected Area

3.2.1. Existence Value

The existence value in Abu Qubies protected area is represented in costs to protect the existing ecosystem resources. Abu Qubies has many endangered animals that are an attraction for many visitors and tourists, such as the *Salamandra infraimmaculata* (Arouss Al-Ayn), *Green Toad* and the *Greek Tortoise*. This is in addition to many birds, such as the *Egyptian Vulture* and the *Greater Spotted Eagle*, for which Abu Qubies is important, due to its geomorphological diversity, and is seen as a major stop in their migration paths. For natural and geomorphological diversity, Abu Qubies has many climates and geographical environmental zones that make it the focus of many visitors in various seasons of the year. Consequently, the locals in Abu Qubies were asked how much they would be willing to pay for protecting the existence of these unique animals and birds. The average willingness to pay per family was around USD 11/month (USD 132/year). When this value is multiplied

by the number of families in the Abu Qubies (585 families), the estimated monetized value of the existence value was approximately USD 77,220/year.

3.2.2. Bequest Value

The bequest value in Abu Qubies protected area was represented by the monetized value that locals are willing to pay to preserve the rights of future generations to benefit from the ecosystem services and resources in Abu Qubies. To estimate the bequest values, the locals were asked through a questionnaire about their willingness to pay to combat poaching, excessive logging and land degradation. The results expressed strong support from the locals to protect the ecosystem resources. The average willingness to pay was estimated at USD 17/month/family. Therefore, the total monetized value of the bequest value was approximately USD 119,340 per year.

Table 2 represents the estimated values of goods and services of non-use value in Abu Qubies. While Figure 7 presents a graded color map of the estimated values of goods and services calculated in Table 2.

Table 2. Monetary values of ecosystem non-use value in Abu Qubies.

TEV Approach Classification (Non-Use Value)				Valuation			Measurement Method
Value Classification		Category	Good/Service	Monetary Value (Per Year)	Total ($/Year)	%	
Non-use Value	Existence Value	Willingness to pay	The existence of unique animals and birds species	77,220	77,220	39.2	CVM
	Bequest Value	Willingness to pay	Combat poaching, excessive logging and soil degradation	119,340	119,340	60.8	
Total Valuation of Non-use Value in Abu Qubies Syrian Protected Area					196,560	100	

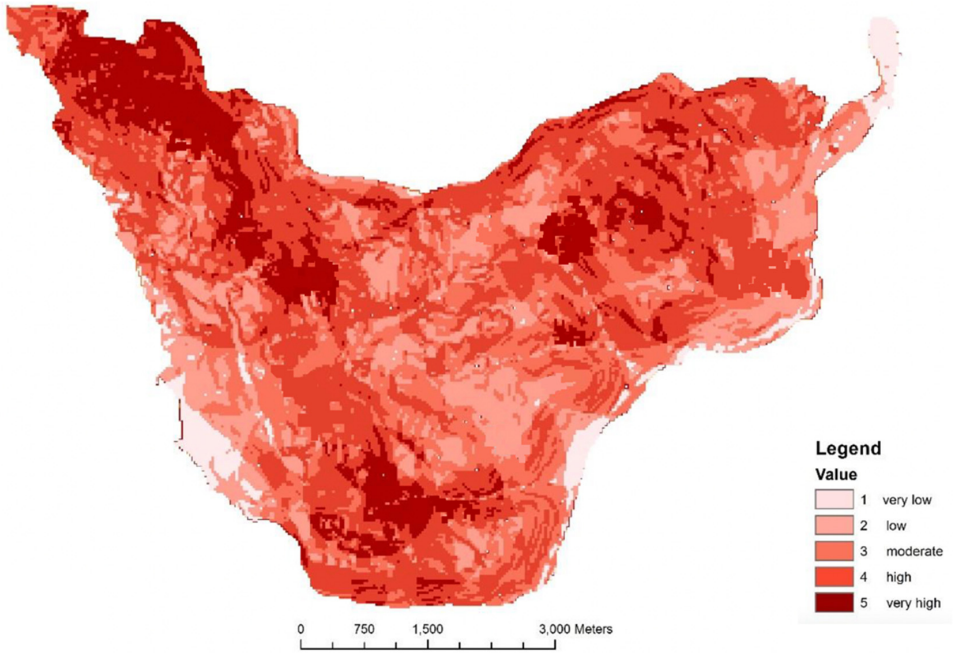


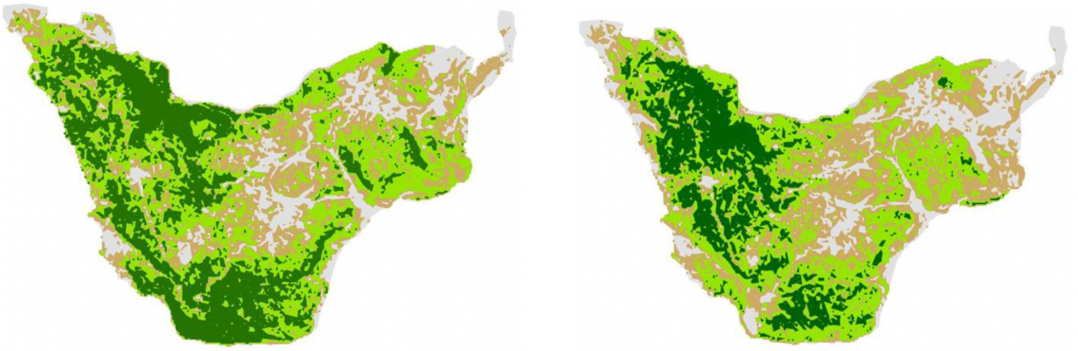
Figure 7. Graded color map representing Abu Qubies non-use values (existence—bequest).

Before moving to the main result of this analysis, which is the classification of the tourism hiking trails based on the valuation of total ecosystem services value in Abu Qubies, it is also worth noting that there were some negative values found in Abu Qubies, which affected the total net monetary value of the natural resources in Abu Qubies. These negative values include soil degradation, fires and mismanagement. Figure 8 shows the difference in

vegetation in Abu Qubies protected area between 2019 and 2021, through which vegetation is significantly reduced. The monetary value of these negative values mentioned before was estimated at USD 704,410.92 [52].

FID	Shape	Grid Code	Class Name	Area (ha)	%
0	Polygon	1	Urban areas	641.89	17%
1	Polygon	2	Degraded areas (Roke-Soil-Jaobat)	919.6	24%
2	Polygon	3	Forests (low density)	1217.04	32%
3	Polygon	4	Forests (high density)	984.11	26%

FID	Shape	Grid Code	Class Name	Area (ha)	%
0	Polygon	1	Urban areas	761.11	20%
1	Polygon	2	Degraded areas (Roke-Soil-Jaobat)	1116.64	30%
2	Polygon	3	Forests (low density)	1173.77	31%
3	Polygon	4	Forests (high density)	710.69	19%



2019 2021

Figure 8. Change of vegetation in Abu Qubies protected area in 2019 and 2021.

3.3. Classification of Tourism Hiking Trails in Abu Qubies Protected Area Based on TEV Approach

In order to determine the most important tourism hiking trial in Abu Qubies based on the gradient map (see Figure 9), the Zonal Statistics tool is used. In Abu Qubies the input values of the cells were determined based on the biodiversity resources values. The total inputs value for each tourism hiking trail was estimated by calculating all cell values that the trail passed through. The final classification and sorting of the tourism hiking trials in Abu Qubies are presented in Table 3. In addition to other statistical parameters predetermined by authors such as majority, minority, median, mean and path length. The most economic value tourism hiking trail in Abu Qubies was the second trail "Abu Qubies—Mshta Elbeer" with a 1463-point score.

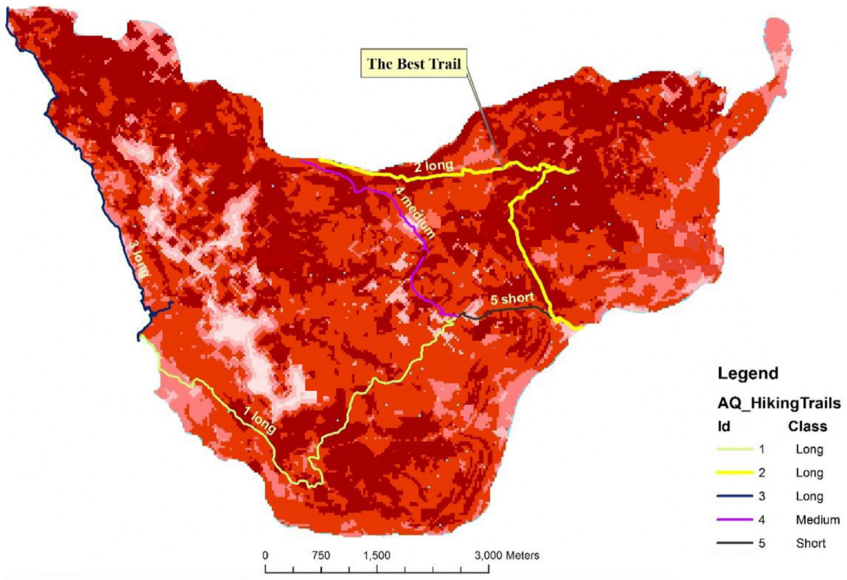


Figure 9. The best tourism hiking trails in Abu Qubies protected area based on the valuation of ecosystem services (use value—non-use value).

Table 3. Ranking of the tourism hiking trails in Abu Qubies based on ecosystem services values.

ID	Tourism Hiking Trail	Length (km)	Mean	Median	Minority	Majority	Total Score
1	Sheikh Ali Majdal—Beer Eljabal	7.77	4.4	4	2	4	1339
2	Abu Qubies—Mshta Elbeer	6.89	4.7	5	3	5	1463
3	Ras Alshareh—Sheikh Hatem	6.34	3.1	4	2	3	591
4	Sheikh Abdullah—Beer Eljabal	3.93	3.9	4	1	4	703
5	Abu Qubies—Beer Eljabal	1.44	2.5	3	3	4	273

4. Discussion

By reviewing the Total Economic Value (TEV) analysis results and identifying the expected monetary value of the biodiversity resources in Abu Qubies, it was emphasized that there are enormous values in Abu Qubies that can be economically relied upon to develop the resources of the protected area on the one hand and to encourage tourism industry with its various activities on the other. The findings of the analysis show that the most valuable biodiversity resource in Abu Qubies is indirect values, specifically carbon reduction, for a total of USD 2,450,000. That is because Abu Qubies is characterized by its high elevations and high-density trees, which makes it function environmentally in reducing carbon efficiently. Wood comes in second place in terms of its total economic price as an ecosystem good in Abu Qubies, with at a value of USD 203,620.76. The importance of wood in Abu Qubies comes from the fact that about 90% of local households rely on it for heating, cooking and food preparation. The locals' willingness to pay to combat poaching, excessive logging and soil degradation ranked third in the monetary value of Abu Qubies (USD 119,340). For other values, it had the lowest share in terms of economic valuation, starting from USD 77,220 for the willingness to pay to protect the existence of unique animals and bird species, and ending with USD 5691.44 for non-wood products such as honey and Thymus Syriacus.

Despite the diversity of tourism hiking trails at Abu Qubies protected area, identifying the most significant trails in terms of ecosystem services values is an important decision support tool [22]. The tourism hiking trail "Abu Qubies—Mshta Elbeer" ranked first as the trail containing the highest economic and monetary ecosystem services values with total cell input points of 1463 (see Table 2). "Abu Qubies—Mshta Elbeer" trail is characterized by its diverse environmental zones, making it the center of attention for Abu Qubies tourists, visitors and locals as well (see Figure 10). This tourism hiking trail also runs through some of the main touristic areas in the reserve, such as ancient Roman monuments and some religious shrines, which represent the identity of the reserve [31], in addition to some steep mountain letters along the trail which are considered ideal sites for establishing environmental observatories to monitor wildlife in the area.

Figure 10. The different environmental zones in "Abu Qubies—Mshta Elbeer" tourism hiking trails in Abu Qubies. Source: author, 2021.

Accordingly, many activities can be proposed in these tourism hiking trails in order to be sources of income for all human elements in Abu Qubies, whether management or community. For example, trail entry and use fees, the establishment of a visitors' database, providing tourist guides services, on-site subsistence allowance, rental allowance for certain equipment (e.g., camping), sales of local products and artefacts, fees for local product markets and shops, and finally fees for using the protected area resources as material for academic research and studies.

In addition, some recommendations could be set to help decision-makers make optimal use of the protected area's resources, especially in the tourism sector. First, the government should concentrate the distribution of the available investments in specific development zones with future economic and social returns, which will help all Abu Qubies system elements (administrative, locals, tourists and visitors). Second, the results of this study confirmed the possibility of estimating an ecological landscape or ecosystem services in terms of monetary value [56]. Third, the study emphasizes the importance of achieving all environmental standards during establishing various tourism projects in the protected areas, in order to preserve its unique ecosystem services. Fourth, the study supports the idea of flexible management in Abu Qubies by emphasizing continuous follow-up of its ecosystem services and monitoring of irregularities that may result from mass tourism.

Finally, it is also worth noting that choosing the best tourism hiking trails in Abu Qubies in terms of its economic values does not in any way mean that the other trails will be neglected. In particular, the five tourism hiking trails in Abu Qubies have their own natural resources and different attractions for tourists and visitors. But the importance of this research and its results comes from the limited investments in the current Syrian situation, the massive neglect of nature protected areas and the mismanagement of the reserve's resources [27]. Accordingly, the process of concentrating tourism investments in one hiking trail is one of the most realistic and effective solutions in the light of these facts on the ground [18].

5. Conclusions

Generally, this study is aimed at enhancing the importance of nature reserves and protected areas as tourist destinations, especially in the current context of the importance of natural resources and the sustainability approach in the COVID-19 era. The specific main objective of this research focuses on the classification of the tourism hiking trails in Abu Qubies (study area) in order to find out which of these trails contains the most beneficial economic and monetary ecosystem services. The Total Economic Value (TEV) approach has been used to estimate the monetary value of the different ecosystem services of Abu Qubies.

The relationship between nature-protected areas and tourism development has become strong in recent years, especially after the COVID-19 pandemic and the growing demand for outdoors tourism activities. Hence, many tourism patterns appeared to be seeking to optimize the use of nature reserves' resources in various tourism activities, such as ecotourism. Consequently, this complex relationship between nature reserves and tourism development has been an encouraging factor for researchers to conduct this research. Regarding the selection of Syria in general and Abu Qubies in particular as a study area for this research was reliant on several reasons. In addition to the previously analyzed relationship between tourism and protected areas, the current Syrian situation is also one of the main criteria for choosing this case study. For example, political volatility, high inflation rates and the continuous international economic fines from global society promoted the selection of Syria and Abu Qubies. This highlights the importance of this research on how to use and develop domestic resources efficiently. As an example, valuing the market and monetary value of the ecosystem services of Abu Qubies, which in turn leads to identifying the most economically desirable tourism hiking trails, helps decision-makers to channel "limited" investments in optimal places to maximize their potential. Additionally, the current Syrian situation has obliged the local community and development partners to

ensure the success of the proposed tourism and economic development schemes, which will have a direct impact on all activities that are part of their daily lives.

6. Limitations and Future Research

Most of the limitations in this research revolve around the central question of "How much is an ecosystem worth?". Although the diversity of natural resources in ecosystems (e.g., protected areas) creates major importance for these ecosystems (economically, environmentally or socially), it causes a burden when trying to transform all these vital values, some of which are intangible, into easily measurable values. In this context, this study adopted the Total Economic Value (TEV) approach to estimate the monetary values of Abu Qubies biodiversity resources by using different measurement methods that are subjected to certain limitations; for example, the constant change in data available on natural resources, which often results in a change in production. In addition, it is difficult to estimate some intangible resources, such as the value of life and the value of looking at a scenic landscape. Moreover, some overestimations of the actual values of natural resources in ecosystems can occur. Finally, many of these measures need enormous amounts of accurate and sensitive data. Therefore, we must be extremely careful when calculating the monetary values of biodiversity resources in any ecosystem, especially the intangible ones. In this research, the researchers have tried to take all these limitations into account and often rely on on-site observations to verify the authenticity of the data and thus reach more reliable and robust results.

Future work needs to be oriented to study tourism development in protected areas and their implications for the environment, accordingly achieving the conservation and sustainable use of natural resources, as they represent capital for these nature reserves and their local communities. Additionally, there is a need for future research to measure other tourism dimensions related to tourism development on natural reserves such as tourist satisfaction, changes in tourist behavior and preferences, etc.

Author Contributions: Conceptualization, M.K. and R.A.; methodology, M.K.; software, R.A.; validation, M.K., Z.L. and L.D.D.; formal analysis, M.K.; investigation, M.K.; resources, R.A.; data curation, R.A.; writing—original draft preparation, M.K.; writing—review and editing, M.K.; visualization, M.K. and R.A.; supervision, Z.L. and L.D.D.; project administration, Z.L. and L.D.D.; funding acquisition, Z.L. and L.D.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Acknowledgments: This research is supported by the Hungarian University of Agriculture and Life Sciences (MATE), Cairo University and the Egyptian Ministry of Higher Education and Scientific Research (MHESR). Additionally, the researchers want to thank Yasser Nassour, the director of Abu Qubies protected area, for his help to organize several on-site observations in order to collect the required data for this study.

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

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