

The Integration of Cultural Ecosystem Services and Cultural Routes Based on the Sharing Paradigm

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ABSTRACT

Cultural ecosystem services are ecosystem services developed on landscape aesthetics as the basis of recreation and tourism. The sharing paradigm produces the possibility of integration of the economic, spatial, and social contexts of cultural ecosystem services with cultural route planning. This study focuses on how to develop a good relationship between ecosystem services, which are named as the earth's aggregative by the sharing paradigm, and the cultural routes that put our aggregative into circulation globally. In this context, route-planning setup is suggested as a conjoint tool between ecosystem services and tourism. The aim of this study is to develop a design setup with an analysis technique to determine cultural routes with an ecosystem services approach at the provincial scale of Malatya and to evaluate the developed route set up within the scope of sharing paradigm. This study can raise awareness of connecting ecosystem services with sustainable tourism for the quality of human life and the conservation of biodiversity. In addition, it is a guide on how awareness can be integrated into the tourism planning process. The method of the research has based on determining cultural ecosystem values, clustering cultural ecosystem values and the realization of the route setup by using the corridor and network analyzes in the Geographical Information Systems software. For each action to provide a curative and supportive cultural ecosystem service, the interconnectedness between actions needs to be evaluated based on knowledge, on the ground plane, and on the possibility of benefit.

Keywords: Cultural ecosystem services, cultural route, Malatya, sharing paradigm, sustainable tourism, Turkey

Introduction

The relationship between culture and tourism has come to play a key role in every discussion of the future of tourism (Innocenti, 2018). Organization for Economic Co-operation and Development (OECD) draws attention to the fact that culture is a more used tool in tourism and destination determination strategies (OECD 2009). The 70th General Assembly of the United Nations affirms the interaction of culture and tourism, which the OECD draws attention to, with the statement that tourism should have a primary role in the field of cultural values, diversity, and heritage (UNWTO 2022). "Heritage Journeys" (UNESCO 2012), initiated within the scope of World Heritage and Sustainable Tourism Program of United Nations Educational, Scientific and Cultural Organization (UNESCO), has designated cultural heritage as the focus. In addition, it is aimed to integrate cultural heritage into thematic routes in the "World Heritage Journeys of Europe" project, which aims to develop sustainable tourism (UNESCO 2016).

Tourism is an interrelated system that contains a variety of services (facilities, tourist destinations, transport, and accommodation) provided to assist tourists and their mobility (Görmüş et al., 2021). Tourism has become an important industry in Turkey as well as in the world, as a sector that creates economic development and employment, and the main inputs that are used by tourism are natural and cultural values. Cultural values play an important role in the formation of tourism at local, national, and international levels. With the concept of "cultural tourism" developed within this context, the risk of cultural heritage turning into an object of tourism has emerged. Because while tourism contributes to the recognition of cultural heritage, it also leads to its ruination. Along with its relevance to tourism, culture is an important force in the discussion that the historical, cultural, religious, and industrial background of a region must be preserved. With cultural tourism, people's past practices are gaining importance again, and the relationship of people with history and culture is re-established (Görmüş, 2017; Terzić et al., 2014). Although it is known that cultural tourism is popular, nowadays, the new trend

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of tourism in the world is focused on the integration of natural and cultural heritage (Görmüş, 2017; Richards, 2007). With the global trend of tourism, the number of cultural routes and cultural regions is gradually increasing in the world (Di Pietro et al. 2013; Görmüş, 2017). Routes such as Viking Route, Napoleon Route, Don Quixote Route, Ceramic Route in Europe, Lycian Route, Hittite Route, and Evliya Çelebi Route in Turkey not only highlight the historical and cultural values of the settlements outside the tourism regions but also support rural development by ensuring that these settlements are centers of interest for tourism (CRS, 2017).

Today, the correct management of the landscape in order to improve the interaction between ecosystems has become an important problem area with the globalizing environmental problems and the increasing human influence. In landscape management, protecting and restoring safe patterns and ecosystems depend on the sustainability of ecosystem services. Thus, sustainability of ecosystem services requires a deep understanding and decision-making processes that need practical auxiliary tools (Durance et al., 2016). Approaches developed for ecosystem services (ES) can be a curative tool in decision-making processes. By expanding the focus of ES from individual sources to the full range of contributions ecosystems make to human well-being, and better identifying the interconnectedness of ecosystems at the wide temporal and spatial scales where ecosystems and humans interact (Daniel et al., 2012), ES can offer curative opportunities in landscape management and spatial planning. Despite acknowledging the potential of ES to improve the quality of planning processes and decisions (Generetti et al., 2020), it is seen that ES studies are still not able to be implemented. Conservation and improvement of ES by integrating it into planning is essential for economic, spatial, and social contexts.

Ecosystems, which are the basic prerequisites of human life, directly or indirectly provide the basic life needs of human beings (i.e., oxygen, water, food, energy, medical and genetic resources, clothing, and shelter) (Grunewald & Bastian, 2015), their livelihoods, and the necessary services for their life quality and well-being (Daily, 2013). The benefits of the natural ecosystem that support the basic needs of human well-being are known as ES (Deng et al., 2015; Du Preez et al., 2020; Grunewald & Bastian, 2015). These services include many components such as health (feeling good, access to clean air, and water, etc.) and security (safe resource access, personal security, safety from disasters, freedom of choice and action) besides the basic components necessary for life (adequate livelihood, adequate nutritious food, shelters, access to goods, etc.) (Deng et al., 2015). After realizing that the resources of the world are limited, ES began to be included in international environmental debates in the 1990s (Grunewald & Bastian, 2015).

According to the Millennium Ecosystem Assessment (MEA) (2005), human well-being has more than one component for a good life, including the basic resource (adequate livelihood). In order for people to continue to benefit from ecosystems in the future, the existence and functioning of natural and semi-natural ecosystems must be ensured (de Groot et al., 2002). Ecosystem services, defined as the services provided by ecosystems to humans, are accepted as the evolution process that humans and nature go through together. Since ES are co-produced by social-ecological processes, there is basically a need for the existence of ecosystems and the human associated with this existence (Biggs et al., 2015; Reyers et al., 2013). According to MEA (2005), human-induced pressures reduce the quality and quantity of assets in the natural environment (Stebbins et al., 2021). Ecosystem services, which are effective in maintaining the support system of living organisms, are

considered as an output of the social-ecological system, and they are classified as supporting services (e.g., soil formation and pollination), regulatory services (e.g., regulation of climate, flood, disease, and water quality), supply services (e.g., food, water, timber, and genetic resources), and cultural services (e.g., recreation, aesthetic pleasure, and spiritual satisfaction) (Costanza et al., 1997; de Groot et al., 2002; Dunning, 2021; MEA, 2005; TEEB, 2010, 2021). Among these services, supporting services and regulatory services form the basis of the delivery of other service categories (Deng et al., 2015). Cultural ecosystem services are ecosystem services developed on landscape aesthetics (MEA, 2005) as the basis of recreation and tourism. Especially natural and semi-natural ecosystems provide a wide variety of opportunities for entertainment, inspiration, intellectual enrichment, aesthetic pleasure, and recreation. Such "psycho-social" services are not considered as important as the provision of "regulatory services" for people. Since the market value of cultural services cannot be determined, the value of these services may be underestimated (Butterfield et al., 2016).

Cultural ecosystem services are the aesthetic, artistic, educational, spiritual, and scientific benefits of ecosystems (Chan et al., 2012). In the MEA, cultural ecosystem services also correspond to nature-based recreational ecosystem services (de Groot Chan et al., 2002; MEA, 2005). In the Common International Classification of Ecosystem Services (CICES), nature-based recreation services (as a result of direct, on-site and outdoor exchanges with living systems, depending on the presence in the environment) are defined as cultural services. Cultural ecosystem services are subdivided into experimental interactions of the natural environment and cultural environment, intellectual and representational interactions with the natural environment, and spiritual and symbolic interactions with the natural environment (Haines-Young & Potschin, 2014; Haines-Young & Potschin-Young, 2018). In the ES Framework, cultural services express the intangible benefits that people derive from ecosystems such as cultural diversity, spiritual and religious values, information systems, educational values, inspiration, aesthetic values, social relations, sense of place, cultural heritage values, recreation, and ecotourism (MEA, 2005); it is intertwined with cultural routes as it provides the opportunity to protect cultural heritage (Grunewald & Bastian, 2015).

Cultural ecosystem services and cultural routes refer to "commonality." Therefore, both concepts can be evaluated within the scope of "the sharing paradigm" (Saito & Ryu, 2020). Sharing means "to have, use, pay for, take part in, or divide (something), not alone, but with other people" (Longman Dictionary of Contemporary English). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) states that in ES, the sharing paradigm has three focuses (Saito & Ryu, 2020):

- Accessing gene resources and sharing benefit, including sharing the community benefit.
- Accessing and sharing information as both an indirect factor of change and a management tool.
- Land-sharing for the diversification of ES production.

The sharing paradigm creates the possibility of integrating the economic, spatial, and social contexts of cultural ecosystem services with cultural route planning. This study focuses on how to foster a good relationship between ES, which is called the collection of the earth by the sharing paradigm, and the cultural routes that circulate our collectives globally. In this context, route planning setup is suggested as a commonality tool between ES and tourism. Routes, which form the basis of the mobility patterns of the past and present,

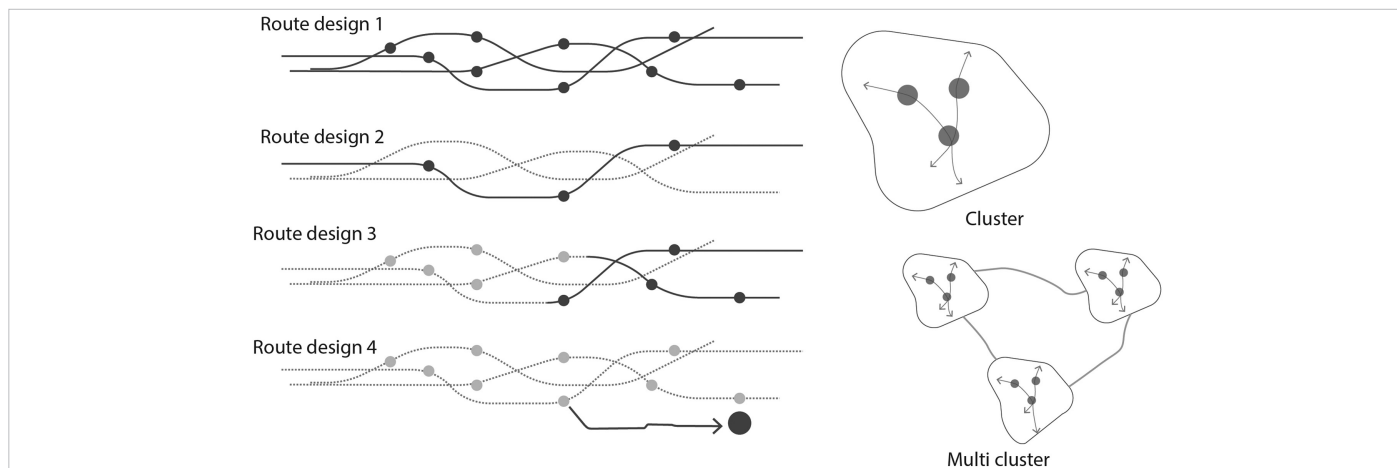


Figure 1.
Design of Route Experience. Source: Developed by Timothy and Boyd (2015).

have been indispensable for traveling for centuries, and today, they have become indispensable for tourism (Timothy & Boyd, 2015). Throughout history, people have used routes to determine their living space and to meet their vital needs. Today, although the contribution of routes, which are the defining elements of the cultural landscape, to tourism and recreation is still not fully understood, they are one of the most important spatial tools for tourism and recreation. Due to their cultural diversity and nature-based recreation and information opportunities, their importance has increased on a global scale and the tourism marketing trends of many communities and regions have been met by them.

Routes are seen as a tool for preserving natural and cultural landscapes based on regional and local goals, a tool for decision-making with a participatory process, a tool to improve regional incomes, and a tool to improve the quality of life of residents with employment and development (Timothy & Boyd, 2015).

The route is based on contemporary conceptualization and definition of a trail that brings together more abstract and often similar natural or cultural features and connects them to a thematic linear or circular corridor. Since the 1980s, roads in the natural countryside and natural landscape have gained value because of the aesthetically valuable views they offer to passers-by (Schill & Schill, 1997). Natural roads often follow natural features such as mountain ranges or coastlines, and these roads contribute to the understanding of the values of the country they belong to, due to their national symbols and focus on national identity (Faggetter, 2001).

Routes are divided into three types cultural values, natural values, and a mix of natural-cultural values (Timothy & Boyd, 2015). Cultural value-based routes are classified as organic and purposeful cultural routes. Organic cultural routes consist of cultural trails (e.g., trade routes, migration routes, faith routes, and historical railways) that promote tourism and recreation. On the other hand, purposeful cultural routes are smaller-scale tourism areas that focus on common local values (e.g., gardens and architectural structures). Nature-based routes are routes developed on the basis of open green spaces with protected areas, national parks, and forests. These routes consist of nature trails and eco-parkour. Nature trails are trails that contain the existing or to be developed natural and cultural structure in order to experience nature (e.g., wild trails, ski/snow trails, water trails, geological trails,

forest trekking paths, multifaceted nature trails, horse trail, hiking trail, bike path, and off-road trails). Eco-parkour, on the other hand, is implemented as an effective tool in protecting the natural environment and includes both formal and informal education. Mixed routes are routes that are developed by combining natural and cultural areas (e.g., bicycle parkour, green belts, green roads, and vehicle paths for excursions). Timothy and Boyd, 2015 identified four scenarios regarding the experiences to be developed in the route types defined above (Figure 1). In route design 1, the visitor is asked to experience the entire route, including all the attractive foci on the route.

In route design 2, the designed routes are long-distance routes covering different attractive settlements and historical foci. In route design 3, a certain part of the route is experienced in the designed routes. This design may apply to routes subject to a permit. In route design 4, the designed routes are the experience scenarios that require leaving the route from one of the main focuses in order to visit the heritage sites that are not on the route. In this scenario, visitors use the route and its segments as backbones to visit other places connected to existing foci. In the determination of scenarios, points of interest, lines, and areas are clustered and bonds are developed between clusters.

In Turkey, tourism was established with public policies (5-year development plans) in the 1960s. Through government incentives, tourism has been directed to coastal areas. In these regions, the negative economic and environmental effects of mass tourism, which have been increasing since the 1990s, have become evident (Soyak, 2013). Along with the negative effects of mass tourism, an environmentally sensitive sustainable tourism approach (Sixth Five-Year Development Plan, 1990–1994), also expressed as flexible tourism, has emerged. In the 2023 Turkey Tourism Strategy (Official Gazette, 2007), published in 2007, it is aimed to adopt a sustainable tourism approach in regional development, in order to make tourism a leading sector and increase employment through tourism. In the same strategy, tourism development zones, tourism development corridors, tourism cities, and eco-tourism zones, which express nature-based development, have been determined. In this strategy document, there is no information about the tourism potential of the TRB1 region, which includes Malatya, Elazığ, Tunceli, and Bingöl provinces, or any of these provinces, and there is no statement about the location where they will be located in tourism strategy, however, it has been mapped as an ecotourism-oriented development region

in the 2023 Turkey Tourism Strategy conceptual action plan (Ministry of Culture and Tourism, 2021).

In Malatya, whose main economic sector is agricultural trade, due to the density of natural and cultural landscape values and the productivity of rural landscapes, local governments see the tourism sector as an important tool in regional development and local development. For this reason, they are trying to develop strategies and projects at the regional and local levels for the possibilities of benefiting from tourism.

The fact that tourism is the most important tool of regional development, which is shown as the goal of neoliberal policies (Aslan & Kozak, 2019; McGuigan, 2005), causes the relationship of the tourism sector with the ecosystem to be of vital importance. On the other hand, with tourism in the world moving to a competitive level in both rural and urban areas, this causes development-oriented neoliberal policies to be reflected in the practices of central government, local governments, and private institutions, and these institutions and organizations are developing their partner networks in this direction (Cooper, 2015). With the development of these networks, tourism practices at regional and local levels can become a part of the tourism industry. Feighery (2011) states that the tourism industry, under the guidance of neoliberal policies, takes control very easily. Tribe and Liburd (2016) emphasize that in order to overcome the control of neoliberal policies, academicians should reveal various possibilities related to tourism. Based on this emphasis, in the landscape architecture discipline, approaches that support looking after the common public interest are important, in order for the ecosystem approach to be effective in tourism land-use decisions. Integrating ES, which meet the emphasis on the common public interest, into the tourism sector can contribute to the improvement of spatial planning processes. However, in order to ensure an effective integration of ES with spatial planning and landscape management, awareness of decision-makers and citizens about ES (Arcidiacono & Ronchi, 2021) should be created.

This study focuses on CES-based cultural route setup from ES, the sharing paradigm and sustainable tourism approaches based on the cultural route, and how developed routes can strengthen the link between biodiversity, cultural diversity, and ES. In this direction, the research question of the study is based on how an ES approach can be developed for the sustainability of tourism in landscape management. In order for landscape management to establish a safe pattern in the future, the need for a comprehensive understanding between biodiversity, ES, and tourism services, and tools to facilitate decision-making is at the core of this research question. Based on this reason, it is thought that cultural service-based cultural route setup can be an important tool for better management of the relationship and interactions between ES and biodiversity in the tourism sector. At this point, the aim of this study is to develop a design setup with an analysis technique for the determination of cultural routes with the ES approach at the provincial scale of Malatya and to evaluate the developed route set up within the scope of sharing paradigm.

Methods

Study Area

Malatya is located at the northwest end of the Mesopotamia Region, on the crossing route of the Euphrates River (Figure 2), located in a geography where there are trails of settlement starting from the Neolithic period. Located at the intersection of two of the four main routes

providing the passage between Turkey, Europe, and Asia, Malatya is one of the major border camps of the Roman and Byzantine empires on the Euphrates River (Winfield, 1977). Due to this feature, it has always preserved its feature of being the main route.

Malatya, which consists of 13 districts and has a surface area of 12 146 km², has a population density of 66 people/km² as of 2020. Its population reached 806 156 people in 2020 (TUIK, 2021). Malatya is a city with an agriculture-based economy and is located in the arid climate zone. Drylands are the most important biome on the planet, which are home to over 40% of the world's population; however, they are endangered by global climate change and land-use pressures. According to measurements made between 1920 and 2020, the annual precipitation is 383.6 mm and the average annual temperature is 13.7°C (General Directorate of Meteorology, 2021). The low humidity has enabled the development of apricot production in Malatya. Today, Malatya meets 75% of the world's dried apricot production (Ministry of Agriculture and Forestry, 2020). Topographically, its height varies between 523 m and 2723 m. Due to topographic variability and precipitation values, the steppe ecosystem is dominant in the region, and it is located in an important region in terms of biodiversity values, as it is in the climate and vegetation transition corridor. There are 1890 registered plant species in Malatya (Davis et al., 1988; Karakuş, 2009, 2016; Özhatay & Kültür, 2006). According to the Malatya data of the National Biodiversity Inventory and Monitoring Project (2016), the total number of flora taxa is 2.224, of which 438 are endemic, and the total number of fauna taxa is 253, of which 14 are endemic. According to these data, the flora endemism rate is 19.6% and the fauna endemism rate is 5.5% in Malatya.

Datasets: Four types of datasets with different scale details and different contents were used in the study. These are respectively ALOS PALSAR DEM (2007), Sentinel Level 2A satellite images (2018), spatial datasets produced at various scales, and non-spatial datasets related to the research area (Table 1).

Method

This study is based on shared values within the sharing paradigm. Cultural heritage values and cultural ecosystem services data, accepted as common values, were determined through literature and field studies. The concept of value is at the center of the ES framework, since ES provide valuable benefits to individuals and communities, such as health and well-being (Dickinson & Hobbs, 2017). While biophysical and economic values are often used in conservation planning to define priorities and inform, community values related to cultural aspects of ecosystems are less considered (Raymond et al., 2009). However, cultural ecosystem services are the key to understanding the values that people produce in their daily activities and interactions with ecosystems and how they benefit from ecosystems (Scholte et al., 2016). Values are shaped by the way people perceive, depend on, and interact with ecosystems (Scholte et al., 2016). In order to understand how cultural ecosystem services are shared, research, academic literature, local people, local government meetings, and local government practices about land use, natural values, cultural values, strategies for land use, and tourism were monitored in Malatya. Since each district has a local government unit, the practices of determining values and sharing the determined values, and the level and strategy of being associated with tourism are different on the basis of each district. For this reason, district boundaries have been accepted as the basic analysis unit for field studies. Nevertheless, since it is a metropolitan city (the upper unit responsible for the management of these districts), the evaluation was carried out at the provincial level.

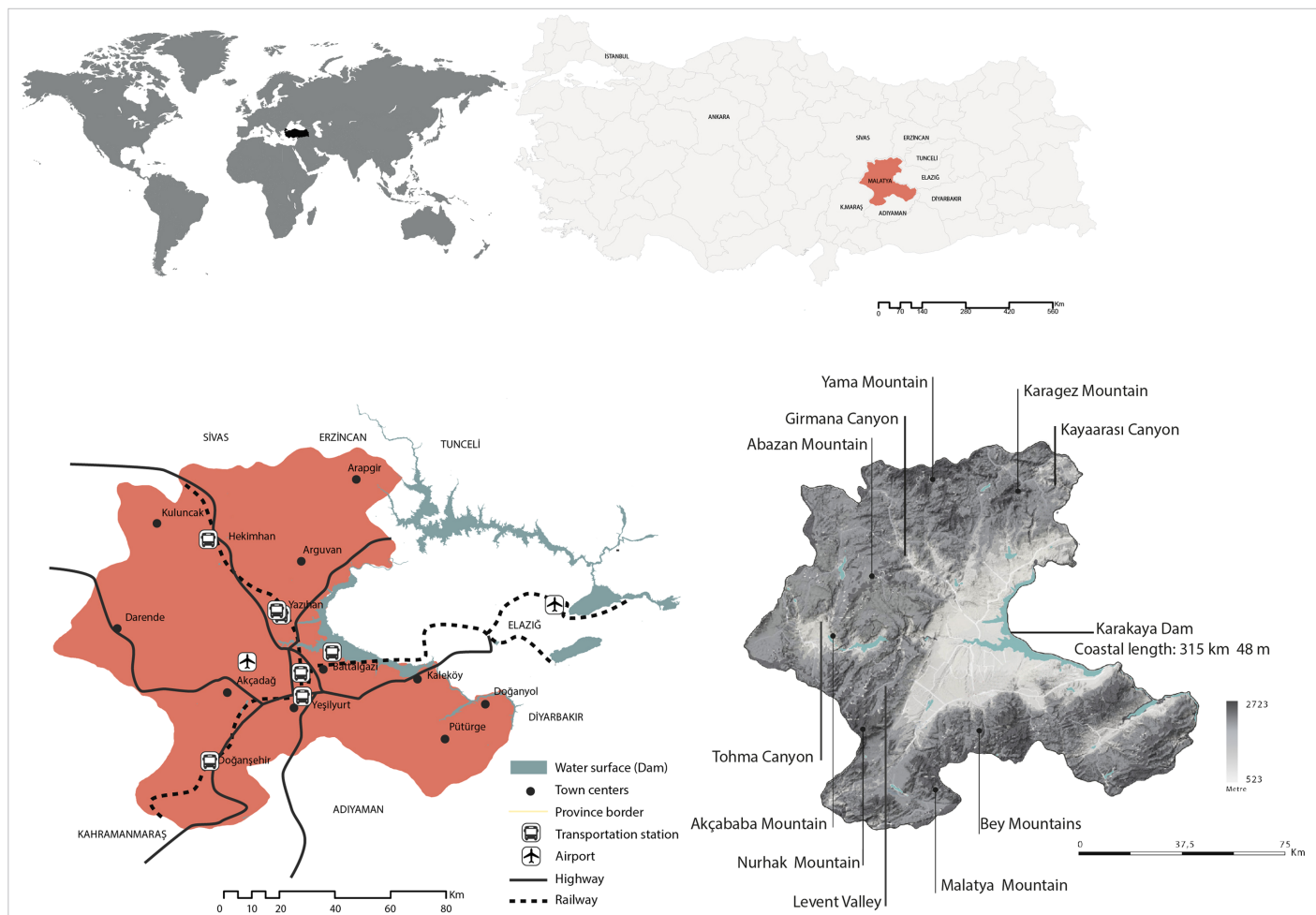


Figure 2.
 Geographical Location of the Study Area.

The method of the research consists of four consecutive stages. The first stage consists of determining, mapping, and testing cultural ecosystem values; the second stage consists of clustering cultural ecosystem values, determining themes, and creating density maps; and the third stage consists of the realization of the route setup by using the corridor and network analyzes in the Geographical Information Systems software over the density maps created according to the themes and the existing road networks. In the fourth stage, the route design was carried out (Figure 3).

Phase I Identifying, Mapping and Testing Cultural Ecosystem Values

This stage itself consists of three sub-stages. These are the stages of digitizing the existing cultural ecosystem values, determining the proposed cultural ecosystem values, and experiencing the determined cultural ecosystem values through field studies, respectively.

Digitizing Existing Cultural Ecosystem Values: At this stage, written and drawn data prepared by various institutions and organizations related

Table 1.
 Data Sets Used in the Research and their Intended Use

Data Sets	Resolution	Intended Use in Research
ALOS PALSAR L-Band Path:592-595, Rows: 740-770 Hi-Res Terrain Corrected DEM (RT1) (18/07/2007) https://search.asf.alaska.edu/	12.5 m	It was used to perform topographic and morphometric analyzes to determine the proposed cultural ecosystem values.
Sentinel-2 MSI: MultiSpectral Instrument, Level-2A (01/07/2020-30/09/2020) median image https://code.earthengine.google.com/	10–20 m	It was used for land use/cover mapping with a spatial resolution of 10 M to determine the proposed cultural ecosystem values.
Spatial datasets (such as Geology, Soil, Biodiversity, Environmental Plan, etc.)	1/25 000-1/100 000	It was used to identify and map existing and proposed cultural ecosystem values.
Non-spatial datasets (such as Cultural inventory, Plan notes, etc.)	–	It has been used to digitize existing cultural ecosystem values.

to the research area (such as Malatya Culture Inventory, Malatya Biodiversity Report, etc.) were digitized or adapted in accordance with the research projection (WGS 84 UTM zone 37 N).

Determination of Proposed Cultural Ecosystem Values: In the realization of this stage, first of all, orthometric height correction was made, and natural values were determined by performing topographic (e.g., slope, visibility, and elevation), morphometric (e.g., topographic position index—TPI-based landform analysis to identify canyons, valleys, and mountains), and hydrological (e.g., determining rafting suitability and stream density analysis) analyzes. Then, satellite images of Sentinel-2 MSI satellite on 01/07/2020 and 30/09/2020 were classified using the Code Earth Engine software using image pre-processing and threshold-based classification (Cengiz et al., 2019), and a land use/cover map with a spatial resolution of 10 m related to the research area was obtained. Appropriate points for camping areas were determined by overlapping the obtained land use/cover map and the thematic layers obtained at other stages (e.g., such as slope, distance to canyons, distance to cultural values, and distance to water surfaces). After these processes, the determined values have been experienced with the field studies carried out in the summer and autumn of 2020.

Phase II Clustering Cultural Ecosystem Values, Identifying Themes, and Creating Density Maps

The cultural ecosystem values obtained as a result of the previous stages (e.g., canyons, valleys, suitable areas for mountaineering, examples of civil architecture, and important points in terms of biodiversity) were clustered thematically according to their value characteristics as blue, brown, and gray. Density maps were produced for each thematic cluster using Euclidean distance analysis. The produced density maps were co-dominantly overlapped with topographic maps (e.g., landform, slope, and visibility), distance maps (proximity to water), LULC map, and value density maps of each theme. For ES value density maps, weights of LULC and landform classes for each thematic route were determined (Table 2). Natural breaks were taken into account in proximity to water, visibility, cultural value density, and slope maps. As a result of the overlapping, cultural ecosystem services value maps were obtained for each theme.

Thematic Cultural Ecosystem Services (CES) value maps were normalized between 0 and 100 using the Sigmoid activation function given below (100 on the map indicates regions with high CES for the focal theme and 0 indicates regions with low CES for the focal theme).

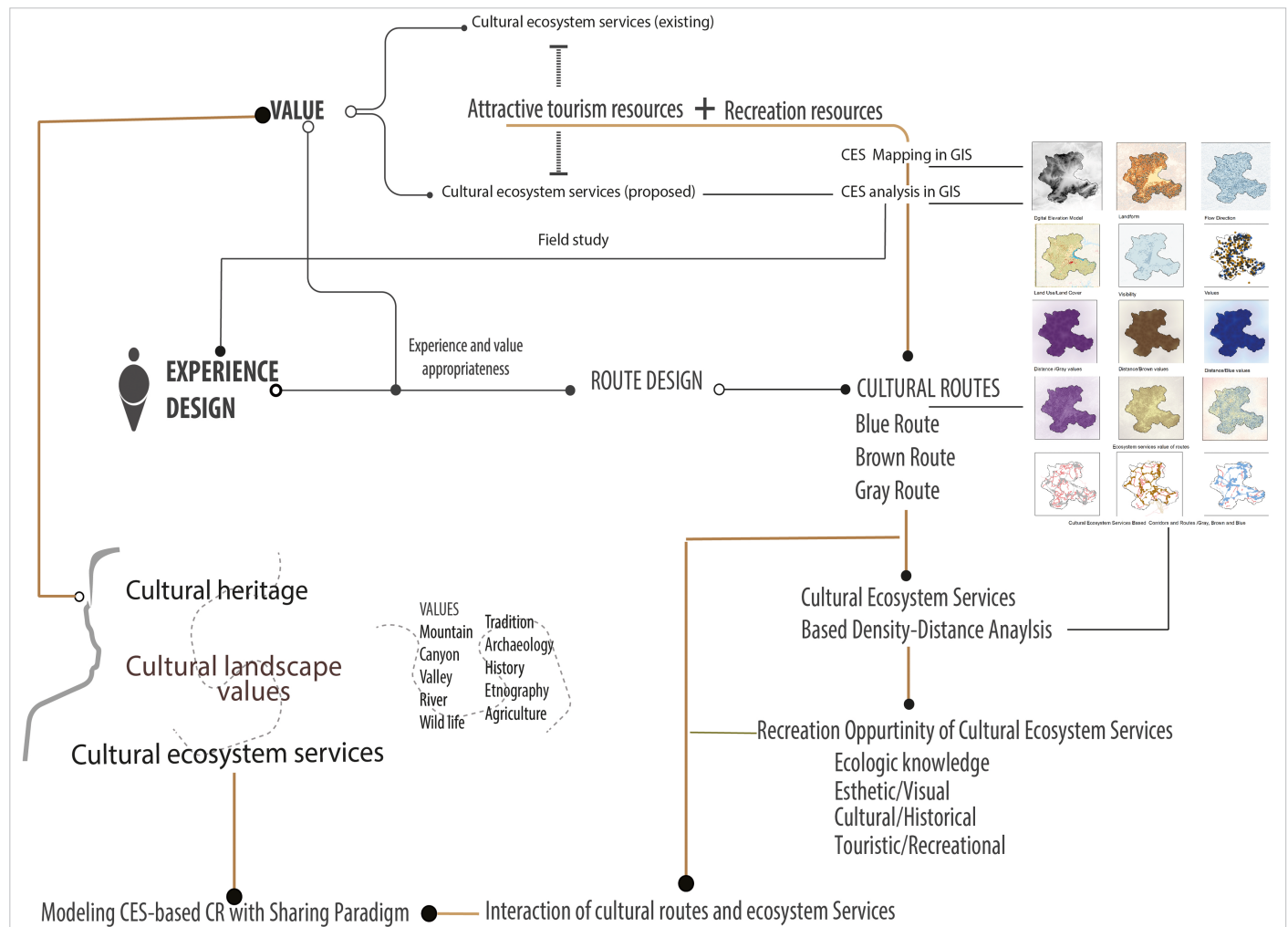


Figure 3.
 Flow Diagram Describing Cultural Route Based on Cultural Ecosystem.

$$\text{Norm}_{\text{value}} = 100 * ((\text{cv} - \text{min}_{\text{value}}) / (\text{max}_{\text{value}} - \text{min}_{\text{value}}))$$

In the formula, “cv” represents the cell value, “min_{value},” the minimum value in the thematic layer, and “max_{value},” the maximum value in the thematic layer.

Phase III Realization of Route Setup by Using Corridor and Network Analyzes Over Existing Road Networks

The thematic value cluster (Gray:18; Brown:30; Blue:18) maps obtained in the previous stages were correlated sequentially with the normalized CES value maps of each theme by taking the CES value ≥ 70 , and corridors were determined according to 25×25 close neighborhood relationships (Gormus et al., 2019).

$$\sum_{P_{vij} \in w_{ij}} P_{vij} \geq 70 \rightarrow v_{n-1} \text{ to } v_n \quad (\text{Cengiz et al., 2022})$$

In the formula, “ $\sum_{P_{vij} \in w_{ij}} P_{vij} \geq 70$ ” is the sum of ij-centered pixel values

with cell value ≥ 70 in the moving window created according to the 25×25 neighborhood rule, “ v_{n-1} to v_n ” refers to consecutive value sets. According to the equation, cells with a value less than 70 are masked in the landscape that includes consecutive value clusters, corridors were created according to the closest distance between cells with a value greater than 70 in compliance with 25×25 neighborhood relations. The course of the routes was determined by associating the created corridors with the existing road network system.

Phase IV Designed CES-Based Cultural Route

An experience design was made for the interaction of values and services. In the experience design, the place, benefit, and knowledge

relationship of cultural services has been taken into consideration. In order for cultural services to be discovered, understood, and transmitted by people, their relationship with tourism has been developed within the scope of being a resource (whether cultural services are a resource for tourism). A resource is an element or factor in the natural world that meets human needs. However, the concept of resource in the tourism sector is defined in two groups developed and undeveloped resources (Chubb & Chubb, 1981). While the developed resource refers to highways, facilities, infrastructure, and structures that facilitate the use or activity of an area, the undeveloped resource includes curative elements found in urban, rural, and natural areas. Cultural services include both developed and undeveloped resources. In addition to this classification, cultural services are classified into two categories those that have the quality of being an attractive resource for tourism and those that have the quality of being a recreational resource. Therefore, in this study, the cultural route planning setup is based on the integration of the developed-underdeveloped resource of cultural ecosystem services and resources with attractive qualities and recreational qualities. In this integration, the relations between biodiversity, cultural ecosystem services, and route planning are based on the past, present, and future of cultural landscape memory. Landscapes (natural and cultural features) are often associated with the identity of an individual, a community, or a society. For the formation and comprehension of cultural bonds, landscapes and relationships that convey social interactions need to be experienced. The landscape includes material representations of cultural practices of tangible and intangible cultural heritage, therefore, the socioecological structure of the landscape that meets all the relations of geography, topography, archeology, history, architecture, and production constitutes cultural ecosystem services in Malatya. Based on this finding, the interaction of nature–culture, rural–urban, development–growth, and production–consumption was considered in the cultural route design. The main components of cultural ecosystem services in Malatya were determined as water, mountains, and structures. Based on these main components, cultural routes that provide the presence of cultural ecosystem services in the landscape and their relationship with sustainable tourism are named as blue (cultural ecosystems based on freshwater ecosystems), brown (heritage-based cultural ecosystem services consisting of individual structures and areas of cultural heritage), and gray (nature-based cultural services based on mountain and steppe landscape). In the determination of the scenarios, management, scale, and demand were taken into account in linking urban, rural, urban–rural peripheries, and natural areas, and in providing the transition between areas. In all three routes, scale and experience have been diversified by expanding the urban area into the urban periphery and remote rural areas.

Table 2.
 LULC and Landform Weight Values of Routes

	Classes	Gray	Brown	Blue
LULC	Trees	9	8	8
	Cropland	5	9	5
	Built-up	1	9	1
	Open water	7	7	9
	Streams	8	7	9
	Herbaceous wetland	7	5	9
	Grassland	9	7	9
	Barren/sparse Vegetation	9	5	9
Landform	Valley and canyons	7	6	9
	Upper slopes	9	2	2
	Upland Drainages	9	8	8
	Streams	7	6	9
	Plains	1	9	8
	Open slopes	2	9	7
	Midslope Ridges	5	3	3
	Midslope Drainages	4	3	4
	Local Ridges	3	7	2
	High Ridges	9	3	1

Table 3.
 Properties of Routes

Properties	Gray Route	Brown Route	Blue Route
Corridor area (km ²)	2.714 18	3.304 20	3.395 48
Total route length (km)	4488.17	5151.53	5617.83
Designed route length (km)	2797.49	1764.8	1030.16
Number of values	174	376	246
Number of foci	18	30	18
Relevance rate to CES	%68,53	%80,23	%69,86

Results

Corridors of Cultural Ecosystem Services

Cultural ecosystem services corridors 5960 km². It constitutes 49.06% of the surface area of Malatya province. The corridor area and route length of the blue route, which is designed as a combination of the gray route and the brown route, are higher. However, among the routes designed within the scope of accessibility criteria, the gray route was the longest route. In terms of the number of values, the number of values belonging to the brown route is higher. It was determined that

the number of foci was also mostly on the brown route. The level of association with cultural ESs was 80.23% in the brown route, 69.86% in the blue route, and 68.53% in the gray route, respectively (Table 3 and Figure 4).

The distribution of the CES corridor by districts from high to low is, respectively, Arapgir, Doğanşehir, Pütürge, Darende, Battalgazi, Akçadağ, Hekimhan, Yeşilyurt, Arguvan, Yazıhan, Kuluncak, Kale, and Doğanyol. Among the CES-based cultural routes, gray route is concentrated in Arapgir and Doğanşehir, Arguvan, and Pütürge, brown values

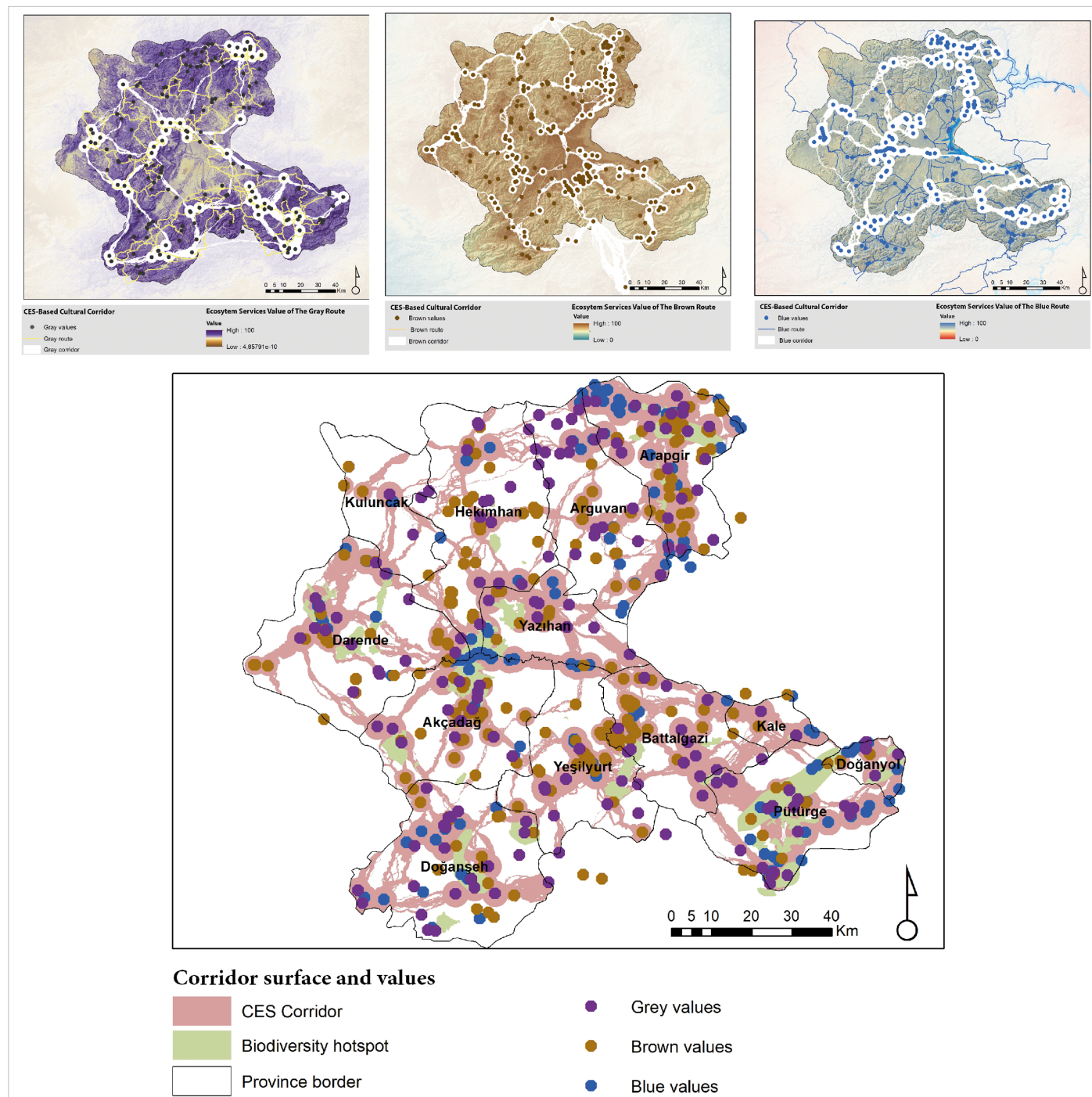


Figure 4.
 Distribution of CES Corridors and CES Values.

in Arapgir and Battalgazi, Hekimhan, and Yeşilyurt, and blue values in Arapgir, Darende, Doğanşehir, and Pütürge (Table 4).

Designed Routes

The heterogeneous distribution of the nature, culture, thermal and faith-based potential of cultural ecosystems provides an important opportunity for the integration of districts. The fact that the supply ecosystems (such as traditional agriculture, fruit farming, wine, and beekeeping) have the potential to be evaluated mostly within the scope of sustainable tourism offers the opportunity to integrate cultural ecosystem services in the region with tourism within the scope of cultural route. In order to ensure integration, routes should offer the opportunity to experience various ecosystems of culture and nature together. In route design, it has been considered the cultural ecosystem services experience framework on visible shared values (cultural landscape values and cultural heritage) and invisible values (e.g., historical processes and interaction narratives) for visitors to understand the values arising from the interaction of both culture and nature-based ecosystems. Based on this importance, a holistic cultural route system based on cultural ecosystem services was proposed; three main cultural routes were determined (Figure 5a).

Therefore, shared values, the historical period of values, and the effects and formation of values in daily life were scripted within the scope of blue, brown, and gray themes. The brown route is a culture-oriented route that invites visitors to archeological, historical,

Table 4.
Distribution of CES Corridors and CES-Based Cultural Routes by Districts

District	Corridor Area (km ²)	Gray Values	Brown Values	Blue Values
Akçadağ	535 05	14	33	22
Arapgir	724,19	24	69	46
Arguvan	427 64	18	18	20
Battalgazi	558 77	14	69	11
Darende	606 00	16	34	32
Doğanşehir	657 87	24	19	26
Doğanyol	144 94	5	4	12
Hekimhan	486 46	16	43	13
Kale	148 52	2	4	5
Kuluncak	164 64	3	4	3
Pütürge	624 09	18	16	24
Yazıhan	427 13	8	11	18
Yeşilyurt	454 70	9	42	11

and traditional narratives and practices, while the gray route is an ecology and nature-oriented route that invites its visitors to access

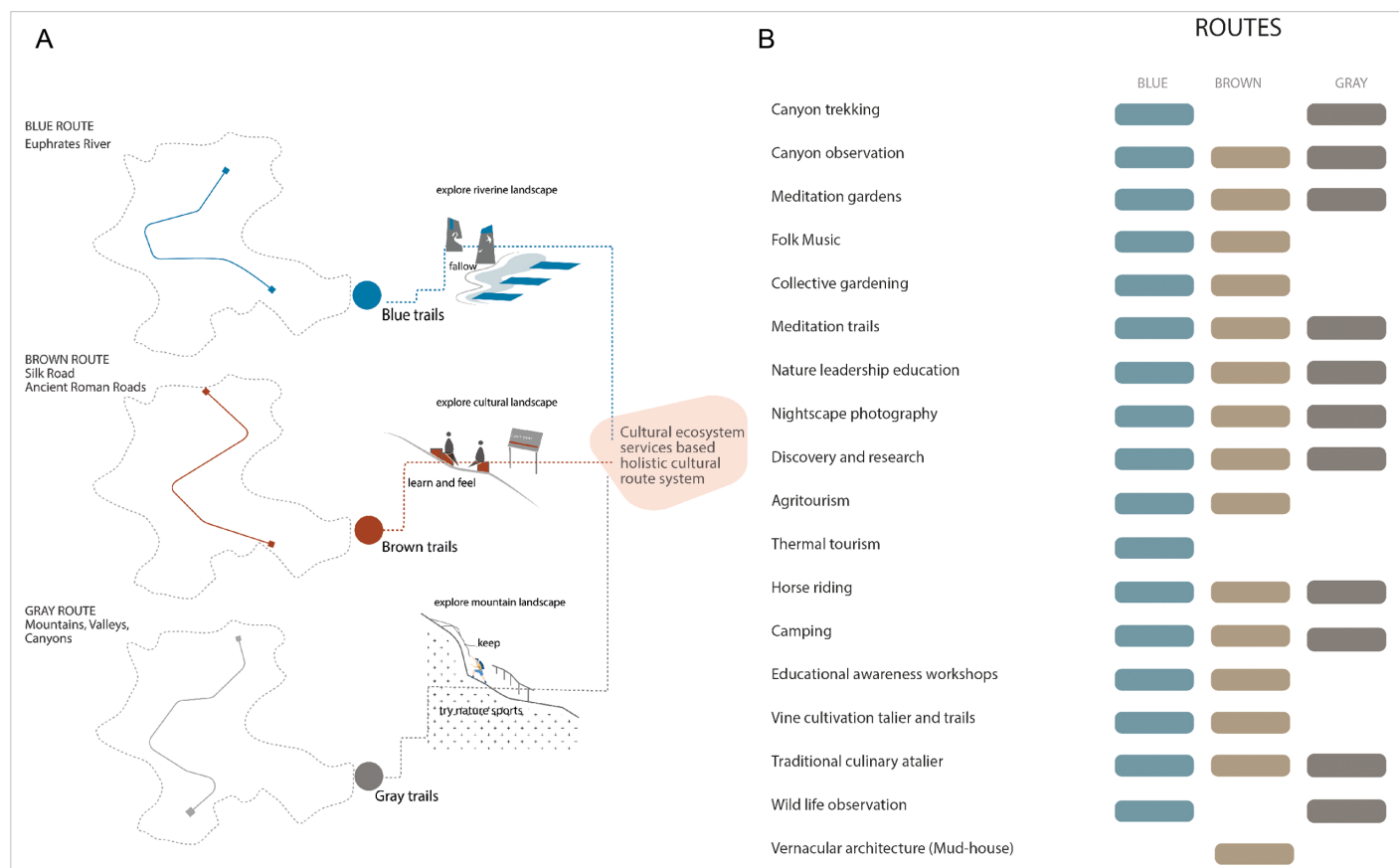


Figure 5.
 (A) Holistic Cultural Route System and Thematic Framework Based on Cultural Ecosystem Services; (B) Experiences Based on Cultural Ecosystem Services.

nature. The blue route, which combines culture (brown route) and nature (gray route), is an open call to experience the dynamism of water. In the determined holistic cultural route system, meditation gardens, meditation trails, wildlife watching activities, research and discovery trails, and nature-based traditional cuisine workshops are suggested on cultural routes in order for visitors to understand the interaction of culture and nature and, therefore, to develop awareness of cultural ecosystem services (Figure 5b). These activities will raise awareness not only about cultural ecosystem services but also about other ES.

Gray Route

It is based on the natural knowledge of landscape memory and body performance. The main focuses of the gray route, which is focused on ecology, are natural landscapes, mountain landscapes, wildlife, vegetation, geological formations, canyons, plateaus, and stands. The route consists of the synthesis of existing trails and non-existing trails. Skiing, wildlife watching, plant discovery, hiking, horseback riding, camping, and learning-information tours are the activities that can be done on the route that offers an experience to its visitors in all seasons. Within the route, visitors can develop trails according to their interests: plateau trails, astro-trails, photo-trails, wild trails, canyon exploration trails, camping trails, winter experience trails, and eco-parkours (Figure 6).

Brown Route

The brown route setup is built on archeology, history, and traditional practices within the context of the cultural landscape. The trail setup and thematic setup of the route have been developed, and it contains the synthesis of touristic places that are the focus of attraction and places that are valuable but do not have a strong thematic narrative (not treated as touristic places). Route, based on landscape memory information, is fed by cultural memory, which is the lower layer of landscape memory. Cultural memory includes architectural forms, agricultural and rural life practices, types of feeding from nature (plant gathering), historical roads, trails, structures, and bridges. Periodic representation areas (Aslantepe, Nemrut Mountain National Park, Suriçi, rock tombs) and traditional landscape textures (architectural and production textures) are the main focuses of the route. In addition, on the brown route, the visitor can identify trails according to the area of interest: Hittite trails, Roman trails, Seljuk trails, trails of Ottoman structures, trails of Armenian masters, mud brick trails, and traditional wine trails (Figure 7). The relationship between the brown route and nature, developed on the basis of cultural ecosystem services, is provided by the gray and blue routes.

Blue Route

In freshwater ecosystems, ES are difficult to understand, but freshwater ecosystems provide a range of services to their users. Some of these services are tangible (such as fishing), while others are intangible

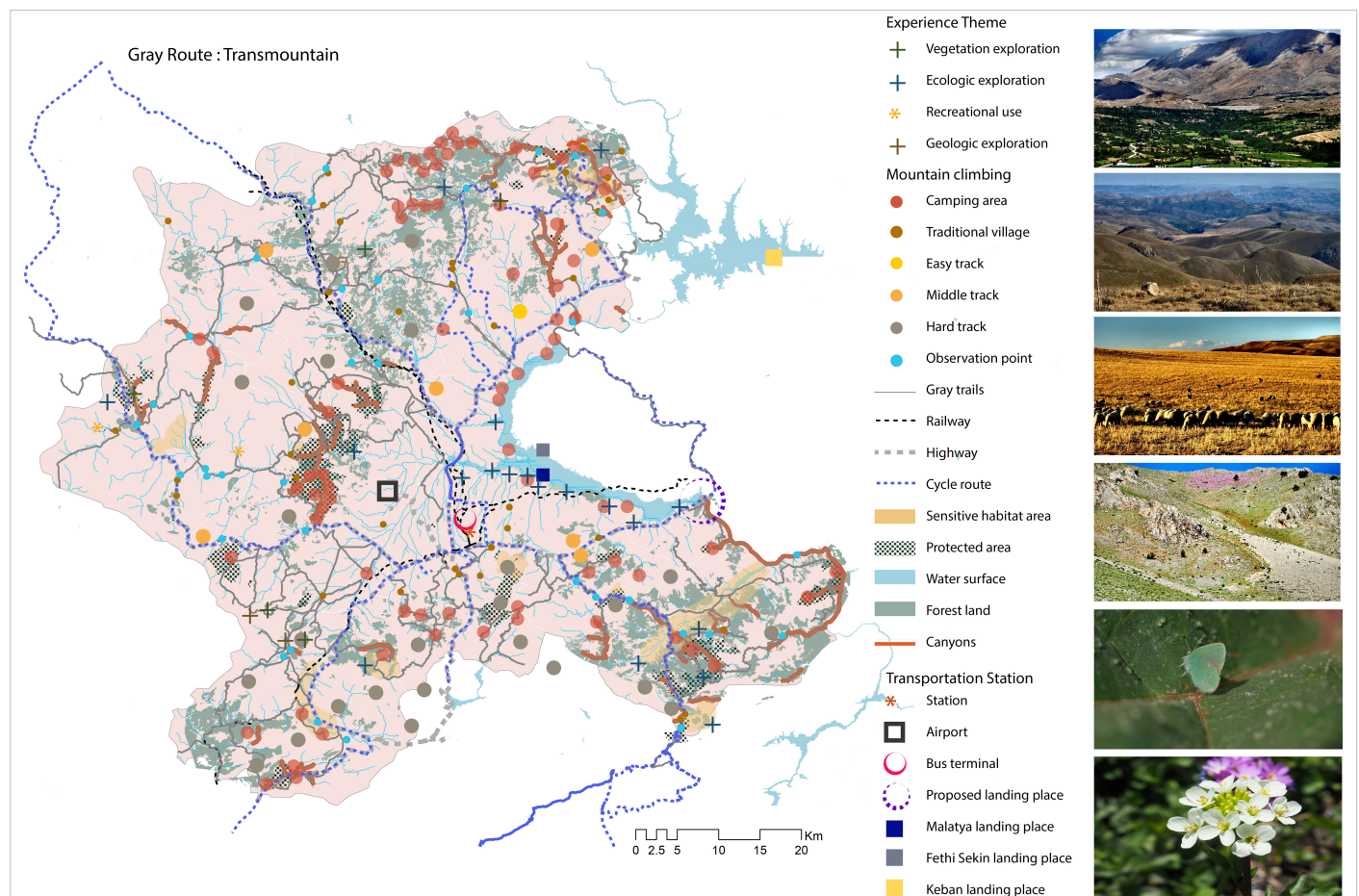


Figure 6.
 Gray Route.

(such as aesthetic values) (Esmail and Geneletti, 2020). The blue route is an interface where trails of ecology and culture complement each other with tangible and intangible values. The route, nourished by both the natural landscape and the cultural landscape, offers its users a special and holistic experience. On this route, the theme of nature and culture is experienced through water with the synthesis of valleys and canyons. The blue route, which invites its visitors to touch, watch and interact with the water, contains opportunities to present the visible and invisible practices directed to water through narrative and digital space. Within the scope of this route, visitors can discover new trails: the trails of the Euphrates, the songs of the Euphrates, the trails of the canyon-water transition, and the trails of the water concert (Figure 8).

The Sharing Paradigm and Ecosystem Services of Routes

Route experiences developed based on cultural ecosystem services meet the three components of the ES sharing paradigm of IPBES (benefit, knowledge, and place). While the benefits from activities within the scope of the blue and gray routes are the improvement of physical performance and sensory recovery, the brown route offers the opportunity to understand cultural differences. While birds and aquatic ecosystem recognition and grasping geographical forms constitute the most distinctive information area of the blue route, the most distinctive information areas of the brown route are comprehending the architectural textures and periodical priorities of architecture, and it is plant associations on the gray route. The prominence of different places on each route makes it easier for the visitor to understand the interplay of

natural and cultural ecosystems in the geography and can also make the visitor feel the difference in the sense of each place. On the other hand, the benefits, knowledge, and sense of place gained through each route can make it easier for visitors to spot other ES. In particular, the blue route will be helpful to visitors in understanding supply, support, and regulatory ES; the brown route in understanding support ES, and the gray route in understanding support and supply ES. Therefore, it will be understood that route experiences determined on the basis of cultural ecosystem services have direct or indirect interactions with other ES (e.g., supply, regulatory, and support services) (Table 5).

The benefits gained, the knowledge acquired, and the “feeling of place” sensed on a cultural ecosystem-based route may have direct and indirect effects on visitors’ awareness of supply, cultural, and support ES in Malatya geography (Figure 9). For instance, visitors and residents can easily understand that supply services provide traditional food production, cultural services lead to the development of social networks, the formation of a sense of belonging, the transfer of ecological and traditional knowledge, and support services are about ecosystem cycling and soil regeneration and productivity improvement. With a holistic cultural route system based on the cultural ecosystem services, raising awareness of the direct and indirect effects of ES can pave the way for sustainable tourism to offer an improvement movement for ES. In addition, evaluating ESs in tourism within the scope of sharing focuses clearly shows the visitors that not only the use-value of ESs is important but also the asset value of them and asset values support use values.

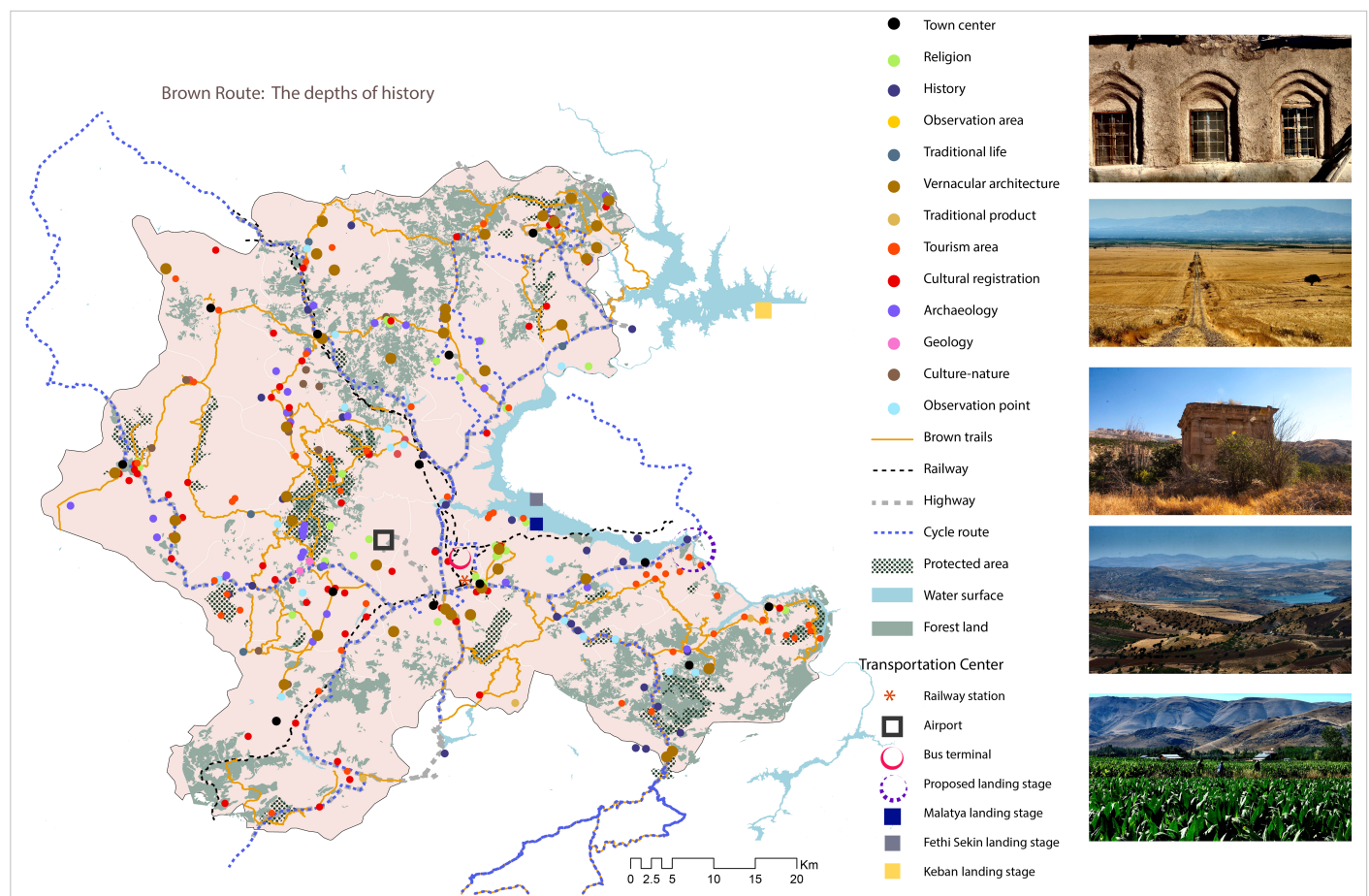


Figure 7.
 Brown Route.

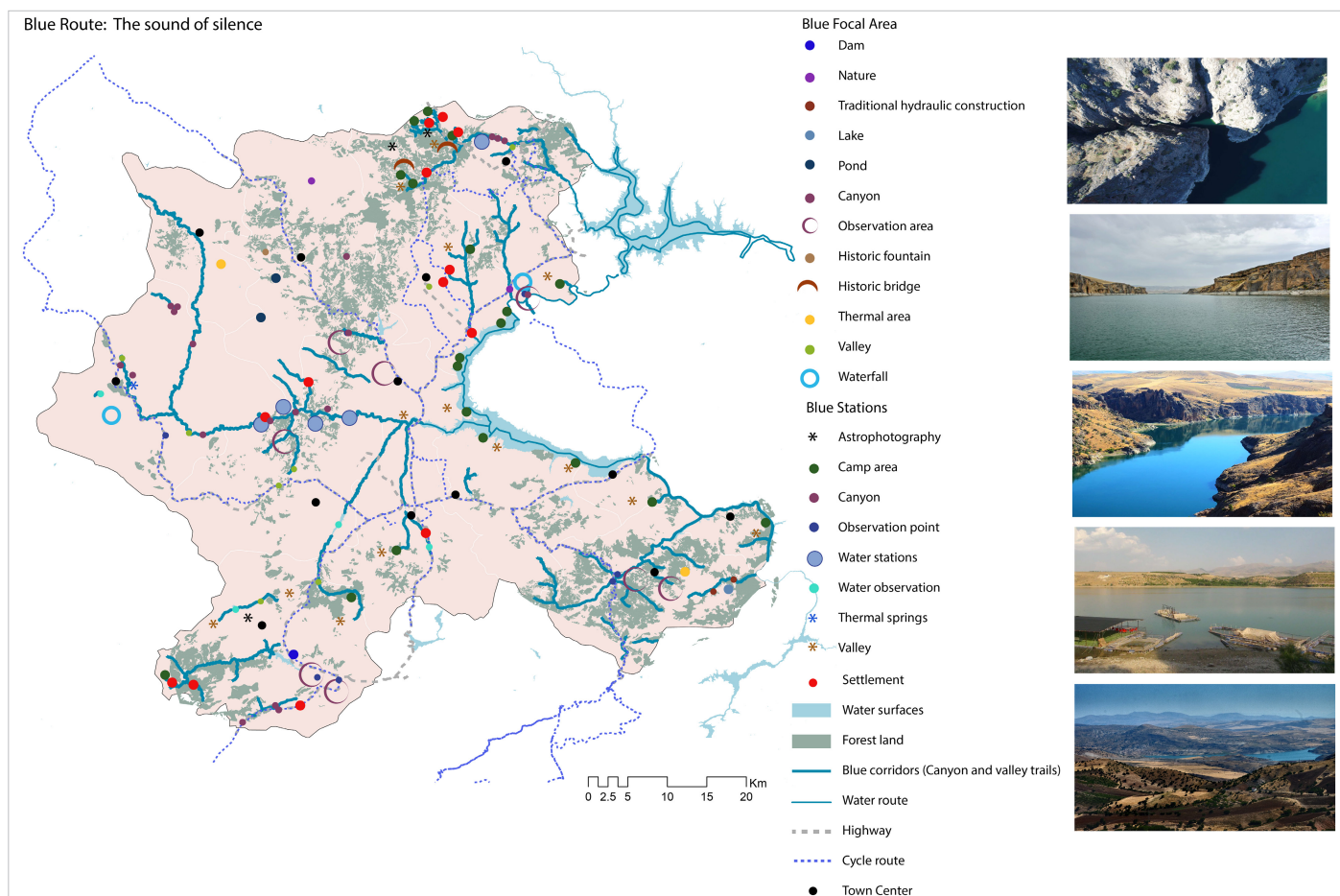


Figure 8.
 Blue Route.

Table 5.
 The Shares Provided by the Routes and the Ecosystem Services They Support

Routes	Cultural Services	Sharing Components			Other Ecosystem Services
		Benefit	Information	Place	
Blue	<ul style="list-style-type: none"> Recreation and eco-tourism Faith and spiritual values Aesthetics, artistic values Educational and cognitive values 	<ul style="list-style-type: none"> Trekking Sensory recovery Spending time outdoors Camping Sport fishing Swimming 	<ul style="list-style-type: none"> Recognition of bird and aquatic ecosystem Grasping geographic forms 	Coastal and valley landscapes	Supply (food supply), support (ecological and traditional knowledge system, educational value, inspiration), and regulatory (hydrological regime)
Brown		<ul style="list-style-type: none"> Understanding cultural difference 	<ul style="list-style-type: none"> Recognizing architectural textures Understanding the periodical features of architecture 	Historical and Archeological Landscapes	Support (ecological and traditional knowledge system, educational value, inspiration)
Gray		<ul style="list-style-type: none"> Trekking Sensory recovery Spending time outdoors Camping Cycling Cruising Riding Scientific discovery 	<ul style="list-style-type: none"> Getting to know wildlife Grasping plant associations 	Mountain and Steppe Landscapes	Regulatory (pollination), support (ecological and traditional knowledge system, educational value, inspiration), and supply (food supply)

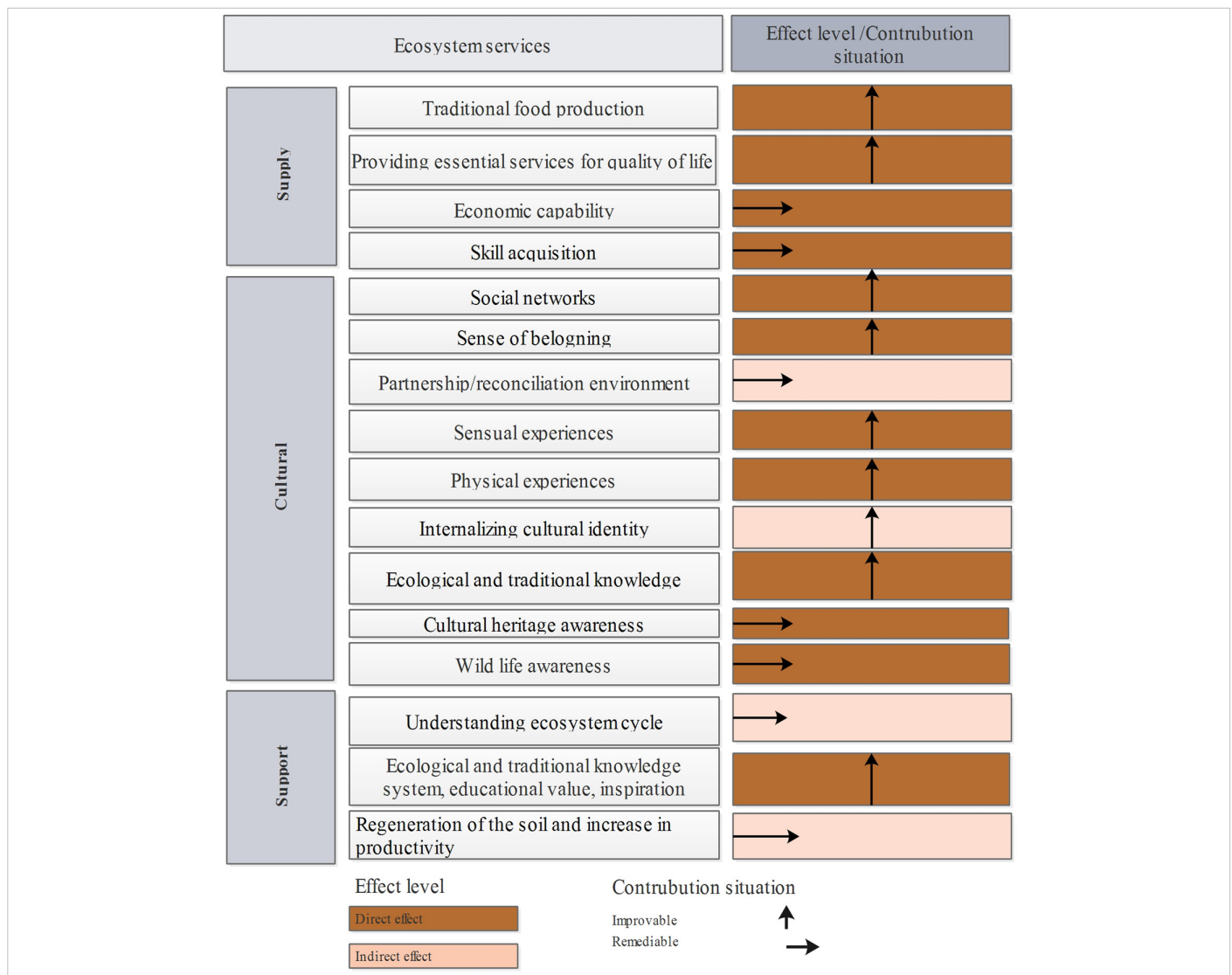


Figure 9.
 The Impact of Malatya Cultural Routes on Ecosystem Services.

Discussion, Conclusion, and Recommendations

Conclusion

The framework of an ES-based comprehension in tourism can be determined by integrating the sharing focus of ES into the cultural ecosystem-based holistic cultural route system. In ES, based on the three focuses of the sharing paradigm and the level of influence of cultural routes in the development of ES, a conceptual framework has been developed that combines the temporal dimension with the motion of the curative and supportive dynamics of cultural ecosystem services between nature–culture, memory–heritage, and experience–mind (Figure 10). The continuous and cyclical interrelationship of nature–culture, memory–heritage, and experience–mind actions are always (e.g., past, present, and future) connected and dependent, not at a single time. For each action to provide a curative and supportive cultural ecosystem service, the interconnectivity between actions needs to be evaluated on the basis of knowledge, at the ground level, and in the probability of benefit. Cultural routes offer the opportunity to present this cyclicity in a simple way.

Determining cultural routes with route design where cultural ecosystem services support other ES, can be an important approach for eliminating the negative effects of tourism. By nurturing the sense of nature protection of visitors, schematization of experience production, which is important in tourism, with an ES approach can increase the satisfaction, awareness, and memorability dimension of their experience. According to Fesenmaier and Xiang (2017) and Ma et al. (2017), fictions developed within the scope of environmental stimuli, sensations, and emotions are related to the satisfaction of the experience in studies on tourism experience. Direct experience and intuitive appreciation of cultural services (Daniel et al., 2012; Gobster et al., 2007) support experience satisfaction in tourism. This level of satisfaction will help increase public support for the protection of ecosystems.

In Turkey, which is in the category of developing countries, tourism, which is an important industry of the neoliberal policy-based economic development program, instrumentalizes natural and cultural landscape values and negatively affects the production of ES due to its negative effects on the landscape. In order to eliminate the negative effects on

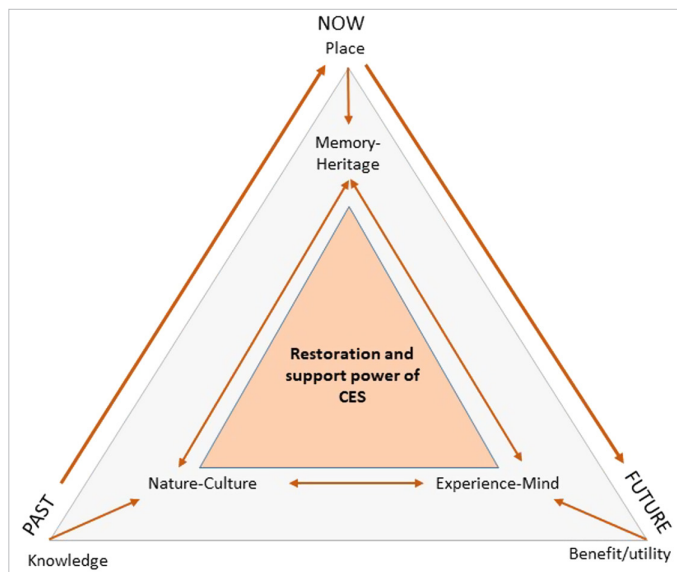


Figure 10.
 Sharing Values of Cultural Routes and Their Contribution to Cultural Ecosystem Services.

ES, developing the partnership of the tourism sector, which is dominant in Turkey's national economic policy, with landscape and ES through collective values and sharing will raise awareness on ES. This study, which provides the integration of cultural routes and ES, provides an idea about what can be the gains of ecosystem awareness practices of decision-makers in tourism and how they can protect collective values (sharing) with the public interest.

Determining how the landscape will be managed at safe thresholds in the future means ensuring biodiversity and the continuity of ecosystem processes and also improving the ability to control tourism pressure in the decision-making process. In this context, the scenario developed for the relationship between cultural ecosystem services and tourism is very important for the development of the Malatya region, which has a sensitive biological diversity and ecosystem.

Associating ES with landscape facilitates the understanding of the connections between cultural ecosystem-based cultural routes and components of biodiversity and cultural diversity. With an understanding of these connections, visitors will have the opportunity to understand the awareness of networks between ecosystem processes and services. By forming this awareness, it can be ensured that ecosystems are resistant to the pressures on them and ecosystems can be protected from tourism pressure. In geographies dominated by the steppe ecosystem, understanding ES is much more important. Because it is known that these ecosystems have a very fragile structure against pressure. Raising awareness about the association of ES with sustainable tourism and expanding the instances and possibilities of integrating this awareness into the tourism planning process provides the opportunity to understand how the concept of ES in tourism can be made functional. In this study, the method developed for the determination of CES-based cultural routes and awareness of the relationship of CES-based cultural routes with the sharing paradigm (e.g., utility, knowledge, and sense of place) is very important for landscape management. In order for each action decided in landscape management to provide a curative and supportive cultural ecosystem service, the interconnection between actions needs to be evaluated on the basis of knowledge, place, and

probability of benefit. In this direction, developing technique and awareness can accelerate the formation of skills in the operationalization of the CES concept in spatial planning and in the decision processes of local governments.

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