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Determination of Criteria and Importance Levels for Prioritization of Protected Areas

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Abstract

Protected areas form the basis of the most effective operational tools of national and international conservation strategies to protect and sustain natural and cultural resource values. This study aimed to score the essential criteria and sub-criteria according to the importance of identifying and prioritizing new protected areas. For this purpose, a 5 Likert scoring technique was applied to 30 experts. As a result, seven essential criteria and 37 sub-criteria that can be used in the prioritization process of protected areas according to their weight scores were determined. The main criteria are listed as natural values (0.32), social and cultural values (0.26), spatial values (0.11), negative criteria (pressures and threats) (0.09), legal, administrative and political situation (0.07), economic values (0.06), research and development potential (0.06). With the seven essential criteria and 37 sub-criteria developed in this study, a decision support tool based on a straightforward, fast, and scientific approach that can mainly serve planners, practitioners, and decision-makers according to the importance levels of protected areas has been created.

Keywords: *Protected areas, assessment criteria, importance levels, nature conservation, biodiversity.*

Korunan Alanların Önceliklendirilmesinde Kullanılabilecek Ölçütler ve Önemlilik Düzeylerinin Belirlenmesi

Öz

Korunan alanlar, doğal ve kültürel kaynak değerlerinin korunması ve sürdürülebilirliğine yönelik ulusal ve uluslararası koruma stratejilerin en etkili eylemini oluşturur. Bu çalışmada yeni korunan alanların belirlenmesi ve önceliklendirilmesi için temel ölçüt ve alt ölçütlerin önemlilik düzeyine göre puanlandırılması amaçlanmıştır. Bu amaçla 30 uzman kişiye 5'li likert puanlama tekniği ile uygulanmıştır. Sonuç olarak; Korunan alanların önceliklendirme sürecinde ağırlık puanlarına göre kullanılabilecek 7 temel ölçüt ve 37 alt ölçüt belirlenmiştir. Temel ölçütler ağırlık puanlarına göre doğal değerler (0,32), sosyal ve kültürel değerler (0,26), mekânsal değerler (0,11), olumsuz ölçütler (baskı ve tehditler) (0,09), yasal, yönetsel ve politik durum (0,07), ekonomik değerler (0.06), araştırma ve geliştirme potansiyeli (0,06) şeklinde sıralanmıştır. Bu çalışma ile geliştirilen 7 temel ölçüt ve 37 alt ölçüt ile korunan alanların önemlilik düzeylerine göre özellikle plancılara, uygulayıcılara ve karar vericilere hizmet edebilecek kolay, hızlı ve bilimsel bir yaklaşıma dayalı bir karar destek aracı oluşturulmuştur.

Anahtar Kelimeler: *Korunan alanlar, değerlendirme ölçütleri, önemlilik düzeyleri, doğa koruma, biyoçeşitlilik.*

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1. Introduction

Human beings have directly and indirectly interacted with nature according to the value judgments, perceptions, perspectives, Degree of importance, and prioritization levels of the individual and society since its existence. As a result of this association, human beings have constantly and unilaterally destroyed, exploited, changed, and shaped nature in line with their needs and demands. Humankind's tendency to dominate nature and consume it at the maximum level has led to its irreversible negative impact (Gül & Kurdoğlu, 2021). Human beings, who have damaged nature by intervening in the physical dimension until today, have been working to change the natural system's content, genetics, magnetics, and frequency, especially in recent years. Although it is not yet clear what the effects will be on nature and human life, it is thought to bring serious vital problems (Gül, Dinç & Gül, 2021).

Nature conservation is the work carried out to protect all living and non-living beings from all kinds of adverse effects, pressures, and destruction of people and to secure them for the future, to maintain ecosystem services such as ecological-environmental, socioeconomic and cultural ecosystem services of natural systems (Gül & Kurdoğlu, 2021). Nature conservation reflects the sense of protection in the human spirit or existence. It can be considered an internal orientation towards guaranteeing one's existence and natural life by worrying about the future. In this context, nature and environmental protection efforts cover the natural and cultural spaces where people live and interact (Gül & Türker, 2014). In the nature conservation approach, the fact that the one who damages or destroys nature and the one who tries to protect nature are human beings in the position of a single subject brings along a philosophical paradox. In this context, the nature conservation approach prioritizes the protection of nature from human activities or limiting its use (Gül & Kurdoğlu, 2021).

The International Union for Conservation of Nature's (IUCN) definition of a protected area is a clearly defined geographical area recognized, allocated, and managed by legal or other effective means to ensure the long-term conservation of nature, together with associated ecosystem services and cultural values (Dudley, 2008). Most protected areas are located in natural or near-natural ecosystems, but they are also integrated with historical, archaeological, and cultural areas due to human activities.

Protected areas offer essential opportunities not only for the protection of biodiversity (protection of species and ecosystems) but also for essential ecological, social, and economical services such as clean water, carbon storage, genetic reservoirs, disaster mitigation and soil stabilization, conducting scientific research, providing education, awareness and consciousness-raising, contributing to the social and economic development of the region and protecting our cultural heritage (Gül & Türker, 2014; Gül, Dinç & Gül, 2021). For this reason, protected areas are key in protecting and sustaining natural ecosystems and biodiversity. It is recognized that they are the only way to stop the extinction of many endangered, threatened, or endemic species. The main reason for the emergence of the protected area approach is to protect the natural and cultural values of protected areas in their current state, to limit human activities that may pose a threat, and to prevent undesirable changes (Gül & Metin, 2021).

Protected areas are increasing in number on a global scale and constitute the most critical component and action of global conservation strategies and in situ conservation (Gaines et al., 2010; Game et al., 2009; Gray, 2010; Lester et al., 2009; Lubchenco et al., 2003; Pimm et al., 2001).

According to the World Database on Protected Areas (WDPA), 2024, the number of protected areas is 293,696 (number of protected areas on land and inland waters: 275496 + number of marine protected areas: 18200) and covers 244 countries and territories. The ratio of protected areas to the world area is 16.1% (The World Database on Protected Areas (WDPA), 2024; protectedplanet, 2024).

In Türkiye, the ratio of terrestrial protected areas to the country's surface area is approximately 14.9 percent.

The amount of protected areas under the responsibility of the Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks is approximately 3 739 459 hectares. Protected areas and their numbers are National Park (48) Nature Park (266), Nature Monument (110), Nature Conservation Area (31), Wildlife Conservation Area (85), Wetlands (106), Ramsar Areas (14),

Protection Forests (55), Gene Conservation forests (353), Seed Stands (311), Seed Orchard (212) and Forest Parks (133) (Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks, 2024).

The total area of protected areas under the responsibility of the Ministry of Environment, Urbanisation, and Climate Change is 7,883,511 hectares. These areas and their numbers are Special Environmental Protection Areas (SEPA) (19) and Natural Protected Areas (3,834) (Ministry of Environment, Urbanisation and Climate Change, 2024).

The total number of protected areas under the General Directorate of Cultural Assets and Museums of the Ministry of Culture and Tourism is 24786. They are Archaeological Protected Areas (24031), Urban Protected Areas (361), Historical Protected Areas (230), Urban Archaeological Protected Areas (36), and Mixed Protected Areas (128) (General Directorate of Cultural Assets and Museums, 2024).

In 2006, Doğa Derneği, in its book 'Türkiye's Important Nature Areas,' identified 305 Important Nature Areas (IBAs) in Türkiye that should be protected according to scientific criteria and where endangered species or critical habitats should be considered during the planning of activities within their borders. The total area of these areas is 20 million 280 thousand 149 hectares. This area constitutes 26 percent of Turkey's surface area (Eken et al., 2006).

Natural systems and protected areas around the world are under serious human threats, including misuse and change, urbanization, mining and quarrying, excavation, environmental pollution, harvesting, hunting, and climate change, leading to their increasing fragmentation and isolation (Brandon et al., 1998; Oates. 1999; Sala et al., 2000; Bruner et al., 2001). With continued economic growth, pressure on natural systems will likely increase further.

Climate change and biodiversity loss are our two most significant environmental challenges. The 2015 Paris climate agreement and agreements such as COPE envisage limiting global warming to an increase of less than 2°C above pre-industrial levels to avoid the most significant impacts of climate change. Nature conservation is perhaps the only way to curb carbon emissions and ensure the proper functioning of ecosystem services (Dudley et al., 2009). In particular, it is envisaged as a target to increase the number and amount of protected natural areas to limit carbon emissions and sustain and protect ecosystem services and biodiversity.

Since the existence of human beings, it has emerged that nature should be protected holistically and that humans should adopt a lifestyle in harmony with nature. The idea of securing at least half of the world by 2050 to protect nature is becoming increasingly widespread (Wilson, 2016). However, many people question whether it is possible to realize this goal (Dinerstein et al., 2017; Watson & Venter, 2017) because it is predicted that it will not be possible to discover the protection of even 30% of all terrestrial and marine ecosystems rather than 50% of the world in economic, ecological, and managerial dimensions.

According to Watson & Venter (2017), to make conserving 50% of the Earth a reality, Watson & Venter (2017) suggest that it should be centered around three key questions.

- Which places are the most important to conserve?

- What is the extent, severity, and trajectory of threats to local biodiversity, and what processes sustain them?

- For areas prioritized for intervention, what measures will be needed to ensure they retain their natural integrity?

It is necessary to determine the general management objectives, status, methods, programs, and principles for protecting protected areas in natural ecosystems and to develop nature conservation policies considering each country's conditions. Selecting and prioritizing natural areas using qualitative and quantitative criteria according to protection status and management objectives is essential. However, the determination of protected areas is generally based on some ecological indicators. Socioeconomic aspects are only considered in the management stages of these areas (Smith & Theberge, 1986). The reasons for nature conservation are accepted as aesthetic, psychological and

medical, ecological and vital, scientific, pedagogical, economic, and ethical reasons (Gül & Türker, 2014).

Although the criteria and indicators used in the identification and planning of protected areas have been given more importance, they have not yet been brought to a scientific standard because they belong to different purposes and categories (quantitative/qualitative, species/habitat) and are often duplicated and sometimes not applicable. In our country, criteria or indicators for identifying or evaluating candidate areas for protected areas have not yet been established. In particular, only limited criteria, such as ecological, biological diversity, and social values, were used to create a simple checklist for evaluating candidate areas.

Today, it is essential to determine the priority areas according to the criteria/sub-criteria, importance levels, and indicators in scientific and technical dimensions according to the protection status of protected areas, which are increasing in quality and quantity. To prioritize protected areas according to the criteria and sub-criteria to be determined, as well as their weight levels, and to select candidate areas easily and quickly, an approach should be put forward according to scientific and technical standards. Thus, it will be of great benefit in terms of more effective protection of the protected areas to be prioritized in terms of quality and quantity, planning/designing according to the purpose of protection, and ensuring sustainable, economical, and rational management.

This study aims to determine the basic/sub-criteria that will include scientific and technical standards in the prioritization and selection of protected areas and to choose the weight scores, including the level of importance of these criteria. Thus, the candidate areas to be protected will be determined according to the sum of the indicator scores proposed for each sub-criteria. The selection of protected areas will promote the country's network of protected areas and allow it to make the best choices from different natural ecosystems.

2. Material and Method

This study was carried out in two stages.

In the first stage, the primary/sub-criteria and indicators used and their significance levels were determined by reviewing the relevant written sources to identify and evaluate protected areas. In this context, a base proposal for basic/sub-criteria was developed.

Second stage: Determination of Significance Levels of Basic and Subcriteria: In determining the relevant candidate protected areas, weight scores were obtained according to the significance levels of the basic/sub-criteria developed by asking the appropriate experts and indicators were proposed according to the sub-criteria.

For this purpose, to determine the criterion/sub-criteria and importance levels, experts were asked to use a 5-point Likert scoring technique (Very unimportant: 1 point, Unimportant: 3, Undecided: 5 points, Important: 7 points, Very important: 9 points). The criteria/sub-criteria and the level of importance were applied to a total of 30 experts including Landscape Architects (n: 5), Building Architects (n: 5), Urban Planners (n: 5), Forest Engineers (n: 5), Agricultural Engineers (n: 5), Biologists (n: 5). Thus, a multidimensional and rapid evaluation guide of priority areas or candidate areas for all protected areas at scientific level has been created.

As a result of the literature review, 6 of the seven essential criteria (Natural values, Spatial values, Social and cultural values, Economic status, Legal, administrative and political status, Research and development capacity status) were determined as positively scored essential criteria and 1 of them was determined as negatively scored negative criteria (pressures and threats).

The sum of the scores given by each expert group to the proposed positive six essential criteria was calculated as the percentage ratio with the score of all crucial criteria. Thus, weight scores showing the level of importance of each essential criterion were obtained. After the weight score of each essential criterion was determined, the percentage ratio of the total score of each expert group was calculated by scoring the sub-criteria belonging to the essential criteria by the experts. Thus, the weight scores showing the importance levels of the sub-criteria were determined. In addition, negative weight scores

were determined by performing the same procedures for the negative scored basic and sub-criteria. Thus, the protected area with the highest total score obtained by subtracting the total score of 6 positive basic/sub-criteria indicators from the total score of negative sub-criteria indicators with negative scores will be determined as a priority area. Thus, deciding on priority protected areas with multi-criteria, scientific, and rapid evaluation has become possible.

3. Results and Discussion

3.1. Determination of Basic/Subcriteria and Importance Levels for the Selection of Natural Protected Areas

For this purpose, many sources have been analyzed to determine the criteria.

According to the UNEP Caribbean Environment Programme (1996), when designating a new protected area, the conservation objectives should be clear, and the area should contain species and/or habitats important for natural (or cultural) conservation and social and cultural sustainability. The main criteria for the designation and selection of protected areas are;

- Ecological diversity and integrity (the area should include specific habitats or species that are rare or endangered, or a variety of different habitats that allow for the occurrence of rare or endangered species, or feeding, breeding, or resting areas for endangered species);
- Presence of rare species or habitats;
- The Degree of naturalness of the area;
- The need to secure the habitat of species in danger of being harmed
- It is the community's willingness to preserve and maintain traditional uses and spiritual links with the past and to ensure the integrity of the relationship with conventional beliefs and ways of life.

The most important factors to be used in the assessment/identification of protected areas by UNEP (1996) are Importance (Degree of uniqueness, naturalness, diversity, ecological integrity, opportunities for sustainable development and scientific values), representativeness (differences or similarities in the character, quality, quantity or combination of resources of the area), feasibility (size, isolation, configuration, accessibility, land ownership and ancestral rights, population density, acquisition costs, economic interests in the region, environmental impacts and staffing or development requirements), priority status (presence of endangered and endemic species, unique or rare landscapes, special areas for migratory species, areas of high biodiversity, areas of high economic and social value, presence of rare species) (UNEP Caribbean Environment Programme, 1996).

According to Kelleher & Kenchington (1992), the general criteria for deciding whether an area should be protected are naturalness, biogeographical, ecological, economic, social, scientific, international, national, and feasibility.

Sharifi et al. (2011) proposed to evaluate protected areas according to 5 criteria. 1) Habitat criterion (sub-criteria are landscape, representativeness, uniqueness, habitat importance, fragility, and water resources), (2) Species criterion (sub-criteria are species diversity, population, conservation level, and damage), (3) Social criterion (sub-criteria are cultural and historical importance and Compatibility), (4) Economic criterion (sub-criteria are dependence on local economy and cultural and historical importance and Compatibility), (4) Economic criterion (sub-criteria; dependency on local economy and importance for national economy), (5) Management criterion (sub-criteria; research and monitoring, education, threat factors and legal support).

According to Rita et al. (2017), a. Ecological factors (Diversity (species and habitats), modifiability/non-modifiability, rarity (species and habitats), endemism, size (area), typicality, representativeness, uniqueness, naturalness, location in ecological/geographical unit (spatial location), spatial connectivity, rarity or irreplaceability (species and/or habitat). b. Socioeconomic Indicators (Threat of human disturbance, recorded history, ecological fragility, vulnerability, economic value, educational value, amenity value, scientific value, availability, ease of acquisition, cost of new establishment,

reserve, accessibility, management considerations, legal context for conservation, habitat representation/addition, spatial connectivity, functional integrity, regional dynamic or evolutionary trend, external human threats, economic value of the site (use or non-use value), financial and land use/ownership constraints, legislation/level of national legal involvement.

Margules & Usher (1981) suggested criteria for assessing conservation potential and ecological value: diversity (including species richness and habitat diversity), rarity, naturalness, number of biological interactions (e.g. predation, competition), area, threat of human interference, typicality, representativeness, educational value, environmental value, recorded history, scientific value, uniqueness, wildlife reservoir potential, ecological fragility, location in ecological/geographical unit, potential value, availability, modifiability, ease of acquisition and management considerations.

Rarity, uniqueness of the area, species richness (diversity), size, naturalness of the area, fragility, representativeness, spatial connectivity, typicality, vegetation structure, fragility, number of plant communities, plant structural formations, fragility, irreplaceability and endemism have been proposed in many sources to evaluate protected areas and biodiversity status (Tubbs & Blackwood, 1971; Tans, 1974; Gehlbach, 1975; Goldsmith, 1975; Wright, 1977; Van der Ploeg & Vlijm, 1978; Smith & Theberge, 1986).

In Europe, the Natura 2000 network is a network of protected areas distributed throughout the European Union, consisting of Special Protection Areas designated under the Habitats Directive and the Birds Directive, respectively, covering both land and marine areas. Within Natura 2000, criteria include species and habitat characteristics such as 'representativeness, conservation status, functions (resting, breeding, feeding, wintering or summering), habitat size, population density of target species, spatial connectivity and sensitivity of species' (WWF, 1998). The International Union for Conservation of Nature (IUCN) has also used ecological selection criteria such as naturalness, representativeness, size, and conservation status to define protected area categories (Dudley, 2008).

Ecological indicators for conservation priorities and protected area designation include site heterogeneity (Lindenmayer et al., 2000), site uniqueness, and natural character (Gubbay, 1995).

In the study by Edward & Porter-Bolland (2008), five essential criteria and 18 sub-criteria were determined according to the level of importance in selecting protected areas in the forest ecosystem. Accordingly, the main criteria are (1) Habitat, (2) Species, (3) Social, (4) Economic, and (5) Management criteria. Sub-criteria are habitat uniqueness, species diversity, habitat sensitivity, habitat representative, legal support, species protection level, habitat importance, threat factors, dependence on the local economy, research and monitoring, education, Compatibility, cultural and historical significance, landscape, water resources, importance in the national economy, damage and population, etc.

In addition to analyzing many foreign literatures, the existing legislation in our country was also examined. In this context, within the scope of the 'Regulation on the Procedures and Principles Regarding the Determination, Registration, and Approval of Protected Areas' (Official Gazette dated July 19, 2012, and numbered 28358), the principles and criteria for the determination of natural sites are defined in Article 6. According to this,

> ***Article 6:*** *a) Of sufficient size to sustain ecosystem functions, b) Having significant biodiversity values in terms of species, genetic, habitat and ecosystem diversity, c) Containing narrowly distributed or endemic species whose extinction is threatened or endangered on a regional, national or world scale, or containing habitats where these species spend a certain period of their lives, ç) Having the ability to represent these species in terms of the protection of threatened ecosystems or species in danger of extinction, d) Has social, cultural and recreational value that provides resource and landscape integrity, e) Can maintain its natural structure without human intervention or with limited intervention, f) Typical, natural, rare, g) The species or habitats it contains are more interesting than other species or habitats, ğ) It has surface and underground water resources of ecological importance in terms of hydrological-hydrogeological aspects, h) It represents a habitat of migratory bird species, ı) Can be regained through ecological*

rehabilitation or ecological restoration works and breeding methods to include existing and potential habitat types, i) Preserves natural processes and species that will ensure the long-term continuity of biological diversity.

3.2. Determination of Basic Criteria and Importance Levels for Prioritisation in Protected Areas

Due to the increase and diversification of protected areas, it is necessary to reconsider and prioritize the evaluation criteria and indicators. On a global scale, various criteria and data have been used to identify areas that may be particularly important for the long-term conservation of biodiversity.

Table 1. Weight scores of the main criteria according to their importance according to the experts

	Natural Values	Social and Cultural Values	Spatial Values	Legal, Administrative, and Political Values	Economic Values	Research and Development Potential	Negative (Pressure and Threats) Criteria	Total Weight Scores and Importance Value
Forest Engineer	45,00	35,00	15,00	13,00	13,00	11,00	13,00	145
	0,31	0,24	0,10	0,09	0,09	0,08	0,09	1,00
Landscape Architect	45,00	39,00	17,00	11,00	11,00	9,00	13,00	145
	0,31	0,27	0,12	0,08	0,08	0,06	0,09	1,00
City Planner	43,00	41,00	17,00	13,00	11,00	7,00	11,00	143
	0,30	0,29	0,12	0,09	0,08	0,05	0,08	1,00
Architect	43	41	17	11	11	7	11	141
	0,30	0,29	0,12	0,08	0,08	0,05	0,08	1,00
Agricultural Engineer	45,00	27,00	13,00	9,00	7,00	7,00	9,00	117
	0,38	0,23	0,11	0,08	0,06	0,06	0,08	1,00
Biologist	45,00	29,00	11,00	11,00	7,00	11,00	15,00	129
	0,35	0,22	0,09	0,09	0,05	0,09	0,12	1,00
Total Score	**266**	**212**	**90**	**68**	**60**	**52**	72	**820**
Significance Score	**0,32**	**0,26**	**0,11**	**0,08**	**0,07**	**0,06**	0,09	**1,00**

In this study, the weight scores of the essential criteria that can be used in the determination and preference of protected areas according to their importance in line with the scores given are listed as natural values (0.32), social and cultural values (0.26), spatial values (0.11), negative criteria (pressure and threats) (0.09), legal, administrative and political status (0.07), economic values (0.06), research and development potential (0.06). It is seen that there is a statistically consistent scoring among the experts.

In the study conducted by Edward & Porter-Bolland (2008), the priorities of the main criteria were determined as habitat, species, social aspects, management aspects, and economic aspects. Factors to be considered in determining the importance of a natural area include the Degree of uniqueness, naturalness, diversity, ecological integrity, sustainable development opportunities, and scientific value. Culturally and historically significant sites may include regions, areas, natural features, structures, or objects that are indicative of a country's heritage and values and have a high level of integrity of location, design, setting, materials, artistry, feeling, and association (UNEP Caribbean Environment Programme, 1996).

According to the UNEP Caribbean Environment Programme (1996), the highest priority areas may have the following characteristics: (UNEP Caribbean Environment Programme, 1996).

- Presence of endangered and locally endemic species;
- The presence of unique or rare national, regional, or international landscapes or ecosystems
- Special areas of high importance for the maintenance of nesting, feeding, wintering, and breeding of migratory species;

- Areas of high biodiversity of special importance for genetic evolution and conservation of resources within each biogeographical region;
- Areas with biological or geographical features that enable and sustain genetic evolution and areas of high economic and social value, in particular, those critical for ensuring the long-term survival and well-being of the population;
- The existence of populations of locally rare species.

3.3. Determination of Sub-criteria and Importance Levels for Prioritisation in Protected Areas

The sub-criteria that may be related to the main criteria and their weight scores were determined as follows.

3.3.1. Natural Values

The most important prioritized essential criterion in the determination of protected areas was determined as natural values. The weight scores of the sub-criteria according to their importance in the natural values criterion are as follows; Biodiversity value (0,15), Endangered, sensitive and rare species (0,15), Representativeness (Uniqueness and Typicality) (0,14), Naturalness (Hemerobi Degree) (0,13), Endemic status (0,13), Presence of water resources (0,12), Self-renewal ability (0,10), Stability status (0,07). The determined sub-criteria will be essential in determining the protected areas regarding natural values. In this context, each sub-criterion can be scored using measurable indicators (Table 2).

Table 2. Importance status and weight scores of sub-criteria for natural values criterion according to experts

	Natural Values								
Experts	**Biodiversity status**	**Endangered, vulnerable, and rare species**	**Representativeness (Uniqueness and Typicality)**	**Naturalness (Hemerobi Degree)**	**Endemic status**	**Presence of water resources**	**Self-renewal ability**	**Stability status**	**Total Score**
Forest Engineer	45	45	45	43	41	41	29	27	316
	0,14	0,14	0,14	0,14	0,13	0,13	0,09	0,09	1,00
Landscape Architect	45	45	45	43	41	37	33	25	314
	0,14	0,14	0,14	0,14	0,13	0,12	0,11	0,08	1,00
City Planner	45	43	41	35	37	31	31	21	284
	0,16	0,15	0,14	0,12	0,13	0,11	0,11	0,07	1,00
Architect	45	45	39	37	35	25	25	15	266
	0,17	0,17	0,15	0,14	0,13	0,09	0,09	0,06	1,00
Agricultural Engineer	45	45	39	41	37	37	29	19	292
	0,15	0,15	0,13	0,14	0,13	0,13	0,10	0,07	1,00
Biologist	45	45	43	43	41	41	39	25	322
	0,14	0,14	0,13	0,13	0,13	0,13	0,12	0,08	1,00
Total score	**270**	**268**	**252**	**242**	**232**	**212**	**186**	**132**	**1794**
Significance Score		**0,15**	**0,14**	**0,13**	**0,13**	**0,12**	**0,10**	**0,07**	**1,00**

a. Biodiversity Status

Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (Convention on Biological Diversity (CBD), 1992).

In this case, biodiversity consists of four essential components (Zeydanlı et al., 2017).

- Ecosystem (or habitat) diversity,
- Species diversity,
- Genetic diversity,
- Process (ecological events and functions) diversity.

Biodiversity is defined as the multiplicity and diversity of the elements and structures of a system. Biodiversity is generally formulated as biodiversity = richness + diversity. In the biodiversity criterion, separate measurable indicators can be defined and scored for four components. For example;

- Potential species diversity (relative frequency and number of different species within a particular area): 5 points can be given if there is at least five species diversity, and 1 point can be given if there is less.
- Genetic diversity (hereditary variation within and between species and populations). If there is at least five genetic diversity, 5 points can be awarded; if there is less, 1 point can be awarded.
- Habitat (ecosystem=biotope) diversity (diversity in habitats within or part of the landscape), 5 points if there is at least five ecosystem diversity, 1 point if there is less.
- In terms of process diversity, if there are at least five process diversity, 5 points can be awarded; if less, 1 point can be awarded.

b. Presence of Endangered, Sensitive, and Rare Species

Founded in 1964, the World Conservation Union's (IUCN) 'International Union for Conservation of Nature's Red List of Threatened Species' has become the world's most comprehensive source of information on the global conservation status of animal, fungal, and plant species. The IUCN Red List is a critical indicator of the health of the world's biodiversity. Much more than a list of species and their status, it is a powerful tool for action on biodiversity conservation and policy change that is critical for protecting the natural resources needed for Survival. It is one of the most decisive criteria, especially in identifying and prioritizing protected areas.

The IUCN Red List Categories and Criteria aim to be an easy and widely understood system for classifying species at high risk of extinction on a global scale. According to IUCN, the Red List is divided into nine categories. Not Assessed, Data Insufficient, Least Concerned, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild and Extinct' (IUCN, 2024).

In protected areas, if a plant or animal species is classified as 'CR - Near Extinct' or 'EN - Endangered' according to IUCN criteria, all areas where they live should be given priority for protection as they are among the rarest species in the world. No threshold value should be used.

However, if the status of a species is relatively better, i.e., 'VU - Vulnerable, DD - Insufficient Data or NT - Near Endangered' categories are still priority areas for protected areas. However, the species' population size, distribution, breeding pattern vulnerability, etc., should be considered. Numerical thresholds can be used for these species.

In this context, the indicators for plant and animal species are proposed as follows.

- 5 points for at least one species or ecosystem entity that is thought to be extinct or extinct, or 1 point if there are no such species in the area
- Presence of at least one endangered species, 5 points, 1 point can be given if there are no such species in the area
- Presence of at least one sensitive or endangered species, 5 points, 1 point can be given if there are no such species in the area
- Presence of at least one rare or uncommon species, 5 points, 1 point can be given if there are no such species in the area

c. Representativeness (Uniqueness=Uniqueness and Typicality)

Representativeness refers to the Degree to which an area is unique and typologically representative of the biodiversity, species, ecosystem, ecological process, biological community, geographical or physical characteristic of a particular region. Preference should be given to areas representing some species and ecosystems, especially in large areas. While these typical areas have similar characteristics, they may also have a unique, rare and unique character (Levin et al., 2013; Zeydanlı et al., 2017).

Uniqueness can be explained by the fact that the area's resource values (species or habitat) have different characteristics from the surrounding geography on an international or national scale and often manifest themselves with distinct natural boundaries. The rarity of the area's resource values is the most important priority of nature conservation. It is sufficient for any resource values (species, ecosystems, climate, soil, water resources, etc.) to be unique and unparalleled (Levin et al., 2013; Zeydanlı et al., 2017).

Representativeness is usually selected from the following groups: Distribution, coexistence, environmental variables, rare species or threatened species, and unique living communities can be considered (Levin et al., 2013; Zeydanlı et al., 2017).

In this context, it has been proposed as an indicator;

- Very high representativeness of the resource values of the area compared to other areas can be given 5 points, and 1 point can be given if the representativeness is low.
- Being unique on an international scale can be given 5 points, being unique on a national and local scale can be given 3 points, and not being unique can be given 1 point.

d. Degree of Naturalness (Hemerobi degree):

Natural ecosystems are an indicator of ecological integrity if they have intact natural biological components (plants, animals, and other organisms), abiotic components (such as geology and water), and processes (such as reproductive population growth). In this context, the Degree of naturalness of the natural ecosystem can be explained as the level of influence of human activities. In defining the concept of nature conservation, the Degree of closeness and naturalness to nature (hemerobi) is another important concept. Hemerobi is explained as the level of influence of human activities on nature (Çolak, 2001).

The word ‘hemerobi’ is formed from the Greek words ‘hemeros’ = cultivated and ‘bios’ = life and refers to the historical and current state of human impact on an ecosystem (Steinhardt et al., 1999). The historical state considers the past: the previous state without the influence of culture. The current state is a specific self-regulating state based on the potential of the growing environment. With the potential primordial state, the Degree of naturalness can be revealed. Thus, the anthropogenic change of the potential of the growing environment is less than the naturalness because this shows a departure from the primordial state.

For example, the presence of beech forests instead of oak or hornbeam forests near the river in an arid place is caused by human influence, and therefore, the Degree of naturalness is low here. In some cases, however, when the growing environment has undergone irreversible human-induced changes or when a new species has been established there for a very long time (e.g., species that have been present for 500 years), these species are called ‘Neophytes.' This can also be characterized as natural vegetation.

In order to analyze the cultural impact of man on the natural system, hemerobi cascades have been established. Kowarik (1999) defined hemerobia as ‘a measure of human cultural influence on the ecosystem'. It is predicted that no ecosystems are left in the world that have not been directly or indirectly affected by anthropogenic impacts that have continued for centuries. Therefore, ‘potential natural vegetation’ is significant in determining the Degree of naturalness.

According to Çolak et al. (2003), the hemerobi approach can be used in vegetation research, ecosystem analyses, nature conservation, and forest management assessment. Four fundamental indicators can

be taken into account for the Degree of hemerobia: the proportion of neophytes (species that, although not naturalized in a place, seem to have been introduced by man, mostly 400-500 years ago, and naturalized there), soil characteristics, indicator species, and the proportion of therophytes (annual plants) (Çolak et al., 2003).

Sukopp (1972) made hemerobia steps:

- Ahemerob = No or very insignificant cultural effect (Natural)
- Oligohemerobes= Minimal impact; primitive vegetation can be visible (close to nature)
- Mesohemerob = with a pronounced and periodic cultural influence (moderately altered):
- Euhemerob = Under very marked influence (Strongly altered):
- Polyhemerobes = Changes in the growing environment and the emergence of new plant combinations (Artificial):
- Metahemerob = Very significant impact, extinction tendency, and artificial condition.

In this context, as an indicator suggestion that can be used for the sub-criterion of naturalness, natural and near-natural areas can be given 5 points, and areas that have been moderately and strongly changed by human impact can be given 1 point.

e. Endemic Status

Endemic species include flora and fauna species whose distribution is limited to a particular geographical area or whose natural habitat consists of a limited geographical area (Korunan Alanların Tespit, Tescil ve Onayına İlişkin Usul ve Esaslara Dair Yönetmelik, (2012). Endemic species may show characteristics such as having a narrow distribution area, being found only in one or very few unique biotopes, and having small populations.

An important indicator is the number, percentage, density, and distribution of endemic species at international, national, regional, and local scales regarding plant or animal species in protected areas. In this context, indicators for endemic sub-criteria are as follows.

- A high number of endemic plant species at the international level can be given 5 points, 3 points for being at the national and local level, and 1 point for not being at the international level.
- Having a high number of endemic animal species at the international level can be given 5 points, being at the national and local level can be given 3 points, and not being at the national and local level can be given 1 point.
- If the density and distribution of endemic plant species at the international level is more than 10% of the area, 5 points; if it is at the national and local level, 3 points; if not, 1 point can be given.
- The density and distribution of endemic animal species internationally is more than 10% of the area. There are 5 points: 3 points for being at the national and local level, and 1 for not being at the international level.

f. Presence of Water Resources

Potable water resources (river, spring, eye, lake, sea, dam, etc.) in the area represent a biotic and abiotic vital value. However, as important as the type and quantity of water resources in the area, the high potable quality of the water should also be considered as an important indicator. Indicators for this sub-criterion;

- If the number of water resource types in the area is 3< or more, 5 points can be given; if not, 1 point can be given.
- If the area's total percentage of water resources is more than 10%, 5 points can be given; if it is less than 10%, 1 point can be given.

- If the potable quality of water resources in the area is high, 5 points can be given; if it is low, 1 point can be given.

g. Self-Renewal Capability,

Natural systems can be negatively affected by natural factors and human activities. Protecting species or ecosystems that are impossible for nature to create on its own or to be created by humans makes it a priority. As a result of negative impacts, natural systems that can renew themselves rapidly are more potent and can create a priority situation compared to other areas due to their sustainable ecological processes. In this context, indicators for sub-criteria;

- If the area's self-renewal capacity of the target plant species is high, 5 points can be given; if not, 1 point can be given.
- The area's high self-renewal capacity of target animal species can be given 5 points; if not, 1 point can be given.
- High self-renewal capacity of abiotic factors (soil, water, and air) can be given 5 points; if not, 1 point can be given.

h. Stability Status:

The ecosystems of protected areas must live with various natural stressors such as storms, snow, insects, and drought. These factors continuously test the vitality of ecosystems and contribute to their stability. DARWIN calls this phenomenon ‘ Survival of the fittest, - 'Survival of the fittest.' The concept of stability has many different meanings.

- ‘Durability’ against unfavourable factors.
- ‘Elasticity is the speed of return to its former value (equilibrium) after an unfavorable factor.
- ‘Stagnation,' which preserves its value against specific changes until a certain time.
- Relative temporal ‘Immutability-Constancy.'
- It can be summarized as the state of reacting against destruction.

Indicators according to the stability sub-criterion of the site can be suggested as follows;

- If the ‘Durability’ of the site against negative factors is high, 5 points can be given; if not, 1 point can be given.
- If the ‘Elasticity’ of the site against adverse factors is high, 5 points can be given; if not, 1 point can be given.
- If the area's 'Relative temporal invariance' against unfavorable factors is high, 5 points can be given; if not, 1 point can be given.
- If the area has a high reaction to adverse factors, 5 points can be

3.3.2. Social and Cultural Values

In protected areas, the conservation of historical and archaeological heritage values that have survived from the past to the present, together with natural values, is accepted as the primary conservation objective. For this reason, cultural heritage values within natural systems, living human communities, local identities, traditions and customs, lifestyles, and approaches of local communities towards conservation should be considered important sub-criteria in the prioritization, planning, and managing of protected areas.

The experts evaluated four sub-criteria within the scope of the leading social and cultural values criterion. The weighted scoring was as follows: Cultural, historical, or archaeological heritage value and presence (0,36), Degree of local community support for conservation (0,25), Local social and political acceptability (0,21), Compatibility with existing land uses of local people (0,19) (Table 3).

Table 3. Importance status and weight scores of sub-criteria for social and cultural values criterion according to experts

	Social and Cultural Values				
Experts	**Cultural, historical, or archaeological heritage value and presence**	**Local community support for conservation**	**Local social and political acceptability**	**Compatibility with existing land uses of the local community**	**Total Score**
Forest Engineer	43	31	27	25	126
	0,34	0,25	0,21	0,20	1,00
Landscape Architect	43	27	25	23	118
	0,36	0,23	0,21	0,19	1,00
City Planner	43	31	25	19	118
	0,36	0,26	0,21	0,16	1,00
Architect	43	29	21	21	114
	0,38	0,25	0,18	0,18	1,00
Agricultural Engineer	37	29	25	23	114
	0,32	0,25	0,22	0,20	1,00
Biologist	41	27	23	21	112
	0,37	0,24	0,21	0,19	1,00
Total score	250	174	146	132	702
Significance Score	0,36	0,25	0,21	0,19	1,00

a.Cultural, Historical, or Archaeological Heritage Value and Presence: The presence of historical and archaeological values in the area and their integrity with natural values will increase the heritage value and ecosystem services of protected areas. Thus, protecting natural and cultural values and ensuring holistic sustainability will be possible. For this reason, protecting historical and archaeological values with natural values should be considered an important priority.

Different indicators can be used for this sub-criterion. For example

- - If there are internationally important heritage values, 5 points can be given; if at the national level, 3 points can be given; if not, 1 point can be given.
- - If the cultural values in the area represent 100 years ago, 5 points; if not, 1 point.
- - If the area has different cultural stratification heritage values, 5 points; otherwise, 1 point.
- - If the site represents historical objects and events at international and national levels, 5 points; otherwise, 1 point
- - If there is diversity in the area's unique cultural landscape values, 5 points can be given. Otherwise, 1 point can be given, etc.

b. Local Community's Support for Conservation: Local people living in and around protected areas play an important role in protecting natural and cultural resource values. To the saying 'the closest to the problem is the closest to the solution,' local people in and around the protected areas are more effective in solving the problems related to protected areas. Especially when local people have high demands and tendencies towards conservation, the conservation and sustainability of natural and cultural resource values in the area can be easier and more effective. For this reason, it is preferable that the local community support conservation.

Different indicators can be used for this sub-criterion.

- - If the local community has high conservation awareness, it is 5 points; if not, it is 1 point.
- - If the local community has very few harmful activities towards the area, 5 points; if not, 1 point.
- - Local community taking actions to protect the resource values can be counted as 5 points, otherwise 1 point.

c. Local Social and Political Acceptability: The Compatibility of local people, administrators, decision-makers, and political approaches with the conservation objectives where protected areas are located is an excellent opportunity for the conservation, management, and sustainability of resource values. For this reason, it is directly related to the social and political acceptability of the area with conservation objectives.

The indicators of this sub-criterion can be suggested as follows;

- 5 points if the level of community acceptance of the conservation and utilization objectives of the site is high, 1 point if not.
- If the level of acceptance of conservation policies and actions by the local community is high, it can be counted as 5 points; if not, it can be counted as 1 point.

d. Level of Compatibility with Existing Land Uses of Local People: The land use activities (agricultural activities, animal husbandry, settlement, etc.) of local people in and around the area must be compatible with the conservation objectives of natural and cultural resource values. The indicator for this sub-criterion can be given as 5 points if the land use activities in and around the area are compatible with the conservation objectives and 1 point if not.

3.3.3. Spatial Values

Spatial values within the area can be important in prioritizing protected areas. In this context, the weight scores of the experts according to the importance of spatial values sub-criteria are as follows: Area size (0,18), spatial connection (0,17), current settlement and construction status (0,16), ownership status (0,16), presence of existing agricultural areas (0,13), accessibility (accessibility) status (0,12), current infrastructure status (0,09) (Table 4).

Table 4. According to the experts, the importance status and weight scores of the sub-criteria for the spatial values criterion

Spatial Values								
Experts	**Size of the Area**	**Spatial connection**	**Existing Settlement and Structuring**	**Status Property**	**Status Existence of Existing Agricultural Areas**	**Accessibility to the Area**	**Existing Infrastructure Status**	**Total Score**
Forest Engineer	33	31	27	29	25	21	13	179
	0,18	0,17	0,15	0,16	0,14	0,12	0,07	1,00
Landscape Architect	35	33	29	31	25	23	15	191
	0,18	0,17	0,15	0,16	0,13	0,12	0,08	1,00
City Planner	31	29	31	29	23	21	17	181
	0,17	0,16	0,17	0,16	0,13	0,12	0,09	1,00
Architect	33	31	29	31	23	23	21	191
	0,17	0,16	0,15	0,16	0,12	0,12	0,11	1,00
Agricultural Engineer	31	29	39	29	21	23	19	191
	0,16	0,15	0,20	0,15	0,11	0,12	0,10	1,00
Biologist	35	31	27	27	23	21	13	177
	0,20	0,18	0,15	0,15	0,13	0,12	0,07	1,00
Total score	**198**	**184**	**182**	**176**	**140**	**132**	**98**	**1110**
Significance Score	**0,18**	**0,17**	**0,16**	**0,16**	**0,13**	**0,12**	**0,09**	**1,00**

a. Area Size:

The size of the protected area is determined according to conservation objectives and priorities. The nature conservation approach is generally fulfilled by in-situ protection at a particular spatial scale, considering the environmental relationship rather than the species or object scale. The natural process can only be secured in large and unaffected areas. Small protection areas may be unable to protect habitats long term.

Numerous studies suggest that larger protected areas are more desirable for long-term conservation of species and maintenance of ecological and evolutionary processes (Cowling et al., 1999; Bierregaard et al., 2001). Other research suggests that small reserves are sufficient for some species and are almost always better than no reserves or management in an area (Turner & Corlett, 1996).

The size of the protected area can vary from 1m2 for the protection of a species to hundreds of hectares for ecosystem or process protection. For example, an area of several decares may be protected to protect a group of trees (a small stand). Alternatively, 'process protection' close to nature may require more than 10,000 ha. The International Nature Conservation Organisation IUCN recommends at least 1,000 ha for national and international nature reserves (wilderness areas, national parks, protected landscapes). For 'zoological species conservation,' large areas are generally required. Depending on the species, this can range from a few m2 to 1 million hectares.

Only in large protected areas can populations adequately maintain their communities for a long time against risks and additional fluctuations in environmental conditions. Indeed, there is a minimum population size for each species. Small populations are likely to die out earlier than large populations. Large populations can only best buffer fluctuations in the stand. For this reason, environmental conditional effects are only rarely practical in large areas. Large protected areas are secured by viable, i.e., sufficiently large, population stands. This requires hundreds of hectares. It is generally recognized that large areas are necessary for the conservation of zoological species or species since wild animals consist of a habitat, a staging area, a mating area, and a feeding area.

The literature often debates whether a large protected area is better than many small protected areas in the same area. For example, some studies in practice show that in terms of habitat, many small islands have more species than large areas. However, it is also recognized that the fragmentation of forests in the form of habitat islands may adversely affect fauna.

As a result, there is no standard for area size in protected areas. Therefore, the area size should be determined according to the target species and ecosystem character. In this context, some indicators can be used for area size. For example

- For target wild animal species (sheltering, feeding, etc.), 5 points for having a suitable size for vital activities, 1 point if not.
- The suitable size for vital activities for target plant species is 5 points, if not 1 point.
- If the habitat areas have a holistic protection size, 5 points; if not, 1 point.
- Abiotic (soil, water, air, etc.) can be suggested as 5 points if it has sufficient size for conservation purposes, 1 point if not.

b. Spatial connection

The geographical location of the candidate area and the existing utilization areas around it may affect the resource values. For this reason, it refers to the organic connection of the area with other natural ecosystems in its surroundings and the fact that it is in a holistic rather than fragmented position. For this reason, having natural systems around the candidate area and having an organic connection should be preferred. Indicators for this sub-criterion can be suggested as follows;

- If there are natural systems (forest ecosystem, lake ecosystem, other protected areas, etc.) near the site, 5 points; if not, 1 point
- If the area is far away (more than 20 km) from the settlement, industry, etc. near the area, it can be recommended as 5 points; if not, 1 point.

c. Existing Settlement and Structuring Status

The area's settlement and construction tendencies may negatively impact resource values, pressure, and threats. For this reason, it should be preferred that there are no settlements in the area. Indicators for this sub-criterion;

- 5 points if there is no settlement in the area, 1 point if not
- If there is no building tendency (accommodation buildings, recreational facilities, agricultural facilities, structures, etc.) in the area, 5 points; if not, 1 point, etc., can be recommended.

d. Presence of Agricultural Areas

The presence of agricultural activities in the area, especially the use of pesticides, irrigation, etc., may adversely affect resource values. For this reason, it should be preferred not to have agricultural areas or agricultural activities in the area. Indicators for this sub-criterion;

- Absence of agricultural activities in the area 5 points, if not, 1 point,
- There should be 5 points if there are no agricultural facilities in the area, 1 point if there are none, etc.

e. Accessibility Status

Existing and possible access roads in the area may facilitate protecting and managing resource values.

Indicators for this sub-criterion;

- If there are existing car roads in the area, 5 points; if not, 1 point, etc., can be suggested.

f. Ownership Status:

The protection and institutional management may be more effective if the area is a forest or treasury land. In particular, it should be preferred that there are no private lands within the area.

Indicators for this sub-criterion;

- If the entire area is under treasury or forest ownership, 5 points; if not, 1 point, etc., can be suggested.

g. Existing Infrastructure Status:

Infrastructure systems such as electricity, water, and sewerage within the area may provide some advantages in managing the protected area. Therefore, having infrastructure systems is an advantage.

Indicators for this sub-criterion;

- - It can be suggested that there be 5 points if there are existing infrastructure systems in the area or 1 point if there are none.

3.3.4. Legal, Administrative and Political Situation

The identification of protected areas, granting protection status, planning/design, implementation, and administrative processes are carried out and organized within the framework of international and national legislation and the scope of the authority and responsibilities of the relevant official institutions. For this reason, the existing legislation, administrative structure and organization, and the protection policies of the state and the public play an important role in prioritizing protected areas.

In this context, the legal, administrative, and political situation was evaluated as an important criterion by the experts, and the weight scores of the sub-criteria according to their importance were as follows: Institutional and management organization capacity (0,26), compliance with the current national legislation (0,24), availability of areal inventory data (0,22), the existence of existing protection statuses in the area (0,15), the existence of NGOs related to the area (0,14) (Table 5).

Table 5. Importance status and weight scores of sub-criteria for the legal, administrative, and political capacity criterion according to experts

	Legal, Administrative, and Political Situation					
Experts	**Institutional and Management Organisation Capacity**	**Status of Compliance with Existing International or National Legislation**	**Availability of Spatial Inventory Data**	**Existence of Existing Protection Statuses in the Area**	**Existence of NGOs Related to the Area**	**Total score**
Forest Engineer	41	37	33	23	21	155
	0,26	0,24	0,21	0,15	0,14	1,00
Landscape Architect	39	37	31	21	17	145
	0,27	0,26	0,21	0,14	0,12	1,00
City Planner	35	31	33	21	19	139
	0,25	0,22	0,24	0,15	0,14	1,00
Architect	37	31	33	19	21	141
	0,26	0,22	0,23	0,13	0,15	1,00
Agricultural Engineer	33	31	31	19	19	133
	0,25	0,23	0,23	0,14	0,14	1,00
Biologist	33	35	29	21	19	137
	0,24	0,26	0,21	0,15	0,14	1,00
Total score	**218**	**202**	**190**	**124**	**116**	**850**
Significance Score	**0,26**	**0,24**	**0,22**	**0,15**	**0,14**	**1,00**

a. Institutional and Management Organisation Capacity: The existence and organizational status of the institutions responsible and competent for protected areas will facilitate protecting and managing natural and cultural values. For this reason, the existing organizational structure of the institutions in charge and responsible for the firm and practical protection status may effectively prioritize the protected area.

In this context, some indicators can be used for this sub-criterion. For example;

- High institutional and organizational capacity related to protection status can be suggested as 5 points; if not, 1 point, etc.

b. Compliance with Existing International or National Legislation: Compliance of protected areas with existing legislation may facilitate the administrative and implementation process. For this reason, the Compatibility of the protected area with the statuses defined in the existing international or national legislation regarding resource values may facilitate the prioritization of the area.

In this context, some indicators can be used for this sub-criterion. For example

- - It can be suggested that 5 points be given if the protected area candidates comply with the legislation and 1 point if not.

c. Availability of Spatial Inventory Data: Existing scientific research or projects for protected areas (especially biodiversity inventory, natural plant species inventory, wild animals inventory, etc.) can provide an important advantage. Thus, obtaining up-to-date resource values will facilitate more effective planning and management of the protected area.

In this context, some indicators can be used for this sub-criterion. For example

- - If the availability of existing scientific data within the protected area candidates is high, 5 points can be suggested. Otherwise, 1 point can be suggested.

d. Existence of Existing Protection Statuses in the Area: The existence of different protection statuses (natural site, archaeological site, archaeological site, archaeological site, nature park, monumental tree, etc.) in and around the candidate protected areas may be beneficial for the holistic protection and sustainability of resource values.

In this context, some indicators can be used for this sub-criterion. For example;

- - In case of having different protection status within the protected area candidates, 5 points, otherwise 1 point, etc. can be suggested.

e. Presence of NGOs related to the area: Where candidate protected areas are located, the presence of non-governmental organizations (NGOs) operating in the area can make significant contributions to the protection and sustainability of the area.

In this context, some indicators can be used for this sub-criterion. For example

- - If at least 1 NGO is associated with the area, 5 points; if not, 1 point, etc., can be suggested.

3.3.5. Economic Values

The conservation, sustainability, planning, and management processes balance expenditure and income, and maintenance and repair of protected areas depend entirely on economic capacity. Therefore, the financial source of the area and the added value to be obtained from the area are the priority criteria for protected areas.

In this context, the economic situation was evaluated as an important criterion by the experts, and the weight scores of the sub-criteria according to their importance were as follows: Ecosystem service value (0,41), conservation status management cost (0,30), potential to receive international and national financial support (0,30) (Table 6).

Table 6. According to the experts, the importance status and weight scores of the sub-criteria for the Economic Status criterion

	Economic Situation			
Experts	**Ecosystem Service Value of the Area**	**Conservation Status Management Cost**	**Potential for International and National Financial Support**	**Total Score**
Forest Engineer	43	31	31	105
	0,41	0,30	0,30	1,00
Landscape Architect	43	31	31	105
	0,41	0,30	0,30	1,00
City Planner	41	31	31	103
	0,40	0,30	0,30	1,00
Architect	39	29	31	99
	0,39	0,29	0,31	1,00
Agricultural Engineer	39	29	29	97
	0,40	0,30	0,30	1,00
Biologist	41	29	27	97
	0,42	0,30	0,28	1,00
Total score	**246**	**180**	**180**	**606**
Significance Score	**0,41**	**0,30**	**0,30**	**1,00**

a. **Ecosystem Service Value;**

Human beings have benefited from the multifaceted services and contributions of natural ecosystems since their existence. Economic and market-based valuation of ecosystem services forms the basis of a conservation model that promotes development for local communities based on the utilization of ecosystem products and services. In this context, the economic value of biodiversity can be assessed by socioeconomic indicators related to the direct and indirect use value, option value, and existence value of a given ecosystem.

Protected areas, which are increasing globally, have a wide variety of purposes, resource values, functioning, administrative processes, etc. Protected areas have many services and functionalities that ensure the continuity of human life and other species and ecosystems. Ecosystem services and functions of protected areas are categorized under four headings (WWF, 2020).

- Supportive Services: Biodiversity protection, soil formation, nutrient cycle, seed dispersal, life cycle, etc.
- Supply Services: Water, food, medicinal and aromatic products, fungi, genetic resources, etc.
- Regulatory Services: Cleansing soil, water, and air; regulation and stabilization of climate; control of natural disaster risks; maintenance of surface and groundwater regulation; pollination of plants; carbon storage and sequestration, etc.
- Cultural Services: Tourism and recreation, health, education, research, aesthetics, tangible and intangible values, socialization, etc.

In this context, some indicators can be used for ecosystem service values, the area's most important economic capacity sub-criteria. For example

- - 5 points if Supporting Services is high; otherwise, 1 point.
- - 5 points if Supply Services are high; otherwise, 1 point,
- - 5 points if Regulatory Services are high; otherwise, 1 point,
- - If Cultural Services are high, it can be suggested as 5 points; if not, 1 point, etc.

b.Conservation Status Management Cost:

In granting protection status to the candidate area, protecting its natural and cultural values and the cost of the management process are important. Therefore, conservation activities' low cost can be considered a priority sub-criterion.

In this context, some indicators can be used for this sub-criterion. For example

- - If the total cost of conservation activities is low, 5 points; if not, 1 point.

c. Potential for International and National Financial Support:

Providing the financial support needed for the conservation and management of the natural and cultural values of the area will provide a great advantage. In this context, it will be possible to provide institutional or private financial resources at international and national scales, especially to make conservation more effective and sustainable with the financial resources the area can obtain from its own resources.

In this context, some sub-criteria indicators can be used, e.g.,

- High level of financial support at an international scale of 5 points, if not 1 point.
- High level of financial support (institutional and private) at a national scale of 5 points, if not 1 point.
- If the field's capacity to generate finance with resources is high, 5 points; if not, 1 point.

3.3.6. Research and Development Potential

Protected areas' natural and cultural resource values may contain many unknown information and secrets. At the same time, it could be a source of original inspiration and create added value. High capacity of research and development activities in the context of solving and discovering the secrets of protected areas and producing new scientific knowledge can provide an important priority. In addition, it can play an important role in transforming the information obtained into multifaceted added value, including social, cultural, technological, and economic.

In this context, research and development capacity was evaluated as an important criterion by the experts, and the weight scores of the sub-criteria according to their importance were listed as follows: Scientific research and development potential (0.51), value added (innovation) capacity (0.49) (Table 7).

Table 7. Importance status and weight scores of sub-criteria for research and development capacity criterion according to experts

	Research and Development Potential		
Experts	**Scientific Research and Development Potential**	**Capacity to create added value (innovation)**	**Total points**
Forest Engineer	33	31	64
	0,52	0,48	1,00
Landscape Architect	31	31	62
	0,50	0,50	1,00
City Planner	29	29	58
	0,50	0,50	1,00
Architect	27	27	54
	0,50	0,50	1,00
Agricultural Engineer	29	29	58
	0,50	0,50	1,00
Biologist	33	31	64
	0,52	0,48	1,00
Total score	**182**	**178**	**360**
Significance Score	**0,51**	**0,49**	**1,00**

a.Scientific Research and Development Potential:

The fact that candidate-protected areas offer opportunities for a wide range of scientific studies in terms of resource values and are attractive to researchers may create an important potential for increasing the scientific capacity of the area and for R&D.

In this context, some indicators can be used for this sub-criterion. For example, if the R&D potential of the area is high, 5 points, otherwise 1 point, etc., can be suggested.

b.**Capacity to Create Added Value (Innovation):**

Existing or potential R&D studies for candidate areas may increase the added value of the area in ecological, social, technological, and economic dimensions.

In this context, some indicators can be used for this sub-criterion. For example, 5 points if the area has high added value, 1 point if not, etc.

3.3.7. Negative (Pressures and Threats) Criteria

In protected areas, pressures and threats within or around the area may negatively affect natural and cultural resource values. Therefore, knowing the capacity and impact level of internal/external pressures and threats can be important in prioritizing protected areas, especially in the negative

direction. In this context, the experts evaluated internal/external pressures and threats as an important criterion in the negative direction. Negative weight scores were determined according to the importance of the sub-criteria. According to this, Pressure and threat of settlement or construction (-0,18), pressure and threat of highways in and around the area (-0,14), pressure and threat of mining and quarrying activities (-0,14), pressure and threat of environmental pollution (-0,14), pressure and threat of environmental pollution (-0,14), 13), pressure and threat of recreational activities (-0,12), pressure and threat of forest fire (-0,12), pressure and threat of energy production areas (-0,10), pressure and threat of natural disasters (-0,08). The negative total score of this criterion will be determined by multiplying the score of each sub-criterion by the weight score, and the negative total score will be obtained (Table 8).

Table 8. According to the experts, the importance status and weight scores of the sub-criteria for the negative (pressures and threats) criterion

	Negative (Pressure and Threats) Criteria								
Experts	**Pressure and Threat of Settlement or Construction**	**Pressure and Threat of Highways in and around the area**	**Pressure and Threat of Mining and Stone Activities**	**Pressure and Threat of Environmental Pollution**	**Pressure and Threat of Recreational Activities**	**Pressure and Threat of Forest Fire**	**EPressure and Threat of Energy Production Areas (HEPP, WPP, Solar Panels, etc.)**	**Pressure and Threat of Natural Disasters (Flood, earthquake, erosion, landslide, etc.)**	**Total Score ((Negative)**
Forest Engineer	-41	-31	-33	-31	-29	-29	-23	-19	-236
	-0,17	-0,13	-0,14	-0,13	-0,12	-0,12	-0,10	-0,08	-1,00
Landscape Architect	-43	-33	-33	-31	-29	-25	-29	-15	-238
	-0,18	-0,14	-0,14	-0,13	-0,12	-0,11	-0,12	-0,06	-1,00
City Planner	-39	-27	-29	-29	-23	-21	-23	-19	-210
	-0,19	-0,13	-0,14	-0,14	-0,11	-0,10	-0,11	-0,09	-1,00
Architect	-37	-29	-27	-29	-23	-23	-21	-13	-202
	-0,18	-0,14	-0,13	-0,14	-0,11	-0,11	-0,10	-0,06	-1,00
Agricultural Engineer	-35	-29	-29	-27	-27	-25	-21	-17	-210
	-0,17	-0,14	-0,14	-0,13	-0,13	-0,12	-0,10	-0,08	-1,00
Biologist	-41	-37	-33	-29	-27	-31	-21	-19	-238
	-0,17	-0,16	-0,14	-0,12	-0,11	-0,13	-0,09	-0,08	-1,00
Total score (Negative)	**-236**	**-186**	**-184**	**-176**	**-158**	**-154**	**-138**	**-102**	**-1334**
Significance Score (Negative)	**-0,18**	**-0,14**	**-0,14**	**-0,13**	**-0,12**	**-0,12**	**-0,10**	**-0,08**	**-1,00**

a. Pressure and Threat of Settlement or Construction: The presence of existing and potential settlements or construction tendencies within and near candidate protected areas is an important threat and pressure factor for natural resource values. For this reason, it should be preferred that there is no settlement or construction tendency in the area.

In this context, some indicators can be used for the negative sub-criterion.

For example, if the pressure and threat of settlement or construction in the area is high, -5 points, etc.

b. Pressure and Threat of Motorways in and around the Area: Existing and potential motorways in and around candidate protected areas may be an important threat and pressure factor regarding habitat fragmentation, noise, accidental deaths and injuries of wild animals, feeding, etc.

In this context, some indicators can be used for the negative sub-criterion, for example, -5 points if the pressure and threat of motorways in and around the area is high, etc.

c. Pressure and Threat of Mining and Quarrying Activities: Existing and potential mining and quarrying activities in or near the candidate protected area may be an important threat and pressure factor in terms of resource values, especially as a result of activities such as destruction of natural vegetation, noise, dust pollution, excessive use of water resources, etc.

In this context, some indicators can be used for the negative sub-criterion. For example, -5 points in case of high pressure and threat of mining and quarrying activities in the area, etc.

d. Environmental Pollution Pressure and Threat: Existing and potential water, soil, and air pollution due to human activities in or near the candidate protected area may be an important threat and pressure factor for resource values.

In this context, some indicators can be used for the negative sub-criterion. For example, if the pressure and threat of environmental pollution is high in the area, -5 points, etc.

e.Pressure and Threat of Recreational Activities: Existing and potential recreational facilities and activities (accommodation and service facilities, sports activities, hunting, picnicking, vehicle road construction, festivals, etc.) in or near the candidate protected area may be a significant threat and pressure factor for resource values.

In this context, some indicators can be used for the negative sub-criterion, for example, -5 points if the pressure and threat of recreational activities in the area is high, etc.

f. Forest Fire Pressure and Threat: Resource values may be adversely affected due to activities such as fire-sensitive species (e.g., red pine forest, etc.), picnic activities with barbecues, stubble burning in agricultural areas, etc., in or near the candidate protected area.

In this context, some indicators can be used for negative sub-criteria. For example, if the pressure and threat of forest fire are high in the area, -5 points can be suggested.

g.Pressure and Threat of Energy Production Areas: During the construction and operation process of Energy Production Areas (e.g., HEPP, WPP, Solar Panels, etc.) in or near the candidate protected area, resource values may be negatively affected as a result of activities such as destruction of natural vegetation, land noise, etc. In this context, some indicators can be used for negative sub-criteria. For example, if the pressure and threat of energy production areas in the area is high, -5 points, etc., can be suggested.

h. Natural Disaster Pressure and Threat: The possibility of natural disasters, such as floods, earthquakes, erosion, landslides, etc., in or near the candidate protected area may adversely affect the resource values in the area. In this context, some indicators can be used for the negative sub-criterion. For example, if the pressure and threat of natural disasters are high in the area, -5 points can be suggested.

4. Conclusion and Recommendations

Today, the harmony or incompatibility of natural (ecological) systems and the relations resulting from the multifaceted economic activities of humans determine and affect the future of both areas of existence. The global economy is shaped and evolving in line with the rules and interests of the global capital power that governs the system. At the last point, the blockage of production and consumption processes in the global economy, the deterioration of income distribution, the excessive depletion of natural systems and resources, the decrease in biodiversity, the food crisis, climate change, etc., have brought along complex problems. As a result, global collapse and chaos continue under the mask of development or economic growth. The minority with global economic power continues to use and exploit nature in line with their interests, seeing every way and method as a license to gain rent, more profit, and power. Natural resources are the habitat for humans and all living things and are the insurance of the future (Gül et al., 2023).

One of the most effective means of protecting natural and cultural resource values is 'in-situ conservation.' Protected areas are envisaged as the only way to sustain and conserve ecosystem services and biodiversity (Dudley et al., 2010). At the same time, in situ conservation must be supported by ex-situ conservation.

There are many reasons for establishing a protected area. Among these, the conservation of biodiversity components (ecosystem, genetic, species, and process diversity) and ensuring the continuity of outstanding landscapes come to the fore. Protected areas are becoming increasingly crucial in eliminating threats to sensitive landscapes, preventing biodiversity loss, ensuring food security, increasing ecosystem services, storing carbon, and providing social, cultural, and economic services and contributions. For this reason, protected areas should be handled multidimensionally, including their legal, ecological, social, cultural, political, and economic dimensions, and should be associated with strategic policies focusing on conservation.

Today, in mitigating and adapting to the negative impacts of climate change, increasing the number and amount of protected natural areas is envisaged as the most important strategic goal, especially for limiting carbon emissions and protecting biodiversity. In this context, identification, prioritization, conservation, planning/design, and management/governance of protected areas should be considered. Therefore, identifying and prioritizing new protected areas must be associated with scientific, ecological, social, economic, institutional, financial, and objective criteria.

This study developed a decision support tool based on seven essential criteria and 37 sub-criteria developed scientifically and objectively based on an easy and fast approach that can help planners, practitioners, and decision-makers according to their level of importance. This tool can prioritize the impact of multidimensional ecological, socio-cultural, economic, administrative, and political criteria to different degrees in determining the protected area.

Basic and sub-criteria that can be used in the prioritization process of protected areas;

- *Natural values (0,32): (Sub-criteria; Biodiversity value (0,15), presence of endangered, sensitive and rare species (0,15), representativeness (uniqueness and typicality) (0,14), naturalness (Degree of hemerobi) (0,13), endemic status (0,13), presence of water resources (0,12), self-renewal ability (0,10), Stability status (0,07)).*
- *Social and cultural values (0,26): (Sub-criteria; Cultural, historical or archaeological heritage value and presence (0,36), Degree of local community support for conservation (0,25), Local social and political acceptability (0,21), Compatibility with existing land uses of local people (0,19)).*
- *Spatial values (0,11): (Sub-criteria are as follows: Area size (0,18), spatial connectivity (0,17), existing settlement and construction status (0,16), ownership status (0,16), presence of existing agricultural areas (0,13), accessibility (accessibility) status (0,12), existing infrastructure status (0,09).*
- *Negative Criteria (Pressure and threats) (0,09): (Sub-criteria; Pressure and the threat of settlement or construction (-0,18), pressure and threat of motorways in and around the area (-0,14), pressure and threat of mining and quarrying activities (-0,14), pressure and threat of environmental pollution (-0,14), pressure and threat of environmental pollution (-0,14), 13), pressure and threat of recreational activities (-0,12), pressure and threat of forest fire (-0,12), pressure and threat of energy production areas (-0,10), pressure and threat of natural disasters (-0,08)).*
- *Legal, Administrative and Political Status (0,07): (Sub-criteria; Institutional and management organization capacity (0,26), compliance with existing national legislation (0,24), availability of areal inventory data (0,22), existence of existing protection statuses in the area (0,15), existence of NGOs in the area (0,14)).*

- Economic values (0.06): (Sub-criteria; value of ecosystem services (0.41), management cost of conservation status (0.30), potential for international and national financial support (0.30)).
- Research and Development Potential (0,06); (Sub-criteria; Scientific research and development potential (0,51), value added (innovation) capacity (0,49)).

With this study, the basic and sub-criteria determined in the prioritization process of protected areas will provide a quick and easy evaluation. However, the indicators proposed in the method can be changed and improved according to the characteristics of protected areas.

Identifying and prioritizing protected areas alone do not guarantee biodiversity protection and other natural and cultural resource values. The objectives of protected areas management include social and economic objectives and the conservation of biological diversity. However, scientific and purposeful planning/design and effective and participatory management/governance are determining factors in achieving conservation objectives.

The primary approach to protected areas should ensure the joint participation of all relevant stakeholders, including relevant institutions and organizations, landowners, managers and users, Indigenous peoples, local communities, and NGOs. Countries should guarantee the protection and sustainability of nature/environment through ecological state policies and legal regulations free from any rent system approach.

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The first author contributed 50%, the second author contributed 25%, and the third author contributed 25%. There is no conflict of interest.

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