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Assessment of the Interactions between the Landscape and Natural Resource Social Values within the Framework of the Social-Ecological Landscape System

Peyzaj ve Doğal Kaynak Sosyal Değerleri Arasındaki Etkileşimlerin Sosyo-Ekolojik Peyzaj Sistemi Çerçevesinde Değerlendirilmesi

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ABSTRACT:

Landscape and natural resource social values (e.g. wilderness and aesthetic) provide essential benefits for human wellbeing. Understanding such community values are essential to predict human behaviours towards nature and also to develop relevant policies and management strategies. Accordingly, the purpose of this theoretical paper was to examine the cross-scale interactions between the landscape and natural resource social values within the framework of the social-ecological landscape system. In doing so, the objectives of the study were (i) to explore the concept and major landscape social values, (ii) to examine the theory and major natural resource social values, (iii) to evaluate the cross-scale interactions between both value systems, and (iv) to design a relevant theoretical framework. The method of the study was based upon the in-depth literature review concerning the landscape and natural resource social values, their typologies, and the potential valuation techniques. The assessment showed that the landscape and natural resource social values are important guiding principles to address a variety of ecological, economic, and socio-cultural benefits for human wellbeing. The typology of the landscape and natural resource social values comprised 16 and 13 major values respectively. However, the types and degrees of both value systems may vary based upon the characteristics of landscapes, ecosystems and associated natural resources, and social systems. The assessment also showed that the landscape and natural resource social values are interconnected through three value scales: spatial, temporal, and social scale. The results of this study can help landscape, land, and natural resource managers to better understand the major landscape and natural resource social values and their cross-scale interactions, which should be integrated into relevant policies and strategies to develop win-win solutions in terms of landscape and natural resource management..

KEYWORDS: *Landscape Social Values, Natural Resource Social Values, Scale, Social-Ecological Landscape System*

ÖZ:

Makalenin Peyzaj ve doğal kaynaklara ilişkin sosyal değerler (ör. Yabanıl yaşam ve estetik) insan refahı için bir dizi temel yararlar sağlar. Belirtilen değerler insanın doğaya, peyzaja ve doğal kaynaklara ilişkin davranışlarını anlamak ve/veya tahmin etmemize yardımcı olur. Bu nedenle, peyzaj ve doğal kaynaklara ilişkin sosyal değerlerin belirlenmesi ve ilgili politika ve/veya stratejilere entegre edilmesine ihtiyaç vardır. Bu bağlamda; bu makalenin temel amacı, sosyo-ekolojik peyzaj sistemi teorisi kapsamında peyzaj ve doğal kaynakların sosyal değerlerinin ölçekler arası etkileşimini değerlendirmeyi içermektedir. Bu amaç doğrultusunda, çalışma dört alt hedeften oluşmaktadır. Bu alt hedefler: (i) peyzaj sosyal değeri kuramı ve temel peyzaj sosyal değerlerini incelemek, (ii) doğal kaynak sosyal değeri kuramı ve temel doğal kaynakların sosyal değerlerini araştırmak, (ii) peyzaj ve doğal kaynak sosyal değerlerinin arasındaki ölçekler arası etkileşimi değerlendirmek ve (iv) ilgili teorik çerçeveyi tasarlamak. Çalışmanın yöntemsel yaklaşımı; peyzaj ve doğal kaynakların sosyal değerleri, tipolojileri ve potansiyel değerlendirme tekniklerine ilişkin detaylı literatür

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analizine dayanmaktadır. Değerlendirme sonucuna göre; peyzaj ve doğal kaynak sosyal değerleri insan refahına ilişkin bir dizi ekolojik, ekonomik ve sosyo-kültürel yararları belirlemek için önemli yol gösterici ilkeler bütünüdür. Ayrıca, değerlendirme sonucunda, peyzaj ve doğal kaynakların tipolojisi sırasıyla 16 ve 13 ana sosyal değerden oluştuğu belirlenmiştir. Peyzaj ve doğal kaynakların sosyal değerlerinin üç temel değer ölçeği (mekânsal, zamansal ve sosyal) ile etkileşim halinde oldukları belirlenmiştir. Ancak, her iki değer sisteminin türü ve derecesi peyzajın, ekosistemin, ilgili doğal kaynakların ve sosyal sistemin karakteristik özelliklerine bağlı olarak değişim gösterdiği saptanmıştır. Araştırma sonuçları arazi, peyzaj ve doğal kaynak yöneticilerinin peyzaj ve doğal kaynakların sosyal değerleri ve ölçekler arası etkileşimlerini daha iyi anlamalarına ve ilgili politika ve stratejileri geliştirmelerine katkı sağlayabilir.

Anahtar Kelimeler: *Doğal Kaynak Sosyal Değeri, Ölçek, Peyzaj Sosyal Değeri, Sosyo-Ekolojik Peyzaj Sistemi*

INTRODUCTION:

Human life depends on nature and associated natural resources to provide basic needs (e.g. food, clean air, and freshwater) and a range of benefits (e.g. aesthetic, sense of place, cultural heritage, and leisure) (Smith et al., 2016). Therefore, there is a close relationship between humans and the natural environment, which provides beneficial outcomes (e.g. improved physical exercise, socialization, life satisfaction, subsistence, and medicine) for human health and wellbeing (Grad, 2002). Besides, the relationship between systems influences the perception of people towards nature and its components (Pett et al., 2016; Stiglitz et al., 2009) (**Fig. 1**).

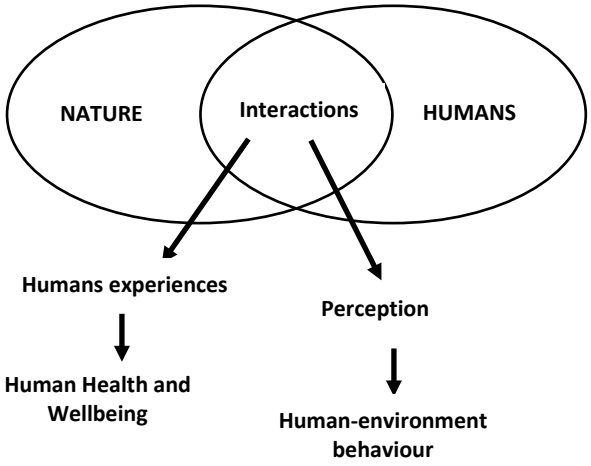

Fig. 1. The human–nature interactions

Fig. 1 shows that the human-nature relationship is characterized by two agents: nature and humans. Humans receive information from nature, process it, and develop perception (Zube, 1987). Humans also experience nature by depending on the physical and biological characteristics of nature (e.g. season, weather condition, landform, plants, and wildlife) and the types of interactions, which can be categorized in three ways: *intentional* (e.g. growing flowers in home gardens) *incidental* (e.g. suddenly hearing birds sounds while walking in a forest), and *indirect* (e.g. watching an image of bird in a magazine) (Keniger et al., 2013; Pett et al., 2016). Thus, the characteristic of nature (e.g. natural and urban landscapes) and the purpose of the interactions influence the human-nature interactions. For example, while the human-nature interactions are diverse and rich in the natural landscapes, they are limited in open-green spaces in cities (e.g. parks and home gardens) (Fuller and Irvine, 2010; Pett et al., 2016). Several driving forces (e.g. intensive urbanization, population growth, and land-use change) have caused the degradation of the humans-nature interactions, which have resulted in many undesirable outcomes for human wellbeing (e.g. depression, diabetes, poor mental and physical health), particularly in developed countries (Pett et al., 2016). Within this context, several scholars (e.g. Miller, 2005; Pett et al., 2016) highlighted that there is a decline in the connection between humans and nature as people live in isolation from nature in their daily lives. As a result, they have less interest for protecting and experiencing nature (Lindemann-Matthies, 2005; Pett et al., 2016). For that reason, we primarily need to change behaviours and attitudes of people for nature by raising their awareness of the benefits and values of nature, and nature conservation. Then, people can demand better conservation of nature and biodiversity from policymakers and create opportunities for more access to open-green spaces. One of the topics of interest emerging in the process of humans and environmental interaction is 'values', as people's lives highly depend on nature and its components. Within this process, they attribute values to nature, landscapes, and their natural resources.

Value refers to evaluative beliefs about the worth, importance, or usefulness of something. Values can be material (e.g. food and fresh water) and nonmaterial (e.g. spiritual enrichment, cognitive development, and aesthetic experience) benefits people obtain from landscapes, ecosystems, and natural resources (Hirons et al., 2016). They are guiding principles that influence our choices, actions, and behaviours (Allen et al., 2009; Manfredo et al., 2017; Seymour et al., 2010). Values are important principles of life and

are mostly formed early in life and subject to change (Allen et al., 2009; Manfredo et al., 2017). They can help to guide our attitudes and behaviours and "what we perceive, and how we interpret and process information". If values change, responding behaviours change too (Inglehart, 1997). Values mostly represent three major human requirements: "biologically based organism needs, social interactional requirements for interpersonal coordination, and social institutional demands for group welfare and survival" (Schwartz, 1992; Smith et al., 2016). The key characteristics of 'values' are addressed in **Table 1**.

Table 1. The key characteristics of 'value'

Spatial scale of value	Social scale of value	Human trait	Contributed of values	Value management tool
Site	Individual Group	Attitude Behaviour	Personal identity sense of place, group perception	Environmental education
Neighbourhood	Community	Norm	Community perception	Government policy
Local	Community	Attitudes, values	Sense of place, community perception	Government policy
Regional/ watershed/ landscape	Society	Values	Sense of place	Government policy

Table 1 shows that values originate at different spatial (e.g. from site to region) and social (e.g. from individual to society) scales. The spatial scale of values can range from sites to regions, which can comprise natural resources, ecosystems, and landscapes. The social scale of values includes value providers who can be categorized as individuals, communities, and societies (Kenter, 2016). Their cross-scale interactions and influences shape the overall value system (Manfredo et al., 2017). Individual values are self-ideas and opinions of persons about a topic of interest. Individual values play a significant role in the formation of personal identity. Individual values of people conduct their actions, give them an identity in interpersonal dealings, and ensure a motivational base for group socialization and membership (Hogg, 2006; Manfredo et al., 2017). Group values are ideal concepts, which attract and maintain group membership, and thereby cause social values. Community and society values represent the societal daily life, attitudes, and values for a specific subject (e.g. education, culture, humanity, and respect). The community and society values cause the formation of community perception and sense of place, which should be considered in the relevant policies. Values at different scales provide different benefits (e.g. sense of place) to individuals, communities, and societies. Such values can be categorized as held values and assigned values (Seymour et al., 2008).

Held values are "ideas or principles that people hold as important to them" (Lockwood, 1999). They are useful tools for understanding people's motivations and environmental behaviours. They also cause beliefs regarding the consequences of environmental conditions (Seymour et al., 2010). On the other hand, assigned values refer to "the values that individuals attach to physical places, goods, and services" (Brown 1984; Lockwood, 1999). Assigned values deal with the relative valuation of particular assets, attributes, phenomena, and natural places. They are more specific than held values (McIntyre et al., 2008). They are used for a specific natural asset. The values that we assign to natural areas are said to underpin our attitudes and environmental behaviour. It is important to note that held values reflect individuals' general environmental concern whereas assigned values are expressed with a particular asset (i.e. a river, wetland, forest). Assigned values can be expressed in monetary or non-monetary terms and are related to economic and psychological approaches. Asset characteristics (e.g. distance of value provider from assets), regarding knowledge and perception, directly influence assigned values. Besides, external drivers (e.g. economic conditions, climate change, and regulations) affect assigned values (Seymour et al., 2010). However, assigned values are more useful than held values for examining the values of specific sites (McIntyre et al., 2008). Brown (1984) and Lockwood (1999) highlighted that held values influence assigned values. Held and assigned values together lead to the formation of environmental behaviour (regarding a specific natural asset) (Seymour et al., 2010). Assigned values may change to provide basic requirements (e.g. biologically-based needs, social interaction, and group welfare and survival) or to adapt to social–ecological changes (e.g. immigration, warfare, or ecological devastation) (Manfredo et al., 2017). Thus, the characteristics of values, their value interactions, and drivers of change are crucial issues in terms of the identification and evaluation of assigned values. Although studies about held and assigned values exist in the literature, studies about the landscape and natural resource social values and their relationships are very limited in the literature (Kenter et al., 2015). To address these limitations, this paper focused on the landscape and natural resource social values and their core cross-scale interactions.

The purpose of this theoretical paper was to examine the cross-scale interactions between the landscape and natural resource social values within the framework of the social-ecological landscape system. The key objectives of the study were (i) to explore the concept and core landscape social values, (ii) to examine the theory and major natural resource social values, (iii) to evaluate the cross-scale interactions between both value systems, and (iv) to design a relevant theoretical framework. The results of this study can help landscape, land, and natural resource managers to better understand the major landscape and natural resource social values and

their cross-scale interactions, which should be combined with relevant policies to develop win-win solutions in terms of landscape and natural resource management.

1. Method

In this article, the complex interactions between the landscape and natural resource social values, which are quite limited in the literature, were discussed. The method of the study was based on the in-depth literature review about the concepts of the landscape and natural resource social values, their typologies, the major values, and the potential valuation techniques. Based on this assessment, several frameworks (comprising the social-ecological landscape system and its core domains, the humans-landscape relationships, the humans-natural resources interactions, and the linkages between the landscape and natural resource social values) were developed. The frameworks developed can be useful tools across the different research disciplines (e.g. landscape planning and design, and natural resource management).

2. Result and Discussions

2.1. The Concept of 'Landscape'

Landscape is a place through what meanings are attached to the land (Roberts, 2004). Landscapes are the products of human adaptations of natural settings to secure basic needs (e.g. food, water, and clean air) and other benefits (e.g. recreation, cultural heritage, and sense of place) (Ciftcioglu et al., 2016; Hirons et al., 2016). Or they are the outcomes of the interactions between human actions, ecosystems, and the abiotic factors that shape the physical environment (FAO, 2013; Sunderland, 2014). People shape and construct landscapes and live in them. In this sense, people are an important part of the landscapes (Makhzoumi and Pungetti, 1999; Walsh et al., 1999). Besides, people are active participants in the landscapes through feeling, acting, and thinking actions (Brown, 2005). They attribute meanings and values to the landscapes (Towards, 1997). In this sense, the landscape is a phenomenon of how people perceive, memorize, and represent history. Lastly, landscapes interact in a feedback loop in which culture structures landscapes and landscapes inculcate culture (Guo, 2004; Kuchler, 1993; Nassauer, 1995; Spiegel, 2004). In this sense, the landscape is a complex socio-ecological system in which the biological and cultural systems interact and influence each other (Cifcioglu et al., 2016; Zube, 1987).

The social-ecological landscapes comprise a mosaic of ecosystems. They are often characterized with the combination of topography, vegetation, land-use, and settlements, which are influenced by the economic, cultural, historical, and ecological processes, and human activities (FAO, 2013). The social-ecological landscapes link the ecological and social systems to ensure community wellbeing, non-human life forms, and their geophysical environment (Binder et al., 2013; Ciftcioglu, 2017). Within this context, the social-ecological landscapes consist of an ecological and a social system (Berkes and Folke, 1998; Pickett et al., 1997). The social system is linked with the social structures of a society, which mostly comprise individuals, groups (communities), societies, and cultures. The ecological system consists of species, populations, and communities (Manfredo et al., 2017). All elements of the ecological and social systems are interlinked in a complex social-ecological landscape system (Ciftcioglu, 2017). In this sense, the land becomes a landscape, which provides a place for human experience and also a forum for sharing information (**Fig. 2**).

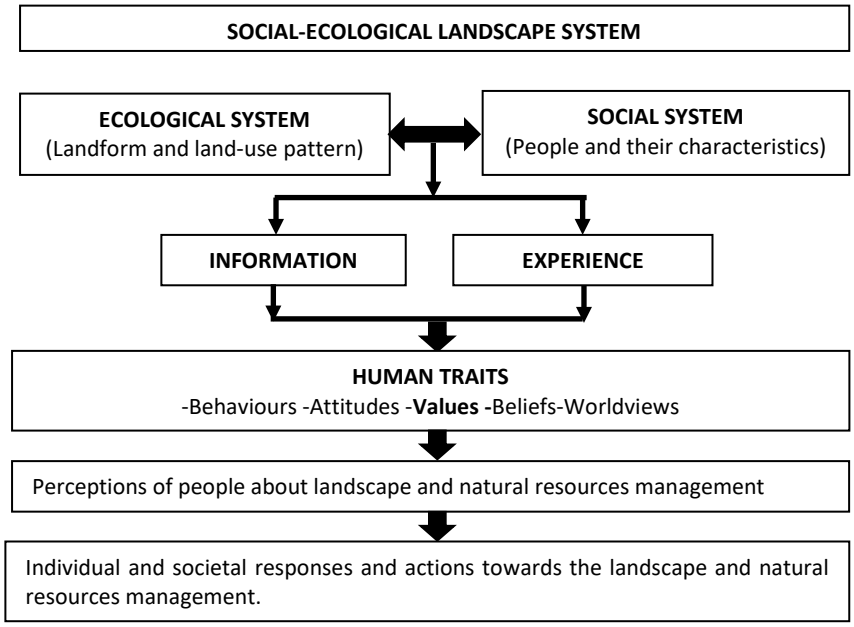

Fig. 2. Conceptualization of the social-ecological landscape system and its core traits (Developed from Ciftcioglu, 2017; Hirons et al., 2016; Towards, 1997; Zube, 1987).

Fig. 2 shows that the social-ecological landscape comprises an ecological and a social system, which mutually affects each other. The ecological system (bio-physical land and its components) provides a place, where humans have interaction with the environment and engage with the land to provide their basic needs (e.g. food) and other benefits (e.g. spirituality and inspiration for art). The interaction with the ecological system helps people to interpret and obtain information about the landscape functions, economic opportunities, and environmental amenities (Zube, 1987). Besides, people can have landscape experiences, which can contribute to the development of human behaviours. Human behavioural traits can be either acquired by heredity (biological evolution and cultural history) or learned from the environment (individual development). They can also depend upon particular conditions (e.g. gender, age, class, and socio-economic situation) (Makhzoumi and Pungetti, 1999). The landscape experience and information together lead to the development of human traits such as attitudes, behaviours, beliefs, worldviews, and values (**Table 2** and **Fig. 3**).

Table 2. The key human domains developed within the process of landscape experience.

Human behavioural traits (domains)	**Definition**	**Spatial scale**	**Social scale (Value providers)**	**The major factors that affect the landscape experience**	**Reference**
Attitude (opinion)	Attitude means tendencies or a person's mental view about the way she/he feels, thinks with regard to someone or something.	Site	Individual	Education, age, occupation experience, environment, social norms/structure	Bergman (1998), Brennan et al. (2014), Dietz et al. (2005), Kearney, (1984), Miller (2005).
Behaviour	Behaviour refers to an individual's or group's reaction to a particular action, person or environment.	Site	Individual, group		
Value	Value refers to the major life goals.	Local, regional	Group, society, culture	Social and cultural issues	
Belief	Belief represents the information a person has about an object.	Local, regional	Group, society, culture		
Worldview	Generalized beliefs about the state of the world.	Local, regional	Community Society, culture		

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Fig. 3. The core human domains developed in the process of landscape experience.

Table 2 and **Fig. 3** show that the process of landscape experience leads to the development of human attitudes, beliefs, and values towards the landscapes, associated ecosystems and services, and natural resources at different scales. The largest human behavioural trait is the worldview, which is constructed outside the individual and represents a system of beliefs (Brennan et al., 2014; Kearney, 1984). Beliefs are "statements indicating a person's subjective probability that an object has one or more attributes". They are subject to change based on new information, life experiences, and other learning processes (Allen et al., 2009; Towards, 1997). The sum of beliefs constructs our values, which guide our attitudes and behaviours towards something. Attitudes reflect "people's evaluations of something as favourable or unfavourable" (Towards, 1997). An attitude is derived from a person's beliefs, values, and indeed their worldviews (Brennan et al., 2014). They can be strong or weak. They are learned and subject to change (Towards, 1997). Attitudes are based on experience and observation. They are the results of human values. Attitudes can directly influence individual behaviours (Brennan et al., 2014). Behaviours are observable actions or activities people do that may or may not conform to their prior intentions. Behaviour is based on a situation and is defined by social norms (Allen et al., 2009; Towards, 1997). The concept of 'value', one of the focuses of this paper, is discussed in detail below.

2.1.1. The Concept of 'Landscape Social Values'

Landscapes are places and/or sites, where people feel, think, act, and attribute values to the lands. Such values emerge in the minds of humans as a collective perception, which can be considered as common knowledge of cultures and reflect the interest of communities (Brown and Brabyn, 2012; Ciftcioglu, 2020; Kenter et al., 2015). They are mostly perceived nonmarket values that public attach to landscapes and their ecosystem services, and particularly to cultural services (e.g. aesthetics and recreation) (Bogdan et al., 2019). Landscape values refer to "the perceived attributes of landscapes, places, and locations for humans" (Brown and Reed, 2000; Brown, 2005; Brown and Brabyn, 2012; Ciftcioglu, 2020; Zube, 1987). They are the results of human-landscape interactions (**Fig. 4**).

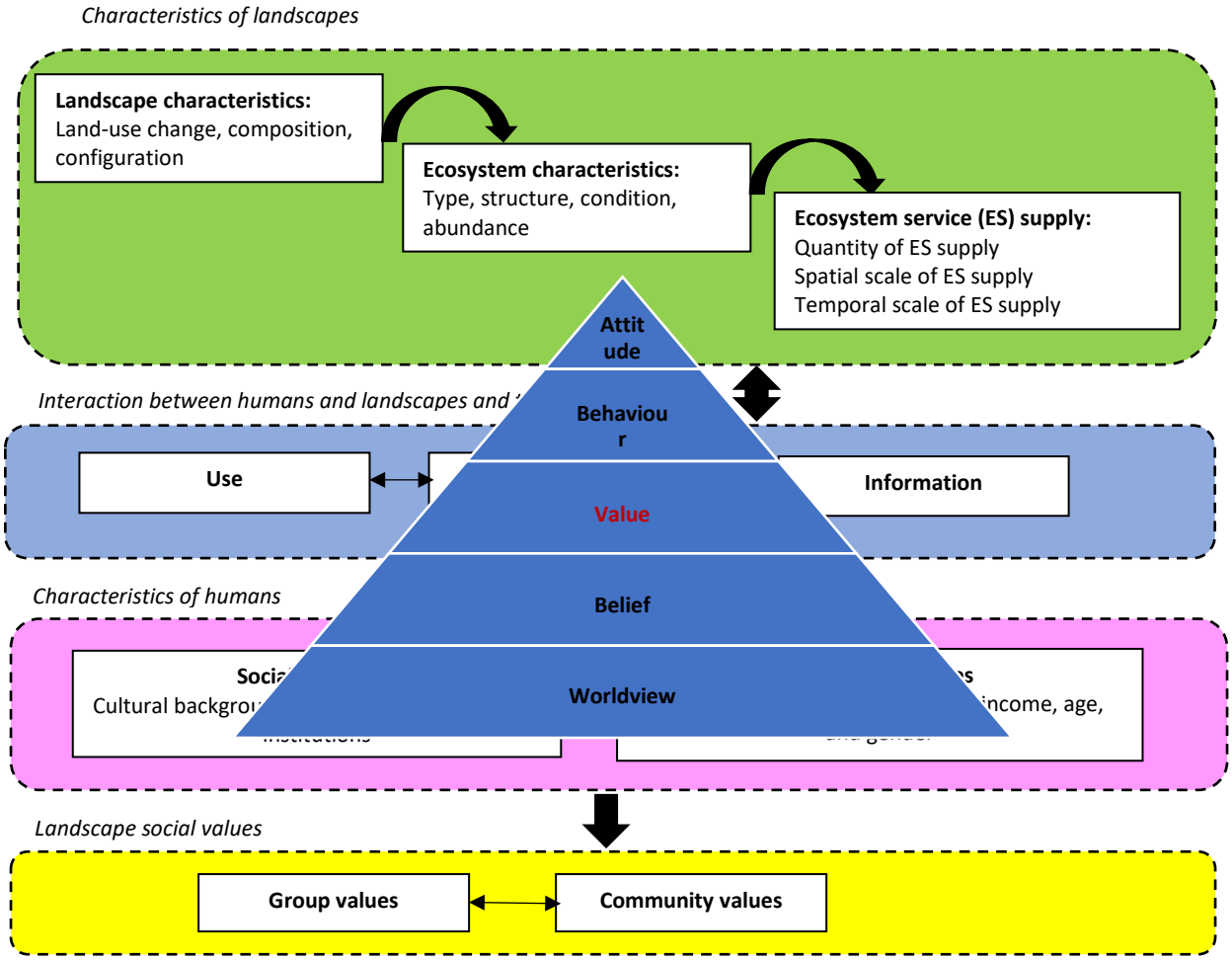

Fig. 4. The interactions between landscapes and humans (Developed from Brennan et al., 2014; Ciftcioglu, 2017; Scholte et al., 2015; Towards, 1997).

Fig. 4 shows that people depend on their surrounding landscapes for various purposes (e.g. food, freshwater, climate regulation, recreation, and cultural heritage). Landscapes consist of a mosaic of ecosystems. Characteristics of the landscapes (e.g. landform and land-use pattern), associated ecosystems (e.g. forest, coast, and agriculture), and services (e.g. food, fresh and irrigation water, climate control and recreation) define the major determinants of the landscape social values. Diversity of the landscape composition, pattern, and heterogeneity contribute to increasing the landscape social values (Nassauer, 1995; Scholte et al., 2015). The interactions between humans and landscapes constitute in three forms: use of ecosystem services by beneficiaries, landscape perception (the results of landscape experience), and information. The landscape social values may also vary depending on several issues (e.g. political and economic aspects, cultural characteristics, life experiences, the use and non-use of these particular areas) (Scholte et al., 2015). Thus, landscapes and humans are interconnected. However, characteristics of humans (e.g. education, gender, social networks, and institutions) and landscape changes influence the landscape social values (Nassauer, 1995; Scholte et al., 2015). For that reason, the key landscape social values should be identified and integrated into the relevant landscape planning and management policies.

2.1.2. The Core Landscape Social Values

The landscape social values are important instruments and/or principles to guide landscape management policies. Characteristics of the landscape social values may vary based upon the social structures of societies (e.g. society, community, group, and individual). For example, while a farmer may value the scenic quality of a freshwater pond surrounding his lands for the source of irrigation water, an urban dweller may value it for a variety of recreational activities (e.g. canoeing and hiking). Thus, people have different experiences and purposes and derive different social values from the surrounding landscapes. And thereby, they attach different meanings to the landscapes (Zube, 1987). Within this context, understanding the landscape social values can contribute to identifying landscape strategies through assessing attitudes towards planning, perceptions of change in the landscapes, preferred land-uses, and the allocation of public funds for landscape management. Besides, evidence of several studies showed that demographic variables (e.g. gender, age, education level, residence status, income, and health) influence the landscape social values and preferences (Shi et al., 2020). For that reason, landscape architects should elicit the 'values' or environmental attributes of specific landscapes to guide landscape management policies as well as to contribute to the field of environmental and/or landscape behaviour. In other words, landscape architects and land managers should understand the landscape social values and their influence on people's perceptions of land management actions. Understanding the social landscape values can help improve the effectiveness of landscape conservation and management actions (Dietsch et al., 2016; Towards, 1997). Within this context, the first task of planners should be to identify the key landscape social values and to develop the typology (categorization) of landscape social values. Based on the literature review, the key landscape social values were explored (**Table 3**).

Table 3. The typology of landscape social values

Class and type of landscape social value	Definition	Example of benefits	Reference
Functional values			

Ecological/life-sustaining/subsistence	These are valuable areas because they provide vital goods to sustain people's lives.	Food, freshwater, clean air, and construction materials.	Brown (2005 and 2013), da Rocha et al. (2017), Piccolo, (2017), Williams and Stewart (1998).
Biodiversity	These areas are valuable because they provide habitats for a variety of marine and terrestrial life, plants, and animals.	Food, energy, medicine, freshwater, and leisure activities.	Brown (2005), Brown and Brabyn (2012), Hirons et al. (2016), da Rocha et al. (2017), Vallés-Planells et al. (2014).
Wilderness	These areas are valuable because they provide native habitats for wildlife to live and/or opportunities for humans to monitor them.	Wildlife observation	Brown (2005), Brown and Brabyn (2012), Hirons et al. (2016), Vallés-Planells et al. (2014), Williams and Stewart (1998).
Economic values	These areas are valuable because they provide opportunities for income generation and employment through relevant activities.	Collection of medicinal and aromatic plants.	Brown (2005 and 2013), Williams and Stewart (1998).
Socio-cultural values			
Social inclusion	Social inclusion refers to the values of social cohesion, civic engagement, communal self-reliance, and community spirit.	Socialization	Brown and Brabyn (2012), Brown (2005), da Rocha et al. (2017), Hirons et al. (2016), Vallés-Planells et al. (2014).
Scenic/Aesthetic	These areas (e.g. mountains, forests, beaches, bays, and islands) are valuable because they contain attractive scenery including sights, smells, sounds.	Aesthetic quality	Brown (2005 and 2013), Brown and Reed (2000), da Rocha et al. (2017), Piccolo, (2017), Rolston and Coufal (1991), Shi et al. (2020), Williams and Stewart (1998).
Recreation	These areas are valuable because they provide places for outdoor recreational activities (e.g. trekking, climbing, and fishing).	Recreation opportunities, growth of employment, and income generation	Brown (2005), da Rocha et al. (2017), Shi et al. (2020), Williams and Stewart (1998).
Sense of place	Sense of place refers to emotional bonds people develop with a place and may include strongly felt values, meanings, and symbols about the place.	Contact with nature (place attachment), psychological well-being	Brown (2005), da Rocha et al. (2017), Towards (1997), Williams and Stewart (1998).
Sense of belonging	Development of the relationship with the surrounding environment.	Contact with nature (place attachment), psychological well-being	da Rocha et al. (2017).
Spiritual and religious value	These values are related to spiritual connection, religious activities in nature's sacred and religious places, and experiences of fascination and connectedness provoked by a natural place.	Spiritual connection	Allen et al. (2009), Bogdan et al. (2019), Brown (2013), da Rocha et al. (2017).
Cultural heritage and history	These values address the significance of cultural-historical-archaeological-traditions and sites.	Preservation of cultural heritage	Bogdan et al. (2019), Brown (2005 and 2013), Brown and Brabyn (2012), da Rocha et al. (2017), Hirons et al. (2016), Vallés-Planells et al. (2014).
Education/Scientific/ Learning value	These values are related to the use of nature for opportunities such as learning and experiencing	Educational and scientific development	Allen et al. (2009), Bogdan et al. (2019), Brown (2013), da Rocha et al. (2017).

	nature through direct contact. They are important places for scientific studies.		
Therapeutic value	These are valuable places because they make people feel better, physically and/or mentally through contact with nature.	Wellbeing enhancement	Allen et al. (2009), Bogdan et al. (2019), Brown (2013), da Rocha et al. (2017).
Symbolic value	These places are valuable because they represent the important symbols of nature.	Wellbeing improvement, protection of important natural phenomenon	Nahuelhual et al. (2016).
Inspiration	These are valuable places because they represent an inspiration source for folklore, artistic manifestations, or national symbols.	Opportunities for development of art.	Bogdan et al. (2019).
Intrinsic value	These values are connected to the estimation of nature itself, with people being present or not.	Protection of nature	Brown (2013), da Rocha et al. (2017), Piccolo (2017).

Table 3 shows the major landscape social values vary depending on the landscape and ecosystem characteristics and associated ecosystem services. The landscape social values contribute to the different dimensions of human wellbeing (mental and physical health) in different ways (e.g. enjoyment, self-fulfilment, and social fulfilment). For that reason, understanding the landscape social values can help landscape managers the core reasons of humans' attitudes towards the landscapes and the basis of social conflicts over the landscape conservation and management actions. In other words, the landscape social values can be used as guiding principles to develop more effective landscape management strategies (Ciftcioglu, 2020; Manfredo et al., 2017). However, the landscape social values are interlinked with the natural resource social values through cross-scale interactions (Ciftcioglu, 2020).

2.2. The Theory of Natural Resource Management

Natural resources (e.g. water, soil, forests, marine, rivers, wetlands, flora, and fauna) refer to the resources that naturally exist in the natural environment. They are important products that deliver a variety of goods and services for human wellbeing. Thus, humans' livelihoods heavily depend on natural resources (**Fig. 5**).

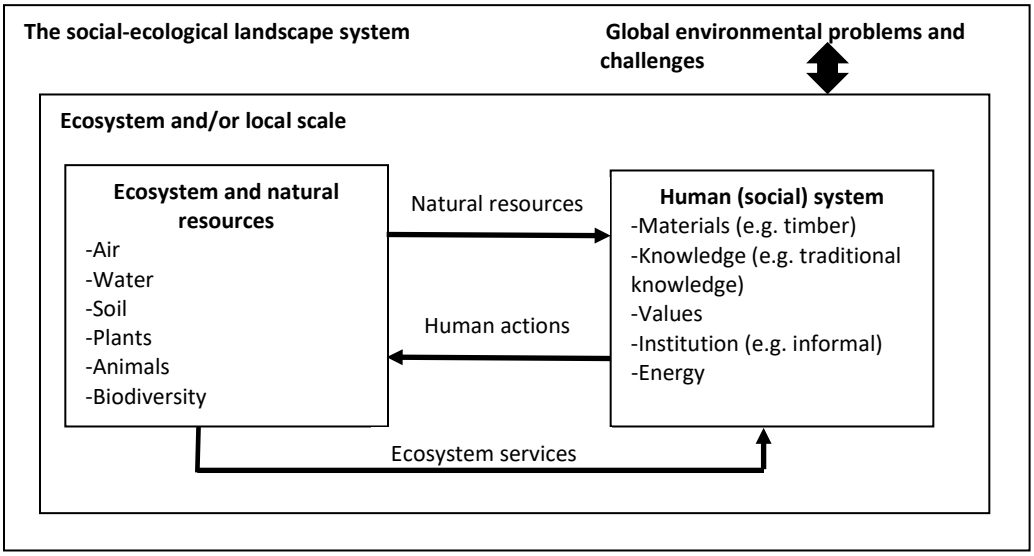

Fig 5. The conceptual framework of the humans – natural resource interactions

Fig. 5 shows that ecosystems and associated natural resources deliver a range of natural resources and ecosystem services for society. However, human activities directly influence the existence, diversity, and quality of those resources. For that reason, *integrated natural resource management*[2] should be conducted within the context of the social-ecological landscape approach to the better conservation and sustainable use of natural resources.

2.2.1. The Core Natural Resource Social Values

The natural resources (e.g. marine, plants, and forests) provide essential needs (e.g. food, freshwater, clean air) and other types of services (e.g. inspiration and beauty) for humans. Therefore, people assign social values to natural resources. The natural resource social values can be expressed as "the values assigned to a particular natural resource (e.g. forest, plants, and rivers)" (Ciftcioglu, 2020). They are guiding principles and/rules, which influence our choices, actions, and environmental behaviours (Seymour et al., 2010). The natural resource social values reflect knowledge, usage, and experiences of individuals and different social groups for particular natural resources at a local and regional scales. They originate as a result of the relationship of people to natural resources (Towards, 1997). They are in the minds of individuals and groups as perceptions based on human needs. They show how communities value specific natural resources, and how the values of holders might motivate their environmental behaviours (Semour et al., 2010). The social structure and type of interaction (e.g. usage and recreation) with the environment can lead to the origination of different natural resource social values. For example, agricultural societies tend to have different interactions with nature than do urban societies, often resulting in different natural resource perceptions, values, and uses (Kennedy and Thomas, 1995; Knight and Bates, 1995). The natural resource social values are learned, inherited, and transmitted (Ciftcioglu, 2020). Therefore, they are important parts of the human dimensions and cultural heritage (Allen et al., 2009). Besides, they are important policy instruments for better conservation of biodiversity and sustainable management of natural resources. Thus, the natural resource social values can help resource managers to better understand and identify place attachment, specific sites and places, important places for biodiversity, sacred spaces, the specific natural features (attributes) and natural resources, and motivated reasons of value holders towards their environmental behaviour (Seymour et al., 2010). The scholars also highlighted that understanding of the natural resource social values can contribute to improving the ability of natural resource management bodies and to developing relevant conservation and management solutions (Dietsch et al., 2016; Towards, 1997). Based on the literature review, the major natural resource social values were explored (**Table 4)**.

Table 4. The typology of natural resource social values

Category and type of natural resource social values	Definition	Reference
Ecological/Functional values		
Commodity/utilitarian	These are valuable areas for materials such as timber and foods for current and future generations.	Kennedy and Thomas (1995), Manfredo et al. (2017), Seymour et al. (2008), Towards (1997).
Ecological/life-sustaining	These are valuable areas for habitat and biodiversity conservation, threatened and endangered species, and preserving and producing natural resources (e.g. clean air, soil, and water).	Brown (2005), Curtis and Robertson (2003), Manfredo et al. (2017), Seymour et al. (2008), Tarrant and Cordell (2002).
Biological diversity	These are valuable natural areas because they provide important habitats for a variety of fauna and flora.	Brown (2005).

[2]Integrated natural resource management (INRM) is "an approach to managing resources in a sustainable manner by helping resource managers and other relevant stakeholders to achieve their different goals (e.g. conservation of natural resources, production and sustainability of food production and security)" (Frost et al., 2006). INRM is interdisciplinary and multi-scaled, encompassing different but linked levels of the social and biophysical organization. It is responsive to different histories, sites, and circumstances, and is intended to integrate varied and complex sets of knowledge into a common framework for analysis and action (Frost et al., 2006; Sayer and Campbell, 2004). However, global environmental problems (e.g. global climate change, and loss of biodiversity), global challenges (e.g. food security, population growth, and poverty alleviation), and human activities (e.g. overharvesting, intensive agriculture and urbanization, and land-use change), mostly occur at the large scale and influence the INRM. For that reason, many international organizations (e.g. the World Bank and FAO) and multiple actors encourage to use of the social-ecological landscape approach to large-scale interventions (e.g. INRM, integrated watershed management, and integrated rural development) (Reed et al., 2015). Thus, a successful INRM should be conducted at the landscape level, as the landscape approach addresses development needs while restoring and protecting natural resources (FAO, 2017).

Wildlife	These are important natural habitats for a variety of species.	Seymour et al. (2008)
Economic value	These are important places (e.g. agriculture and forest) for the economy (e.g. employment, income generation, extraction of resources such as medicinal plants).	Curtis and Robertson (2003),Moore and Renton (2002), Satterfield (2001), Rolston (1994).
Socio-cultural values		
Scenic/Aesthetic	It refers to the beauty of places, which include sights, sounds, and smells.	Curtis and Robertson (2003), Manfredo et al. (2017), Moore and Renton (2002), Satterfield (2001), Seymour et al. (2008), Rolston (1994).
Recreation	These are important natural places that provide opportunities for physical challenges such as bird watching.	Rolston (1994), Satterfield (2001).
Spiritual values	These are valuable areas as sacred places.	Seymour et al. (2008).
Health value	These are valuable areas for medicine.	Allen et al. (2009), Bogdan et al. (2019), Brown (2013).
Learning value	It is about valuing the environment and its resources to learn about them.	Brown (2005), Seymour et al. (2008).
Existence value	Valuing a natural place and its resources simply because they are out there, even if you may not see them.	Rolston (1994), Satterfield (2001), Seymour et al. (2008).
Therapeutic value	Valuing a natural place and its resources because they make people feel better, physically and/or mentally.	Brown (2005), Seymour et al. (2008).
Future generation value	Recognizing the value of the rights of future generations to a healthy environment.	Rolston (1994), Satterfield (2001), Seymour et al. (2008).

Table 4 shows that the natural resources (e.g. wetlands and forests) may comprise diverse social values depending on the ecosystem characteristics, geography, and demographic variables (e.g. age and gender), and proximity to resources. Therefore, understanding of the natural resource social values is crucial to help resource managers to identify policy directions that benefit both natural resources and humans (Allen et al., 2009). Besides, assessment of the natural resource social values can help to identify the specific high-value natural assets, which can help resource managers to protect those sites and places (Seymour et al., 2010; Towards, 1997). However, the natural resource and landscape social values interact. In other words, they mutually influence each other.

3. Assessment of the Cross-Scale Linkages between the Landscape and Natural Resource Social Values

This part of the study focuses on the design of a theoretical framework to illustrate the cross-scale linkages between the landscape and natural resource social values in a systematic manner. The framework can help planners, resources, and policymakers to better understand the core linkages between both social value systems, to identify the current gaps, and the potential management interventions, and relevant policies (**Fig. 6**).

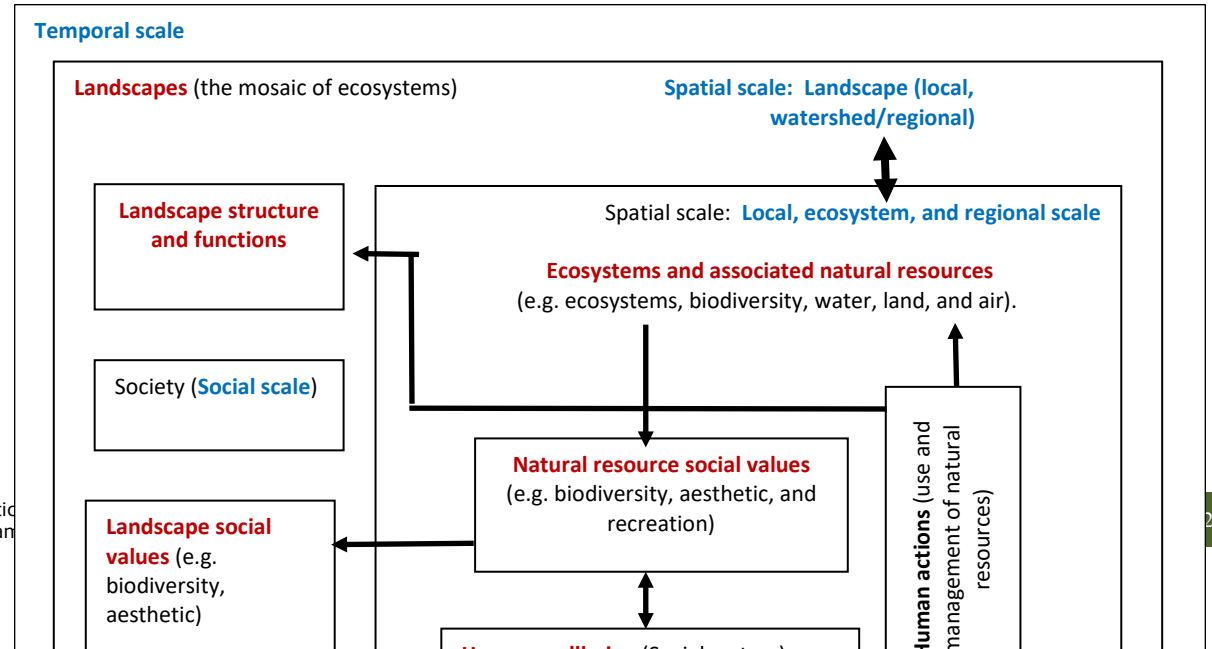

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Fig. 6. The theoretical framework for the evaluation of the cross-scale linkages between the landscape and natural resource social values

Fig. 6 shows that the natural resources are shared assets (e.g. forest natural resources, medicinal and aromatic plants, and wild edible plants), which have an essential role in food production and security, socio-economic development, and biodiversity conservation (Galvani et al., 2016). They are the three fundamental goals of landscape planning. Natural resources provide a range of natural resource social values (e.g. aesthetic, and leisure) for human wellbeing through human-resource relationships. The type and degree of the natural resource social values may vary depending on the physical attributes of natural resources, the social system and its structure social structure (e.g. age, gender, and occupation), and the social scale (e.g. individual and group). However, human actions (e.g. overuse, intensive urbanization, and loss of natural vegetation) may adversely affect the target ecosystems and relevant natural resources, and thereby the natural resource social values. In other words, degradation and/or loss of the target ecosystems and associated natural resources may cause a similar decline in the natural resource social values. Thus, there is a mutual relationship between natural resources and the social system. On the other hand, natural resources are nested in the landscapes. For that reason, natural resource management initiatives are mostly implemented at the landscape and/or regional/watershed scale.

The landscape represents the place where natural resources exist. Landscapes are the results of human interventions with the natural processes. When humans use natural resources, they become goods and services. Within this complex relationship, people attribute values to the resources and landscapes. Landscape structure and functions, and social structure are the key determinants that form the landscape social values. However, landscapes expose to global environmental problems (e.g. climate change, sea-level rise, and drought) and unsustainable human actions (e.g. intensive urbanization and agriculture); which lead to the degradation of landscapes, associated ecosystems, natural resources, and relevant social values. Within this context, the landscape (spatial) scale directly and/or indirectly influence the cross-scale interactions between the landscape and natural resource social values. Besides, the temporal dimension of landscapes and the social scale of society are the key domains that affect the cross-scale interactions between both social values. Thus, both values are interrelated through three value scales.

Spatial scale: People attach social values to landscapes, which can be studied in a geographical context. The social landscape values are place-related and tend to vary spatially (Fagerholm and Käyhkö, 2009). In this sense, spatial scale is a phenomenon or the extent of an area, at which the social landscape values process (Selman, 2006). The spatial scale may range from the universal, global, national, regional, local to the site scale. Landscape planning-related studies are mostly conducted at the regional or watershed scale. The characteristic features of a landscape at the watershed scale mostly comprise land-uses and landforms (e.g. forest, agriculture, coast, wetland). On the other hand, the characteristic features of landscapes at the site scale often comprise natural and man-made elements such as trees, buildings, shrubs, and ponds. In this sense, the spatial scale represents the major resource systems (e.g. ecosystems and habitats) and resource units (e.g. natural resources, trees, shrubs, and plants). Within this context, the landscape and natural resource social values are interlinked through the spatial scale of values. However, the human-environment interaction operates across different scales, ranging from site to the landscape level (Walsh et al., 1999). The scholars also emphasized that

landscapes are the spatial patterns of lands, which are formed by environmental and social processes. The influence of both factors can operate from the site to the regional scale. Thus, the human-environment interactions may operate at the site, local, and regional scales. In this case, landscapes are some distinct physical units (Selman, 2006). The type and the degree of landscape modification can help us to identify the impacts of driving forces (e.g. urban sprawl, growth of infrastructure, and land abandonment) on the landscape social values. Besides, Smith et al. (2016) highlighted that the loss of biodiversity and degradation of ecosystems continue on large scale such as the landscape scale. For that reason, natural resource management initiatives are mostly conducted at the landscape/watershed/regional scale. Although the natural resource social values mostly operate at the local and/or site scale, they foster the landscape social values at the upper scale. This argument supports the findings of Smith et al. (2016).

Temporal scale means the duration or time of a process. It is fundamental to understand past, present, and future changes in landscapes (Selman, 2006). The landscape is a dynamic system, which changes over time with the effects of natural and cultural factors. Based on this, we can argue that the landscape and natural resource social values may change through the impacts of global, regional, and local environmental and socio-economic challenges. Within this context, the temporal scale of value is important for understanding the nature and intensity of change.

The social scale represents the social system and its components such as resource users (e.g. individuals, groups, and community), and relevant institutions (e.g. institutions for management). The social scale is interlinked with the socio-economic and political settings. Most of the problems in the management of natural resources and landscapes derive from the interactions between people and the environment. Therefore, the social scale is important to better understand the actions of humans, their resource and land use, and potential solutions in decision-making (Fagerholm and Käyhkö, 2009).

4. The Major Research Techniques for the Valuation of the Landscape and Natural Resource Social Values

Valuation of nature has been a growing topic of interest for policymakers and scientists in recent years. Within this context, several international initiatives (e.g. Millennium Ecosystems Assessment in 2005) have been developed. However, the current initiatives mostly focus on either the ecological (functional value) or the economic (monetary value) value of nature. The social values of nature have been neglected in most of the studies (de Groot et al., 2010; MA, 2005; Scholte et al., 2015). In other words, studies regarding the social landscape and natural resource values, which are the objectives of this study, are very limited in the literature. For that reason, this part of this study focuses on the potential social valuation techniques for the landscape and natural resource social values.

Social valuation methods are used to explore the importance, preferences, needs, or demands expressed by people towards nature (Chan et al., 2012; Kelemen et al., 2016; Winkler and Nicholas, 2016). The social valuation techniques range from structured survey techniques (e.g. questionnaire and interviews) to more participatory approaches (e.g. Participatory Rural Appraisal-PRA and Participatory Action Research-PAR). They provide useful information on the importance of biodiversity to people. For example, in-depth interviews and focus groups may allow greater in-depth assessments of the motivations underlying people's value for biodiversity (Chan et al., 2012, Kelemen et al., 2016). Such methods can be quantitative and qualitative. They offer rich information about how and why people value certain landscapes and natural resources (Seymour et al., 2010). Combining different valuation approaches (e.g. taking a mixed-method approach) may lead to a deeper understanding of social values (Scholte et al., 2015). The key social valuation techniques for the landscape and natural resource social values were explored through the literature review (**Table 5**).

Table 5. The key participatory and deliberative research techniques for the valuation of the landscape and natural resource social values

Class of method	Method	Characteristics of method	Description	Value scale	Reference
Deliberative (Discourse-based)	Questionnaire	Quantitative, qualitative	A questionnaire is a research tool, which is used to quickly collect data on a specific topic. They can vary based on the structure (e.g. closed, structured, and open-ended).	Group, society	Brown (2005), Fish et al. (2011), Kenter et al. (2015), Seymour et al. (2010).
	In-depth discussion groups and interviews	Qualitative	Discussion groups and interviews (usually 4-8) provide a forum in which participants shape the terms of discussion, develop themes in ways relevant to their own needs and priorities.	Group	

	Citizen's juries	Qualitative	A small cross section of the general public who come to a considered judgment about a stated policy issue/problem through detailed exposure to, and scrutiny of, the relevant evidence base.	Group, society	
	Deliberative opinion pools	Quantitative and qualitative	This technique is designed to observe the evolution of the views of a large citizen test group as they learn about a topic. Typically, the group votes on the issues before and after an extended debate.	Group	
Analytical-deliberative	Participatory modelling	Quantitative and qualitative	The involvement of stakeholders in the design and content of analytical models represent values and their benefits under different spatial and temporal conditions.	Community, Society	
	Deliberative monetary valuation (DMV)	Quantitative	Techniques that use formal methods of group deliberation to come to a decision on monetary values for environmental change. The major methods are survey-based techniques (e.g. contingent valuation, choice experiments) or a non-econometric approach to establish values (e.g. incorporating citizen's juries).	Group, community, society	
	Deliberative multi-criteria analysis	Quantitative	Techniques that involve groups of stakeholders designing formal criteria against which to judge the non-monetary and (sometimes) monetary costs and benefits of different management options as the basis for making a decision.	Group, community, society	

Table 5 shows that there is a range of research techniques to identify the landscape and natural resource social values. Each method has different characteristics (e.g. quantitative, qualitative, participatory, deliberative, and spatial representation) (Christie et al., 2012; Kelemen et al., 2016; Milcu et al., 2013). The quantitative methods generate information that can be captured numerically. Examples of quantitative methods include questionnaire surveys. The quantitative methods are more often associated with top-down approaches (Freudenberger, 2008). They generally do not generate specific numbers. They (e.g. in-depth interviews and focus groups) provide opportunities for research to probe more deeply into people's preferences than could be achieved using either quantitative or economic techniques. Such detailed insights may be extremely useful for uncovering local, cultural, and spiritual values that might not be directly transparent to external researchers (Christie et al., 2012; Freudenberger, 2008).

Deliberative methods allow people to ponder, debate, and negotiate their values, which can inform, moralize, and democratize the valuation process (Fish et al., 2011; Kenter, 2016). Such techniques are appropriate to work with stakeholders to develop and implement a policy or management plan. Deliberative methods engage the public more actively in decision-making to reach decisions through deliberation and discourse (Mavrommati et al., 2017). They are particularly suited for understanding the meanings that people attribute to landscapes, ecosystems, and their services (EU FP7 OpenNESS Project, 2017).

Analytic-deliberative methods are more elaborate approaches to participation in decision-making. They integrate discussion-based techniques with more formal technical tools for decision making (Fish et al., 2011). Thus, participatory and deliberative valuation methods help address the landscape and natural resource social values. However, combining several different methods will be more useful to see the most complete picture of a given situation (Freudenberger, 2008).

5. Conclusions

This paper examined the cross-scale linkages between the landscape and natural resource social values within the context of the social-ecological landscape system. Thus, the core landscape and natural resource social values and their cross-scale interactions were examined. Based upon this, a theoretical framework for the assessment of the cross-scale interactions between the landscape and natural resource social values was designed. The framework can help policymakers, landscape, land, and resource managers to understand the cross-scale linkages between both social values and their importance for biodiversity conservation, landscape, land, and natural resource management. This approach supports the arguments of Kennedy and Thomas (1995).

The results of the assessment revealed that people hold social values towards landscapes and natural resources. The characteristics of values may change depending on the physical and social characteristics of the ecological and social systems. Thus, the landscape and natural resource social values operate and interact in the social-ecological landscape system. Such as system approach can help future studies to answer several global environmental challenges, which can be: how do the landscape and natural resource social values shape the ability of individuals, people, and societies to adapt to changing environmental conditions (e.g. the loss and/or degradation of agricultural landscapes and associated agro-ecosystem services)? What are the impacts of landscape degradation on the landscape and natural resource social values that affect attitudes, behaviours, and practices of people towards the surrounding environment and associated resources?

The results also uncovered that the landscape and natural resource social values are interlinked through several cross-scale interactions such as spatial scale. Thus, the landscape and natural resource social values are not independent values. They interact at the horizontal (e.g. spatial and social scale) and vertical (e.g. social and temporal scale) levels. In other words, the upper and lower spatial, social, and temporal scales directly and/or indirectly affect each other. Integration of the landscape and natural resource social values into the relevant policies can help to identify the potential landscape scenarios for landscape and natural resource management. This approach supports the arguments of Manfredo et al. (2017) and Smith et al. (2016). Besides, integration of both values into the relevant policies can contribute to increasing public engagement in landscape, ecosystem, and biodiversity conservation initiatives, and also raising their awareness of these issues, as highlighted by Lane et al. (2005), Pett et al. (2016) and Seymour et al. (2010).

Compliance with Ethical Standard

Conflict of Interests: The authors declare that for this article they have no actual, potential or perceived conflict of interests.

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