METHODOLOGICAL FRAMEWORK OF CULTURAL ECOSYSTEM SERVICE ASSESSMENT

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Abstract. In recent decades, cultural ecosystem services have been increasingly studied in the field of ecosystem services. Even more diverse studies have been conducted since the Covid-19 pandemic and today's political situation brings cultural ecosystem services, more specifically identity, symbolic, religious and cultural-historical values even more to the fore. Although the services of cultural ecosystems in general are more and more extensively researched, mostly focusing on tourism issues, the cultural-historical, symbolic, religious and entertainment value as base not only for tourism, but also for strengthening local communities, is still rarely studied in research in the world and in Latvia due to the lack of data and the intangible nature of research. Therefore, a methodological framework for conducting such a research, selecting data from publicly available sources, as well as obtaining missing data in field studies. Also, tools for integrating results from assessment of cultural ecosystem services related to identity, religious and symbolic values into political and decision-making documents are missing.
Thus, as a continuation of the study on the assessment of cultural ecosystem services and integration into political and decision-making documents, the aim of the particular article is presentation of a methodological framework developed for the assessment of cultural-historical, symbolic, religious and entertainment values in the landscape. The methodological framework includes seven steps, which are described in this article.
The methodological framework created will be tested and validated in future studies, where improvements may be made depending on the situation during the process.

Keywords: cultural ecosystem services, methodological framework, assessment

Introduction

Nowadays when the sense of place, identity and historic, cultural values for many countries in the world has been threatened, these values are becoming increasingly important and more often studied to increase belonging to a particular place or landscape, thereby providing a range of cultural ecosystem services (CES). In the Millennium Ecosystem Assessment CES has been explained as nonmaterial benefits that people obtain from ecosystems through recreation, aesthetics of surroundings or spiritual or religious enrichment [31]. The number of studies on CES has increased in recent years, but there is still a lack of comprehensive studies due to various reasons, such as difficulties in measuring individual indicators, evaluations tend to be subjective, lack of extensive data, etc. [4; 37; 47; 49]. CES are used and directly experienced in society, but due to the complexity of assessment CES is difficult to integrate into decision-making and management [16; 50]. In the research process it is necessary to know for which landscape management level specific data can be useful, for this reason the methodology framework is needed where several scenarios are incorporated, for which specific CES assessment can be useful.

This research is a continuation of two previous research articles developed by authors [45; 46] where literature review of methods for landscape quality assessment using ecosystem services approach was researched. During previous research [45;46], the knowledge gap for CES assessment methods and specifically research gaps related to symbolic, religious, entertainment and cultural-historical values of CES were determined and thereby is the main research objects (see figure 1). In the studies conducted in Latvia [27; 28; 29; 30; 43], the lack of assessment of the aforementioned ecosystem services stands out even more, the assessment is based only on expert assessments and data availability is not sufficient for detailed assessment. Previous studies of ecosystem services in Latvia focused more on services related to local ecology

[27;28;29;30] and tourism [29;30,43]. Cultural services as a basis for strengthening local identity and creating a sense of place have so far been little studied. In Latvia, cultural services in the context of recreation, aesthetics of landscape, cultural heritage and education have been examined in the studies of Grassland Ecosystem Services [28;29], MAREA Project [30], LIFE Ecosystem Service Project [27] and Zemgale region landscape and green infrastructure plan [43], but lack of connection with the strengthening of local identity and the creation of a sense of place evaluation is still missing. To reduce this gap in research on cultural-historical, symbolic, religious and entertainment ecosystem services in the landscape, a methodology framework is developed and described in this article. The aim of this research is to develop a methodology for CES assessment, specifically for cultural-historical, symbolic, religious and entertainment values of ecosystems and describe tools for integrating the results of this study into political, spatial planning and decision - making documents. The developed methodological framework was viewed in the context of Latvia, analyzing the available data accordingly. Methodology described in this paper consists of seven stag-
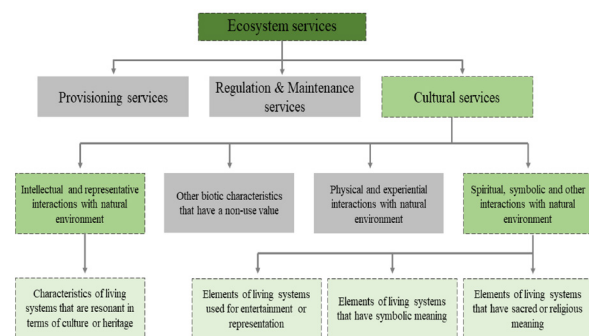

Fig. 1. Scheme with the researched cultural ecosystem services in the overall context of ecosystem services, where at the bottom of the scheme are the ecosystem services assessed by this methodology [created by authors]

es, which has been described step by step in the next section. This paper reflects the methodology which will be applied and tested during the continuous research.

Methodological framework and Discussion

Methodological framework for CES assessment has been created and will be tested and carried out in ongoing research. This section introduces every stage, the theory and describes the steps more detailed. In order to navigate the structure of the research, a scheme was created (figure 2), where all stages of the research are represented.

Research of the study field, experience, knowledge gap

As mentioned before two previous research articles were made in order to research the ecosystem service assessment methods, study field and discover knowledge gaps. Additionally, research was done in Latvia's previous projects and researches of ecosystem service assessment and methods used in these studies. Several researches have been done in Latvia to evaluate CES [27; 28; 29; 30; 43], only a few of these researches have been assessing the symbolic, religious, entertainment or cultural-historical value. The expert evaluation method is the most popular among these studies, but pointing to the lack of accurate and complete data and possible shortcomings of the method due to data limitations [27]. Cultural-historical value in Latvia has been associated mainly with cultural-historical heritage data, which has specific state protection status. The National Cultural Heritage Administration has been pointing out that the heritage database and data collection needs to be more comprehensive and involve a broad part of society [8], but until now such methodology is not widely used and the database is not extensively updated. Several researches point out that in cultural-historical evaluation relying only on heritage data or element protection status can lead to biases in the research [13; 43]. Due to changes in the political situation in the territory of Latvia in the 20th century, inaccuracies and gaps are possible in the process of creating the heritage list [9]. In order to obtain a comprehensive list of cultural-historical objects, it is necessary to supplement the list of cultural heritage used so far with symbolic elements of the landscape, as perceived by local residents, cultural workers, etc. the cognitive aspect of landscape [13]. Several authors point out that a combination of methods can give comprehensive research with more precise data, while with one method assessment can be biased [4; 19; 51].

Definition of CES supply objects

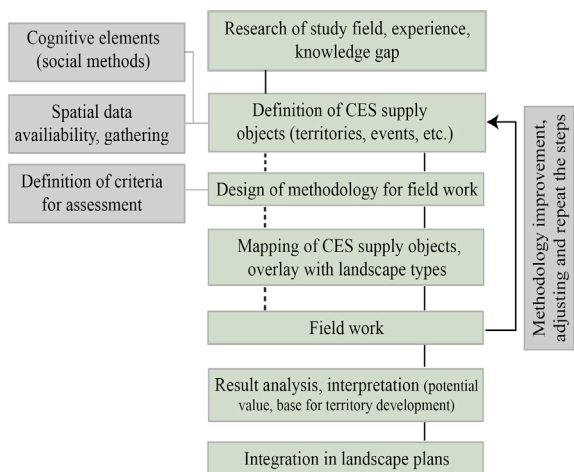To define the objects, territories, symbolic features, events and other elements of cultural significance it is necessary to use multiple methodologies. One of the stages of the research is the identification of the necessary data and evaluation criteria for the research and assessment of the proposed CES. In general, when analyzing the research of other authors, it can be seen that the most frequently used criteria in landscape studies, which would be related to landscape CES, are the history of the place, architectural heritage, visual aesthetic factors, sense of place and identity (see figure 3).

Several elements can be defined and mapped using publicly available databases but some must be obtained through field research and interviews with local residents and experts. Publicly available data can be used for initial research without surveying the territories in nature. The analysis of the available data in the context of Latvian landscape research was carried out within the framework of the State Research Program project "Sustainable management of land resources and landscapes: assessment of challenges, methodological solutions and proposals" (hereinafter referred to as LandLat4Pol) [39]. In the LandLat4Pol project, landscape characterization took place on the scale of landscape areas in Latvia. Considering the availability of public data analyzed in the LandLat4Pol project, it is possible to determine data related to cultural services - historically significant and symbolic effects of landscape elements and structures on society, which can be used in this study according to the set goals. In order to ensure effective data processing, it is recommended to use the geographic information systems (GIS) approach, which provides both spatial transparency of all available data, simultaneously viewing and analyzing the overlap of information from different spatial layers, and ensuring data processing offered by various GIS software. In some cases, data can be obtained from old photographs and maps. The determined, publicly available data for the assessment of CES are included in the table 1.

Considering that all the necessary data cannot be obtained only from available databases, field research and interviews are also necessary, within the framework of which it is possible to obtain data by surveying specific territories and interviewing local residents. It is also important to make sure that the previously collected data correspond to the situation in nature.

The symbolic meaning and cognitive dimension of the landscape or landscape elements is an essential aspect in the landscape evaluation process when the understanding of the values and meaning of the landscape is needed, respecting intangible values as well. The cognitive study of the landscape is related to the physical state of the landscape to the socio-cognitive one - here a close connection is formed between the spatial structure of the environment and the cogni-

Fig. 2. Schematic representation of the methodological framework [created by authors]
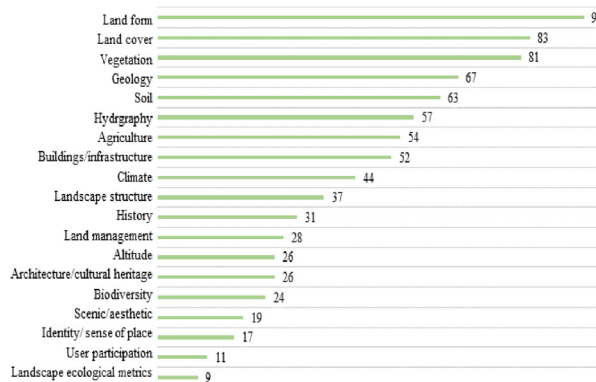

Fig. 3 Simensen et al. [44] analysis of the most frequently used criteria in landscape assessment (a total of 54 studies) [created by authors]

Table 1. Publicly available data for the characterization and evaluation of proposed CES

#	Place identity, symbolic value	Religious value	Cultural-historical value	Entertainment value	Data
Natural values (natural elements – relief, rock outcrops, dunes, individual trees, etc.; structures – forest massifs, water bodies and streams, etc., landscapes)	x	x		x	Natural data management system Ozols [34]
Land use types and land cover	x		x		Rural support service database [42]; Corine Land Cover Database
Toponyms	x				Latvian Geospatial Information Agency [21]
Cultural and historical heritage	x	x	x		Cultural Heritage Database [8]; Project of the National Library of Latvia Zudusī Latvija [40]
Historical roads	x		x		Cultural Heritage Database
Tourism objects				x	Latvian State Forest Database [14]
Objects and territories important to society	x	x	x	x	The most significant landscapes in the Landscape Treasures project were selected by public vote [38]
Areas of scenic value important to the municipality	x	x	x		Municipal databases
Landscape values determined within the landscape surveys of the LandLat4Pol project	x	x	x	x	Digital atlas of landscapes [39]

tive content of the place. Researchers Jurģis Šķilters and Ģirts Burgmanis [33] distinguish several groups of environmental perception factors in this interaction. The first group describes the fact that we remember places through roads (how we get to the landscape) and places (through names, size, spatiality, characteristic features) - all together a cognitive spatial structure. There are also perception approaches, or analysis, which divides all landscape objects into two groups - the object/objects we are looking for, or the objects that help us search for a goal, or remember/orientate in landscape. On the other hand, the second group of environmental perception factors is related to the individual's personal experience and knowledge – here, cognitively simulated situations that form non-existent mental connections and automatically assigned roles, meanings or symbols to landscape objects. Such a process of cognitive perception is completely based on our ability to abstractly perceive a place and give it an emotional-psychological character (6; 11; 15; 20; 25; 26). Human perception is subjective and landscape characterization based only on these results is easily interpreted in different forms and has questionable reliability in scientific terms. Therefore, it is essential to combine the studies of the cognitive perception of the landscape with other methods, creating a comprehensive image, where the cognitive meaning of the landscape has its own role, because the landscape is able to accumulate in itself the knowledge, experience, traditions and peculiarities of perception - seeing and feeling more than in the physical

manifestation of the landscape - in the most literal sense of the word - 'invisible landscape'.

The importance of community surveys is appreciated by many landscape researchers who incorporate landscape associative perception into their research. Here, a concept as Psychology of Place appears, which in Canter's theory [5] is characterized by physical elements, people's understanding and perception, and people's activities [2].

Recognition of cognitive, symbolic and emotional characteristics, values and aspects of landscape perception is possible with the help of surveys of residents and experts. Citizens' and experts' involvement take place in different ways:

- Remote surveys - it is positive that data can be obtained quickly and widely, but not all groups of respondents can be reached - it is the senior citizens who have accumulated the most experience about the landscape that remain less surveyed. One should be aware that obtaining qualitative data, where the respondents have to express themselves, write or speak, is a more difficult result to achieve [42];

- Interviews - one-on-one - a very effective method for obtaining qualitative data, but time-consuming. Respondents are not always ready to meet with researchers and share their personal experience of the landscape. Here, the best methods are to communicate with respondents through non-governmental organizations, involving them in the research process - it is easier for respondents to trust and share [17];

- Open discussion interviews - discussions where larger groups of respondents are involved at once - they can be organized in parallel with some territorial planning processes, as part of research - involving residents and experts both in discussions and in working groups with a specific task, where one of the goals is also to obtain landscapes symbolic values. This method is effective and can be used in the spatial planning process of the territory;

- Creative tasks - the involvement of young people and children through creative tasks - drawings, models, creative events - where the whole family gets involved through the children, participating in the event - part of the task is highlighting the values of the landscape. This method is valuable with the possibility of involving younger respondents as well, but difficult to interpret, because the creative expressions have a broad focus and it is difficult to maintain a narrow concentration only on the mental values of the landscape;

- Ethnography – immersion of the researcher in the daily environment of the entire social community in order to observe and experience the daily life and culture of a local community, to observe their perception of the landscape and their importance in daily life and also their role in culture. The results of ethnographic research are very reliable, but time-consuming [23; 24; 49].

These methods are the most suitable for determining the cognitive values of the landscape, as they are able to provide data that characterize the 'invisible values' of the local landscape.

Design of methodology of field work

The method of this research aims to evaluate landscape potential to supply symbolic, entertainment, religious and cultural-historical values using ecosystem service approach. The size of the data collection cells used in this research is 1x1km, in order to use the collected data and research results for wider data analysis with other researches and Central Statistical Office data.

Table 2. CES assessment indicators and criteria for field evaluation

Indicator	Criteria	Notes
Access to object or territory	0 - no public access 1 - the object can only be reached by private transport, there is no possibility of public transport, or it runs very rarely 2 - the object can be reached by public and private transport, there is parking infrastructure + a walk of more than 15 minutes 3 - the object can be reached in less than 15 minutes from a parking place or a public transport stop	Accessibility of objects is an important criterion for providing a range of CES. For example, if an object is not accessible there is much less visit to a specific object. 15-minute walking distance has been proven to be the maximum distance for object visitation by several researches [32; 52]. Public transportation data needs to be analyzed beforehand
Infrastructure	1 - no special infrastructure or amenities have been created 2 - infrastructure or amenities are incomplete or outdated 3 - a complete infrastructure has been created, in good condition	Basic infrastructure and amenities are an important criterion for public places, to encourage use of specific objects.
Visual accessibility	0 - the object is not visible in nature and from access points 1 - the object is visible only in the immediate vicinity (100 - 500 m) 2 - the object is visible from access roads, parking lot 3 - the object is dominant from the surrounding areas, adjacent roads	Visual accessibility assessed in the field work, is the object a dominant and creates symbolic scenic landscapes or is it difficult to find specific object even when being directly next to it
Accessibility of the environment for people with mobility impairments	0 - not provided 1 - is provided incompletely 2 - is fully provided	Object accessibility for everyone, also for people with mobility impairments. Object can be easily accessible without any manmade objects, then rating is the highest
Function	0 - not applicable (ancient graveyards, etc.) 1 - does not fulfil either the original or any other function, visually unattractive 2 - preserved or restored architecture or original appearance, without additional functions 3 - performs several functions, multifunctional	Function assesses the use of a specific object, its multifunctionality or perhaps no use due to neglected state. Some objects, for example, graveyards do not correspond to other functions, for this reason this criterion is not applicable.

For field research, a questionnaire is drawn up using GIS Survey 123 tool, including the necessary evaluation criteria in the questionnaire. During the field work, the survey is filled out, while marking the location of the elements and adding photos. For the field study, in accordance with the previously analyzed studies on the evaluation of CES, the criteria were put forward (table 2), which is included in the site survey to be filled out when surveying the studied territories. Indicators and criteria in table 2 definition uses term 'object', with meaning that it could be territory, process or any other significant element for local society.

Mapping of CES supply objects
Table 1 summarizes the publicly available data sets that overlap with each other using GIS software. After mapping all the cultural-historical, natural and other landscape elements with CES potential, elements that result from social assessment methods need to be mapped in the same matter. Some of the criteria defined for field work can be assessed already in mapping process, for example for accessibility criteria public transportation data needs to be assessed before field work.

Field work
In order to collect precise data and verify initial research re-

sults from publicly available data, it is necessary to do field work. As several authors emphasize, field research can confirm the initial research results, supplement them, or completely overturn the previously proposed theory due to the inaccuracy or lack of the data [3; 19]. Based on the developed aforementioned criterion and initial assessment with publicly available data field work is done. For data collection ArcGIS tool Survey123 will be used, to systematically collect data and have a geographical location for each surveyed point. After the first field work stage it is possible that adjustments of the methodology will be needed. If necessary, revision and improvement of methodology is done and assessment repeated.

In a field study, it is also important to identify those natural and human-made elements that have not previously been marked as values in publicly available data, but which are visually expressive in the landscape and which can potentially have historical or cognitive significance in the specific place and region [36]. In order to obtain data on the significance of these natural and man-made elements determined in the field research, as well as the landscape values previously identified in public databases, in the local cultural space (municipality, region), surveys of the local community and interviews of experts are an important stage. Thus, it is possible to evaluate which of the landscape values identified in the feasibility study and field study have a symbolic, religious, cultural-historical, informative or entertaining significance from the point of view of the local society. Such assessment is important in the grouping and inclusion of these valuables in the implementation of certain future development scenarios.

Result analysis, interpretation (potential value, base for territory development)
In the context of territory development planning and management, it is important to determine the development possibilities and scenarios of territories with identified CES, evaluating the CES provided by the specific territory against possible development scenarios.

The assessment of the CES provided by the landscape is a process in which the individual CES of the landscape are evaluated in the context of a possible development scenario. Such an assessment allows territory planners and decision-makers to determine in which direction it would be desirable to develop the specific territory in order to more effectively use the CES provided by the landscape. The results obtained can help:
▪ developing territory planning documents;
▪ preparing thematic plans in spatial planning;
▪ in landscape management plans;
▪ for individual proposals.

After all stages of CES assessment, separate stage of the methodological framework is to evaluate the assessed CES in the context of possible development scenarios. Therefore, one of the tasks that was set in the research is the determination of the possible development scenarios of the studied territories in connection with the theme of CES provided by the landscape. Sustainable development strategies of local governments, as well as development planning documents in the international and Latvian context [35], were used to determine development scenarios, which note the importance of the landscape and its elements in creating a cultural space, which is determined by the complex of several CES provided by the landscape. The following documents are the main documents for identifying development scenarios:
▪ Convention Concerning the Protection of the World Cultural and Natural Heritage [48], which determines the identification, protection, preservation, presentation and

transmission of the existing cultural and natural heritage to future generations. Heritage is a resource to strengthen identity and build a sense of belonging.

- Convention for the Protection of the Architectural Heritage of Europe [7], the main purpose of which is to strengthen and promote the European heritage conservation and development policy. It was emphasized that the architectural heritage is an irreplaceable form of expression of the richness and diversity of the European cultural heritage, it contains invaluable evidence of our past and is the common heritage of all Europeans.

- Framework convention of the council of Europe on the value of cultural heritage for society [12], which emphasizes the characteristics of cultural heritage and the importance of their use also in landscape diversity policy. The Convention emphasizes the importance of linking with other documents, such as the European Cultural Convention (1954), the European Convention for the Protection of the Architectural Heritage (1985), the European Convention for the Protection of the Archaeological Heritage (1992, amended) and the European Landscape Convention (2000).

- The Burra Charter [1] was adopted in Australia in 1979 with the aim of helping to assess the cultural significance of the heritage values found in a place. This concept made it possible to preserve landscapes with cultural significance.

- European Landscape Conventions (2000) [10], the purpose of which is to promote the protection, management and planning of landscapes, as well as to organize cooperation on landscape issues in Europe.

- Lausanne Declaration (2020) [22] aimed at integrating landscapes into national regional and urban planning policies and into cultural, environmental, agricultural, social and economic policies, as well as any other policy with a possible direct or indirect impact on the landscape.

- Consequently, the following possible development scenarios arise, according to which the CES provided by each territory are evaluated, determining which of the scenarios is more appropriate for each of the territories:

- Different scenarios according to a specific theme (e.g., protected landscape area, sacred landscape area, etc.)

- International, national importance/value according to the importance of the provided CES on an international or national scale

- Local municipality importance/value according to the importance of the provided CES on the scale of the local community, municipality

- Tourism development (including thematic tourism – tourism of manors and castles, etc.)

- Local communities' development initiatives – importance for strengthening local community/ society traditions, sense of belonging.

Conclusion

Such a comprehensive assessment methodology of landscape CES can produce true and accurate assessment results that can be used in landscape development plans and guide the development of specific areas based on various scenarios. Until now, in the studies carried out in Latvia, the CES discussed in this article have not been widely studied, in some cases they have been studied with the expert method and give an insight into the potential of CES. Assessment and knowledge of CES values can lead to specific tools for development of endangered landscape elements or historic processes in the landscape.

Publicly available data, which should be used in the research, occupy an important place in the methodological framework of landscape CES. However, currently in Latvia they are not enough to evaluate CES related to place identity, symbolism, religion and entertainment. Therefore, collecting these missing data in field studies and surveys and individual interviews is an essential step. In the context of CES, it is necessary to collect data both on landscape values that are visible in the landscape, analyzing their meaning in the context of various aspects, as well as on those values that have remained in people's memories.

During the evaluation stage of CES, it is important to identify the possible scenarios for the development of the territory, within the framework of which the lost CES would be used most effectively and sustainably. Both international strategic documents and local sustainable development strategies can be used to identify scenarios, from which the main ideas and needs of the specific municipality can be gathered.

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Kopsavilkums

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