

Linking Ecosystem Services with Cultural Landscape Research

The ecosystem services approach has become prominent in conservation science and practice. There is an abundance of data, indicators, and models for assessing provisioning and regulating ecosystem services. However, the concept of ecosystem services has not been successful in capturing cultural ecosystem services in any detail.

Research in the two fields “cultural landscape” and “ecosystem services” should be conducted jointly to enhance the understanding of cultural ecosystem services in social-ecological systems and to develop methods of assessment.

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Abstract

The concept of ecosystem services facilitates the valuation of the multiple services from ecosystems and landscapes, the identification of trade-offs between different land use scenarios, and also informs decision making in land use planning. Unfortunately, cultural services have been mostly neglected within the ecosystem services framework. This could result in trade-off assessments which are biased and mislead ecosystem management and landscape planning. However, cultural landscape research approaches have proven valuable in the assessment of different nonmaterial landscape values and cultural services. In this paper, we compare the objectives, approaches, and methodologies adopted by ecosystem services research and cultural landscape research through a bibliographic research. Both research communities investigate the human dimension of ecosystems and landscapes and, hence, study the same object. A closer link between the two research communities would enrich and possibly sharpen both approaches. In particular, landscape research on cultural services such as aesthetics or cultural heritage could provide valuable results and methods for a comprehensive assessment of ecosystem services.

Keywords

cultural landscape, cultural services, decision making, ecosystem services, human well-being, landscape aesthetics, landscape planning, social values

The Difficulty of Assessing Cultural Ecosystem Services

Within a few years, the concept of “ecosystem services” has shifted rapidly “from an academic backwater to the mainstream of conservation and environmental policy” (Redford and Adams 2009, p. 785). Ecosystem services comprise provisioning services (e. g., food, fresh water), regulating services (e. g., flood protection), cultural services (e. g., tourism, cultural heritage), and supporting services (e. g., nutrient cycles). By linking ecosystem functions with human livelihood quality, the concept aims to justify nature conservation and environmentally sensitive management (Ghazoul 2007). A peculiarity of cultural landscapes – landscapes that are deliberately managed by humans – is that greater value is not so much attributed to undisturbed, “intact” ecosystems. Rather, biodiversity and ecosystem services have been sustained through a long and complex history of settlement and land use (Antrop 1997, Jones-Walters 2008). Compared to more natural ecosystems, cultural landscapes stamped by agriculture and forestry have much greater potential to expand the supply of ecosystem services: Knowledge about biophysical input-output relationships in agricultural landscapes is available, precedents for economic incentives that can enhance the supply of ecosystem services exist, and past agricultural and forestry performance suggests that the supply of goods and services can respond strongly to attractive incentives (Swinton et al. 2006).

Cultural ecosystem services, somewhat vaguely defined as “nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recrea-

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tion, and aesthetic experiences” (MA 2005, p. 40), create strong ties between humans and their natural surroundings and play a crucial role in “feeling at home” in a landscape. Moreover, cultural services represent one of the strongest incentives for people in developed countries to become involved in environmental conservation (Philips 1998).

Unfortunately, so far cultural services have been assessed only marginally in the ecosystem services framework: The Millennium Ecosystem Assessment (MA) has been able to specify qualitative, in most cases even quantitative trends in human use of ecosystem services and enhancement or degradation of ecosystem services for all 21 categories and subcategories of provisioning and regulating services (with the exception of wild plant and animal products). In contrast, only three – 1. spiritual and religious values, 2. aesthetic values, and 3. recreation and ecotourism – of the ten services defined as cultural services could be assessed. Measured in terms of the number of people affected, these three services have experienced increasing human use over the past 50 years. Two of them – spiritual and religious values, and aesthetic values – have become degraded (defined as a change in the ecosystem features that decreases the cultural benefits provided by the ecosystem) over the same period, and one – recreation and ecotourism – showed mixed effects. For the remaining cultural services – 4. cultural diversity, 5. knowledge systems, 6. educational values, 7. inspiration, 8. social relations, 9. sense of place, and 10. cultural heritage values –, the pattern of human use and the status of the service could not be assessed from the information available (MA 2005).

This lack appears not only in the MA, but throughout the literature on ecosystem services. A recent meta-analysis of 89 restoration assessments evaluated the provision of biodiversity and ecosystem services in a wide range of ecosystem types worldwide. Although 524 quantitative indicators related to supporting, provisioning, and regulating services as well as biodiversity were extracted, not a single study had measured cultural services explicitly (table 1; see also Rey Benayas et al. 2009).

Clearly, the assessment of trends in human use and of the status of cultural services is one of the most difficult and least accomplished tasks in ecosystem services research. The evident difficulties in capturing the intangible cultural benefits of ecosystems also cast new light on attempts to further refine the concept of ecosystem services by distinguishing between ecosystem services and their benefits (e. g., Boyd and Banzhaf 2006). Drawing on these ideas, Fisher et al. (2009) suggest defining ecosystem services exclusively by referring to ecological phenomena or elements of ecosystems, while recognising cultural and amenity values as benefits resulting from these services.

However, simply to remove cultural services from ecosystem services in this way may seriously endanger a comprehensive view of benefits people obtain from ecosystems. We propose an alternative approach to fill the knowledge gaps in cultural services, namely to link ecosystem services research with cultural landscape research. The latter includes research in human geography, landscape ecology, and spatial planning, and within this field, the

TABLE 1: Number of indicators for biodiversity and ecosystem services used in ecological restoration projects worldwide according to Rey Benayas et al. (2009). The fact that none of the projects considered cultural services demonstrates that these are often neglected because they are difficult to assess.

	number of indicators
biodiversity	270
ecosystem services:	
■ provisioning services	13
■ supporting services	195
■ regulating services	46
■ cultural services	0

investigation of nonmaterial landscape values has a long tradition. The ecosystem services and cultural landscape research communities share a common interest in relation to the demands people place on, as well as benefits people obtain from, ecosystems and landscapes. Both focus on the “human dimension” of landscapes. Yet, they seem surprisingly disparate: A mere six publications covering both key terms could be detected in the *ISI Web of Science* (as assessed on October 15, 2010). We aim to identify the reasons for the divergence of ecosystem services and cultural landscape research. We consider the origin, publication records, theories, concepts, and methods of each research community. We argue that the neglected cultural services concept within the ecosystem services approach could be improved by incorporating insights from cultural landscape research.

The Cultural Landscape Paradigm

The word “landscape” originated around 500 AD in the Anglo-German language (*landscaef*) and described a settler’s clearing in the forest with animals, huts, fields, and fences. “Landscape” originally defined a man-made artefact and the inherent cultural processes and values (Taylor 2009). The link between the concepts “landscape” and “ecosystem” has been emphasised by Leser (1997) in his definition of landscapes as ecosystems, i. e., complex systems of biotic (including humans) and abiotic elements. Today, the common understanding of “landscape” accords with the definition of the *European Landscape Convention*¹ (2000) as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”. This view highlights the fact that the human dimension of landscape is not limited to negative impacts on ecosystems or exploitation of natural resources, but also encompasses people’s emotional, intellectual, and socioeconomic inputs, which contribute in many ways to landscape diversity and distinctiveness (Moreira et al. 2006). Landscape refers to the cultural meanings and uses of land and can be seen as the human element of the environment. Therefore the concept of “landscape” can be used to draw connections among people, between people and places, and between societies in their environment (ESF 2010). Linking the attribute “culture” to landscape underlines the holistic view of landscapes: Humans interact with landscapes in dynamic transactional processes (Na-

veh 1995). Cultural landscapes are at the interface between nature and culture, tangible and intangible heritage, biological and cultural diversity. They represent a closely woven net of relationships, the essence of culture and identity (Rössler 2006).

Given the long-lasting, comprehensive, and large-scale human land use history in Europe, almost its entire land surface can be considered a mosaic of cultural landscapes, in which different stages of anthropogenic influences have been overlaid and refined, resulting in multi-layer systems. Hence, cultural landscapes can be understood as “social-ecological systems”, in which social, economic, and environmental components are closely interwoven (Berkes et al. 2003). Many landscape studies have adopted holistic principles, integrating natural and social sciences, humanities, and local knowledge in a transdisciplinary way (Höchtel et al. 2007). According to Vos and Meeke (1999), landscape studies should foster the integration between disciplines, address various temporal and spatial scales, interact with decision makers and landscape users, include links between landscape change and human perception and well-being, and enhance the understanding of social and economic processes that shape landscapes.

“Ecosystem Services” and “Cultural Landscape” – a Bibliometric and Conceptual Comparison

To compare the publication output of the research communities investigating ecosystem services and cultural landscapes, respectively, we searched for papers containing the keywords “ecosystem services” and “cultural landscape” in the *Web of Science*² (accessed on February 14, 2010). This database is limited to the most prevalent international journals and conference proceedings and thus represents the scientific mainstream. Much research on ecosystem services and, possibly, even more on cultural landscapes is place-specific and applied. Therefore, a substantial part of the literature is published in national journals and magazines, books, technical reports, and other media not covered by this database (cf. Mocikat 2009, Nentwich 2009, Winiwarter and Luhmann 2009 for a critical discussion in this journal). We focus on the *Web of Science*, as our main interest was to track when the two concepts entered the international research arena. The first paper on ecosystem services was dated 1983 (Ehrlich and Mooney 1983); the first ten papers were published by 1995. Cultural landscape research has a much longer history: The first paper was published in 1928 (Witte 1928) and the first ten papers had appeared by 1933 (table 2). However, recent publication activities relating to ecosystem services have been far more intensive than those referring to cultural landscape. Overall, more papers on ecosystem services have been published, and these have been cited considerably more often than those on cultural landscape. *The Value of the World's Eco-*

TABLE 2: Comparison of publications containing the keywords “ecosystem services” or “cultural landscape” (database: Web of Science 2010). Although the ecosystem services concept is of much more recent origin than cultural landscape research, it has resulted in a greater number of publications, which have been cited much more often.

publications containing the keyword “ecosystem services” “cultural landscape”	
first paper published	in 1983	in 1928
first ten papers published	by 1995	by 1933
total number of publications	1770	1148
number of publications in 2009	476	129
mean number of citations per paper	12.36	4.54
number of citations of most frequently cited paper	1584	137

system Services and Natural Capital by Costanza et al. (1997) was the most cited ecosystem services paper. The most cited paper on cultural landscape, *Landscape Openness and Pollen Records: A Simulation Approach* by Sugita et al. (1999), was cited much less.

99 percent of papers on ecosystem services have been published in English, whereas cultural landscape publication culture seems more regional, with only 86 percent of papers published in English. 69 percent of all papers on ecosystem services stem from US, British, or Australian authors; cultural landscape papers are much more diverse in terms of geographic origin, with only 37 percent of authors based in these countries.

Distinct differences also arise from the analysis of subject areas of research in ecosystem services and cultural landscape. Prominent subject areas in ecosystem services research are ecology, economics, biodiversity conservation, and various fields of biology, as classified by the *Web of Science* (figure 1, p. 272). Cultural landscape research seems more rooted in subject areas such as geography and geosciences, ecology (but to a far lesser extent than ecosystem services), humanities, and social sciences. Papers from both fields have often been classified as multidisciplinary sciences, environmental sciences, and environmental studies, indicating their interdisciplinary character.

A review of publications from 1999 to 2010 showed that ecology, economics, and conservation journals such as *Ecological Economics* (six percent of papers), *Ecology and Society* (three percent), the *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, *Biological Conservation*, and *Environmental Management* (two percent each) counted among the most important outlets for recent ecosystem services studies. During the same time span cultural landscape studies were mostly present in geography, planning and palaeoecological journals such as *Landscape and Urban Planning* (six percent of papers), *The Holocene* (two percent), *Landscape Research*, *Landscape Ecology*, and *Veg- etation History and Archaeobotany* (one percent each).

In order to investigate conceptual similarities and differences between ecosystem services and cultural landscape research, we analysed 40 of the most recent papers in the key journals of both fields (see appendix, p. 277). The publications analysed for each research field were chosen from the five most important journals in the last ten years (specified above) by taking the four most re-

1 www.coe.int/t/dg4/cultureheritage/heritage/landscape/default_en.asp

2 http://thomsonreuters.com/products_services/science/science_products/a-z/web_of_science

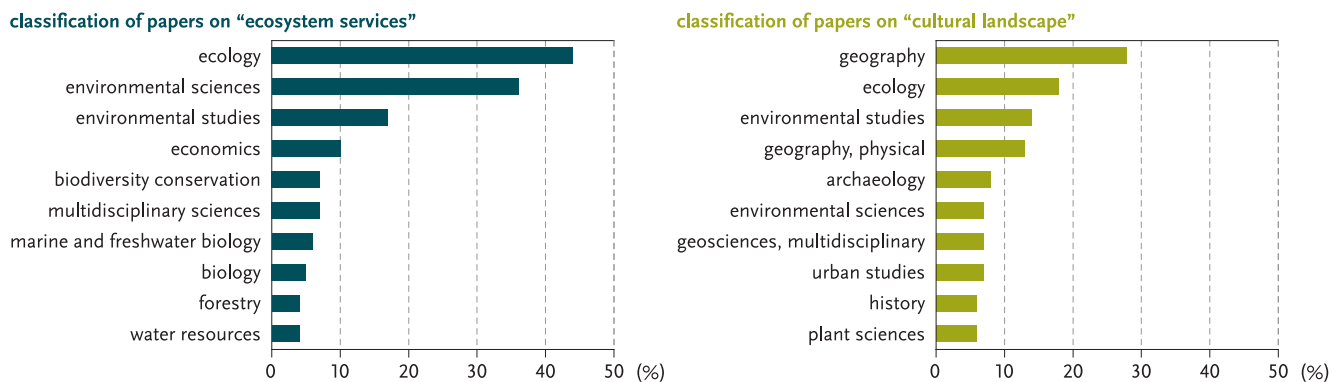


FIGURE 1: Subject areas in which papers on "ecosystem services" and "cultural landscape" have been classified in the *Web of Science* (as of 2010).

cent papers each for the search terms "ecosystem services" and "cultural landscape" (accessed October 15, 2010). This systematic selection approach was necessary because a totally randomised procedure would have included articles from other disciplines (e.g., "cultural landscape" also found in archaeology) only indirectly related to the two core research fields. We focussed on recent publications to represent the currently prevailing conceptual notions of each research community.

The analysis shows pronounced conceptual and methodological differences between the two research fields (table 3). There are also distinct differences in the underlying assumptions on the relationship between human activities and nature, and research in both approaches covers different spatial levels and time scales. The comparison shows that both the concept of "ecosystem services" and the concept of "cultural landscape" concentrate on the human dimension of ecosystems and landscapes and therefore study almost identical objects. The complementarity of the two concepts in terms of methodologies, disciplinary foci, spatial and time scales, and political and practical impact of research is evident. The observed disconnection of both research communities is therefore surprising.

Capturing Cultural Ecosystem Services through a Landscape Approach: Some Examples

Given this disconnection, we argue that synergies could be achieved if the two research communities cooperate. Cultural landscape research can advance the assessment and appreciation of cultural ecosystem services. We will use the examples of landscape aesthetics, cultural heritage, and "sense of place" to illustrate the potential contribution of landscape studies to the further development of the ecosystem services concept.

Cultural landscape research has long been concerned with questions of human perception of, and involvement with nature. There exists, for example, theoretical literature on the psychological background of aesthetic preferences (Kaplan and Kaplan 1989, Wöbse 2002), and broad knowledge about the assessment of aesthetic values on site and in specific contexts. This variant of landscape research also offers tools to capture aesthetics effectively in terms of law, for instance in the context of permission for afforestation (box 1) or compensatory measures with regard to the establishment of wind farms or power lines. Guidelines have been developed for landscape management practices to maintain or

TABLE 3: Conceptual comparison of 20 recent papers on "ecosystem services" and 20 recent papers on "cultural landscape" (details: see text, pp. 271/272; list of papers analysed: see appendix, p. 277).

aspect	"ecosystem services" research community	"cultural landscape" research community
empirical/conceptual	often conceptual	mostly empirical
quantitative/qualitative	mainly quantitative approaches (often modelling)	quantitative and qualitative approaches (often combined within the same study)
disciplinary/interdisciplinary	mainly disciplinary	mainly interdisciplinary
disciplinary focus	ecology, economics, political sciences	land use science, social sciences, humanities, palaeoecology
key terms	ecosystem, biodiversity, valuation, payments for ecosystem services, human well-being, governance	landscape, land use change, driving forces, perception, fragmentation
typical human role	threatening ecosystems and/or beneficiary of ecosystems	land user and manager; creator or transformer of landscapes
political and practical impact	mostly high political and medium to high practical impact	mostly low political but high practical impact
spatial scale	global or national case studies with global lessons	regional or local case studies, sometimes with national recommendations
time scale	current or future	past (mainly last 200 years, but also studies referring to periods back to the Holocene)

BOX 1:

Assessing Landscape Aesthetics in the Context of Afforestation

Legislation in Germany (as well as in other countries) permits afforestation only if the scenery is not severely harmed. The legal procedure requires determining the aesthetic outcome of the afforestation in question. Landscape research has contributed specific guidelines to support such assessments (Bieling et al. 2008). Drawing on a range of studies on the psychology of landscape perception, four basic characteristics are essential for the appreciation of beautiful scenery:

1. coherence (interplay between different landscape features),
2. historic continuity (e. g., of landscape scales),
3. diversity and complexity (to the extent typical for the region), and
4. comprehensibility (the extent to which a landscape is “readable”).

These characteristics can be converted into a set of criteria that allow to identify afforestation proposals that would seriously impair landscape aesthetics. This would prevent afforestation of places (e. g., ice-age tumuli shown in figure 2) where the origin of the landscape would become unrecognisable and the character of the place (*genius loci*) would be destroyed by forest. These characteristics and criteria also provide guidelines for afforestation designs compatible with desirable landscape aesthetics (e. g., regarding scale, geometry, and composition of forest edges).



FIGURE 2: These tumuli formed by ice-age glaciers near Hirschberg in Bavaria, Germany, are – with their aesthetic values – part of the cultural ecosystem services that landscapes provide to society. Afforestation would hide these structures that reveal the specific history and embody the character (*genius loci*) of the place.

enhance aesthetic qualities as well as the unique character and visibility of the cultural heritage of a particular place (e. g., Bell and Apostol 2008, Reeg 2009, Lanninger and Langarová 2010).

Landscape research can also provide tools for the assessment of sense of place and cultural heritage. For example, drawing on a social constructivist perspective, Kühne (2009) elaborates how notions of “Heimat” (“feeling at home”) can be integrated into participatory landscape planning practice. Likewise, cultural heritage services can be assessed through surveys of historical landscape elements, for instance remnants of abandoned land use practices (Reinbolz et al. 2008, Schaich et al. 2004). New technologies such as laser scanning can be used to assess relics of cultural landscapes, e. g., earthworks, precisely and effectively (Schell-

FIGURE 3: Afforestation at the border of the Schönbuch Natural Park, Germany. German legislation permits afforestation only if the scenery – a cultural ecosystem service – is not severely harmed. While the ecosystem services concept does not offer adequate methods to assess cultural ecosystem services, landscape research can provide specific guidelines to determine, for instance, the aesthetic outcome of afforestation.



berg et al. 2010). This knowledge can also be used to develop techniques and standards for the accounting of cultural ecosystem services. Finally, landscape research has been dedicated to quantifying perceptions of people and land users towards landscape change (Plieninger et al. 2004, Schaich 2009) and linking aesthetic and other cultural values to certain landscape features in a spatially explicit way (Tyrväinen et al. 2007).

The tools and insights that cultural landscape research offers have rarely been integrated into assessments or accountings of ecosystem services. The example of land use change, for instance the afforestation of former farmland, illustrates the difference between a “classic” ecosystem services approach that focuses on provisioning and regulating services and a perspective that integrates cultural services. Afforestation can have a considerable impact on the scenic beauty of a landscape, on its function as an archive of cultural heritage, and on the unique character of the place, as shown in figure 3. If cultural services of this kind are not accounted for in an ecosystem services approach, one would limit the discussion on trade-offs to regulating services (carbon sequestration, hydrological services, etc.) and provisioning services (wood vs. forage provided by grassland). It would not be considered how afforestation relates to aspects of scenery and how severely it harms typical historical or contemporary features that give a landscape its identity.

Ecosystem Services and Cultural Landscape: Links and Challenges

The ecosystem services approach is innovative and powerful in terms of quantifying, accounting, and valuating different services provided by a specific landscape unit. The ability to display the



trade-offs of ecosystem services for different land use scenarios in a landscape is, in our view, a major conceptual advantage of the ecosystem services approach. However, trade-off analysis between different land use scenarios can only be effective if all ecosystem services – and especially the cultural services, which have been neglected –, are accounted for. The ecosystem approach needs further development in this respect before it can provide a useful understanding of the cultural inputs, outputs, and services of ecosystems (ESF 2010). This is particularly true for environments heavily influenced by humans like those typical for much of Europe and many other parts of the world.

The conceptual comparison and the examples of assessments of cultural landscape values demonstrate that landscape research offers a methodology for the assessment and valuation of cultural services on a regional and local scale, e.g., via participatory plan-

landscape research often relate to a local or regional scale and are not suitable for upscaling to higher spatial levels. Thus, defining the scale for an overall accounting scheme or assessment is a major challenge because many other ecosystem services are accounted for at national or global levels. Spatial inventories of cultural services via the mapping of nonmaterial landscape values allows to identify possible trade-offs with other local to regional-scale ecosystem services, and may help inform decision making in regional landscape planning. Whether “landscape” itself can be used as a geographical unit and the definition of scale can be also questioned because individual perceptions of landscape differ. This problem of scale for the accounting of ecosystem services, and especially cultural services, must be subject of further research and a pilot topic for the collaboration of both research communities.

Cultural landscape research provides different perspectives on the interactions between man and nature, and deepens the understanding of the role of humans in landscapes and ecosystems.

ning approaches, historical land use analysis, guidelines pointing at critical elements or values, and qualitative and quantitative social surveys. It is even possible to spatially assess cultural services by accounting for cultural landscape values and for social demand for ecosystem services (box 2). However, monetary valuation of the landscape values identified is often unrealistic (and perhaps also undesirable). This view is shared in a science policy briefing of the European Science Foundation (ESF 2010) that summarises the established strengths of landscape research as follows:

- the understanding of environmental history and long-term historical transformations underlying present-day perceptions of environment;
- tried and tested methodologies of studying landscape as personal and collective cultural constructions (in participatory studies, archive studies, fieldwork, surveying, and mapping);
- solid groundwork on mapping national and regional landscape character; and
- a long tradition of landscape-based heritage and nature management, planning, and design.

A major obstacle to harmonising the ecosystem services approach with cultural landscape research lies in the definition of scale, or the identification of suitable, comparable landscape units for the assessment of cultural ecosystem services. It is difficult to define a uniform scale for the accounting of different, or even the same, cultural services in the landscape. For instance, aesthetic values of landscapes can be enjoyed by viewing a single tree, but also by valuing an entire landscape, e.g., the complex structure of different land uses in a traditional cultural landscape. The results from

One major challenge in the future is the organisation of dialogue and cooperation between the two research communities. The advantages need to be transparent for both communities to engender a willingness to cooperate. Additionally, such intensified cooperation will depend upon finding a common definition of basic terms and concepts to ensure clear communication between the two communities.

Conclusions

Our sketch of the two research communities indicates that there is complementarity between them, which creates potential for synergies. The ecosystem services concept has had an enormous impact very quickly. This entails a certain risk that the current enthusiasm for ecosystem services may be followed by disillusionment (Ghazoul 2007, Redford and Adams 2009). Cultural services, an essential element of the concept, are rarely taken into consideration in current research activities. This is particularly problematic if the concept of ecosystem services is applied in cultural landscapes, given their long-lasting land use history, their dynamic interactions of humans and nature, their cultural patterns, and people’s identities and values. Cultural landscape research may enrich ecosystem services research as it builds on a long tradition of interdisciplinary and transdisciplinary environmental studies. It provides different perspectives on the interactions between man and nature, and deepens the understanding of the role of humans in landscapes and ecosystems. Nonmaterial landscape values can be determined qualitatively, quantitatively, or in a spatially explicit way, and can thus be integrated into accounting schemes for ecosystem services. The need to strength-

BOX 2: Spatial Mapping of Spiritual, Aesthetic, and Recreational Ecosystem Services: A Case Study from Tanzania

A study informed by cultural landscape research – conducted in Tanzania by Fagerholm and Käyhkö (2009) – illustrates how to assess cultural ecosystem services at community level. Members of coastal communities of Zanzibar were questioned about social landscape values. Using participatory and GIS techniques,

- 1. traditional,
- 2. aesthetic, and
- 3. leisure-related

values of landscapes were mapped in addition to the spatial assessment of subsistence-oriented land use (figure 4). In the ecosystem services terminology, these values would correspond to

- 1. spiritual and religious services,
- 2. aesthetic services, and
- 3. recreation and ecotourism services.

Local demand for ecosystem services provision was assessed through interviews with inhabitants who were asked to mark the locations where

specific cultural services were provided on an aerial photograph, using drawing ink. Among the questions were:

- Are there religious or places sacred to you in the landscape, and where? (spiritual/religious services)
- Where are the most beautiful places here? (aesthetic services)
- Where do you go in your spare time? Are there, for instance, any meeting places important to you or do you go to the surroundings? (recreational services)

The resulting maps were spatially and statistically analysed to understand local communities' perceptions of ecosystem services provided. Through landscape-ecological analysis, it was possible to identify typical extent, patch numbers, and distances from people's homes for each service. Moreover, single service maps were overlaid to detect hotspots in the landscape where cultural ecosystem services are clustered. The insights of the study can be harnessed for local stakeholder participation in landscape planning and management.

FIGURE 4: Geographical distribution and intensity of social landscape values of Kigomani community in Matemwe, Zanzibar. Individual informant-specific delineations for leisure-related, traditional, aesthetic, and subsistence-related values (i. e., cultural ecosystem services) that the interviewees attribute to their landscape are grouped in a geographic information system to represent these values and their intensity spatially. The figures in the legend indicate whether one or multiple informants have assigned a value to a specific 50x50 meter (0.25 ha) cell. The maps were spatially and statistically analysed to understand local communities' perceptions of ecosystem services. The insights can be used for local stakeholder participation in landscape planning and management. (Graphic charts modified after Fagerholm and Käyhkö 2009.)



en the research on the human dimension, cultural values, and quality of life in cultural landscapes worldwide should be tackled by closer communication and cooperation between ecosystem services research and cultural landscape research.

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APPENDIX:

Literature Used for the Conceptual Comparison of “Ecosystem Services” and “Cultural Landscape”^a

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^a For the choice procedure, see text, pp. 271/272.