

Cultural Ecosystem Services – Framework, Theories and Practices

Usługi kulturowe pełnione przez ekosystemy – struktura, teoria i praktyka

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Abstract

The article above is an attempt to present main issues of conceptual background and research practices for cultural ecosystem services, seen as an important part of sustainable development, for its practical implementation. The author begins with conceptual background of ecosystems services as whole, then goes to cultural ecosystem services conceptual background and finally to cultural ecosystem services research practice. The last part of the article gives an overview of participant disciplines (their methodologies and perspectives), main research topics, national/geographical background of authors, and finally – main weaknesses of contemporary researches and main challenges for the future ones.

Key words: ecosystem services, cultural ecosystem services, wellbeing

Streszczenie

Artykuł stanowi próbę przedstawienia głównych zagadnień odnoszących się do teoretycznego tła i praktyk badawczych odnoszących się do usług kulturowych pełnionych przez ekosystemy. Jest to ważna kwestia związana z wdrażaniem rozwoju zrównoważonego.

Autorka rozpoczyna od ogólnej analizy usług pełnionych przez ekosystemy, przechodząc następnie do uwarunkowań teoretycznych usług kulturowych, aby potem odnieść się także do praktyk badawczych. Ostatnia część artykułu to przegląd dyscyplin powiązanych (ich metodologii i perspektyw), głównych tematów badawczych, krajowego/geograficznego pochodzenia autorów, a także głównych słabości obecnie prowadzonych badań i zarysu wyzwań jakie staną przed nami w przyszłości.

Słowa kluczowe: usługi pełnione przez ekosystemy, kulturowe usługi pełnione przez ekosystemy, dobrobyt

Introduction

An important issue in sustainability is keeping balance between cultural, monetary and environmental needs, and the fair acting by all actors in wide range of situations. The three pillars of sustainability revolve around economy, social issues and the environment. For the economic, sustainability means: local prosperity, social equity, employment quality and economic viability. For social it is understood as local control, cultural richness and community wellbeing, and for the environment as a physical integrity,

biological diversity, resource efficiency and environmental quality (UNEP & WTO, 2005).

The paradigms of sustainability, despite never criticized and formally accepted by decision makers and many stakeholders, remain quite often at the stage of rhetoric declaration. This lack of implementation was the main incentive to involve into play so called *ecosystem services*. The term has been created by ecologists and economists to explain the monetary value of ecosystems, giving decision makers a dollar value for fresh water, air, forests or coral reefs. Proving how much we can lose in a long-term perspective

if we don't respect the ecosystems enough (or – in other words – if we are not sustainable enough). Ecosystem services revolve around same topic as sustainability but looking at it from different perspective, mostly very practical, monetary one. Thus, if the ecosystem services are not appropriate, sustainable development will not be possible. There is similar dependence with the term *wellbeing* revolving around most of principles of sustainable development (like respect for values, social equity etc.), but perceived from human-centred perspective. The researches about wellbeing look at what people are aware of (e.g. money, family, safety) and at what they are not, but remains very important (e.g. breathing fresh air, or having access to water). The second part is strongly related with environment. Again – if the resource efficiency and environmental purity are not respected, future generations wellbeing will not be possible. As A. Prescott (2001), the author of famous *Wellbeing of nations* stated *To sustain their own wellbeing people need to look after the wellbeing of the ecosystem: the system of land, water, air and living creatures that embraces and supports them. This dramatic change in the human conditions impels the growing concern for sustainable development. People still need ways of living that correspond to their views of the good life. But now this ways of life must also be equitable – both within and among societies and between present and future generations – and they must safeguard the diversity, productivity and resilience of the ecosystem* (Prescott, 2001, p. 1).

One of the main messages of the *Millennium Ecosystem Assessment*, related to cultural services, is that human cultures, heritages, religions, knowledge systems, social interactions and the linked amenity services always have been shaped or at least influenced by the environment (nature of the ecosystems and ecosystem conditions) in which each culture is based. At the same time, people have always shaped and influenced the environment to enhance the availability of certain services (MA, 2005; Tengberg et al., 2012, p. 14). A consensus of *Millennium Ecosystem Assessment* is to use the following framework for linking ecosystems to human wellbeing and sustainability (MA, 2005; De Groot et al., 2010).

In recent decades, the concept of ecosystem services has gained prevailing attention as an efficient approach for integrating into decision-making ecosystem-related values often heretofore dismissed as difficult to capture. As the supply of direct and indirect people's benefits coming from ecosystems, ecosystem services framework was seen as an approach to bridge the gap between ecology and economics, and thus this type of approach so far primarily represents these two perspectives (Daily, 1997; Chan et al., 2012, p. 8).

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part of sustainable development practical implementation. The author begins with conceptual background of ecosystems services as a whole, then goes to cultural ecosystem services conceptual background and finally to cultural ecosystem services research practice. The last part of the article gives an overview of participant disciplines (their methodologies and perspectives), main research topics, national/ geographical background of authors, and finally – main gaps of contemporary researches and main challenges for the future ones.

Conceptual background: how to value ecosystem services?

The concept of ecosystem services dates back at least to the 1970s (De Groot, 1992; Costanza et al., 1997; Daily, 1997). Especially, economic valuation techniques are implemented to determine a value to ecosystem components and functions. The economic valuation brought to ecologists the ability to express some of the values of ecosystems in metrics (dollars) that are better understood and have more powerful meaning to publics, policymakers and decision contexts. Ecosystem service approaches have than become a considerable basis for planning and management policies (Chan et al., 2012, p. 8). Major contribution was made to the understanding of both the monetary – costs-and-benefits – of ecosystem service delivery (Berkel, Verburg, 2014, p. 164).

In the scientific literature the idea of ecosystem services gained momentum in the 1990s (De Groot, 1992; Costanza et al., 1997; Daily, 1997). The concept was mainstreamed by the *Millennium Ecosystem Assessment* (MA, 2003, 2005) and since then, the number of publications about ecosystem and landscape functions and services increased rapidly (Fisher et al., 2009; De Groot et al., 2010). Also the efforts to put the concept into practice, since MA have increased strongly (Daily and Matson, 2008; Tallis et al., 2008). Landscape become an important concept in policy making, as decision makers always had to deal with an explicit and diversified demand for landscape services from a broad range of stakeholders (FAO, 1999; OECD, 2001; Hollander, 2004; Wilson, 2004; Bills and Gross, 2005; Hein et al., 2006, De Groot et al., 2010). Mapping ecosystem services have offered policymakers suggestions about best locations for service delivery (Egoh et al., 2008, Willemen et al., 2008).

The Millennium Ecosystem Assessment (2005) divided ecosystem services into: provisioning, regulating, cultural and supporting ones, but still there is much debate how to classify the services in order to make them quantifiable in a consistent manner (Wallace, 2007; Fisher et al., 2009). Also the distinction between ecosystem functions and services is still discussed. As De Groot et al. (2010) explained: *Ecosystem services are generated by ecosystem functions which in turn are underpinned by biophysical struc-*

tures and processes called 'supporting services' by the 'Millennium Ecosystem Assessment'. Ecosystem functions are thus intermediate between ecosystem processes and services and can be defined as the 'capacity of ecosystems to provide goods and services that satisfy human needs, directly and indirectly'. Actual use of a good or service provides benefits (nutrition, health, pleasure, etc.) which in turn can be valued in economic terms and monetary terms. Although the overall structure of this 'cascade' is generally accepted, the distinction between 'function', 'service' and 'benefit' is still debated." (De Groot et al., 2010, p. 261-262).

The discussion about defining and classifying ecosystem services is followed by approaches to quantify and value ecosystem services. Most of the research programs, however, are focussed at one or a few ecosystem services aspects. We still lack of coherent and integrated approach to practical application of ecosystem & landscape services, functions and planning (ICSU et al., 2008). Many issues still have to be resolved to fully integrate the concept of ecosystem services into regular landscape planning, management and decision-making (De Groot et al., 2010, p. 260). At the landscape level, the main challenge is how to decide on the best allocation and management of numerous and diversified land use options. However, ecosystem-landscape related services are still lacking in most policy support tools (Pinto-Correia et al., 2006; Vejre et al., 2007), and current landscape models mostly deal with either land cover patterns (Verburg et al., 2004) or are strongly sector-oriented (Heilig, 2003; Meyer and Grabaum, 2008; De Groot et al. 2010).

Another problem is that the quantitative relationship between biodiversity, ecosystem components, processes and services is still poorly understood. The specific nature of biotic communities and the functioning of ecosystems remains one of the most important unresolved questions even within ecology seen as one discipline (ICSU et al., 2008). Adequate indicators and criteria are needed to exhaustively describe the interactions between the ecological processes and components of ecosystems and their services (De Groot et al., 2010, p. 262).

The relationship between ecosystem processes and provision of ecosystem services is almost not researched and remains unknown (Carpenter et al., 2009). Thus, we don't know much about when to expect synergies or trade-offs between different services, we don't know the mechanisms that cause them, or how to minimize trade-offs and enhance synergies (Benett et al., 2009, p. 1395). This lack of knowledge has led to an increase in a few services and a decline in most other (MA, 2005). Sometimes, an overly-narrow focus on a selected set of ecosystem services has even led to regime shifts with unexpectedly sudden losses of other ecosystem services (Benett et al., 2009). Looking at the ecosystem services correlations, Benett et al., (2009, p. 1396) pro-

posed a typology of relationship based on the two types of mechanisms causing them: (1) effects of drivers on multiple ecosystem services and (2) interactions among ecosystem services.

Integrating economic and ecological analysis has been an important platform for ecosystem services research (Turner and Daily, 2008). This integration has contributed to policies, primarily with payment for ecosystem services programs and researches (Eigenraam et al., 2007; Engel et al., 2008; Juniper, 2011; Muñoz-Piña et al., 2008; Turpie et al., 2008). But as Chan et al. (2012, p. 8) stated, *approaches of this kind cannot or have yet to encompass all dimensions of value, thus many important considerations remain marginalized within ecosystem services research and practice*. While this adaptation of economic metrics was likely fuelled by a desire to give monetary value to inherent, mostly intangible values of nature to better explain the policymakers their meaning (Satterfield and Kalof, 2005), one could argue that all efforts to include economics and ecologists result in adaptation or even acceptance of an essentially economic worldview only. In so doing, *we may have simultaneously closed the door to other social perspectives – those more fully representative of the vicissitudes of human behavior and the less tangible social and ethical concerns to be outlined more fully below* (Chan et al., 2012, p. 8).

Conceptual background: how to value cultural ecosystem services?

Ecosystem services have been defined in reference to their material or non-material values. The material values were considered in relation to provisioning, regulating, and supporting services, whereas non-material values have been associated with *cultural (ecosystem) services* (Chang et al., 2012, p. 9). Cultural ecosystem services have been included in many other typologies of ecosystem services and referred as: cultural services (Constanza et al., 1997), information functions (de Groot et al., 2002), life-fulfilling functions (Daily, 1999), amenities and fulfilment (Boyd and Banzhaf, 2007), cultural and amenity services (de Groot et al., 2010; Kumar 2010), or socio-cultural fulfilment (Wallace, 2007). They are often dependent on intermediate ecosystem services (Fisher et al., 2009; Johnston and Russell, 2011), and services combined with other forms of capital (Chan et al., 2011; Constanza et al., 2011; Milcu et al., 2013). Constanza et al. (1997) defined cultural values services as *aesthetic, artistic, educational, spiritual and/or scientific values of ecosystems* (p. 254). The *Millennium Ecosystem Assessment* (2005, p.894) expanded this definition to include the *non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g., knowledge systems, social relations, and aesthetic values*. Till now, *The Millennium Ecosystem Assess-*

ment still provides the most comprehensive overview and categorization of cultural ecosystem services, with the following categories suggested:

- *Cultural diversity* (in the sense that the diversity of ecosystems is one of factors contributing to the diversity of cultures);
- *Spiritual services* (recognising that many religions attach spiritual values to ecosystems or their components);
- *Knowledge systems* (recognising that ecosystems influence the traditional and formal knowledge systems developed by different cultures);
- *Educational values* (recognizing that ecosystems and their components provide the basis for formal and traditional education in many societies);
- *Inspiration* (in the sense that ecosystems provide a rich source of inspiration for art, folklore, national symbols, architecture, and advertising);
- *Aesthetic values* (recognizing that people find beauty in various aspects of ecosystems, as reflected in the support for forest, sea, parks, scenic drives, or choice for housing locations);
- *Social relations* (recognizing that ecosystems has an impact on types and character of social relations that are established in particular cultures);
- *Sense of place and identity* (ecosystems can be seen as a central pillar of the 'sense of place' that is associated with recognised features of their environment);
- *Cultural heritage values* (understanding that many societies place high value on the maintenance of cultural landscape or culturally significant species);
- *Recreation and ecotourism* (recognising that people often choose where to spend their leisure time based on the characteristics of the natural or cultivated landscapes in a chosen area) (see also Kira, Burkhard, 2010, p. 350).

We also should add factors related to the observer, such a social and cultural personal experience, habits and belief systems, traditions of behaviour, style of living and judgement of other styles, coming into play when talking about given cultural ecosystem service. There is a wide range of factors that are related to the particular observer and indirectly at best to the ecosystem itself (Kumar and Kumar, 2008). E.g. a mountain slope can be seen as a great skiing opportunity but only for people used to skiing. For others it can have an aesthetic, or any kind of value. The benefits produced by cultural ecosystem services (physical, emotional, and mental ones) are often intuitive in nature (Kenter et al., 2011) and expressed through indirect manifestations. The value assigned to cultural ecosystem services is very personal depends therefore on personal cultural assessments of their contribution to someone's wellbeing

(Charles and Dukes, 2007; Eicken et al., 2009; Scullion et al., 2011).

Yet, the definition of cultural ecosystem services, done by *Millennium Ecosystem Assessment* has been criticized (Boyd and Banzhaf, 2007; Wallace, 2007; Chan et al., 2012) because it does not clearly separate the welfare of human beneficiaries, between the above notions of services, benefits, and values (Milcu et al., 2013). De Groot et al., after Haines-Young and Potschin (2010, p. 264) proposed a framework for linking ecosystems to human wellbeing. Ecosystems & Biodiversity, first as a physical structure or process influences on functions (e.g. slow water passage biomass). The function impacts service (e.g. flood protection products). The service has an impact on human wellbeing, in socio-cultural context. First on benefits (contribution to health, safety) and from benefits to economic value (e.g. money for water protection or health services).

The discussions concerns also the understanding of *values, benefits* and their correlation. Costanza et al. (1997) define cultural ecosystem services as *values*, while the *Millennium Ecosystem Assessment* (2005) defines them as *benefits*. De Groot et al. (2005) talk about benefits, services, values, and activities. In the interest of conceptual clarity, Chang et al. (2012, p. 9) suggested distinguishing between these diverse things. They describe services as the production of benefits (where benefits may take the form of activities), which are of value to people. Accordingly, they defined cultural services inclusively as ecosystems contributions to the non-material benefits (e.g., capabilities and experiences) that arise from human-ecosystem relationships. (Chang et al., 2012, p. 9). Following Chang et al. (2012, p. 10) *Benefits are related to the level at which people can most easily relate ecosystems to themselves. Services, as the ecosystem processes underpinning benefits, are the level at which ecosystem properties and dynamics might be considered in planning and management. Values are the preferences, principles and virtues that we (up)hold as individuals or groups. Values are seen as one way to understand and represent what matters to people, and not a set of entities that exist out there.* Chang et al. (2012, p. 10-12) propose a distinction of values based on their dimensions for environmental decision – dividing them on eight platforms:

1. Preferences – vs. – Principles – vs. – Virtues;
2. Market-mediated vs. – Non-market-mediated;
3. Self-oriented vs. – Other-oriented;
4. Individual vs. – Holistic / group;
5. Experiential vs. – Metaphysical;
6. Supporting vs. – Final (instrumental vs. inherent);
7. Transformative vs. – Non-transformative;
8. Anthropocentric vs. – Biocentric.

De Groot et al. (2010, p. 263-264) proposed potential indicators for determining (sustainable) use of ecosystem service. They have distinguished 23 ecosys-

tem services, divided into: provisioning (e.g. food, water), regulating (e.g. climate regulations, waste treatment), habitat or supporting (nursery habitat, genepool protection), and cultural amenity ones (e.g. aesthetic, spiritual, cultural heritage and identity). To each ecosystem service they have indicated: first – ecological processes and/or component providing the service (or influencing it's availability) = functions, second – state indicator (how much the service is present) and third – performance indicator (how much can be used/ provided in a sustainable way). A proposed indicators give a wide range of classification of ecosystem services but also make an important step to linkages with sustainable development.

When talking about characteristic of cultural ecosystem services, there is a common agreement about their intangibility, that has been an explanation for their poor appraisal in the literature and policies (Sarukhán and Whyte, 2005; Adekola and Mitchell, 2011; Daw et al., 2011), but also as an argument for better consideration of them in the future research (Chiesura and de Groot, 2003; Chan et al., 2011).

Practical background – cultural ecosystem services in research and projects

Despite cultural ecosystem services and so called *non-use* values are included in all major typologies (Costanza et al., 1997; Daily et al., 1997; de Groot et al., 2002; MA, 2005), and present some of the most decisive reasons for conserving ecosystems, many barriers exist to their explicit characteristic. In practice they have received very limited attention in the growing body of empirical ecosystem services research and policies. They are seldom reflected by economic indicators (e.g., real estate prices) and are rarely marketable (Carpenter et al., 2009; Martín-López et al., 2009; Milcu et al., 2013). The exceptions are only cultural heritage & educational values (Kumar, 2010), and recreational & aesthetic ones (Chan and Ruckelshaus, 2010) quit widely described in the literature (Berkel, Verburg, 2014; Milcu et al., 2013). Still there is a wide research about cultural ecosystem services in regard to landscape recreational values (Tengberg et al., 2012; Plieninger et al., 2013; Berkel, Verburg, 2014) and role green areas in given cities (Bolund, Hunhammar, 1999). However, there have also been suggestions to remove cultural ecosystem services from the ecosystem services framework altogether (Fisher et al., 2009) and stop on simple recognition of them, with no going deeper into analysis (Tengberg et al., 2012, p. 15).

Insofar as cultural ecosystem services have been named, defined and quantified, they have generally been valued in purely economic terms (e.g. Chiesura

and de Groot, 2003; Martín-López et al., 2009; Martín-López et al., 2007), which couldn't illustrate their full extent, and differences from other ecosystem services. Following Chan et al. (2012): *While these intangible values have been described elegantly through poetry and prose (...), these descriptions are neither expressions of how these values are produced (as in an ecological production function), nor are they commensurate with an ES framework* (p. 9).

Ecosystem services are mostly researched by English speaking authors. 99 % of papers on ecosystem services have been published in English (Schaich et al., 2010). One can say that English is widely used for all publication, thus high percent of English articles cannot serve as geographical indicator. However the same analysis shows that 69 % of all papers on ecosystem services is wrote by American, British, or Australian authors¹. Cultural landscape papers are much more diverse in terms of geographic origin, with only 37 % of authors based in these countries. The results above were confirmed in *Tourism, Well-being and Ecosystem Services* COST action, which found out that within 30 participating countries only English speaking and Scandinavian have adequate vocabulary for ecosystem services and wellbeing. Thus only there adequate policies and researches were applied (www.tobewell.eu). Most of others have almost no linkages in researches and policies between tourism – wellbeing and ecosystem services². Following UE advices participating countries must somehow value and map their ecosystems and ecosystem services, but as the term is subject to *artificial* translation, there is no common *feeling for it*. In consequence, except official government of UE payed analysis, almost no attention is attached to this topic by researchers. An important gap in most of those countries, is lack of linkages between cultural ecosystem services and wellbeing.

Publications dedicating more than half of their content to cultural ecosystem services were typically published after 2009. An overview of the current state of research in a frame of cultural ecosystem services was provided by Milcu et al. (2013), who have classified the diversity of research approaches by identifying clusters of publications that address cultural ecosystem services in similar ways, and highlighted some important challenges for the future research. The authors have reviewed 107 publications and extracted 20 attributes describing their type and content, including methods, scales, drivers of change, and trade-offs between services. Using a cluster analysis on a subset of attributes Milcu et al. (2013) identified five groups of publications: Group 1, conceptual focus, deals with theoretical issues; Group 2, descriptive reviews, consists mostly of

¹ The analysis was based on authors affiliation in American & British & Australian Universities, not on their nationality origins.

² The results of Tourism & Wellbeing and Ecosystem Services project, elaborated by working groups will be published in different articles.

desktop studies; Group 3, localized outcomes, deals with case studies coming from different disciplines; Group 4, social and participatory, deals mainly with assessing preferences and perceptions; and Group 5, economic assessments, provides economic valuations. The publications came from eight academic disciplines 72 contained case studies, 32 included strong conceptual elements, and 21 were reviews (p. 2).

Most publications named, as suppliers of cultural ecosystem services, specific types of ecosystems (n=54) such as coastal ecosystems or urban green areas, or specific geographical areas (n=25). The majority of the case studies were in English speaking countries (the USA n=12; the UK n=10; Australia n=4), others in Germany (n=8), Spain (n=8) and Finland (n=4), so all of them in western, *developed* part of the world.

Milcu et al. (2013) distinguished five clusters of articles. The first one (n=25) was called *conceptual focus*, and contained predominantly theoretical publications. Second was of *descriptive reviews* (=25), third, the largest one (n=32) was related to given locations, selected ecosystems, policies and managements, dealing with specific treats or conflict situations. Forth cluster (=13) – *social and participatory* emphasised social aspects of case studies. The fifth one (=12) named *economic assessment* was concentrated on present or future economic value of ecosystem services, giving factual, often monetary accounts of cultural ecosystem services. A surprising result of this analysis is that *social and participatory* cluster, that is supposed to be core topic for culture, is represented in such low (almost the lowest percentage) in the research of cultural ecosystem services.

Cultural ecosystem services research engages many disciplines that use a wide and different range of research approaches (p. 1). Looking at number of cultural ecosystem services publication done by authors of different disciplines the authors confirmed the dominance of biology and environment studies, and surprisingly low input of economics (tab. 1):

Table 1. Number of cultural ecosystem services publication related to author's discipline, after Milcu et al. (2013)

Biodiversity conservation and ecology	45
Environmental management and policy making	33
Others (geography, social sciences, engineering, chemistry)	10
Agriculture and forestry	9
Economics	7

An example of social sciences paper can be Kumar and Kumar (2008) one that builds upon insights from psychoanalytic psychology and environmental-psychology. *It outlines recent research findings from experimental psychology to redefine concepts such as ecological identity, self-other dichotomy, and the fostering of identification with nature, as issues that*

must be embraced in the valuation of ecosystem services (p. 808).

As already told, most of studies evaluating cultural ecosystem services have been limited to the category of *recreation and ecotourism*, leaving out the intrinsic qualities that are interrelated with tourism in the cultural service category (Berkel, Verburg, 2014, p. 164). Still, a number of techniques have been developed for the localisation of different type of cultural services valued by stakeholders, through participatory mapping (Alessa et al., 2008; Brown and Raymond, 2007; Raymond et al., 2009; Sherrouse et al., 2011). The identification of best locations for service delivery has been helpful for understanding the spatial determinants of ecosystem and its associated value to given society (Berkel, Verburg; 2014, p. 164). However, as MA doesn't give detailed explanation about what exactly are cultural ecosystem services related to recreation, their identification is rather *free*. Plieninger et al. (2013, p. 120) e.g. have included: walking, dog walking, horse riding, swimming, gathering wild food, angling, hunting, other uses, whilst Berkel and Verburg (2014) involve: cycling, walking, swimming, tranquillity and rest, shopping, eat and drink, farm-based camping, unique landscape, family visits, region specific recreational activities, festival, other and – nothing. Respondents were required to pick the top three activities that attracted them to the region. The services selected by Plieninger et al. (2013) and Berkel and Verburg (2014) remain quit distant from services categories commonly applied in the tourism & recreation literature. Moreover, following the World Tourism Organization (WTO) definition of what tourism is, the authors were not allowed to use the term of *tourism* at all (as *tourism* means leaving the house for minimum 24 hours), but only – the term of *leisure* or *recreation*. Plieninger et al. (2013) and Berkel and Verburg (2014) article could be an example of detailed, well done analysis and mapping of services, but same time lack of linkages with mother discipline (in this case tourism & leisure).

Basing on current state of research in a frame of cultural ecosystem services, we could indicate three types of gaps and corresponding challenges for future work. First – lack of social & human perspective, second – lack of interdisciplinary cooperation, and third – lack of adequate approach to the discipline in which given service is done.

The first challenge (lack of social and human perspective) is widely discussed in the literature. It is underlined that for a holistic understanding of ecosystem services, social sciences are just as important as economy and ecology (Milcu et al., 2013). Cultural ecosystem services highlight powerful linkages with the social sciences, as by definition they are related to human perceptions, attitudes and beliefs (Wallace, 2007; Daily et al. 2009; Chan et al., 2012). The literature on ecosystem services shows such a

strong bias of studies carried out by researchers with the base in natural science. But an example of such bias is even the *Millennium Ecosystem Assessment* publication (2005), which devotes only 2 % of its total pages to cultural ecosystem services. Same with the assessment of *The Economics of Ecosystems and Biodiversity* (TEEB, 2010), which provides detailed economic analysis of ecosystem services, but no discussion of their intangible cultural values (Tengberg et al., 2012, p. 15). One reason for this could be that the MA was designed to respond to government requests for information received through the multilateral environmental agreements and conventions (*Convention on Biological Diversity, the United Nations Convention to Combat Desertification, the Ramsar Convention on Wetlands, and the Convention on Migratory Species*) which are generally perceived to be the responsibility of the environment sector alone (Tengberg, et al., 2012, p. 15). Second gap is widely discussed regarding methodology and perspective, as most of researches are very much within one discipline methodology narrowly focus. Despite four main ecosystem services (provisioning, regulating, cultural and supporting services) are interrelated in the MA concept, the literature shows clear tendencies of separating these categories in specialised research fields. Third gap is somehow a consequence of first two. The cultural ecosystem services approaches are widening research fields, but without involving those *new* disciplines background. Such discipline-bound approaches that hold one component constant while varying (or not including) the others, can lead to incomplete or incorrect answers (Carpenter et al., 2012).

As long as cultural, non-use, and/ or intangible values are so poorly represented in the literature and project, rejected by ill-suited value metrics, an ecosystem services approach will continue to be criticized by many disciplines: ecologists and others perceiving higher values in nature (e.g., Ludwig, 2000; McCauley, 2006; Redford and Adams, 2009; Rees, 1998); philosophers and others concerned with inappropriate assumptions of substitutability and with diverse kinds of values (e.g. Norgaard, 2010; Norton and Noonan, 2007; Randall, 2002) and critical theorists concerned with the privatization and co modification of the environment (Robertson, 2004).

Some values do not fit within an ecosystems services approach, and it seems to be a kind of mission impossible to do such global inclusion. How one can value in monetary terms the social relations? Beliefs? Family tradition? Many questions still remains highly important and probably – rhetoric. However an ecosystem services approach that provides appropriate space for ill-fitting values such that important cultural and moral ones are not dismissed as hidden externalities, is more than needed.

Conclusions

The *Millennium Ecosystem Assessment* opened a new framework for social and ecological systems analysis having strong influence in both: the policy makers and scientific communities. As defined by MA, cultural ecosystem services are one of the four main ecosystem service categories, however they depend on provisioning, regulating and supporting services, thus their analysis and management must be done in wider perspective.

But still, despite contribution from numerous theories and methodologies, there is a common agreement that a sufficient level of understanding of many important issues and types of cultural ecosystem services has not been reached yet (de Groot et al., 2005; Beaumont et al., 2008; Gasparatos et al., 2011). Moreover, there are many signals that the framework for analysing cultural ecosystem services must be much wider and more precise than the one proposed by *Millennium Ecosystem Assessment*, but still adequate proposition for this are missing (Milcu et al., 2013, p. 2). There is a broad agreement that cultural ecosystem services analysis need insights from anthropology, psychology and behavioural studies with focus not only at the individual level (more typical for those disciplines) but also at the collective one (Chiesura and de Groot, 2003). We should agree with Carpenter (2009) that *The gaps in knowledge that exist today cannot be addressed through un-coordinated studies of individual components by isolated traditional disciplines* and with Tengberg et al. (2012, p. 15) stating that to improve the understanding of cultural ecosystem services the interdisciplinary approaches are needed, so we should take into account the dynamic nature of human-environment interactions and possible synergies and trade-offs between cultural, supporting, provisioning and regulating ecosystem services.

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