Reg Environ Change (2016) 16:1779–1791
DOI 10.1007/s10113-016-0926-2

ORIGINAL ARTICLE

Disaggregated contributions of ecosystem services to human well-being: a case study from Eastern Europe

Andra-Ioana Horcea-Milcu[1] · Julia Leventon[1] · Jan Hanspach[1] · Joern Fischer[1]

Received: 14 May 2015 / Accepted: 25 December 2015 / Published online: 28 January 2016

Abstract Aggregated analyses of the benefits from ecosystem services (ES) to well-being neglect important differences among beneficiaries and fail to capture the complexity of factors that mediate the ES–well-being relationship. Based on 25 group interviews, we disaggregated the ES–well-being relationships across six groups of potential beneficiaries in a farming landscape in central Romania, Eastern Europe. We explored what mediates distributional patterns of needs and benefits among beneficiaries and identified six contextual factors: (1) characteristics of the appropriated ES; (2) policies, formal institutions, and markets; (3) social and power relations, and informal institutions; (4) household decisions and individual contexts; (5) different perceptions and understandings of equity; and (6) individually held values. Based on these empirically derived factors, we developed a conceptual model of mediating factors that holistically takes into account the contextual space between ES and human beneficiaries. This model provides a framework for unpacking ES–well-being relationships that may guide ES research across varying socioeconomic cases. Notably, this model of mediating factors incorporates an equity perspective that is more refined than the dominant discourse on the relation between poverty and ES (which typically emphasizes that poor people are most dependent on ES, but neglects factors such as power relations and held values). Recognizing multiple contextual factors that shape the contribution of ES to well-being opens doors for harnessing new interdisciplinary collaborations and can help to inform more holistic policy interventions.

Keywords Equity · Benefit distribution · Perception · Poverty · Value · Romania

Introduction

The ecosystem service (ES) concept contributes to understanding how ecosystems relate to well-being, including in a context of poverty alleviation (Fisher et al. 2014). Defined as the "benefits people obtain from ecosystems" (MA 2005: 5), ES have become a heuristic for revealing multiple ways in which nature supports human well-being (MA 2005: 6), as well as a compelling decision-making tool for policy makers (Daily et al. 2009). At the same time, the ES concept has attracted criticism because of its utilitarian focus (Schröter et al. 2014). ES such as crop provision, climate control and recreation allow humans to derive benefits and well-being from ecosystems. However, since the Millennium Ecosystem Assessment (MA 2005), scholars have recognized that deriving benefits is not automatic; rather there are mechanisms that mediate and contextualize the ES–well-being relationship (Sikor 2013; Pascual et al. 2014). To date, papers have considered the institutional context (Corbera et al. 2007; Norgaard 2010; Vatn 2010), social embeddedness (Muradian et al. 2010; Díaz et al. 2011; Polishchuk and Rauschmayer 2012) and value attribution (Spangenberg et al. 2014b) or articulation (Ernstson 2013) around ES. Many of these factors are interrelated. Yet, few publications have taken a holistic approach to studying ES–well-being linkages in specific socioeconomic cases (but see Hicks and Cinner 2014).

Editor: Elena M. Bennett.

✉ Andra-Ioana Horcea-Milcu
milcu@leuphana.de

[1] Faculty of Sustainability, Leuphana University Lüneburg, Scharnhorststraße 1, 21335 Lüneburg, Germany

Understanding what mediates the ES–well-being relationship relies on issues of differentiated ES access ("ability to derive benefits from things," Ribot and Peluso 2003: 153) and equity (Sikor 2013; Fisher et al. 2013, 2014). While recognizing multiple dimensions of equity, we refer to equity as an equal distribution of well-being contributions derived from appropriated ES. Disaggregation acknowledges that factors mediating access to ES and influencing the distribution of ecosystem benefits play out differently for different beneficiaries (Daw et al. 2011; Brooks et al. 2014)—for example, as a result of power relationships (Felipe-Lucia et al. 2015), human agency or capacity to act (Spangenberg et al. 2014a), and individual preferences (Fisher et al. 2014). By not disaggregating ES beneficiaries, research overlooks potentially important trade-offs (Rodríguez et al. 2006). Disaggregation is useful in asking who are the "winners" and "losers" of a certain change in ES provision, whose well-being is at stake, and over which scales these processes occur. Consequently, disaggregation is increasingly acknowledged as important for understanding ES provision and for setting policy and management priorities (Wilson and Howarth 2002; Carpenter et al. 2009; Brooks et al. 2014; Pascual et al. 2014), particularly in a context of poverty alleviation (Daw et al. 2011).

In this study, we explored how the ES–well-being relationship was mediated for disaggregated beneficiaries in Southern Transylvania, Romania. We selected the area as a rich case study with a complex social, ecological and political context. Transylvania is recognized as one of Europe's most prominent biocultural refugia (Barthel et al. 2013), but the traditional relationships between people and nature are being altered, as the area has experienced rapid cultural, socioeconomic and institutional changes over the last decades (Milcu et al. 2014). Following the collapse of socialism (1989), the region's culture and ethnic composition was no longer dominated by the Transylvanian Saxons. Post-socialism tenure changes fueled social and economic inequity (Verdery 2003) and eroded community trust. In addition, the transition to a market-based economy has made small-scale farming increasingly unviable (Mikulcak et al. 2013). In 2007, Romania entered the European Union (EU). The Common Agricultural Policy (CAP), notably Pillar II, grants the region access to financial support for agriculture, conditioned by the compliance to certain environmental requirements (MARD 2014). However, by EU standards, rural Transylvania still has high levels of poverty in terms of low income, and many locals rely on local ES in their daily lives (Mikulcak et al. 2013), especially on provisioning ES (see Table 1 for examples).

As a central aim of this paper, we develop a conceptual model of mediating factors (MMF), which distills six key factors that influence the relationship between ES and human well-being. We do so in two stages. Firstly, we disaggregate the ES–well-being relationships in our study area by examining how groups derive direct and indirect benefits from nine ecosystems services, and how well these benefits meet their needs. Secondly, we identify what mediates or shapes distributional patterns of benefits and needs among beneficiaries. The resulting conceptual model provides a general framework for unpacking the relationships between ES and the well-being derived by different beneficiaries. It can be applied in a broad range of settings to facilitate the explicit consideration of equity issues in ES research and management.

Methodology

Data collection involved semi-structured group interviews (GIs), questionnaires and participant observation in five villages from Southern Transylvania. Villages were

Table 1 List of the discussed ES and associated direct and indirect benefits derived by beneficiary groups, as identified during group interviews

ES	Direct benefit	Indirect benefit
Harvested hay from meadows	Fodder	Income from commercialization, exchange or employment
Pasture	Fodder	Income from subsidies or employment
Sheep and related products	Domestic consumption	Income from commercialization, exchange or employment
Cows and related products	Domestic consumption	Income from commercialization, exchange or employment
Arable and orchard crops	Domestic consumption	Income from commercialization, exchange or employment
Collected berries, mushrooms, medicinal plants and snails[a]	Domestic consumption	Income from commercialization
Harvested or collected wood	Domestic consumption (construction, heating, cooking)	Income from exchange or employment
Clean water	Domestic consumption	Watering livestock
Agro-tourism[b]	Aesthetic amenities	Income from commercialization or employment

[a] Referred to collectively as "berries"

[b] Referred to as a provisioning ES (cf. Abson and Termansen 2011)

selected based on trust levels developed between the researcher and the community, and the richness of ES narratives elicited during former research in the area (Milcu et al. 2014). Following five initial pilot GIs, we disaggregated ES beneficiaries by their main income source into six beneficiary groups: (a) small farmers (as defined by Fundaţia ADEPT 2010), (b) large farmers, (c) non-farmers (non-farming, with/without additional farming income), (d) officials (state salary; e.g., mayor, policeman, priest), (e) poor people (generally recipients of state financial assistance) and (f) external supertenants (Romanians or foreigners living outside the village, but having economic connections to it) (Verdery 2003: 312–313). Supertenants were not interviewed for practical reasons (being located outside the villages), but their role was discussed with other groups when respondents felt sufficiently knowledgeable. In each village, we held one GI with each of the remaining five beneficiary groups, inviting a range of representatives within that group (total = 25 GIs). Each GI involved four people on average. Participants were invited through town halls, local stores and priests.

During GIs, we conducted several participatory exercises to stimulate deliberation around three topics, inspired by Daw et al. (2011): (1) How does the interviewed group benefit from each of nine ecosystems services (directly or indirectly)? (2) How much benefit does each group derive from each ES, and what explains differences between groups? (3) How much need does each group have for deriving benefits from a given ES, and what explains differences between groups?

Because benefits depend on the perspective of a given beneficiary, we explored participant perceptions to gain a grounded understanding of how locals obtain benefits from ES. Participatory methods are especially useful to express plurality of perceptions (Chambers 1995). In addition, these were implemented within an organized group setting, thereby generating deliberation (Kenter et al. 2011). This novel research approach allowed participants to express and defend their internal constructions of ecosystem derived well-being, in contrast to established economic ES assessments that typically overlook the subjectivity of well-being, as well as other contextual factors. Asking participants to reflect on other social groups prompted them to look beyond their immediate self-interest, as common with deliberation approaches (Raymond et al. 2014). Group discussions thus provided insights into people's different perspectives, but especially into shared understandings of a complex topic. This discursive method also made held values more explicit by encouraging dialog and reflection of what beneficiaries truly value in the proposed ES. Limitations of this approach include group pressure, limited replicability and representativeness. Our purposive participant samples (Bryman 2012) do not allow generalization of results to larger populations, as is common for place-based research. However, our approach could be replicated in other locations. Discussions were recorded (with permission), translated from Romanian to English and transcribed.

We focused discussions around a suite of locally relevant provisioning ES and associated benefits (Table 1; Hartel et al. 2014). Cultural and regulating ES were outside the study's scope. Here, we understand ES as the appropriation of ecosystem structures and functions and other associated ecological phenomena through investments of time, labor and different capitals (in agreement with Spangenberg et al. 2014b). Ecosystem benefits are the contributions to aspects of well-being, derived from those appropriated ES. For example, the collection or harvesting of wood is an ES, whereas the satisfaction derived from using that wood as a heating source is an ecosystem benefit.

To disaggregate the ES–well-being relationship (stage 1), we employed a consensus scores technique to produce a quantitative overview of each group's needs, benefits and the differences therein. Participants were first given time to discuss benefits and needs for all beneficiary groups and were then asked to assign scores to represent the discussed benefits and needs. During each GI, a matrix was created showing beneficiary groups by perceived benefits and needs. Scoring exercises were used as a way to summarize and validate information, and consensus scores were visible to everyone. During data analysis, matrix scores for each beneficiary group were averaged across all GIs to consider the overall differences between needs and achieved benefits across beneficiary groups.

To understand the factors that mediate distributional patterns (stage 2), we performed an iterative narrative analysis on the interview transcripts. This analysis was informed by a grounded theory approach; a systematic set of procedures to develop a theory starting from the data (Strauss and Corbin 1990: 24). The approach was operationalized in two cycles of coding (Saldana 2009). During the first cycle, we searched for narratives that referred to, or explained, the overall distribution and disaggregated contributions of ES to beneficiary groups. During the second cycle, all refined themes (research and data driven) were coded on and "lifted" (Suddaby 2006: 636) to a higher level of abstraction. We thus sought to group narratives identified in the first cycle into emergent themes. Our narrative analysis identified general higher-level factors that our respondents perceived as mediating factors in the ES–well-being relationship. Having identified these factors, we went back to the transcripts to explore how each factor influenced the relationship for each beneficiary group. By identifying differences in the impact of each factor, we were able to construct a general model of

mediating factors (MMF) that influence the relationship between ES and well-being.

Results

Disaggregated ES–well-being relationships

Group discussions revealed both direct and indirect benefits from ES (Table 1). Beneficiary groups largely derived the same types of benefits from ES (except for poor people benefiting mostly indirectly through employment), but differed in the proportion of direct versus indirect benefits (Fig. 1).

Respondents reported that different beneficiary groups had different needs for ecosystem benefits in order to achieve well-being (Fig. 2, gray lines). The basic nature of the needs of poor people was acknowledged; wood, water and berries were services that poor people had high needs for. Poor people were considered to have lower needs for those ES that required work investment and long-term returns for achieving well-being contributions. For example, poor people had less need for hay or pasture. Participants acknowledged that such needs were partly a result of access: without livestock, poor people had no access to pasture, which meant they could not keep animals. In contrast, small and large farmers were perceived to have high needs for services directly linked to farming activities.

Disaggregating beneficiaries further showed that participants considered the nine ES benefits to be unevenly distributed among potential beneficiaries (Fig. 2, black lines) and unequally contributing to the fulfillment of needs. For farming-related ES, needs were best matched with derived benefits for supertenants and large farmers. Across all ES, officials appeared to have their needs best met. No group had their needs met for water. Poor people and small farmers did not have any of their needs matched by their derived benefits. These differences in distribution indicate a high degree of inequality in accessing benefits from ES; poorer people (including small-scale farmers) were less able to fulfill their well-being through ES benefits than wealthier people (including officials, supertenants and large farmers).

Model of mediating factors (MMF)

Our narrative analysis revealed that ES were co-produced by the social and ecological system (in agreement with Reyers et al. 2013; Bennett et al. 2015). On the one hand, *the biophysical characteristics and ecological availability*

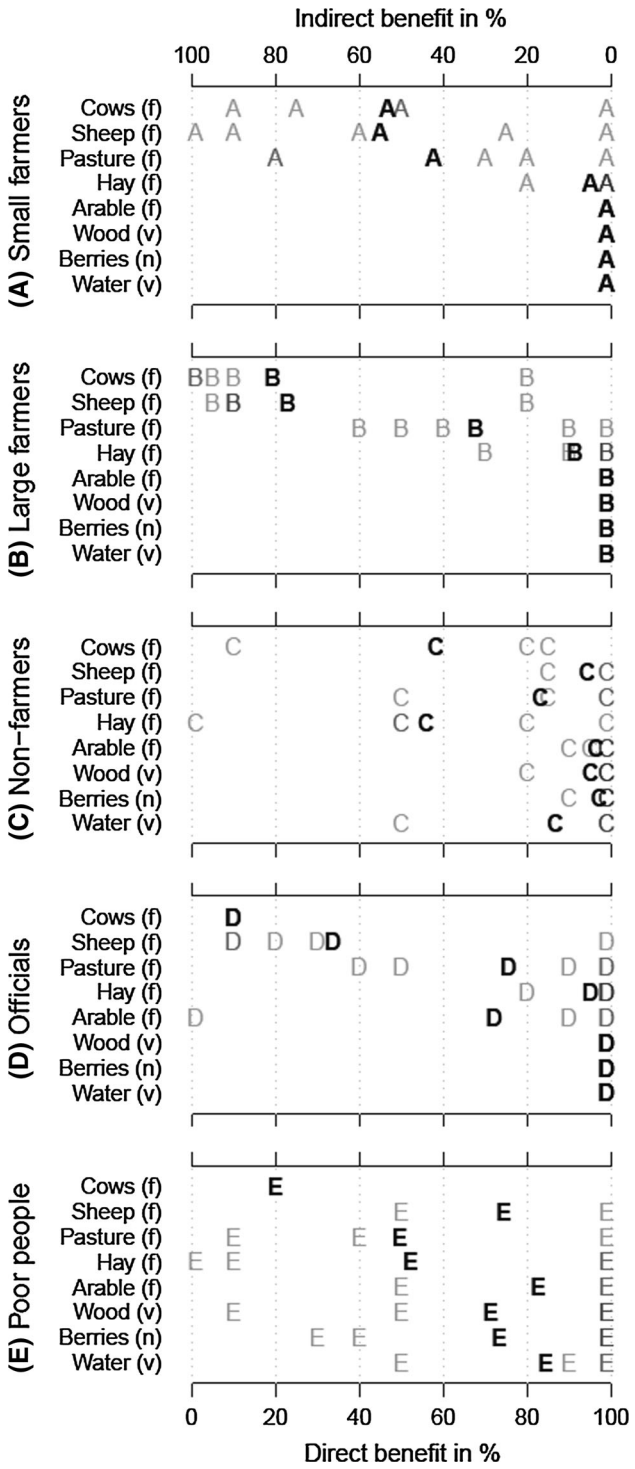

Fig. 1 Proportion of perceived indirect versus direct benefits per ES (*f* farming ES, *v* vital ES, *n* no-stake ES), per beneficiary group (**A**–**E**). The position of the *black letters* indicates average values of scores assigned by beneficiary groups (position of the *gray letters*). Participants were asked to decide for their own beneficiary group which percentage of the total ecosystem benefit arises from direct benefits, versus indirect benefits

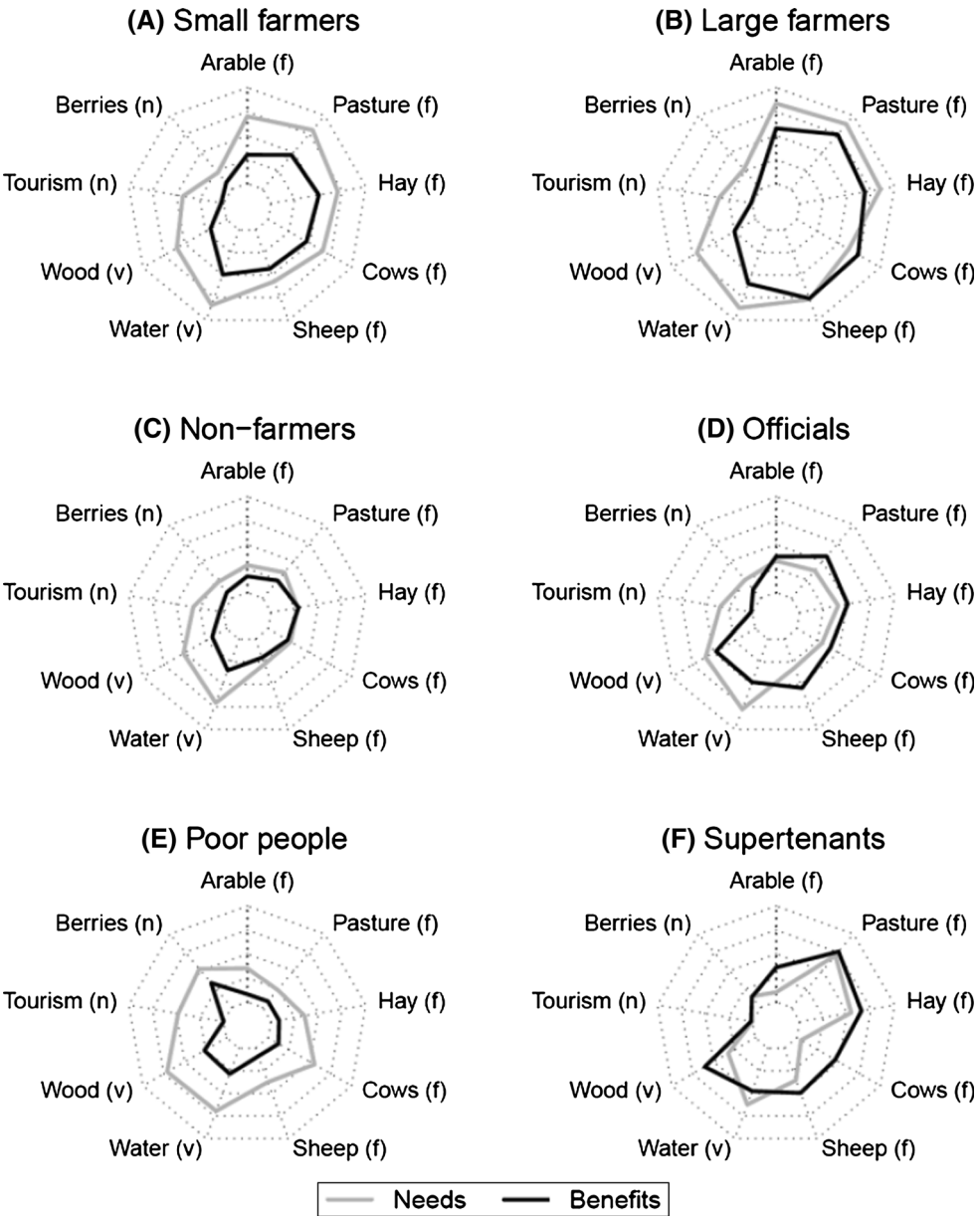

Fig. 2 Averages of matrix scores for the perceived benefits from and needs of ES (*f* farming ES, *v* vital ES, *n* no-stake ES), per beneficiary group (**A**–**E**), on a scale from 1 (very low; *inner circle*) to 5 (very high; *outer circle*)

of supplying stocks of ES were considered essential for the provisioning of ES and associated benefits. The conditions of the ecological system determine natural barriers in accessing ES benefits, such as limited land surfaces, drought, dangerous wildlife, or soil fertility, which were frequently mentioned by our participants. The importance of biophysical conditions varied with the ES being discussed. For example, water was considered more prone to ecological limitations.

On the other hand, *the beneficiaries within the social system determine the mobilization and appropriation of ES* through agency, human interventions and investments of time, various capitals and resources (see also Spangenberg et al. 2014b). Characteristics of a given beneficiary group therefore influence its ability to access ES and derive well-being contributions (see also Daw et al. 2011). Disaggregating beneficiaries based on their characteristics (here, source of income) uncovered key contextual factors that mediate the ES–well-being relationship. Below, we present a model of mediating factors (Fig. 3), explain each factor, and try to demonstrate how these factors play out differently for different groups.

Factor 1: characteristics of the appropriated ES

The MMF distinguishes whether a given ES contributes with direct or indirect benefits to well-being. Depending on their ability to provide income or employment as indirect

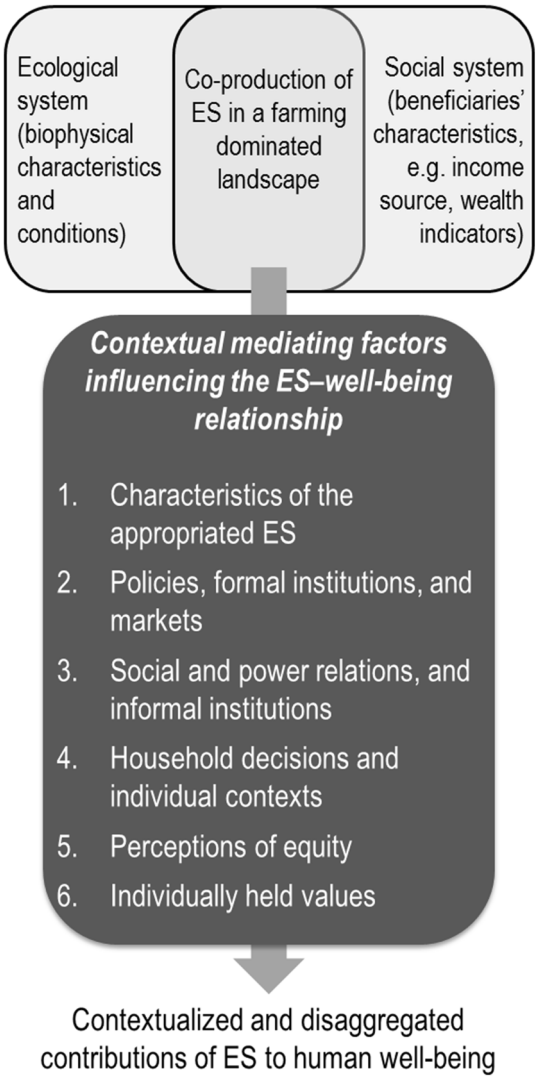

Fig. 3 Conceptual model of mediating factors (MMF) influencing the relationship between co-produced ES and well-being. Key contextual mediating factors determine the contextualized and disaggregated contributions of appropriated ES to human well-being

benefits (Fig. 1), and their positioning along the continuum from rival (where their use by a beneficiary precludes their use by another beneficiary) to non-rival ES (sensu Fisher et al. 2009), different ES activate different mediating factors. Income-providing ES are more likely to be mediated by policies, and institutional arrangements (e.g. payments for pasture management), which in turn, play out differently for different beneficiary groups.

In the case of Southern Transylvania, when discussing needs and derived benefits with participants, three categories of ES emerged (Fig. 1). *Farming ES* were closely linked to the provision of indirect benefits from the land. For example, obtaining agricultural subsidies under the CAP was mentioned during all GIs as one of the main indirect benefits of using a pasture. Pastures and hay meadows were regarded as subject to high access rivalry, sources of village conflicts, or factors underpinning the possibility to increase well-being. Farmers in particular perceived an intrinsic link between livestock and fodder sources. "If he has a pasture, he has animals, because he needs the pasture for the animals […] so, this is like a food chain" (GI16).

Vital ES were important for beneficiary groups as a direct benefit. Wood (as heating fuel) and water (for domestic and farming use) were both critical for living in the area, with high needs, but lower rivalry across beneficiaries ("Wood is vital for us. […] I could not live without wood, that's it. It's like drinking water" GI19).

In contrast, *no-stake ES* were characterized by low direct and indirect benefits and no rivalry, and included berries, agro-tourism and apiculture products. These ES were not associated with major opportunities for income or employment, but were important to supplement people's livelihoods.

Factor 2: policies, formal institutions, and markets

Supranational and national policies, formal institutions, and markets are powerful factors that mediate access and the contribution of ES to the well-being of potential beneficiaries. Within this factor, the benefits stemming from ES filter down through formal institutional arrangements. For example, historical contingencies, such as the legally enforced Saxon ownership of land and post-socialism restitution reforms, have severely restricted land access for some beneficiaries in the past. Today, there are still visible consequences, particularly in explaining differences in access to farming-based services between small farmers versus large farmers and supertenants. "They [large farmers] leased land and they did very well because [in this way] they got somewhere. But we didn't do anything and remained like this" (GI20). Large farmers capitalized on opportunities arising from political and institutional changes, and more easily derived ecosystem benefits. "He had money when the collective farm was dissolved; he bought 100 sheep or ten cows, that's how he started" (GI8).

Market mechanisms and policies have particularly influenced the ability of poor people to access farming ES. Poor people were reported to have sold their land either to qualify for welfare payments, or because they felt forced to by the changing profitability of Romanian agriculture. "P3: In agriculture [now], you have high costs for plowing, for digging, for sowing, and that's the annual costs. […] P2: And they preferred to give up everything and take the social assistance and they became day laborers and live better than us. P6: Yes, because we have to work" (GI1). According to their personal narratives, non-farmers often evolved from resigned farmers: "When they started to pass

these laws […] they destroyed us. […] I sold all the cows and went to work for someone else" (GI9).

Another important access mechanism for poor people related to the influence of social assistance policies that guarantee welfare payments to individuals below a certain income threshold, thereby acting as a monetary safety net. This financial aid was perceived to have disconnected the poor from the ES in the area. "P1: They have no animals because these laws are contradictory. They would receive social assistance only if they don't own animals. It is a great encouragement! P2: They would sell the cow, or would give it to their mother and brother" (GI8).

Similarly, although many groups acknowledged a dependency on subsidies for improving the profitability of farming, subsidies also accentuated inequities in access and reinforced existing power structures. For example, such payments can only be accessed by those who have access or ownership of pasture land, which is more likely to be supertenants and large farmers. Thus, the wealth of these groups further increases relative to poor people and small farmers, providing additional opportunities to buy the land from small farmers. "P1: He signed a lease for 49 years. And he will not terminate the lease, to give us the pasture back so we can have it for animals, he holds it with his teeth, he has power… P3: He holds it because he gets subsidies" (GI7).

Factor 3: social and power relations, and informal institutions

Social and power relations, and informal institutions, can enhance, dampen or block access to ES benefits. Power was mentioned as an access mechanism for officials (formal authority), and supertenants (political and economic influence), as well as for large farmers (economic influence, physical control over pastures). The web of power is complicated by dominance, subordination and co-dependencies among groups. However, officials and large farmers were most able to use or abuse their powers to access benefits from ES. "The higher the position, the more animals they have" (GI21); "Those who have functions earn more and have more animals" (GI17). Officials also had the highest perceived illegal access across groups (corruption), especially in relation to pastures (managed by the town hall) and ensuing subsidies. Furthermore, during drought, officials and large farmers tended to control the availability of water at the village well. "P2: If you don't have a benefit given by God… what else will you have then? P3: They will kick us in the head for a cup of water. […] I went there with two bottles and a bucket. And if he [a large farmer] gets insane, […] he goes up and turns the tap off" (GI19).

Poor people and small farmers are less able to use power to access ecosystem benefits, and took a subordinate role to other beneficiary groups. Officials were believed to readily find poorer people to work for them. Many small farmers were reluctant to forming not only formal, but also customary-based associations despite the potential of these to strengthen their social networks and therefore facilitate access to benefits from farming ES. This was linked to the low levels of trust and community spirit, following political and institutional changes (factor 2). "P4: He doesn't collaborate with the others. P2: Each one is taking care of his own business" (GI15). This social and power configuration was further supported by local constructs of equity (see factor 5).

Factor 4: household decisions and individual contexts

Our interviews revealed that household decisions affect how ecosystem benefits are accessed and how they contribute to the well-being of locals. Respondents' strategies for achieving well-being, their livelihood choices and decision rationales thus mediate the flow of ES contributions and further explain the perceived distributional differences. For example, for the households of non-farmers the decision to partly rely on farming activities could take the following forms: practicing subsistence agriculture as a supplementary source of food for the family ("to have a lamb to eat for Easter" GI13); being selectively involved in profitable activities without taking part in the whole production process (e.g., working for large farmers, renting land, selling hay); or applying a mixed income livelihood strategy (spouse provides complementary income based on farming). Our narrative analysis revealed that household decisions and preferences toward certain livelihood strategies were often adjustments in response to farming policies (factor 2). Moreover, making a living as a farmer was seen as a morally desirable lifestyle to improve one's well-being according to the standards set by the community: "You can't live in the countryside if you don't own animals" (GI14).

Household decisions were typically associated with individual contexts shaped by levels of wealth, needs and aspirations, but also personal abilities, capital assets and histories. As an example, for small farmers, access to labor was cited as important, with small farmers investing their own workforce and large farmers soliciting additional workforce. In contrast, large farmers possessed the necessary personal histories to accumulate financial capital and knowledge. "P2: Most of them used to work at the collective farm. P1: And they continued. They knew better how to do this, so they became what they are today" (GI8). Supertenants were perceived to be more capable business people than other groups: "They cultivate colza, they have contracts to export, they take most of it, they don't bother with small things" (GI20).

Factor 5: perceptions of equity

Fifth, the way in which respondents conceived and constructed perceptions of equity fundamentally shaped the ES–well-being relationship. All themes grouped under this attitudinal factor, such as defeatism, the acceptance of inequality, and conflation of wants and needs, reinforce and legitimize the trends set by the other mediating factors, especially power constellations regarding access. These perceptions, in turn, reduce chances for reversing the dynamics underpinning the identified patterns of inequity. For example, discourses validated the assumed high aspirations of some beneficiary groups ("It is in human nature to want more," GI8) and often conflated wants and needs. Locals tended to regard the wants of the rich and powerful as more important than the needs of the poor, thus giving the rich a distorted kind of legitimacy, which indirectly enhanced their access. The perception of equity was further influenced in discourses where the logic of "the more they have, the more they want" was sanctioned through group deliberation. Counter-intuitively, an additional unit from an ecosystem benefit was perceived to always increase the total benefit of groups such as supertenants, officials and large farmers, while at the same time not decreasing their needs: "They need it because they have it and they need it" (GI11).

Similarly, a defeatist attitude was found to perpetuate the state of inequity created by other contextual factors such as established power relations. When recognized, inequities (especially in relation to officials and supertenants) were regarded fatalistically, with certain groups thought to ordinarily obtain most of the benefits. "He was rich! [Yet] he gave him three hectares because poor him, he doesn't have" (GI19). Even if participants disliked the consequences, they rarely questioned the motivations of other groups, seemingly accepting the prevalent fairness criteria set by power relations. Many villagers felt disempowered and were waiting for outside support from official institutions for accessing the flow of benefits. "P3: So here, despite the fact that this was a famous village, it has a beautiful landscape… P2: Yes. P3: We're very disfavored by law, by the town hall protection" (GI19). Participants felt beneficiary groups mostly "tread the same roads," thereby further contributing to disempowerment of the poor and reinforcing the existing distributional patterns.

Factor 6: individually held values

Finally, internal norms and values held by locals played a key role in unpacking the contribution of ES to well-being. In contrast to the above factors, such norms and values dampened the inequity dynamics created by the other mediating factors. Unlike the social norm of making a farming-based livelihood that supported household decisions based on social validation and external motivation (factor 4), inner held values transcended contexts. "Nobody needs animals. […] We are stupid because we are still breeding and we are giving ourselves a rough ride. […] We are working for nothing! But the time goes on and I can't do anything" (GI3). The social norm of maintaining cultivated land emerged as a manifestation of a deeply rooted agrarian identity of locals as land stewards. According to the narrative analysis, it mirrored a land ethic irrespective of livelihood returns, which may explain some of the underpinnings of the current distribution of ES benefits. "Those who have less land, they would be forced to abandon it […]. I am afraid of this!" (GI1). "You would be able to work only 1 ha… and what will you do? Will you abandon it? A lot of weed would grow there… because you don't have any source of income to work the land" (GI22). These deeply held values play an important role in maintaining close ties between the well-being of local people and farming-related ES through cultural connections to the land, even when farming is not profitable (factor 2) or sanctioned livelihood strategies shift (factor 4). P2: "This is not an income source. P1: We are only working the land… just so we don't abandon it" (GI4).

In addition, an altruistic social norm of compassion toward poor people mediated how the benefits from farming ES reach beneficiaries: "You can live off animals, you can offer something to your children; to those who don't need hay [the poor], you can give them a job, because there are no jobs here" (GI23).

Finally, the internal social norm of working hard was often cited as explaining locals' access to ES. Respondents described both the current and an ideal hypothetical distribution of ES as being proportional to work input. "You have to work… It has nothing to do with the situation, if you work, then you will have" (GI13). This reasoning suggests underlying respect that respondents ascribe to the value of work. "He is fine, he works, he works the land, he deserves this. That's good!" (GI1). Similarly, participants were negative toward situations involving livelihood strategies deemed inferior in workload (e.g., welfare payments, middlemen selling products). "We're waking up at 5 o'clock to take care of those little cows we have, and they [poor people] are waking up at 8 or 9" (GI1).

Interactions across factors

Notably, the MMF described above does not imply a strict hierarchy of factors where one is more important than the other. Rather, factors interact. Tailored to Southern Transylvania, the combined influence of these factors results in large farmers and especially supertenants being the winners, while small farmers and poor people are benefiting

less from nature. For example, the way pastures are shared among locals is mainly contributing to the well-being of supertenants and large farmers, indirectly contributing to reinforcing inequities, and to the progressive disappearance of the commons, known to be more important to the poor than to the rich (Carpenter et al. 2009). This is a consequence of multiple mediating factors. For example, in terms of formal institutions, the current pasture law (Parliament of Romania 2011) does not guarantee that anyone with livestock can access the pasture. In terms of social and power relations, and informal institutions, farmers need to be able and willing to self-organize (e.g., in associations) to have a communal pasture. Where such self-organization fails, adverse trends set by institutional contexts are reinforced by power dynamics, thus further eroding community spirit (see also Vatn 2010). With regard to equity perceptions, local attitudes of defeatism and fatalism perpetuate the status-quo, thereby leading to a seemingly irreversible dynamics of mediating factors fostering pasture encroachment. Furthermore in terms of held values, the normative of maintaining an agrarian identity has the potential to dampen or work against ensuing dynamics by determining locals to obtain pasture access.

Similarly, the mediating factors considered in the MMF (Fig. 3) are not inherently positive or negative. In our example, factors such as national and supranational policies, or social and power relations may be experienced positively or negatively. They may also interact by working against, dampening or reinforcing trends set by the other factors. Accordingly, accounts of market access draw a positive influence for large farmers and a negative one for small farmers. For poor people, the influence of policy circumstances through welfare payments added to their cultural model and low aspirations, while historically they had traditional occupations related to nature (e.g., wood crafters). The official separation, drawn by social policies between those who receive welfare payments and those who do not, further accentuated the disempowerment of the poor and encouraged a way of life decoupled from nature.

Discussion

Our findings show that disaggregated social groups have different ways to derive well-being from ES, as a result of a range of interlinked mediating factors. We have shown these mediating factors to act upon the ES co-produced by the social and ecological system, and to affect their distribution among beneficiaries. Our generated model of mediating factors (MMF) goes beyond the established conceptualization of a fixed linkage between the level of ES provided by ecosystem functioning and their aggregated contributions to well-being. Taken collectively, the structure of the MMF is not intended to be rigid. Each mediating factor in the MMF may span multiple scales, including through time (e.g. historical political contingencies), as well as space, depending on the selected beneficiaries and services.

The MMF challenges the dominant conceptualization of the aggregated contribution of ES to well-being. A key contribution of our work is a refined conceptualization of the contextual space between ES and human beneficiaries, a space utterly simplified by many framings dealing with the links between ES and well-being, such as the "cascade model" (Haines-Young and Potschin 2010). Our findings support the idea of socially defined ES bundles (Martín-López et al. 2012) in addition to functionally and spatially determined ones (Raudsepp-Hearne et al. 2010). The more we descend the ES cascade and leave the supply side behind, the more we recognize the flow from the ecosystem to human welfare to be embedded in human-made contextual spheres of influence. These spheres are not integrated within the "cascade" and pertain to the social system such as formal institutions, human interrelations, cash livelihoods, perceptions, attitudes, and internal norms and values. The MMF thus contributes to recent initiatives to expand the model of the ES cascade to include social processes linked to beneficiaries (Ernstson 2013; Spangenberg et al. 2014b).

By illustrating the role of interlinked mediating factors, our MMF further highlights that existing explanations of the contribution of ES to the well-being of poor people are not universal. With some exceptions (e.g. Lakerveld 2012), the current dominant poverty narrative may be too simple, grounded too much in cases of communities linked to their land and based on the study of developing countries, which typically have no government social safety net. ES management in developed societies is increasingly disconnected from nature with implications related to human behavior and lifestyles (Fischer et al. 2012). Currently, research is failing to capture both the complex reality of developed societies or social groups not directly using the land (e.g. welfare recipients, poor urban people) and the diversity of mediating factors. For example, in our case study, the poorest people were not perceived to be particularly reliant on ES. This could be explained by a combination of mediating factors: the social welfare policy (factor 2); the low aspirations of the poor (factor 4); and their attitudes and perceptions, such as defeatism, conflation of needs and wants, and favoritism of the rich (factor 5). Especially the latter factor reveals multiple, unrecognized dimensions of poverty (Pascual et al. 2010), which are based on meanings attributed to needs, benefits and equity by various beneficiary groups in a case study, and hence are more subjective. Analysis of equity in relation to ES may obtain different outcomes depending on the extent

to which nature contributes to well-being by fulfilling objective versus subjective needs and demands (Costanza et al. 2007; Busch et al. 2011). For example, listening to poor people in Transylvania yielded paradoxical patterns because many are conditioned to go with existing power structures, justifying the aspirations of the more powerful groups such as large farmers, and constructing them into reality. These empirical results emphasize the importance of context for the global discourse on ES, poverty alleviation and well-being (MA 2005: 61–63), and suggest refinements of these framings, such as incorporating subjectivity.

In order to refine these dominant framings, our findings demonstrate the need to engage with multiple academic disciplines beyond traditional ES research. Economists already play a considerable role, particularly in relation to payments for ES. However, given the importance of institutional and policy contexts (factor 2), political ecology (e.g. Bryant 1992) needs to be engaged more centrally in ES research. Recent work that is particularly relevant addresses the influence of markets (Corbera et al. 2007; Pascual et al. 2010), of globalization (Kosoy and Corbera 2010), and of commodification of ES. Power relations, negotiations of social relations, the confrontation of bargaining powers among individuals and beneficiary groups (factor 3) have also been the focus of work on ES flows and access of individuals or groups to ES (Pascual et al. 2014; Felipe-Lucia et al. 2015), especially in a context of common pool resources (Schlager and Ostrom 1992). Individual contexts and household decisions (factor 4) could be linked to the notion of livelihood strategies from Scoones (2009) framework and related work, in particular, the types of capitals accessed by different beneficiary groups. Moreover, the heterogeneity of household decisions and different opportunities to achieve desired livelihoods given personal circumstances are also emphasized by the capability approach (Sen 1985; Pascual et al. 2010; Fisher et al. 2013).

When dealing with subjective perceptions and mental constructs that shape the contribution of nature to well-being, future refinements in ES research may steer away from a positivist logic to better accommodate subjective knowledge (factors 5, 6). Researchers' assessments of equity and poverty cannot be applied in an undiscriminating manner without exploring the cognitive dimensions of stakeholders. Mental models of fairness and adjusted expectations (factor 5) distort outcomes of the ES–well-being relationship by being part of the socially constructed reality of those living within the system's borders (Chambers 1995; Kumar and Kumar 2008; Amblard and Colin 2009). Deconstructing such "realities" calls for deeper collaborations with disciplines such as behavioral economics and anthropology. The values and norms of participants (factor 6) are understood by disciplines such as psychology and philosophy as more deeply rooted in individuals than their perceptions and attitudes (Ives and Kendal 2014). The importance of underlying value systems is increasingly being recognized within frameworks dealing with human–nature relationships (Kittinger et al. 2012).

With the MMF, we have tried to provide an analytical framework for exploring interdisciplinary contexts and unpacking mediating factors in a range of contexts. Literature highlights that future research needs to carefully address the context and conditions that influence the ability of different beneficiaries to obtain benefits from ES (e.g., Daily et al. 2009; Reyers et al. 2013). Our model deconstructs this contextual complexity and creates an explicit, structured way of thinking about disaggregation. This, in turn, may help to inform future research aiming to holistically unpack ES–well-being relationships. We propose future research should explore the disaggregated benefits of ES through grounded, place-based research. Beneficiary groups and key ES ought to be identified and an analysis performed on how each group accesses which benefits from which services. Similar to our methodology, studies might then consider the equity in the distribution of benefits (and their match to needs). Our MMF could then be used as a framework for understanding how the factors (1–6) play out in different places and for different beneficiary groups. We expect that replicating such assessments in different settings would add detail and nuance to the model.

As a practical contribution, our MMF highlights points in the system that can be targeted (more or less easily) to effect change in the distribution of ES. The MMF helps to understand: (1) which mediating factors to take into account, (2) where to intervene for increased equity, i.e. which leverage points—places of system intervention that can lead to fundamental changes in the system as a whole (Meadows 2008: 145)—to target, and (3) whom to target. Within our model, policies that would target the components and processes of the ecological system, and the ES–well-being relationship, cannot ignore beneficiaries' characteristics and the mediating factors that interact to modify the outcomes of the relationship. Conversely, sectoral policies would engage only with a "shallow" leverage point (sensu Meadows 2008) and fail to engage with the core drivers of inequity. For example, the CAP's rural development program of agri-environment schemes may deliver increased ES, but because it does not holistically engage with mediating factors (Plieninger and Bieling 2013), it will not equitably increase access to benefits. In Transylvania, such design flaws translate into high transaction costs, especially for marginalized groups (Mikulcak et al. 2013). Deeper leverage points should engage with matters of power, competing value systems and normative goals within the dynamics of the system (in agreement with

Cote and Nightingale 2012). Paraphrasing Verdery (2003), the "vanishing commons" call for empowering community stewardship of ES and fostering social capital and collaboration (Plieninger and Bieling 2013) within the realm of factor "social relations." To engage with such mechanisms, in Transylvania, the social norm of maintaining the land, a potential "deep" leverage point, will support decision-making aiming at sustaining farming ES, because there is high in-principle support by local people to maintain their agrarian identities. Hence, capitalizing on locals' held values has the potential to reverse or at least dampen system dynamics leading to inequity patterns among ES beneficiaries, all the more because the success of instruments such as the agri-environment schemes depends on farmers' non-economic motivations (Van Zanten et al. 2014).

The policy relevance of the MMF is particularly apparent when asking whom to target. The model helps in identifying groups for which most of the mediating factors have a negative influence. In the case of Transylvania, small farmers are considered stewards of the landscape and key co-generators of ES. The support of this group therefore appears key to aggregated well-being. However, many needs of small farmers are not adequately covered by access to ES benefits (Fig. 2). Simultaneously, small farmers also experience policy barriers and pressures from the other groups; that is, context restricts their capacity to access ES. In addition, narrowly designed subsidy schemes may compromise the identity defining norm of cultivating and maintaining land and may inadvertently follow a similarly unbalanced distribution pattern to that of some payment schemes for ES (Jack et al. 2008). Our analysis seems to suggest instead the alleviation of external pressures acting on small famers (e.g. command-and-control instruments) through a tailored mix of regulations based on cross-sectoral compliance, market interventions and information policies that steer both extrinsic and intrinsic motivations (Van Zanten et al. 2014). The MMF can be used to tailor integrative policy designs according to the most contextually challenged beneficiary group whose way of life and perceived well-being are tightly linked to ES, so that policies stand a better chance of tackling inequities in well-being contributions.

Conclusion

This paper contributes context-specific empirical findings on ES–well-being relationships that may uncover broader aspects than the initial operationalization of the ES concept allowed for. By disaggregating ES beneficiaries in a low-intensity farming landscape, we obtained a more contextualized and explicit perspective on the contributions of ES to well-being. We show how a multi-dimensional context creates winners and losers among potential beneficiaries and therefore challenges the dominant conceptualization of the relationship between ES provision and aggregated contributions of ES to well-being. Hence, a key conceptual contribution of this paper is the explicit refinement of the contextual space between ES and human beneficiaries via a model of mediating factors (MMF), which goes beyond dominant framings of poverty and equity. This model highlights avenues for new interdisciplinary research on ES and, as an analytical tool, may help to systematically unpack the relationship between ES and beneficiaries' derived well-being in a broad range of settings. With respect to policy, better accounting for contextual factors, such as those considered in our MMF, should provide an improved basis to manage ES fairly and inclusively. For example, in Transylvania, capitalizing on locals' held values has the potential to reverse or at least dampen system dynamics leading to inequity patterns among ES beneficiaries.

Acknowledgments We are indebted to all locals who contributed directly or indirectly to our research. We are deeply grateful to the late Marian Solomon for his support. We thank Dave Abson, Leonie Bellina, Laura Sutcliffe and Anda Pop. Comments from two anonymous reviewers greatly improved the paper. The interview and survey procedure was cleared by the ethics committee of Leuphana University, Lueneburg. The project was funded through a 2010 Sofja Kovalevskaja Award by the Alexander von Humboldt Foundation to JF.

References

Abson DJ, Termansen M (2011) Valuing ecosystem services in terms of ecological risks and returns. Conserv Biol 25:250–258. doi:10.1111/j.1523-1739.2010.01623.x

Amblard L, Colin J-P (2009) Reverse tenancy in Romania: actors' rationales and equity outcomes. Land Use Policy 26:828–836. doi:10.1016/j.landusepol.2008.10.008

Barthel S, Crumley CL, Svedin U (2013) Biocultural refugia: combating the erosion of diversity in landscapes of food production. Ecol Soc 18:71. doi:10.5751/ES-06207-180471

Bennett EM, Cramer W, Begossi A, Cundill G, Díaz S, Egoh BN, Geijzendorffer IR, Krug CB, Lavorel S, Lazos E, Lebel L, Martín-López B, Meyfroidt P, Mooney HA, Nel JL, Pascual U, Payet K, Harguindeguy NP, Peterson GD, Prieur-Richard AH, Reyers B, Roebeling P, Seppelt R, Solan M, Tschakert P, Tscharntke T, Turner B, Verburg PH, Viglizzo EF, White PC, Woodward G (2015) Linking biodiversity, ecosystem services, and human well-being: three challenges for designing research for sustainability. Curr Opin Environ Sustain 14:76–85. doi:10.1016/j.cosust.2015.03.007

Brooks EGE, Smith KG, Holland RA, Poppy GM, Eigenbrod F (2014) Effects of methodology and stakeholder disaggregation on ecosystem service valuation. Ecol Soc 19:18

Bryant RL (1992) Political ecology: an emerging research agenda in third-world studies. Polit Geogr 11:12–36

Bryman A (2012) Social research methods, 4th edn. Oxford University Press, Oxford

Busch M, Gee K, Burkhard B, Lange M, Stelljes N (2011) Conceptualizing the link between marine ecosystem services and human well-being: the case of offshore wind farming. Int J Biodiver Sci Ecosyst Serv Manag 7:190–203. doi:10.1080/21513732.2011.618465

Carpenter SR, Mooney HA, Agard J, Capistrano D, DeFries RS, Díaz S, Dietz T, Duraiappah AK, Oteng-Yeboah A, Miguel H, Perrings C, Scholes RJ, Whyte A, Reid WV (2009) Science for managing ecosystem services: beyond the millennium ecosystem assessment. PNAS 106:1305–1312. doi:10.1073/pnas.0808772106

Chambers R (1995) Poverty and livelihoods: whose reality counts? Environ Urban 7:173–204. doi:10.1177/095624789500700106

Corbera E, Kosoy N, Martínez Tuna M (2007) Equity implications of marketing ecosystem services in protected areas and rural communities: case studies from Meso-America. Glob Environ Chang 17:365–380. doi:10.1016/j.gloenvcha.2006.12.005

Costanza R, Fisher B, Ali S, Beer C, Bond L, Boumans R, Danigelis NL, Dickinson J, Elliott C, Farley J, Gayer DE, Glenn LM, Hudspeth T, Mahoney D, McCahill L, McIntosh B, Reed B, Rizvi SAT, Rizzo DM, Simpatico T, Snapp R (2007) Quality of life: an approach integrating opportunities, human needs, and subjective well-being. Ecol Econ 61:267–276. doi:10.1016/j.ecolecon.2006.02.023

Cote M, Nightingale AJ (2012) Resilience thinking meets social theory: situating social change in socio-ecological systems (SES) research. Prog Hum Geogr 36:475–489. doi:10.1177/0309132511425708

Daily GC, Polasky S, Goldstein J, Kareiva PM, Mooney HA, Pejchar L, Ricketts TH, Salzman J, Shallenberger R (2009) Ecosystem services in decision making: time to deliver. Front Ecol Environ 7:21–28. doi:10.1890/080025

Daw T, Brown K, Rosendo S, Pomeroy R (2011) Applying the ecosystem services concept to poverty alleviation: the need to disaggregate human well-being. Environ Conserv 38:370–379. doi:10.1017/S0376892911000506

Díaz S, Quétier F, Cáceres DM, Trainor SF, Pérez-Harguindeguy N, Bret-Harte MS, Finegan B, Peña-Claros M, Poorter L (2011) Linking functional diversity and social actor strategies in a framework for interdisciplinary analysis of nature's benefits to society. PNAS 108:895–902. doi:10.1073/pnas.1017993108

Ernstson H (2013) The social production of ecosystem services: a framework for studying environmental justice and ecological complexity in urbanized landscapes. Landsc Urban Plan 109:7–17. doi:10.1016/j.landurbplan.2012.10.005

Felipe-Lucia MR, Martín-López B, Lavorel S, Berraquero-Díaz L, Escalera-Reyes J, Comín FA (2015) Ecosystem services flows: why stakeholders' power relationships matter. Plos One 10:e0132232. doi:10.1371/journal.pone.0132232

Fischer J, Dyball R, Fazey I, Gross C, Dovers S, Ehrlich PR, Brulle RJ, Christensen C, Borden RJ (2012) Human behavior and sustainability. Front Ecol Environ 10:153–160. doi:10.1890/110079

Fisher B, Turner R, Morling P (2009) Defining and classifying ecosystem services for decision making. Ecol Econ 68:643–653. doi:10.1016/j.ecolecon.2008.09.014

Fisher JA, Patenaude G, Meir P, Nightingale AJ, Rounsevell MDA, Williams M, Woodhouse IH (2013) Strengthening conceptual foundations: analysing frameworks for ecosystem services and poverty alleviation research. Glob Environ Chang 23:1098–1111

Fisher JA, Patenaude G, Giri K, Lewis K, Meir P, Pinho P, Rounsevell MDA, Williams M (2014) Understanding the relationships between ecosystem services and poverty alleviation: a conceptual framework. Ecosyst Serv 7:34–45. doi:10.1016/j.ecoser.2013.08.002

Fundaţia ADEPT (2010) High nature value grasslands. Securing the ecosystem services of European farming post 2013

Haines-Young R, Potschin M (2010) The links between biodiversity, ecosystem services and human well-being. In: Raffaelli D, Frid C (eds) Ecosystem ecology: a new synthesis. Cambridge University Press, Cambridge

Hartel T, Fischer J, Câmpeanu C, Hanspach J, Fazey I (2014) The importance of ecosystem services for rural inhabitants in a changing cultural landscape in Romania. Ecol Soc 19:42

Hicks CC, Cinner JE (2014) Social, institutional, and knowledge mechanisms mediate diverse ecosystem service benefits from coral reefs. PNAS 111:17791–17796. doi:10.1073/pnas.1413473111

Ives C, Kendal D (2014) The role of social values in the management of ecological systems. J Environ Manage 144:67–72. doi:10.1016/j.jenvman.2014.05.013

Jack BK, Kousky C, Sims KRE (2008) Designing payments for ecosystem services: lessons from previous experience with incentive-based mechanisms. PNAS 105:9467–9470. doi:10.1073/pnas.0705503104

Kenter JO, Hyde T, Christie M, Fazey I (2011) The importance of deliberation in valuing ecosystem services in developing countries—evidence from the Solomon Islands. Glob Environ Chang 21:505–521. doi:10.1016/j.gloenvcha.2011.01.001

Kittinger JN, Finkbeiner EM, Glazier EW, Crowder LB (2012) Human dimensions of coral reef social-ecological systems. Ecol Soc 17:4

Kosoy N, Corbera E (2010) Payments for ecosystem services as commodity fetishism. Ecol Econ 69:1228–1236. doi:10.1016/j.ecolecon.2009.11.002

Kumar M, Kumar P (2008) Valuation of the ecosystem services: a psycho-cultural perspective. Ecol Econ 64:808–819. doi:10.1016/j.ecolecon.2007.05.008

Lakerveld R (2012) Applying political ecology to ecosystem services: operationalizing an alternative approach to ecosystem services. Dissertation. Wageningen University

MA (2005) Ecosystems and human well-being: synthesis/millennium ecosystem assessment. Island Press, World Resources Institute

MARD (2014) Romanian ministry of agriculture and Rural development. National Rural Development Programme for the 2014–2020 period

Martín-López B, Iniesta-Arandia I, García-Llorente M, Palomo I, Casado-Arzuaga I, Amo DGD, Gómez-Baggethun E, Oteros-Rozas E, Palacios-Agundez I, Willaarts B, González JA, Santos-Martín F, Onaindia M, López-Santiago C, Montes C (2012) Uncovering ecosystem service bundles through social preferences. Plos One 7:e38970. doi:10.1371/journal.pone.0038970

Meadows DH (2008) Thinking in systems. A primer. Chelsea Green Publishing, White River Junction, Vermont

Mikulcak F, Newig J, Milcu AI, Hartel T, Fischer J (2013) Integrating rural development and biodiversity conservation in Central Romania. Environ Conserv 40:129–137. doi:10.1017/S0376892912000392

Milcu AI, Sherren K, Hanspach J, Abson D, Fischer J (2014) Navigating conflicting landscape aspirations: application of a photo-based Q-method in transylvania (Central Romania). Land Use Policy 41:408–422. doi:10.1016/j.landusepol.2014.06.019

Muradian R, Corbera E, Pascual U, Kosoy N, May PH (2010) Reconciling theory and practice: an alternative conceptual framework for understanding payments for environmental services. Ecol Econ 69:1202–1208. doi:10.1016/j.ecolecon.2009.11.006

Norgaard RB (2010) Ecosystem services: from eye-opening metaphor to complexity blinder. Ecol Econ 69:1219–1227. doi:10.1016/j.ecolecon.2009.11.009

Parliament of Romania (2011) Law no. 241/2011 for the organisation, administration and exploitation of pastures

Pascual U, Muradian R, Rodríguez LC, Duraiappah A (2010) Exploring the links between equity and efficiency in payments

for environmental services: a conceptual approach. Ecol Econ 69:1237–1244. doi:10.1016/j.ecolecon.2009.11.004

Pascual U, Phelps J, Garmendia E, Brown K, Corbera E, Martin A, Gomez-Baggethun E, Muradian R (2014) Social equity matters in payments for ecosystem services. BioScience. doi:10.1093/biosci/biu146

Plieninger T, Bieling C (2012) Resilience and the cultural landscape: understanding and managing change in human shaped environments. Cambridge University Press, Cambridge. ISBN: 9781107020788

Polishchuk Y, Rauschmayer F (2012) Beyond "benefits"? Looking at ecosystem services through the capability approach. Ecol Econ 81:103–111. doi:10.1016/j.ecolecon.2012.06.010

Raudsepp-Hearne C, Peterson GD, Bennett EM (2010) Ecosystem service bundles for analyzing tradeoffs in diverse landscapes. PNAS 107:5242–5247. doi:10.1073/pnas.0907284107

Raymond CM, Kenter J, Turner N, Alexander K (2014) Comparing instrumental and deliberative paradigms underpinning the assessment of social values for cultural ecosystem services. Ecol Econ 107:145–156. doi:10.1016/j.ecolecon.2014.07.033

Reyers B, Biggs R, Cumming GS, Elmqvist T, Hejnowicz AP, Polasky S (2013) Getting the measure of ecosystem services: a social-ecological approach. Front Ecol Environ 11:268–273. doi:10.1890/120144

Ribot JC, Peluso NL (2003) A theory of access. Rural Sociol 68:153–181. doi:10.1111/j.1549-0831.2003.tb00133.x

Rodríguez JP, Beard TD, Bennett EM, Cumming GS, Cork SJ, Agard J, Dobson AP, Peterson GD (2006) Trade-offs across space, time, and ecosystem services. Ecol Soc 11:28

Saldana J (2009) An Introduction to codes and coding. Coding Man Qual Res. doi:10.1519/JSC.0b013e3181ddfd0a

Schlager E, Ostrom E (1992) Property-rights regimes and natural resources: a conceptual analysis. Land Econ 68:249–262

Schröter M, van der Zanden EH, van Oudenhoven APE, Remme RP, Serna-Chavez HM, de Groot RS, Opdam P (2014) Ecosystem services as a contested concept: a synthesis of critique and counter-arguments. Conserv Lett 7:514–523. doi:10.1111/conl.12091

Scoones I (2009) Livelihoods Perspectives and Rural Development. J Peasant Stud 36:171–196. doi:10.1080/03066150902820503

Sen A (1985) Commodities and capabilities. Oxford University Press, Oxford

Sikor T (2013) The justices and injustices of ecosystem services. Routledge, London

Spangenberg JH, Görg C, Truong DT, Tekken V, Bustamante JV, Settele J (2014a) Provision of ecosystem services is determined by human agency, not ecosystem functions. Four case studies. Int J Biodiver Sci Ecosyst Serv Manag 10:40–53. doi:10.1080/21513732.2014.884166

Spangenberg JH, von Haaren C, Settele J (2014b) The ecosystem service cascade: further developing the metaphor. Integrating societal processes to accommodate social processes and planning, and the case of bioenergy. Ecol Econ 104:22–32. doi:10.1016/j.ecolecon.2014.04.025

Strauss A, Corbin J (1990) Basics of qualitative research: grounded theory procedures and techniques. Sage Publications, Inc, Newbury Park, London, New Delhi

Suddaby R (2006) From the editors: what grounded theory is not. Acad Mang J 49:633–642

Van Zanten BT, Verburg PH, Espinosa M, Gomez-Y-Paloma S, Galimberti G, Kantelhardt J, Kapfer M, Lefebvre M, Manrique R, Piorr A, Raggi M, Schaller L, Targetti S, Zasada I, Viaggi D (2014) European agricultural landscapes, common agricultural policy and ecosystem services: a review. Agron Sustain Dev 34:309–325. doi:10.1007/s13593-013-0183-4

Vatn A (2010) An institutional analysis of payments for environmental services. Ecol Econ 69:1245–1252. doi:10.1016/j.ecolecon.2009.11.018

Verdery K (2003) The vanishing hectare: property and value in postsocialist Transylvania. Cornell University Press, Ithaca

Wilson MA, Howarth RB (2002) Discourse-based valuation of ecosystem services: establishing fair outcomes through group deliberation. Ecol Econ 41:431–443. doi:10.1016/S0921-8009(02)00092-7