Resilience, Values and Ecosystem Services: Innovations in Rangeland Governance

Caroline Upton[1,2,3], D. Dulmaa[1,2,4], N. Nyamaa[5,6]

[1]Department of Geography, University of Leicester, University Road, Leicester LE1 7RH UK
[2]Mongolian Society for Range Management, Ulaanbaatar 976, Mongolia
[3]<cu5@le.ac.uk>
[4]<dorjgotovd@yahoo.com>
[5]Mongolian Academy of Agricultural Sciences, Zaisan-17024, Ulaanbaatar, Mongolia.
[6]<nyamaa_n@yahoo,com>

ABSTRACT

Mongolia's socio-ecological rangeland systems face a number of critical, contemporary challenges. Climatic change, persistent poverty and growing land use conflicts, especially around mining, pose complex problems both for herders and policy-makers. Furthermore, there is renewed emphasis on meeting Convention on Biological Diversity (CBD) and Aichi targets, following the publication of Mongolia's 5th National CBD report in March 2014, and the development of a new National Biodiversity Strategic Action Plan. (E)valuation of the contributions of rangeland ecosystem services (ES) to biodiversity and livelihoods/wellbeing are highlighted as priorities for future planning therein. ES thinking, valuation and commodification are becoming increasingly influential in other contemporary policy initiatives, not least through the development of the national REDD+ roadmap, Business and Biodiversity offset programmes and Government commitments to the 'Green Economy'. Nonetheless critical questions remain about the ES paradigm itself, values/ valuation of ES and how these may be enacted and supported through policy. Here we report on a three year Darwin-Initiative funded project, which aimed to 'generate policy and practice relevant knowledge of values of ecosystem services (ES) in Mongolia, and test the efficacy of Payment for Ecosystem Services (PES) schemes, in order to enhance biodiversity and livelihoods'. Aims were realised through i) participatory mapping and analysis of ES, including cultural ES, with 300 herder households across four case study sites, and the development of innovative methods for non-economic valuation; ii) co-development and implementation of a novel rangeland payment for ES (PES) scheme at the four sites, through the Plan Vivo standard; iii) analysis of the impacts ES and of the PES scheme on biodiversity and livelihoods. Methods used included deliberative valuation approaches, mapping, ranking and choice modelling to examine group and individual values and trade-offs between ES across ecologically contrasting areas. We also applied the SOLVES (Social Values of ES) GIS model to highlight spatial, place-specific dimensions of ES values, as part of a series of wider biodiversity, livelihoods and ES assessments. Results highlight spatial and temporal diversities in ES values, importance of cultural ES for wellbeing, and the potential of carefully designed PES schemes to contribute to more resilient socio-ecological rangeland systems in the future.

Keywords: values, ecosystem services, livelihoods, biodiversity, governance

INTRODUCTION

In contemporary Mongolia, ecosystem services (ES) thinking is becoming increasingly influential in contemporary policy initiatives and in framing decision-making around rural futures, despite growing critiques of the commodification of nature, arguably inherent in the ES paradigm (Robertson, 2012; Upton, 2014). These issues are brought into particularly sharp relief in Mongolia by the recent, rapid proliferation of mining activities, which look set to transform economic growth and trajectories. Furthermore, there is renewed emphasis on meeting Convention on Biological Diversity (CBD) and Aichi targets, following the publication of Mongolia's 5th National CBD report in March 2014, and the development of a new National Biodiversity Strategic Action Plan. (E)valuation of the contributions of rangeland ecosystem services (ES) to biodiversity and livelihoods/wellbeing are highlighted as priorities for future planning therein. Nonetheless critical conceptual and practical questions remain concerning not only the ES paradigm per se, but its local meanings, and contested ES values and valuation practices. The concept of 'ES' is by no means universal or universally accepted, with the continued recognition of different cultural understandings of human/ nature relationships vital for future policy making and for environmental justice. Nonetheless, a global form of ES thinking continues to extend its influence, not least in Mongolia. Vital issues at this juncture are therefore to explore local meanings and values around 'ES' in this respect, something which we begin to do herein. Of particular relevance to pastoral resource governance are questions of how local, culturally specific values and concepts of ES may be elicited, enacted and supported through policy, not least in relation to holistic (e)valuation encompassing not only provisioning but cultural ES and values (Plieninger et al., 2013).

Critiques of the ES paradigm notwithstanding, recent work in the social and environmental sciences has begun to explore the possibilities and impacts of economic mechanisms, notably Payment for Ecosystem Services (PES) schemes, in resource governance and sustainable resource use. However, with a few notable exceptions (e.g. Dougill et al., 2012; Reed et al., 2015), pastoral/ rangeland systems have not featured prominently in this literature to date. These absences reflect the particular challenges presented by inherent characteristics of rangeland socio-ecological systems, for example: low rates of carbon sequestration in rangeland soils compared to above ground biomass (trees and shrubs) in forested systems; complex and variable socio-ecological boundaries linked to widespread lack of clear individual tenure rights; and climatic variability prompting temporally and spatially variable adaptive responses (Dougill et al., 2012). Nonetheless, and given the wider Mongolian environmental and policy contexts outlined above, critical analyses and exploration of (P)ES and the promises and pitfalls of ES-based approaches in rangelands are timely and offer important insights for future policy directions.

This paper reports on a Darwin-Initiative funded project (2012-2015), which aimed to 'generate policy and practice relevant knowledge of values of ecosystem services (ES) in Mongolia, and test the efficacy of Payment for Ecosystem Services (PES) schemes, in order to enhance biodiversity and livelihoods'. Specifically, and with the emphasis on eliciting local meanings and values of 'ES' as a primary concern, we ask a) how herders at four different case study sites across Mongolia understand, use and value ES, with particular attention to the role of cultural ES therein; b) how pilot PES schemes may be developed and implemented at these sites, given challenges inherent in rangeland systems and to reflect local ES values; c) what are the policy lessons in relation to sustainable livelihoods and biodiversity into the future?

STUDY SITES

Research was conducted at four sites across Mongolia, as shown in Figure 1, from 2012-2015. In total, 12 herder groups participated in the work, 3 from each of the main

study areas, selected to represent contrasting ecological zones (Ikh Tamir *soum*, Arkhangai *aimag* in the forest steppe; Undurshireet soum, Tuv *aimag* in the steppe; Bogd *soum* Bayanhongor *aimag* in the steppe/ desert steppe; Ulziit *soum*, Dundgov *aimag* in the desert steppe). With the exception of the Bogd *soum* groups, all were Mongolian Society for Range Management (MSRM)/ Swiss Development Agency (SDC) Pasture User Groups (PUGs)/*heseg*. They therefore represent a particular form of the herders' groups/ organizations, which have proliferated in rural Mongolia in recent years, typically under donor influence. Recent studies of these groups have highlighted intra-group diversity, relationships with non-group members, sustainability and the extent to which they represent traditional, endogenous forms, as issues meriting further, critical consideration (e.g. Upton, 2008). Nonetheless, they continue to constitute important local institutions, variously involved with pasture use and livelihoods, in particular areas. The groups identified in Figure 1 above are a subset of the 12 groups who participated in this study, and are those involved in the pilot PES scheme through the Plan Vivo standard.

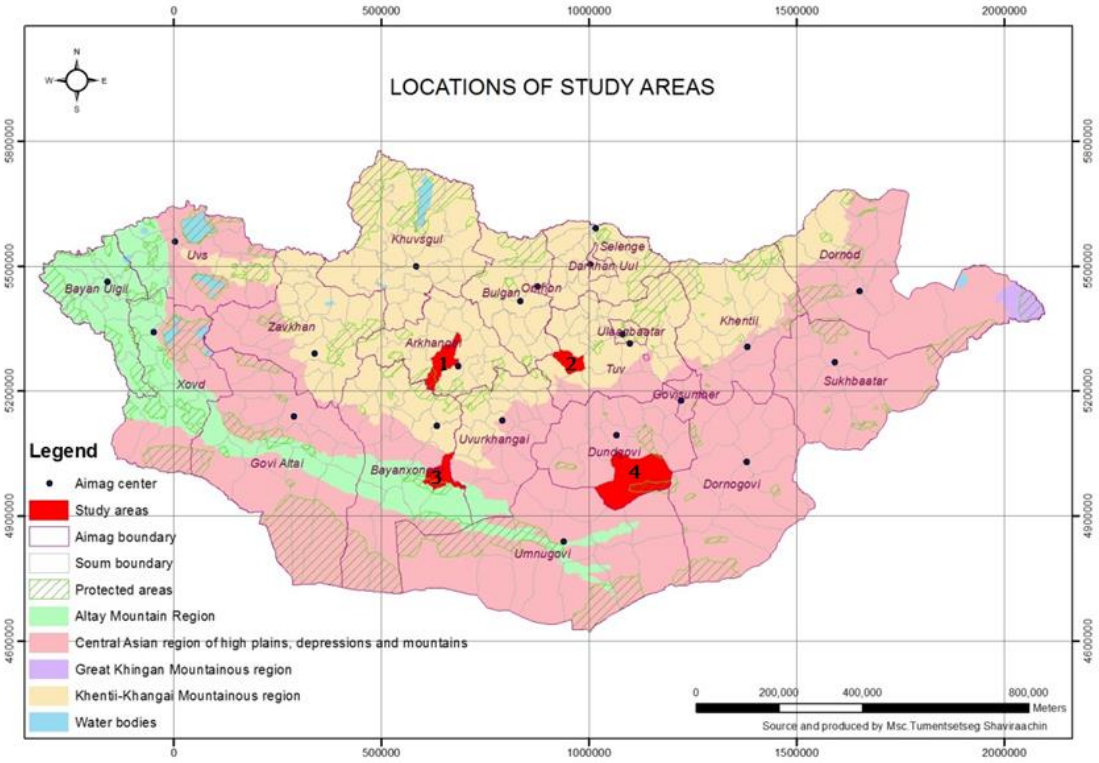

Figure 1. Study sites: 1) Hongor Ovoo *heseg*, Ikh Tamir *soum*, Arkhangai *aimag*; 2) Ikh am *heseg*, Undurshireet *soum*, Tuv *aimag;* 3) Dulaan Khairkhan herder group, Bogd *soum* Bayanhongor *aimag*; 4) Dert *heseg*, Ulziit *soum*, Dundgov *aimag*

METHODS

The following methods were employed with participating herder groups at each of the four sites:

i) participatory mapping of ES, including cultural ES with 300 herder households across four case study sites;
ii) ranking and valuation of ES (including deliberative and group valuation approaches);
iii) household socio-economic surveys;
iv) focus group discussions (with each participating herder group);
v) Key informant interviews;

vi) Participatory photography/ video.

In addition, baseline vegetation and biodiversity surveys were completed for all sites.

These datasets were variously analysed through: statistical analysis of quantitative data (e.g. descriptive statistics, correlations and regressions); conjoint analysis of ES ranking/ valuations (all using SPSS); coding of qualitative materials, interview transcripts, annotated maps etc. drawing on the precepts of grounded theory; use of GIS software and models to explore spatial dimensions of ES values (using the SOLVES model); visual analysis of photographic and video materials. Modelling of C sequestration under baseline and planned (with Plan Vivo project) grazing regimes were also developed using the CENTURY model.

RESULTS AND COMMENTS

The final analyses of project datasets are ongoing. To date, key results highlight the importance of multiple ES categories at sites across Mongolia and thus the importance of holistic assessment of ES. Although provisioning services (grazing, water resources) unsurprisingly feature highly in ES lists and rankings across all sites, cultural services (for example aesthetic, spiritual services) retain importance at all locations, albeit with willingness to trade-off between different services showing significant variation both across sites and by attributes (age, gender etc.) for the dataset as a whole. Attempts to assign monetary values to cultural services are problematic, echoing the findings of others in diverse geographical contexts (e.g. Kenter et al., 2011), although choice modelling/ conjoint analysis approaches do provide tools for the elicitation and, to some degree, the quantitative analysis of these services, with important implications for policymakers. Group and deliberative approaches, as employed here, reveal the importance of shared values, especially in relation to non-economic valuation and to cultural services, and underscore the importance of group approaches and holistic ES (e)valuation in sustainable and equitable rangeland governance (see also Reed et al., 2015). Through analysis of the spatial dimensions of ES provision and valuation, using the SOLVES model, ES are revealed as bundled services, with hotspots in provision of the most highly valued cultural and other ES associated with particular landscape and/or landcover attributes. These 'hotspots' and their cultural ES dimensions are also widely cited by informants across the four sites as important aspects of well-being. Cultural services mapping using SOLVES thus offers insights into management planning and decisions at the landscape scale and emphasizes the resonance of the cultural landscapes concept in the Mongolian context (Pleininger et al., 2013).

Analyses of temporalities in ES provision highlight both drivers of decline and their impacts on perceptions of well-being, with climatic impacts on provisioning services forming a particular area of concern across sites.

The development of a pilot PES scheme at the four sites under the Plan Vivo standard proceeded through *heseg/*herder group led planning, building on the ES identification and valuation exercises highlighted above, and taking full account of socio-economic and local biodiversity contexts, as well as stated values around cultural ES. Specifically, herder groups developed a range of planned activities, which variously contributed to carbon sequestration, biodiversity or livelihood goals. Table 1 provides a brief summary of the results of these exercises. A climate benefit quantification methodology was also developed specifically for Plan Vivo (PV) as part of this project, namely 'Carbon sequestration through improved grassland and natural resources management in extensively managed grasslands' (Values for Development, 2014), drawing on existing work in relation to the Verified Carbon Standard (VCS) (Dougill et al., 2012). CENTURY modelling, an integral aspect of this proposed methodology, in conjunction with unwillingness of herder groups to substantially reduce livestock numbers as part of an initial PES commitment phase, indicates that the carbon (C) metric alone is unlikely to

yield substantial marketable benefits at present. This is not an uncommon issue with rangeland PES schemes, as noted above. However, the recent development of a new PV standard (December 2013), for which this project is one of the pioneers, offers a number of opportunities for a 'carbon plus' type approach, which may begin to address some of the previous critiques of PES schemes. Specifically, the danger of focusing on single ES or metrics is herein recognized and plans developed for a more holistic approach through the kind of tripartite model set out in Table 1. By emphasizing the livelihoods/ wellbeing and biodiversity conservation aspects of planned activities, issues such as equitable benefit sharing, poverty alleviation and measures to avoid leakage (i.e. negative changes beyond PES scheme boundaries, due to PES related activities), whilst maintaining traditional norms of reciprocity better reflect the norms and values of participating communities at study sites. As a result of participatory planning activities conducted during this study, an initial commitment period of only 3 years has also been agreed. This reflects the status of the PV activities as a pilot intervention with an emphasis on institutional and mutual learning amongst parties.

IMPLICATIONS

From the extensive fieldwork with herders at sites across Mongolia, it is evident that holistic assessment of ES and their values, in particular to include cultural ES and non-economic valuation, is important in planning for more resilient socio-ecological rangeland systems in the future and for ensuring co-ownership of plans with local herding communities. Such approaches are also important in the context of the publication of Mongolia's 5th National CBD report in March 2014, and the development of a new National Biodiversity Strategic Action Plan. (E)valuation of the contributions of rangeland ecosystem services (ES) to biodiversity and livelihoods/wellbeing are highlighted as priorities for future planning therein. Various methods for elicitation and (e)valuation of ES were trialed during the Darwin project, which will form the focus of training materials being developed for students at MAAS. These will also be set out in further details as part of a briefing for policy makers.

The Plan Vivo aspects of the Darwin project are ongoing. The development of this pilot PES intervention has thus far illustrated the challenges and complexities of translation of local ES meanings and values, biodiversity and livelihood concerns into this market driven standard, whilst nonetheless indicating that the move beyond a purely C metric may offer significant opportunities for PES in rangelands. This learning process, with clear policy applications, will undoubtedly continue throughout the 1st Plan Vivo commitment period (2015-2018).

ACKNOWLEDGEMENTS

This study was funded by the Darwin Initiative 'Values and Valuation: New Approaches to Conservation in Mongolia' project (Award 19-021). The authors wish particularly to thank all participating herder groups for their input into this project.

REFERENCES

Dougill A, Stringer L, Leventon J, Riddell M, Rueff H. (2012). Lessons from community-based payment for ecosystem service schemes: from forests to rangelands. *Philosophical Transactions of the Royal Society B.*, 367, 3178-3190.

Fisher J, Patenaude G, Meir P, Nightingale A, Rounsell M, Williams M, Woodhouse J. (2013). Strengthening conceptual foundations: analyzing frameworks for ecosystem

services and poverty alleviation research. *Global Environmental Change*, 23(5), 1098-1111.
Kenter J, Hyde T, Christie M, Fazey I. (2011). The importance of deliberation in valuing ecosystem services in developing countries—Evidence from the Solomon Islands. *Global Environmental Change*, 21(2), 505-521.
Pleininger T, Dijks S, Oteros-Rozas E, Bieling C. (2013). Assessing, mapping, and quantifying cultural ecosystem services at community level. *Land Use Policy*, 33, 118-129.
Reed M, Stringer L, Dougill A, Perkins J, Atlhopheng J, Mulale K, Favretto N. (2015). Reorienting land degradation towards sustainable land management: linking sustainable livelihoods with ecosystem services in rangeland systems. *Journal of Environmental Management*, 151, 472-485.
Robertson M. (2011). Measurement and alienation: making a world of ecosystem services. *Transactions of the Institute of British Geographers*, 37, 386-401.
Sherrouse B, Clement J, Semmens D. (2011). A GIS system for assessing, mapping and quantifying the social values of ecosystem services. *Applied Geography*, 31, 748-760.
Upton C. (2014). Communities, culture and commodification: Mongolia's new resource politics. *Inner Asia*, 16(2), 252-274.
Upton C. (2008). Social capital, collective action and group formation: developmental trajectories in post-socialist Mongolia. *Human Ecology*, 36, 175-188.

Table 1. Summary of activities under Plan Vivo, as identified by herders at project sites

Activity type	**Examples**	**Main contributions to Tripartite/ C+ Plan Vivo certificate**
Improved rangeland management	• Restoration/ improvement of traditional seasonal mobility between pastures ('rotational use') • Reduced livestock stocking densities	CARBON C sequestration (soils) Additional contributions to BIODIVERSITY through reduced grazing pressure and rangeland degradation.
Nature conservation	• Group activities for conservation/ protection of named key fauna (wild sheep, deer etc., dependent on key species identified in territory) • Group activities for conservation/protection of named key flora (e.g. medicinal plants, dependent on key species identified in territory). • Group activities for stopping illegal mining	BIODIVERSITY May also contribute to LIVELIHOODS/ WELL BEING (e.g. cultural, aesthetic, environmental ES)
Disaster/ risk preparedness	• Cooperation for haymaking • Cooperation for fodder preparation • Cooperation for repairing wells/ enhancing water supply	LIVELIHOODS/ WELL BEING
Productivity/ income support	• Enhanced production of value-added milk and wool products • Vegetable production, sale and storage	LIVELIHOODS/ WELL BEING