



An analytical approach in accounting for social values of ecosystem services in a Ramsar site: A case study in the Mekong Delta, Vietnam



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ABSTRACT

Within the existing literature body, the evaluation exercises predominantly adopt expert disciplined assessments to explore the biophysical conditions and economic values of ecosystem services (ES) and ecosystem disservices (EDS). This preference largely emerges from the relative convenience in data collection and quantification of these approaches, collectively accrue to practitioners' beliefs that unless explicitly quantified and monetized, these benefits will be negligible. Social aspects of ecosystems contributions to human well-being, on the other hand, are comparatively harder to grasp, thus predominantly overlooked in the general assessment of ES and EDS. To alleviate this imbalance, we presented a case study in exploring relevant ES and EDS within the context of a protected area using non-monetary methods with the aid of the local community. In particular, through deliberative mapping approach, the manuscript strived to locate, quantify, and assess a full range of relevant ES and EDS as perceived by local inhabitants across the landscape of U Minh Thuong National Park (UMTNP), Vietnam. Within the scope of this paper, we also delved into how socio-cultural perceptions and preferences towards these natural resources diverge among groups of respondents. Through the presented research, we strived to consolidate the baseline understanding regarding the ES profile of the research area with relevant social insights, paving the way for the design and implementation of sustainable management strategies. Finally, this manuscript also sought to present a practical measure to account for social dimensions and their relevance to the general assessment of ES.

1. Introduction

The concept of ES has contributed an essential step to recognize the dependence of human societies on natural ecosystems by connecting anthropogenic benefits with biophysical aspects (Häyhä et al., 2015). With the publications of landmark studies such as Costanza et al. (1997), The Millennium Ecosystem Assessment (MA) (2005), or The Economics of Ecosystems and Biodiversity (TEEB) (2010), ES has made its way into academia and policy circles, representing a sustainable growing number of scientific literature and associated policies (Christie et al., 2012; Rall et al., 2015). The concept has been drawing considerable attention as it could facilitate a platform to integrate different worldviews including scientists from multiple disciplines: ecologists, economists, socialists, etc., to policy planners, and relevant non-professionals (Schröter et al., 2015). Throughout the evolution history of ES, several valuation methods have been developed to account for the biophysical, economic, and social aspects of the human benefits

contributed by ecosystems, which accrue to the multidisciplinary characteristic of the concept (MA, 2005; TEEB, 2010; Christie et al., 2012).

The merits of economical approach firstly relate to the simplicity of data collection and computation, hence the mainstream focus of ES evaluation studies on the biophysical and economic accounts, while overlooking socio-cultural information (Plieninger et al., 2013). Also, this imbalance emerges from the vagueness of the terminologies associated with social aspects, such as human needs, wants or satisfaction, which makes it more challenging to establish relationships with ecological processes (Daniel et al., 2012). In other words, it is less explicit to represent the social aspects of ES in a quantitative manner, yet their economic valuations lack robustness, and thus are predominantly neglected (Plieninger et al., 2013).

However, scholars such as Schaich et al. (2010) have raised their opposing voices that the incorporation of socio-cultural features is essentially indispensable for a comprehensive assessment of the

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ecosystems contributions to avoid biased management and unwanted tradeoffs. Likewise, Chan et al. (2012) took note of the ability of social based ES studies to reveal cultural variances among residents groups, which are crucial for sustainable management of natural resources. Even more vigorously, Martín-López et al. (2012) argued that studies, through addressing relevant social variables: perceptions, attitudes, and beliefs are more likely to shed useful lights to human-nature relationships themselves than purely biophysical assessments.

The gap is particularly relevant to the evaluation of Forest associated ES. Being the most important terrestrial ecosystem on Earth, forests supply a wide range of services from the provisioning of clean water, food and timber to the regulating of climate, and hydrological regime, constituting the crucial conditions for human well being (Raymond et al., 2009). How to quantify and evaluate the values of these services, henceforth have drawn considerable attention (see for instance Ninan and Inoue, 2013; Ninan and Kontoleon, 2016; Sutherland et al., 2016; Guimarães et al., 2017). Being able to factor in these values in decision making processes could lead to better conservation outcomes via strengthening the arguments for justifying the conservation. In so doing, not only knowing the ecosystem capacity in terms of quantified ES, but also understanding the interactions (both synergies and trade-offs) among them are meaningful information required by forest managers (Alamgir et al., 2016). The need is even more critical in developing country contexts with the immense pressure of having to divert forests resources for meeting pressing development targets (Ninan and Kontoleon, 2016).

Keeping the above in view, this study aims to contribute an analytical framework to account for the values of forest ES via social accounts, using the case of a biosphere reserve area of Vietnam. There is a substantial number of publications associated with the study site, including peer-reviewed papers, having explored the ecological characteristics given its significance as one of the world's Ramsar sites. The social importance of the site, however, has never been investigated. This pilot study henceforth sought to contribute bridging these gaps with an exploratory evaluation of significant (dis) services across the site landscape, as perceived by the residents.

2. Descriptions of the research area

The research was performed at UMTNP, which contributes significantly to biodiversity preservation of Kien Giang biosphere reserve (BR) and Vietnam's Mekong Delta, in the broader sense. The Park sits on the southeast of U Minh Thuong district, Kien Giang province (Fig. 1), covering the total area of 8038 ha between Minh Thuan (MT) and An Minh Bac (AMB) communes, and supporting one of the largest peat-swamp forests remaining in the country. The National Park houses an extensive collection of terrestrial and aquatic fauna ecosystems, including 32 mammal species, 187 bird species, 37 fish species, and 203 insect species. To accommodate such rich biodiversity, notable ES include the provision of water and nutrients; the regulation of hydrology and climate regime; and the protection from natural hazards. Regarding cultural values, UMTNP also offers nature observation and ecotourism, educational activities, and cultural heritage. In fact, UMTNP is one of the most popular water bird viewing sites of the Mekong Delta, having received 44,000 visitors (97.5% domestic and 2.5% foreigners) and generated the revenue of USD 1 million in 2013 (Tran Ngoc Cuong, 2015).

Since February 22nd, 2015, UMTNP has been registered as the 8th Ramsar site of Vietnam, and the 2228th worldwide. Ramsar is one of the oldest of the modern global environmental agreements, which was negotiated through the 1960s by countries and non-governmental organizations about the increasing degradation of wetlands habitats. The term Ramsar was taken after the name of the Iranian city where the convention was adopted in 1971 and later came into force in 1975. The ultimate mission of the Ramsar convention is to provide the frameworks for national actions and international collaborations for the

conservation and wise use of wetlands and their resources. The term *Ramsar site* was used to refer to the important wetlands in the world concerning the representativeness, rare species, abundance, and significance of water birds and aquatic fauna, etc. Up to date, there have been 2242 Ramsar sites with the total area of 215,253,716 ha successfully identified in 169 contracting countries. Vietnam joined the convention in January 20th, 1989 and has contributed eight RAMSAR sites, in which UMTNP being the latest recognized (From <http://www.ramsar.org/about/history-of-the-ramsar-convention>).

3. Research design

3.1. Assessment framework

This study seeks to propose and apply an analytical framework to quantify and evaluate the social values of the multiple benefits derived from UMTNP. Fig. 2 schematized the overall framework, clarifying the data to be collected, analysis tools and the generation of relevant insights through numerical indicators, including *Richness*, *Quality*, and *Diversity* of the associated ES across the landscape. The quantification of these indicators is further explained in the following Section.

3.2. Data collection

3.2.1. Secondary data

Among the associated literature reviewed, the Ramsar Information Sheet (RIS) is of particular importance as it provides fundamental information regarding natural attributes (e.g. area, hydrological regime) and ecological descriptions (e.g. abundance, representativeness and rarity of species). The RIS of UMTNP was prepared by the Biodiversity Conservation Agency, Environment Protection Administration, Ministry of Natural Resources and Environment, Vietnam. Other notable literature include the relevant scientific publications and annual reports prepared by the management board, e.g. BirdLife International and MARD (2004), Hoa (2005), Nguyen Van De (2002), Sage et al. (2004), Institute of Tropical Biology (2002), Tran Triet (2002), and UMTNP (2013). Collectively, the analysis of the relevant literature body has provided a general picture of the research area, paving the way for the identification of ecosystem services (ES) and Dis-services (EDS) to be evaluated as summarized in Table 1.

3.2.2. Field survey

In addition to reviewing the existing literature, data collection also includes a public participatory survey. The targeted populations for this survey were randomly selected from the local settlements of approximately 4000 households inhabiting along the 38 km boundary of UMTNP. Following the suggestions of Whittington (1998) who underlined the low response rates of self-administered methods in developing countries, we opted for a face-to-face interview approach. More specifically, we used deliberative mapping technique to collect the participants' responses regarding the abundance and quality of ES/EDS across the study site landscapes. This method is well-known in social science disciplines and has been widely applied in ES assessment studies (see for instance Fagerholm and Käyhkö, 2009; Plieninger et al., 2013; Loc et al., in press).

Each interview typically started with an introduction about the purposes of our research. Our facilitators then explained briefly the importance of ecosystems and their benefits. Subsequently, we discussed respondents' judgments about the ES and EDS of UMTNP using a matrix comprised of the four different LCS in the columns and the list ES and EDS in the rows. Table 2 provides an example of the matrix used in our deliberative mapping exercise.

Alongside the questionnaire, the facilitator also presented the photographs of each LC (Fig. 3) to support the verbal explanations. Co-author Ho Huu Loc took these photos himself shortly before the surveys to effectively describe the current situation of each LC given the

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