

ECOSYSTEM SERVICES VALUATION MECHANISM

FOR COMMUNITY-BASED LANDSCAPE PLANNING

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Abstract

Incorporating ecological knowledge in landscape planning is believed to make landscape plans become more environmentally sustainable. By involving stakeholders in the planning process, community-based planning becomes a forum of value. I regard ecosystem services valuation as a potential tool to facilitate interdisciplinary cooperation of ecological science and landscape planning. For the purpose of valuation, I focus on the value issue to 1) re-conceptualize ecosystem services as function-benefit-value chain linking ecosystems and human wellbeing; 2) examine the role of value in and the key features of community-based planning. The valuation mechanism is proposed as an alternative approach other than mainstream economic valuation methods. It presents an explorative way to assess the value of ecosystem services in the planning process and from the perspective of multidimensional human wellbeing.

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Chapter 1. Introduction

This thesis addresses ecosystem services valuation mechanism for community-based landscape planning. I seek for integrating valuation exercises in the cyclical planning process. It is believed that incorporating ecological knowledge in landscape planning would enhance landscape performance by increasing spatial heterogeneity, generate better resource allocation and land use, and make landscape planning sensitive to the non-linear relations between landscape change and functions (Verburg et al., 2004; Lovell & Johnston, 2009; de Groot et al., 2010a). However, because of the separate development of different scientific disciplines, interdisciplinary cooperation has not yet received enough attention and remained challenging for both academic and practical communities (de Groot et al., 2010a). It requires not only development of theoretical discourses but also methodological supports to facilitate interdisciplinary knowledge generation and practices.

Based on the framework of the social-ecological system, the concept of landscape is interpreted as ‘the medium of the interaction between biophysical environment and human activities, which could be changed through anthropogenic efforts with certain intention’ (Nassauer, 2012). There are two layers of meaning embedded in the statement. First, it entails not only the human ability to change landscape, but changing according to their will. Human intentions of landscape change are mainly driven by needs and demands for wellbeing (Nelson et al., 2006; Willemen et al., 2010). Second, it indicates the intermediary role of landscape in the interaction between human society and biophysical environment. Via its spatial configuration and components, landscape physicalizes the life-supporting functions provided by underlying ecosystem processes, and allows anthropogenic changes affecting the supply of services (Willemen et al., 2010). The interdependent relationship has been recognized in literature on ecosystem services; however, incorporating the concept into landscape planning is scarce (Termorshuizen & Opdam, 2009) and progress here involves many challenges of interdisciplinary work (Opdam et al., 2002; Nassauer & Opdam, 2008; de Groot et al., 2010a). A number of different terms have been employed to denote understandings of the dynamic interaction and benefiting process between the nature and human society. For the interest of research, I use the term ‘ecosystem service’ to representing the benefiting process of biophysical environment to human society, and use the term ‘landscape’ when addressing the spatial-physical features of the social-ecological system. Although the term ‘ecosystem service’ has been widely adopted in fields of natural conservation, environmental policy and business (Lamarque et al., 2011), the vague defined concept needs further delineation in order to derive a consistent logic for planning and decision-making.

When aiming to incorporate the concept of ecosystem services into landscape planning, the issue of 'value' is put forward as the means to adapt landscape planning for the concept of ecosystem services. I consider value as the starting point to frame the discussion why such adaptation is necessary. Therefore, the construction of a valuation mechanism for community-based landscape planning is an important planning tool. This is not an easy task to do. Value is a complex hybrid of individual psychological cognition and socio-economic institutional influences (Vatn, 2005; Wallace, 2007). If we regard landscape planning as a process to obtain added value out of the environment by reshaping physical settings (Termorshuizen & Opdam, 2009), it is necessary to know what values are expected behind the goals of planning.

The investigation of how comparative importance of ecosystem services influence landscape decision-making takes place in community-based planning. The stakeholder-oriented collaborative planning approach believes that stakeholder participation would improve the quality of landscape planning and natural resource management (Berkes, 2004; Lane & McDonald, 2005; Healey, 2006). While stakeholders obtain the opportunities in decision-making process, values embedded in their interests would significantly influence the direction of discussion and decisions. For planning with ecosystem services, it means that the values that they perceive and pursue will determine the outcome of the planning process. Ecosystem service provides an interesting topic to explore the interaction and interdependence of human society and the nature. Also, incorporating the concept of ecosystem services allows further investigation on how values are formulated and influencing the process and result of landscape planning.

Correspondingly, current valuation methods need to meet the requirements of community-based planning to integrate the concept of ecosystem services in landscape planning from perspective of values. The concept of ecosystem services has been adopted in ecological economics and developed into economic valuation identifying the monetary values of ecosystem services (Polishchuk & Rauschmayer, 2012). To put it in strong words, current economic valuation methods help us to identify values of ecosystem services in such unsustainable economy that would just blind our viewpoint to complex environmental challenges (Norgaard, 2010). Considering the value pluralism in community-based planning, overemphasizing the economic values of ecosystem services would limit the suitability of the concept for guiding landscape change and defers the integration of valuation in the cyclical planning process. Moreover, the rigorous economic valuation models have a rationale different from community-based planning. It promotes the instrumental rationality and overlooks the normative influence of value articulating institutions (Vatn, 2005), while the community-based planning advocates stakeholder participation and

collaboration based on communicative rationality (Healey, 1996; 2006; Innes & Booher, 1999; Lane & McDonald, 2005).

The main objective of this thesis is to propose an alternative ecosystem services valuation mechanism other than economic valuation with a broader aim to facilitate integrating the concept of ecosystem services in landscape planning. The thesis will be developed with focus on the topic of ‘value’ and structured as follows. Starting with re-examining the literatures about community-based planning in Chapter 2 to figure out the features and specific requirements for developing the valuation mechanism. In Chapter 3, I will revisit the conceptualization of ecosystem services and focus on the value formation process from perspective of human wellbeing. Based on the notions of previous review and discussion, I will propose a prototype of valuation mechanism consisting of three-steps exercises integrated in the cyclical planning process in Chapter 4. At the end, a general discussion on the developing the valuation mechanism for community-based planning and the underlying theoretical framework will be delivered to conclude the thesis.

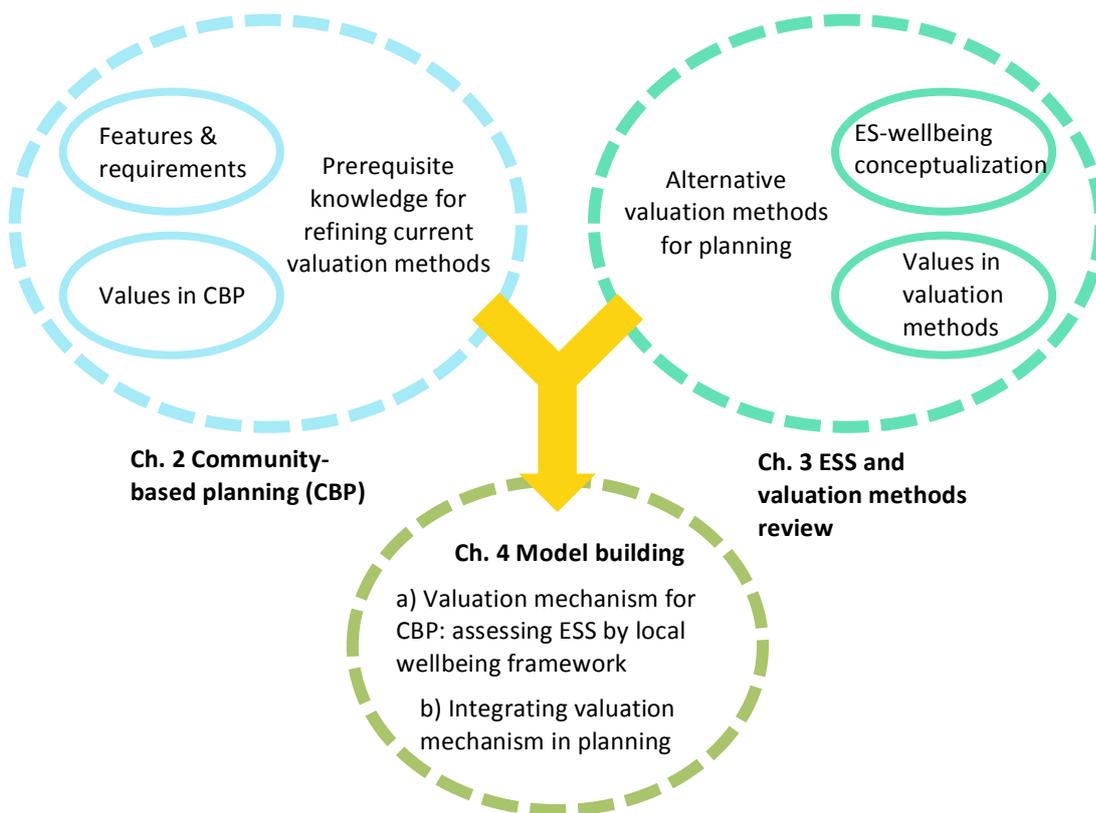


Figure 1-1 Conceptual framework

Chapter 2. Community-based planning

2.1 Development of community-based planning

Community-based planning has been considered as a prominent planning approach since 1970s, and mainstreamed in environmental management and spatial planning since 1990s (Leach, Mearns & Scoones, 1997; Lane & McDonald, 2005). The bottom-up and collaborative approach is often presented as an alternative to the conventional top-down planning approach (Healey, 2003; Lurie & Hibbard, 2008), which responds to contemporaneous trends of government decentralization, empowerment of citizens and devolution of responsibility to local communities (Leach et al., 1997, 1999). The 'bottom-up' concept has been widely adopted in planning and environmental practice but named in different terms, such as collaborative planning, co-management, community-based planning, and place-based collaboration. Although each of them has specific research aims and perspectives, making clear delineation is difficult and beyond the research scope of this thesis. I will continue the discussion using the term 'community-based planning' while baring a wealth of notions from relevant literatures on divisions of bottom-up approach at the same time.

Two paradigms of community-based planning will be investigated here, with respect to the research aim of incorporating ecological knowledge in landscape planning. One is community-based environmental management concerning natural resources conservation and development. The other paradigm takes place in spatial planning discipline, which focuses on converting landscape functions to fulfill human needs. Although starting respectively at the standpoints of natural environment and human society and reacting to different driving forces, both of them share certain principles and beliefs in their transition to bottom-up approach. Community-based planning practitioners and theorists assume that the potentiality of local community, knowledge from traditions and local experiences would improve environmental management and planning outcomes. They also believe that the local community has rights to directly involve in decision-making process and determine the goals of community development (Kellert et al., 2000; Lane, 2006).

Under the banner of sustainability, these two disciplines converge at the empirical practices and point out the urgent needs of interdisciplinary knowledge incorporating environmental and planning science (Opdam et al., 2002; Berkes, 2004; Nassauer & Opdam, 2008; de Groot et al., 2009; Termorshuizen & Opdam, 2009). In natural resources management, the long separation between advocacy for environment and advocacy for people has been

challenged in the emergence of community-based planning, and brought in a new extended vision linking social and environmental concerns (Hibbard & Madsen, 2003; Brosius et al., 1998). The human-nature relations has been emphasized and managed into operational strategies to attract more attention from general public to natural conservation and pro-environmental activities. In spatial planning discipline, the turns of environmental discourse toward sustainable development in 1990s (Healey & Shaw, 1994) indicates the need of incorporating environmental science in planning theories and practices. The bottom-up, collaborative approach as community-based planning has been identified as a prominent means for interdisciplinary incorporation. Involving and empowering stakeholders provides stability and legitimacy for implementation and responds to the trend in democratic local governance (Healey & Shaw, 1994; Healey, 2003; Lane & McDonald, 2005).

Discourse in environmental governance

Community-based approach of environmental management has been widely promoted and adopted in programs and projects sponsored by governmental agencies, multilateral organizations and non-governmental organizations around the world since 1990s (Leach et al., 1997; Broisius et al., 1998; Lane & McDonald, 2005). Its emergence exemplifies the conceptual shifts in ecology and governance (Berkes, 2004; Lurie & Hibbard, 2008). The collaborative, bottom-up approach largely departs from conventional state-dominant command-and-control style, and promises local development and resource allocation carried out in a more democratic process that offers greater potential to meet local livelihood needs (Leach et al., 1997; Berkes, 2004; Lurie & Hibbard, 2008). While the advantages of broad participatory decision making is commonly acknowledged and becomes prerequisite of environmental policies and regulations, it indicates the trend from representative democracy to deliberative democracy that allows direct involvement, devolution of responsibility to citizens and decentralization of government (Leach et al., 1997; Harrington et al., 2008).

The deliberative transition in environmental governance is developed in parallel, and relies significantly on the conceptual shifts in ecological discourses (Berkes, 2004; Lane et al., 2004). Berke (2004) identifies three interrelated conceptual shifts in ecology: the complex adaptive system view of the environment shifts from reductionism, the inclusion of humans in the ecosystem as social-ecological system, and the epistemological and methodological change of expert-based scientific research towards knowledge generated through deliberative and collaborative process involving local stakeholders. Involving stakeholders in scientific research and natural resources management is developed with several premises about the characteristics of community. Community members are assumed to concern about sustainable use of resources more than distant managers; they know better about the local ecological process and resources; they can manage and utilize those resources in an

efficient way based on indigenous knowledge and traditions (Brosius et al., 1998). Thus, incorporating traditional knowledge and interacting with local stakeholder would supplement the incomplete information and limited understanding of dynamic social-ecological system in conventional scientific approach. Incorporating traditional knowledge and local stakeholders could help supplement insufficiencies in conventional expert-led research approach, and share the uncertainties due to incomplete information and limited understanding of the dynamic complex human-ecological system (Berkes, 2004). The aforementioned conceptual shifts reveal the diminishing delineation between generation of scientific knowledge and actions in practice from the perspective of science evolution. Furthermore, bridging the gap between scientific research and demands from practical actions in environmental management, credibility based on technical evidence is no more the dominant principle of effective scientific information but credibility, legitimacy and salience acknowledged by local stakeholders determines the effectiveness of scientific information for decision making (Cash et al., 2003). Incorporating indigenous knowledge and collaboration with local communities could not only supplement the information insufficiency in sole scientific work, but also bring scientific research close to problems perceived by people from livelihood perspective.

Community-based planning is often presented as an alternative to linear systematic rational top-down planning approaches. It is problematic to oversimplify the state-community relations using the dichotomy of 'top-down' versus 'bottom-up' approach and rules out the importance of cross-level collaboration (Lane & McDonald, 2005). The oversimplified dichotomy often misleads the conceptualization of community and constrains its use in environmental governance and sustainable development (Harrington et al., 2008). Although community-based approach is supported strongly in literatures, there remain debates about the concept of community. Discussions about the definition of 'community' try to emancipate it from the territory-bounded, demographic meaning, and encompass social-cultural perspectives, such as institutions made up of rules-in-use, common interests, values and identities (Duane, 1997; Talen, 2000; Berkes, 2004; Lane & McDonald, 2005; Harrington et al., 2008). The deconstructive conceptualization recognizes the complexity and heterogeneity disguised under the unity of community, and allows further elaboration about power distribution, ways of participation, values, and scales. Hence, multi-dimensional and multi-scale collaboration is suggested for community-based environmental management (Lane et al., 2004). Within the process of collaboration, information transparency and accountability should be secured to create a learning environment that brings the community actively into the management process (Berkes, 2004).

Discourse in spatial planning

The development of communicative, participatory and collaborative turns in the planning field enriches the content of community-based planning. It emerges as an alternative to traditional comprehensive rational planning approach that dominated the planning system in 1960s. However, it is not a single, unified planning model but a range of new approaches sharing common goals and principles that respond to varied criticisms on rational planning (Lane, 2001). Similar to the conceptual shifts in environmental governance, decentralization, public participation, social learning, and cooperation and sharing responsibility between planning experts and local communities have become the main topics of those new planning approaches (ibid).

One should notice that even though the concept of collaborative planning has been widely accepted, it has not succeeded traditional top-down planning; the two approaches still co-exist. There is a to-and-fro tendency moving between centralized, expert-lead, apolitical decision-making, and the demand for public participation and power decentralization of planning system (Murray et al., 2009). In the transition against rational planning, some argues that the traditional rational planning approach should be abandoned (Hoch, 1994), while others found that methodological and institutional inheritances of rational planning should be carried on and refined in the development of collaborative planning (Healey, 1996). Instead of instrumental rationality serving behind traditional rational planning, collaborative planning is developed on the basis of communicative rationality (Healey, 2003, 2006). In this sense, normative institutions and social orders has been reconstructed through communication and interactions between actors within the planning regime (Lane, 2001; Healey, 2003).

In the shift from top-down planning to collaborative planning, the concept of planning and the role of planners have been re-examined and redefined. Planning is formulated into an interactive and communicative activity deeply embedded in the social-political context of public decision making, within which planners act as mediators facilitating the interactions and communication between stakeholders (Innes, 1995; Healey, 2006). Unlike traditional spatial planning providing physical solutions to social or economic problems, collaborative planning expands the focus to process and institutional design that frames and mobilizes stakeholders to achieve shared concerns about spatial planning (Albrechts, 2004). Therefore, collaborative planning is developed to be a strategic approach that facilitates community collaboration in the construction of discourse and consensus for a good quality of life (Healey, 1996). Spatial planning is re-conceptualized as 'governance of place' (Healey, 2003). It pursuits not only improving spatial quality of a place, but also deliver other valuable elements defined in the social-cultural context of the place. Following the transition of planning concept, the definition of community has changed from traditional

place-based territorial meaning to a collective of stakeholders identified and included according to the planning objectives (Healey, 1996). Baring the notion of communicative rationality and the stakeholder-oriented approaches, collaborative planning theorists work on directive principles for planning process and institutional design. Those principles are provided to ensure inclusionary involvement, continuous engagement and interaction of stakeholders in an environment of transparent information with equal speech position and access. Efforts on ensuring a just process imply a firm belief that equitable outcomes will be generated through democratic participation and citizen empowerment (Lane, 2001).

The development of communicative, participatory and collaborative planning approaches echo the turn of environmental discourse in the planning system. Collaboration with local communities is recognized as an effective strategy for sustainable development superseding narrow focus of land use to include environmental, social and economic objectives (Lane, 2001; Albrechts, 2004). In the work of Healey and Shaw (1994) investigating environmental discourses in UK planning system, sharing power and responsibilities of planning and environmental governance has been witnessed. Sustainable development is not simply adding environmental targets in existing agenda of local spatial planning system, but requires further thorough deliberation of environmental objectives and values in the local context through a democratic process involving all members of the local community (Healey, 1996). The principle of inclusionary involvement of stakeholders might be too ambitious in practice. However, reducing the entrance barrier for potential participants with diverse ideas is important for developing plans in the dynamic complex social-ecological system.

Convergence of environmental governance and spatial planning

In the previous discussion, conceptual transitions toward participatory bottom-up approach are recognized in the recent development of environmental governance and spatial planning. Although with distinct environmental and landscape focuses respectively, a convergence of these two disciplines arrives at the local community in response to the rising awareness of sustainable development. Community-based planning provides not only instrumental functions for better scientific research or planning outcome, but also opportunities to bridge environmental and landscape issues in the regime of place governance. It is destined to be a pro-environmental landscape planning approach to achieve good quality of life at the community level.

Community refers to the closest collective social group beyond individual and family level. Regarding to community-based planning, literatures in both disciplines agree that the concept of community should be complemented with social-cultural consideration about values, interests and identities, which are disguised under traditional place-based unity of community. The institutional thinking of community (Berkes, 2004; Lane & McDonald, 2005)

and community based on stakeholder mapping (Healey, 1996) present a strategic way to mitigate conflicts between given objectives and local goals by normative building. The process of formulating community institutions or stakeholder groups is actually a process of translating the issue into local languages and context. It provides opportunities for the local community to integrate technological supports and local participation to achieve community-determined objectives (Lane, 2006). The collaborative process enhances and social and intellectual capital of the community, which would benefit future development (Innes, 1996). The idea of community-based planning is more than community empowerment. It allows mutual influence between the locals and external experts and governmental agencies through communicative and deliberative process of planning, which might evoke further institutional changes not only within the community but also the network where it embedded. Sharing management power and responsibilities, creating learning environment, ensuring inclusionary participation and knowledge transmission between the state and local communities are key elements for applying community-based planning in a dynamic complex social-ecological system (Berkes, 2004).

2.2 Features of community-based planning

The previous discussion presents the development of community-based planning in the field of environmental governance and spatial planning with distinct perspectives in their own context. To sum up, the bottom-up approach in environmental governance supported by transformation of scientific knowledge system in ecology liberates the management power and the right to interpretation from state and scientists (Kellert et al., 2000; Berkes, 2004; Lane, 2006). Meanwhile, collaborative approach in spatial planning changes the planning process to incorporate plural interests and values by institutional design and normative building (Lane, 2001). Although there is no common-agreed definition for community-based planning, several critical characteristics could be identified for conceptualization (Berkes, 2004; Lurie & Hibbard, 2008). Community-based planning is a flexible, open adaptive system that shapes landscape according to the wills of stakeholders to improve the quality of life in respect of environmental, social and economic objectives. It is place-based but not limited to a certain range of territory, and points toward cross-level and cross-scale management.

Collaboration is the backbone of community-based planning, where local stakeholders, governmental agencies, non-governmental organizations and academic communities cooperate through intimate communication, group deliberation and co-decision-making. Community-based planning is not a one-time exercise with a single aim; long-term thinking for vision building and backcasting strategies is fundamental. Different actors might have

different expectation and acquire different outcome of community-based planning. Ecologists generate local information about the ecosystem process and resources. Local communities gain the opportunities to achieve local-determined objectives and reinforce social and intellectual capacity during the process. Planners and policy makers take deep insight into demands and social-cultural context of the community that achieves comprehensiveness and effectiveness in implementation. Conservationists expand the conservation objectives with local social-political or economic concerns to win local supports. Therefore, enabling inclusionary participation and facilitating effective communication between multiple stakeholders determine the outcome of collaboration. Tools like multidimensional incentives, leveraging existing social network and institutions, inviting opinion leaders, creating an open and learning environment, and using visualization or communication techniques are suggested (Bryson & Anderson, 2000; Berkes, 2004; Lane & McDonald, 2005; Healey, 2006; Murray et al., 2009).

Box 2.1 Key characteristics of community-based planning

Planning process

- It is stakeholder-oriented. Local participation is not just for consultation but community members should have power in decision-making.
- It is a deliberative, consensus-oriented collaboration between stakeholders (Ansell & Gash, 2007).
- It is place-based but not limited to a certain territory. Community is determined by the parameter of planning, which depends on the stakeholders identified and involved (Healey, 1996; Mansuri, 2004).

Power relationship

- It requires power decentralization of existing planning and environmental management system (Healey & Shaw, 1994).
- It enables local communities to claim their own resources and control over planning activities (Kellert et al., 2000; Lane, 2006).

Knowledge generation system and worldview

- Integrating traditional values and knowledge with scientific knowledge is both means and ends. Knowledge from action is of same importance as knowledge from experiments (Broisius et al., 1998; Berkes, 2004; Hibbard et al., 2008).
- The planning spectrum and concerns of environmental governance is expanded to include social-cultural aspects. A more humanistic viewpoint and plural values are recognized (Berkes, 2004).

Cyclical planning process

Community-based landscape planning discussed in this thesis takes notions of landscape ecology and collaborative planning, which aims achieve environmental sustainability while meeting social needs and societal values in landscape change (Nassauer & Opdam, 2008;

Termorshuizen & Opdam, 2009). It requires interdisciplinary cooperation of knowledge building and adapts to socio-cultural context of planning.

A cyclical planning process converts conventional linear means-ends approach into a reflective and dynamic problem-solving process to re-evaluate and pre-defined goals according to methodological feedback and monitoring results (Leitão & Ahern, 2002). Furthermore, planning cycle should develop with long-term goals leading the direction of future development and obtaining public values. Four major activities- objective setting, design, implementation and evaluation, are identified to create a feedback loop for continuous collaboration toward the long-term goals. How to facilitate stakeholders to accomplish tasks in each phase and motivate them to move from one phase to the next are key issues in cyclical planning process.

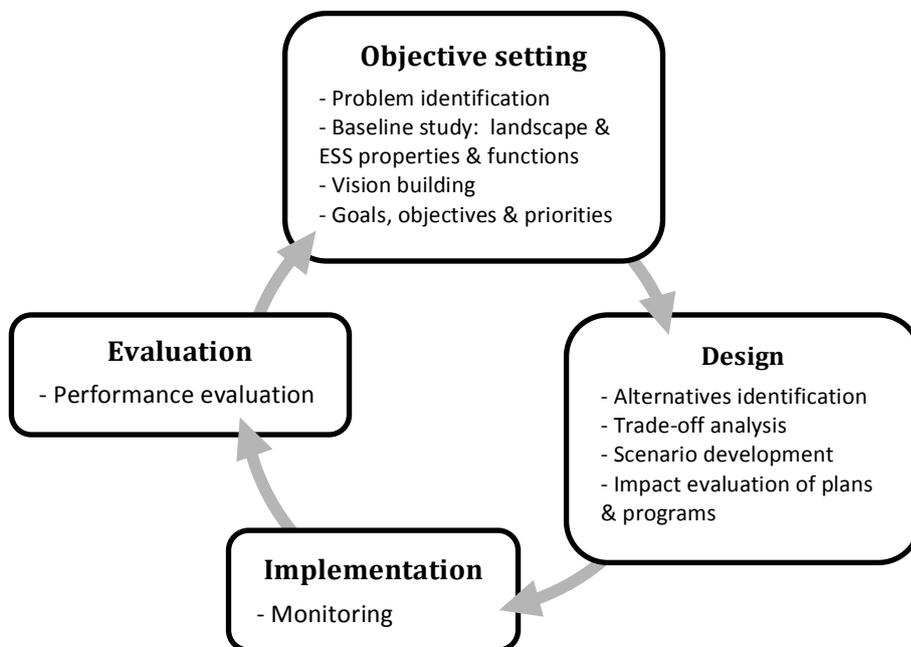


Figure 2-1: Planning cycle (adapted from Opdam et al., 2002; de Groot et al., 2010; Steiner & Butler, 2007)

2.3 The contribution of ecosystem services to community-based landscape planning

Landscape planning is assumed to be a value-oriented exercise, which is determined by values, beliefs and perceptions of people toward the biophysical environment. In the context of community-based planning, the issue of human values stands out when diverse values and political concerns are revealed through the communicative process (Healey & Shaw, 1994; Innes, 1996; Wallace, 2012). Value is individually held but socially constructed. Due to its stakeholder-oriented and collaborative characteristics, community-based planning is not only affected by various values associated with multiple stakeholders, but fostering collective values and norms throughout the planning process (Healey, 2003).

Aiming to integrate ecological knowledge in landscape planning, the concept of ecosystem services provides a potential way to understand and elaborate various values embedded in planning process and outcomes. It is well recognized that incorporating ecological knowledge in landscape planning and emphasizing the landscape attributes of ecosystems would mutually enforce landscape performance and environmental quality. However, the interdisciplinary cooperation of ecological science and planning remains a challenging task (Opdam et al., 2002; Nassauer & Opdam, 2008; de Groot et al., 2010a). Landscape changes considering resources allocation and land use management has gained significance in policy making (de Groot et al., 2010a). It is necessary to clearly describe and resolve values underlying social demands and environmental matters to drive a consistent logic of planning and ensure that the political aspects of decisions are dealt with appropriately (Wallace, 2012). Integrating the concept of ecosystem services in landscape planning is a strategic way to drive landscape change toward sustainability. Instead of using a vague-defined term like sustainability, ecosystem services address the interrelations between nature, social and economic activities that provide a more comprehensive framework for incorporating ecological knowledge in landscape planning. It is believed that landscape performance would be improved through increasing heterogeneity of landscape functions to satisfy various value attributes (Lovell & Johnston, 2009).

However, ecosystem services can only contribute if the plurality of value concept is addressed. Currently, economic valuation providing explicit calculative values in monetary term is emphasized in literatures of ecosystem services valuation. Whether monetary values can reveal multiple interests and beliefs in a value pluralism society is doubtful. Solely using monetary values for decision making would dismiss various value attributes reflected in the planning process and result in outcomes serving limited interests. While economic valuation methods ensure the economic efficiency, values in social and ecological aspects should be also taken into consideration respectively instead of being generalized into

monetary values. Using valuation as a strategy to incorporate the concept of ecosystem services needs to consider the plural values featured in community-based planning. For this reason, valuation methods for community-based planning are prerequisite to enable articulating various value aspects of ecosystem services.

Chapter 3. Ecosystem service and the values of ecosystem service

3.1 Definition of ecosystem services: for the purpose of planning

The term of ecosystem services first appeared in the work of Ehrlich and Ehrlich (1981) following the concept of identifying social values of benefits provided by nature in the previous work of Westman (1977). The concept of ecosystem services has been employed to reconstruct the intimate relationship between the natural environment and human society. It emphasizes the central role of ecosystem benefiting human wellbeing and the societal dependence on ecological life support system (Daily et al., 2009; Gómez-Baggethun et al., 2010). To describe and specify the intangible social-ecological relations, the term 'service' has been adopted from economics, which translates the novel and abstract concept into a rather familiar term and allows deliberation and application from economic perspective. The concept of ecosystem services was first applied in biodiversity conservation (e.g. Ehrlich & Ehrlich, 1981). Following this humanistic conceptual transition in ecological science, it has been elaborated in different research domains like ecological economics and landscape ecology. Mainstreaming the concept can contribute to solving the long-term conflict of the natural environment and economic development. Instead of posing a trade-off between environmental health and progressive development, the concept stimulate to look for a 'win-win' situation that generate ecological, social and economic benefits (de Groot et al., 2010a). This is considered as a promising way forwards.

Definition and classification problems

Making use of an existing economic term without precise definition causes the problem of ambiguity: different definitions and classification schemes have been developed in literatures to support research interests and purposes (de Groot et al., 2002; Wallace, 2007; Fisher & Turner, 2008; Fisher et al., 2009; Lamarque et al., 2011). While the terminological diversity might hinder on-the-ground use of the concept and problematize quantification and comparison for scientific research, the broad definition is advantageous for free interpretation that attracts the general public and policy makers to its fundamental message about natural benefits in human life (Lamarque et al., 2011). Moreover, a perfect precise definition of ecosystem services is only applicable on condition of strict principle of operation and calculation, which has little tolerance of uncertainty and unpredictable behavior that happen often in real-life decision-making (Costanza, 2008). Considering different settings of decision-making and governance, keeping the definition broad and developing purpose-based classifications would help to adapt and apply the concept into

various practical uses and enrich the thinking about ecosystem services (Costanza, 2008; Fisher et al., 2009; Dempsey & Robertson, 2012).

Services, functions, benefits and values

Ecosystem service is a representation of nature from the perspective of human wellbeing, which is created by ecologists and economists to emphasize the importance of nature and counteract the long time deprivation and exploitation. The definition given by Fisher et al. (2009) is as follows: *ecosystem services are the aspects of ecosystems utilized (actively or passively) to produce human wellbeing*. This implies that not only the physical components but also the processes and functioning of ecosystem could be defined as 'services' if they positively contribute to the society. Following the definition, to understand the concept of ecosystem services requires disentangling the interlinking value-flow in social-ecological system and delineating related concepts of services, functions, benefits and values (de Groot et al., 2010a; Haines-Young & Potschin, 2010). Unlike the definition adopted in The Millennium Ecosystem Assessment (MA, 2003, 2005), *the benefits people obtain from ecosystems*, separation of 'benefit' and 'service' is commonly highlighted in literatures of valuation to avoid the double-counting problem (e.g. de Groot et al., 2002; Hein et al., 2006; Wallace, 2007; Fischer & Turner, 2008; Dempsey & Robertson, 2012). It is not only for the purpose of value identification and calculating, but the intrinsic nature of these two terms is different. Investigating the main message carried in ecosystem service, the term 'service' stands for 'a system supplying a public need' while 'benefit' is 'an advantage or profit gained from something' (Oxford Dictionary of English). Ecosystems could be recognized as 'ecosystem services' once they satisfy people's needs or increase opportunities for them to obtain a desired benefits in future. A benefit is regarded as the contribution of ecosystem services to a human individual, group or society; it is the positive effect but not the service itself (Turner et al., 2010). Ecosystem services are all means to create human wellbeing. However the relationship between different services and between the physical system and benefits are complex, dynamic, and non-linear due to the nature of ecosystems. There is a need for purpose-based classification (Costanza, 2008; Fisher & Turner, 2008).

Ecosystem services provide many functions that benefit human society in different ways. Additionally, a certain function might need support from more than one ecosystem component, process or functioning. The relationship between ecosystem services and functions might be nonlinear and non-unitary. The function of ecosystem services is different than what is usually applied in ecology. Inspired by the deliberation approach of Fisher et al. (2009), the word 'functioning' is chosen here to indicate actions and natural process maintaining the existence of ecosystems, while 'function' is remained for actions by ecosystems of relevance to human wellbeing. Part of the later actions consists of ecosystem services. In this sense, functions of ecosystem services are the capacity that ecosystem

services benefiting the human society directly or indirectly through the work or existence of their components, processes and functioning. The definition is close to ‘ecosystem functions’, which is defined as ‘*capacity of ecosystems to provide goods and services that satisfy human needs*’ (de Groot, 1992; de Groot et al., 2010a). I consider ecosystem services as a term representing the combination of ecosystem components, processes and functioning with benefiting properties for humans. The argument above frames ecosystem services to the utilization and perception of human beings, which has been increasingly adopted by conservationists (Armsworth et al., 2007; Fisher et al., 2009). It is anthropocentric but emphasizing the role that ecosystem plays in human wellbeing. In table 3-1, a function-based classification scheme adopted in Millennium Ecosystem Assessment (MA, 2003, 2005) provides a general overview of ecosystem services though the concept behind it is contestable and needs further deliberation on the other end of function-benefit-value chain (see Fig. 3-1), that is, human wellbeing.

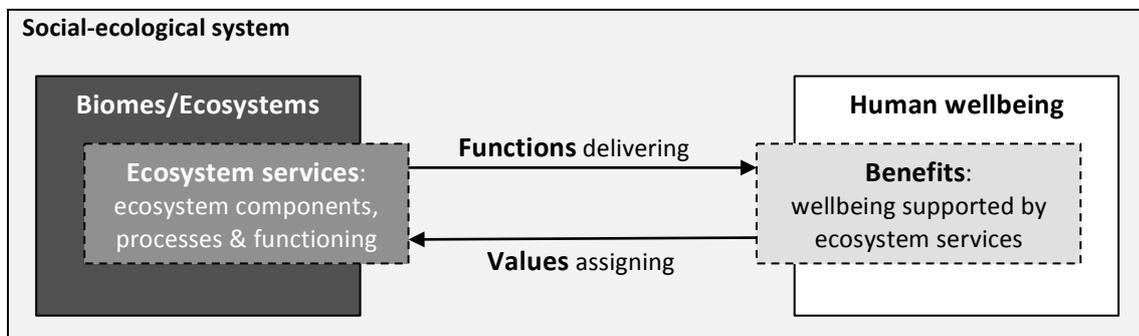


Fig. 3-1: The function-benefit-value chain of ecosystem services: by delivering functions that generate benefits for human wellbeing, upon which people determine the value of ecosystem service.

Table 3-1: MA classification of ecosystem services functions (MA, 2003; de Groot et al., 2010b)

Function Group	Service components
Provisioning	Food; Water; Fiber & Fuel & other raw materials; Genetic Materials: genes for resistance to plant pathogens; Biochemical products and medicinal resources; Ornamental species and/or resources.
Regulating	Air quality regulation; Climate Regulation; Natural Hazard mitigation; Water regulation; Waste treatment; Erosion protection; Soil formation and regeneration; Pollination; Biological Regulation.
Habitat or supporting	Nursery habitat; Gene pool protection
Cultural & Amenity	Aesthetic: appreciation of natural scenery; Recreational: opportunities for tourism and recreational activities; Inspiration for culture, art and design; Cultural heritage and identity: sense of place and belonging; Spiritual & religious inspiration; Education & science opportunities for formal and informal education & training.

Human wellbeing

Human wellbeing is a broad term, which implies the desired end-state of existence, the fulfillment of needs and belief, and the satisfaction of life (Marans, 2003; Wallace, 2007; Summers et al., 2012). Although there is no single rigorous definition of human wellbeing, its multidimensional nature is commonly acknowledged (MA, 2005; de Groot et al., 2010b; Wegner & Pascual, 2011; Summers et al., 2012). The Millennium Ecosystem Assessment framework (MA, 2003; 2005) recognizes the intimate human-nature relations and identifies the strength of linkages between categories of ecosystem services and components of human wellbeing. However, the MA framework fails to capture all the aspects of human wellbeing (Polishchuk & Rauschmayer, 2012; Summers et al., 2012), which limits the analytical scope of human-nature dependence and underestimate the value of ecosystem services. In their studies of human-nature linkages from the perspective of sustaining 'good quality of life', Summers et al., (2012) and Smith et al. (2013) suggest a comprehensive conceptual framework of human wellbeing with four fundamental components- basic human needs, subjective happiness (these two are later combined into 'societal wellbeing'), environmental wellbeing and economic wellbeing. The associated nine core wellbeing domains allow links to economic, social and ecosystem services and thus assess their contribution to wellbeing dimensions. Wellbeing studies are valuable for not only constructing a comprehensive conceptual framework to identify human wellbeing, but also pointing a potential way to classify ecosystem services from wellbeing perspective, which can supplement MA function-based classification scheme. However, one should notice that although ecosystem service is indispensable, it is not the only element and needs to cooperate with social and economic service to achieve human wellbeing comprehensively.

It is difficult to identify the contribution of a specific ecosystem service in each of the wellbeing domains. Moreover, a single ecosystem service might be beneficial to more than one wellbeing domain. For example, adequate food and drinking water are fundamental for human health and living standard, but also important for supporting psychological sense of security and life satisfaction, and indirectly affect social cohesion (Smith et al., 2013). In spite of ecosystem components, processes and functioning that directly contribute or influence human health and livelihood, appropriate environmental composition and structure, healthy condition, connectedness and accessibility are all key factors determining the value of ecosystem services in wellbeing terms (Wallace, 2012; Smith et al., 2013).

In addition to multidimensionality of human wellbeing, the process of translating ecosystem services into wellbeing dimensions needs more elaboration. In the MA framework (MA, 2005), besides security, basic material, health and social relations, the freedom of choice and action to achieve a good state of being and doing is recognized as an essential component to the aforementioned wellbeing dimensions. It is fundamental for people to

fulfill not only basic human needs but also social and economic functions from ecosystem services. However, lack of a concrete translation of ESS into wellbeing and explication of their interrelations limits its ability to measure and interpret ESS in terms of personal or societal wellbeing (Polishchuk & Rauschmayer, 2012).

Studies incorporating the Capability Approach (CA) in human-nature interaction analysis broaden the viewpoint of wellbeing beyond utilitarian perspective (Ballet et al., 2011; Polishchuk & Rauschmayer, 2012). Having adequate resources and fair distribution of goods and services are necessary but not sufficient to achieve human wellbeing. The CA studies emphasize that the opportunities to directly involve in deciding what should be chosen and the willingness and capacity to obtain these elements should be considered when assessing people’s actual wellbeing (Ballet et al., 2011; Polishchuk & Rauschmayer, 2012). It argues that not all ecosystem services defined by theorists could be approached in every situation for everyone. In this sense, the function delivering process in the function-benefit-value chain of ecosystem services could be elaborated into a two-step process considering the external and internal influences of wellbeing formation. External influences or the conversion factors are in charge of converting ecosystem services into a potential set of functions for people in a specific situation. The conversion factors are elements from social and environmental context that enhance or constrain people’s ability to approach goods and services. While wellbeing is subjectively determined, the internal influence or the personal contextual factors decide the achieved functions for individuals in real-life (see Fig. 3-2).

Manifold roles of ecosystem services have been recognized in the converting process of human wellbeing. It provides goods and services that could be directly used. It might also enhance or impede people’s abilities to obtain wellbeing elements from goods and services directly as environmental conversion factors or indirectly as contextual factors influencing social and personal conversion factors (Polishchuk & Rauschmayer, 2012). The CA approach indicates that ecosystem services are not just services that could be used; they also have contextual influence on people’s opportunities and abilities to achieve a desired state of being and doing.

Table 3-2: Multidimensional human wellbeing and ecosystem services related (adapted from Wallace, 2012; Summer et al., 2012; Smith et al., 2013)

Wellbeing	Desired end state	Related ecosystem services
Basic needs	Adequate resources and ability to fulfill basic physical and psychological needs	Provisioning services- food, air, water, light, pollination, material and energy for production. Components in physical and chemical environment for health and protection. Cultural services- services that support employment,

		physical and mental health, childhood development, cognitive learning and education.
Environmental needs	Clean, healthy, and stable natural environment	Regulating services- availability of clean air and water, low health risk due to toxics, distance from critical ecological thresholds, biodiversity
Economic needs	Achieving financial stability	Renewable and non-renewable resources for economic activities; potential resources for future income; commensurate economic values
Subjective wellbeing	Life satisfaction (cognitive aspect) and happiness (affective aspect)	Services supports quality of life, interwoven influence. Cultural services related to psychological affections, respects or access to nature, and aesthetics

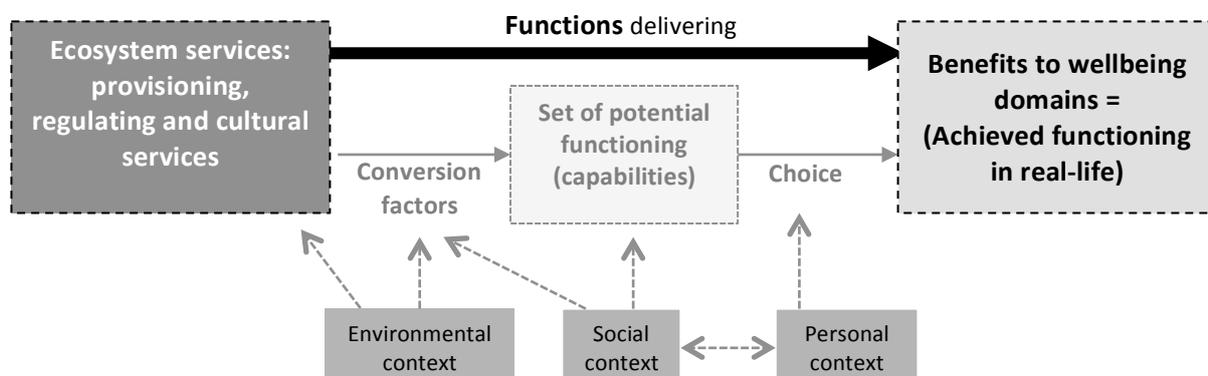


Figure 3-2: Converting process translating services into human wellbeing. It consists of conversion factors and choice making, which are influenced by external factors. (adated from Pelenc, 2010; Polishchuk & Rauschmayer, 2012)

The MA classification scheme has been widely adopted for its clear, understandable function-based structure is suitable to communicate the general concept of ecosystem services (Fisher et al., 2009; Polishchuk & Rauschmayer, 2012). However, classification scheme should be purpose-based and consider the end-use of the information (Costanza, 2008; Fisher & Turner, 2008; Fisher et al., 2009). The previous discussion about the multidimensionality and the converting process of wellbeing aims to reconstruct the MA framework as well as its functional-based classification scheme for the purpose of planning. By expanding the value spectrum of ecosystem services, it would facilitate integrating the concept of ecosystem services into a value pluralism context such as community-based planning.

Wellbeing dimensions and the roles in the converting process provide a basic framework to categorize ecosystem services. However, the role of ecosystem services is not fixed in the converting process of wellbeing and the link between services and wellbeing dimensions are neither unitary nor linear. To avoid interference of confounding factors, analyses linking

ecosystem services and human wellbeing are most easily carried out at local scale (Lead et al., 2005). Community-based assessment can leverage local knowledge about natural resources, capture real-life experience of changes in ecosystems to human wellbeing, based on which develops a more sustainable ecosystem management plans for the community (Folke et al., 2005). The manifold roles of ecosystem services and people's capacities determining the level of wellbeing should be understood through participatory investigation as noted by CA theorists.

Valuation

The exercise of valuation plays the key role in integrating the concept of ecosystem services into practical use of decision-making. Valuation of ecosystem services takes various forms concerning the practical purposes and value beliefs. In general, valuation is to identify and clarify how much and to what level that ecosystem services supporting our life. The value of ecosystem services is judged from the received benefits to wellbeing or the perceived importance assigned by people intuitively. Economic valuation with utilitarian viewpoint is an anthropocentric exercise to assign values of ecosystem services based on the utilization or experience of their functions. Here comes the problem about intrinsic values of nature. Intrinsic value is an umbrella term. The notion behind it is that human beings and the society should not be separated from the nature system and the existence of humanity is necessary condition to human wellbeing (Pelenc et al., 2013). However, the definition as '*value of something in and for itself*' (MA, 2005) is ambiguous and not consistent with the concept of ecosystem service, which is created from human beneficiary perspective. The definition built against economic utilitarian perspective indicating values having little or no market values or those other than self-interested desires and personal satisfaction (Kumar & Kumar, 2008; Wegner & Pascual, 2011) is preferable and allows further deliberation in value articulating process. Although the definition of intrinsic value is contestable, it is obvious that some value categories like aesthetic, memorial, banquet, and heritage values are important to human wellbeing and cannot be ignored in valuation. It is personal experience or perception but constructed socially (de Groot et al., 2010b).

In this thesis, I consider ecosystem service valuation to be anthropocentric but not necessary utilitarian. Following the function-benefit-value chain of ecosystem services (see Fig. 2-1), valuation could be described as a workflow starting from human wellbeing to ecosystems. Values of ecosystem services are determined from the contribution of their functions to overall human wellbeing, their comparative importance to other means of life, and the influence on socio-cultural institutions and decision-making context. To generate the collective value of ecosystem services, valuation methods are designed to elicit

preference or experience on the individual basis and translate through calculative aggregation process or group deliberation (see Fig. 3-3).

From the perspective of community collaboration, important ecosystem services and important capabilities should be valued and elevated to make stakeholders aware that their altruistic acts need to be geared to contribute to a greater collective end (Pelenc et al., 2013). Instead of capturing multidimensional wellbeing into a single number, the purpose of assessing ecosystem services in terms of human wellbeing is not just to identify their linkages and importance to human livelihood. It is developed with a broader aim to raise the awareness of the general public and decision makers in different levels, and encourage them to make further commitment on generating a balanced human-nature environment. Prerequisites from community-based planning should be acknowledged and using as criteria for choosing valuation methods. Valuation of ecosystem services is a means to provide information to bring about changes in decision-making institutions (Daily et al., 2009).

Incorporating ecosystem services valuation in community-based planning is not just about adding an additional activity to the existing agenda. The previous discussion implies that not both the value outcomes and valuation process need to be appropriately integrated into the communicative collaborative planning process. To accomplish changes in landscape and land use patterns from ecosystem perspective, valuation needs to invoke stakeholders to take further actions and make commitment on investing money and time, physical changes and financial arrangements. In the following section, a review of existing valuation methods would bring out further insight about different value articulating institutions from different perspectives of values for different purposes.

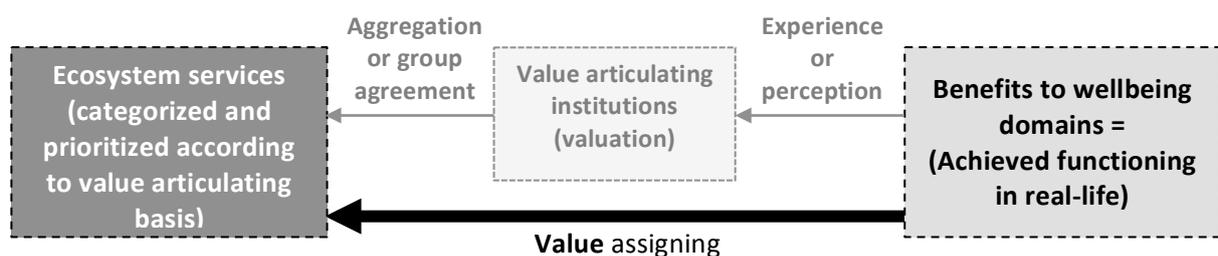


Figure 3-3: Valuation process: based on the experience or perception about benefits received from ESS, which are translated into preference or comparative importance. Through calculative aggregation or group deliberation process, generating collective values toward ESS. Depending on the design of value articulating institutions, value can be expressed as monetary terms or ordinal outcome.

3.2 Review: current ecosystem services valuation methods

3.2.1 Economic valuation

Economic valuation is developed for monetization and commoditization of ecosystem goods and services based on the conceptualization of exchange value in neoclassic economic (Gómez-Baggethun et al., 2010). Monetary values enable decision-makers to compare the benefits of ecosystem services with other development alternative, aims to help people to recognize economic gains derived from the natural environment, and communicates the value of ecosystem services by using common currency (Christie et al., 2008; Brondízio et al., 2010). Furthermore, from the perspective of economic accounting, monetizing values of ecosystem services enables internalizing the positive and negative effects of ecosystem, which are regarded as environmental externalities by conventional economists. It reveals the social and environmental costs in human activities and encourages sustainable thinking in decision-making concerning ecosystem services. The idea of internalizing environmental externalities gives birth to economic valuation methods aiming to correct market failure by incorporating non-marketed ecosystem services into market economy (Gómez-Baggethun et al., 2010).

Economic valuation based on the framework of total economic value (TEV) calculates the aggregate amount of various sub-categories of use and non-use values (Pascual et al., 2010). The delineation of (direct and in-direct) use and non-use values is based on different ways that ecosystems benefit and satisfy human wellbeing, which are classified as provisioning, regulating, supporting and cultural services (MA, 2003, 2005). Based on their understanding about commoditized natural resources, such as agriculture products, minerals and wood, direct use value is the first one integrated into decision making in the market economy. Their experiences in market transaction influence how economic valuation methods developed. Baring the notions of neoclassic economics, economic valuation methods are market-based and preference-based, which are developed on the basis of utilitarianism and methodological individualism. Generally, economic values are determined by the interaction of supply-side and demand-side agents in the market; the optimal price of goods or services would fall between the cost that we need to produce it by ourselves and the amount that we are willing to pay to obtain it from someone else. As long as ecosystem services are inherent from the nature, the economic value is decided by the willingness to pay (WTP) of individual economic agents (Kumar & Kumar, 2008; Pascual et al., 2010).

Economic valuation methods

For eliciting different types of value and ecosystem services with different features and value types, various economic valuation methods have been developed. Methods for eliciting data about individual preference pertaining marginal change of ecosystem services could be divided into: 1) direct market methods including price-based approach, cost-based and production function based approach; 2) indirect market (surrogate market) methods with revealed preference approaches including of travel cost method and hedonic pricing; 3) hypothetical market method, and stated preference approaches of contingent valuation, choice modeling and group valuation (Chee, 2004; Christie et al., 2008; Pascual et al., 2010).

1) Direct market methods

Some of natural resources have been commoditized and/or utilized in production into marketable goods and services. Market price directly reveals the economic contribution or benefit provided by these ecosystem services. Although with shortcoming in identifying indirect use and option values (Christie et al., 2008), it is considered as the most reliable valuation method that reflects the actual preference or costs to individual (de Groot et al., 2010b). There are three approaches using market price to determine the economic values of ecosystem services, including price-based, cost-based, and production based approach.

Price-based: Price of commoditized ecosystem services in a well-functioning market reveals the actual preference or cost to individuals, which is suitable for valuing most provisioning services (de Groot et al., 2010b).

Cost-based: When ecosystem services could be replaced by manmade systems or the function could be substituted by artificial means, costs occur alongside could be seemed as the estimated values of ecosystem services (de Groot, 2006; de Groot et al., 2010b). The avoid cost, replacement cost, mitigation and restoration cost are often applied on estimating use values of regulating and provisioning services (Christie et al., 2008).

Production function based: Based on the analysis of cause-effect relationships between ecosystems being valued and output level of marketable commodities (Chee, 2004), economic values assessed by its contribution to the revenue growth of production. This approach requires sufficient information about the cause-effect relationships, clear delineation of ecosystem services and relevant production activities to prevent the problem of double counting (Barbier et al., 1997; Chee, 2004; de Groot et al., 2010b).

2) Indirect (surrogate) market method: revealed preference approach

The revealed preference approach relies on indirectly using information from real markets to reveal individual preference for a certain attribute of ecosystem services such as

recreational value, amenity and/ or other direct or indirect values. The differences between direct market methods and revealed preference approach lie in that price obtained from the market is not about utilizing or maintaining the service itself but the derivative payment for its benefits. Determining whether a surrogate market exists related to ecosystem services assessed and realizing the correlation between changes in such service and demand shift in the surrogate market are two key elements for revealed preference valuation (de Groot et al., 2010b).

Travel cost method: For services providing recreational benefits for human wellbeing, the value could be determined by how much that users are willing to pay for approaching the specific ecosystem service with those benefits (Brown Jr. & Mendelsohn, 1984). In practice, travel cost refers to the number of trips made and the cost of each trip for individuals to access the site (Boyer & Polaski, 2004). It is based on the observation of actual individual behavior in a real market instead of making a hypothetical market by assumption (Christie et al., 2008). The application of travel cost method is limited to recreational value and not able to capture all value aspects of ecosystem services (Boyer & Polasky, 2004; Christie et al., 2008).

Hedonic pricing: Amenity values or different characteristics of ecosystem services could be assessed from the price difference of properties or marketed commodities with and without it (Costanza et al., 2006; de Groot et al., 2010b). The estimated value of the specific characteristic is derived from a regression of expenditures on the surrogate property, in which individual characteristics is presented as independent variable in the hedonic equation (Malpezzi, 2002).

The most problematic limitation of market-based methods is the existence of 'well-functioning markets' (Barbier et al., 1997; de Groot et al., 2010b). Even within existing markets, environmental externalities, imperfect information flow, social-economic context, behavioral patterns of individuals and the intervention of state would all lead to distortion of market efficiency (Wegner & Pascual, 2011). The limitation of market-based valuation should be recognized when using data obtained from them for planning and policy-making, in which combination of market and non-market valuation methods to assess the total economic value of ecosystem services might be preferable (Christie et al., 2008).

3) Hypothetical market methods: stated preference approach

For non-market ecosystem services, stated preference approach observes individual behavior and elicits their preferences about the value attributes of ecosystem services being assessed. The value elicitation process is deducted in a constructed market with hypothetical changes in the provision of ecosystem services (de Groot et al., 2010b). It is

capable of capturing both use and non-use value, and can be conducted in any context (Pearce et al., 1989; Christie et al., 2008; de Groot et al., 2010b). By constructing different scenarios, state preference approach could provide information of multiple alternatives for planning and policy-making (Carson, 2000). Stated preference approach avoids the limitation of market imperfection and directly elicits individual preference from survey; however, the effectiveness of valuation highly depends on the survey design, sample selection and data collection process that could be evaluated by the validity and reliability of survey.

Contingent valuation (CV): It is the most common stated preference valuation method. Contingent valuation is a survey-based method intended to generate precise statistical estimate of willingness to pay or willingness to accept (compensation) for the survey target (Carson, 2000; MacMillan et al., 2006). It could be conducted in forms of in-person interview, questionnaire, and many other experimental techniques. However, a contingent valuation should consider not only the ecosystem services inquired, but also the institutional context that it would be provided (Pearce, 1989).

Choice modeling: Unlike contingent valuation aims to assign specific monetary value from investigating individual preference, choice modeling asking respondents to rank, score or choose preferred option from a series of alternatives (Barbier et al., 1997; Turner et al., 2010). Those alternatives have shared attributes of the target ecosystem services but in different levels of attribute (de Groot et al., 2010b).

Deliberative monetary valuation (DMV): Deliberative monetary valuation aims to combine stated preference valuation methods with deliberative process from notions reflected on insufficiency of market-based monetary valuation and experiences gained from stated preference valuation in forms of group deliberation (Spash, 2007). Conventional contingent valuations asking people to assign specific monetary value to ecosystem services or goods distant to their daily life are found fail eliciting true values held by people (Sagoff, 1988; MacMillan et al, 2006). Therefore, economists try to improve the knowledge base of people by means of group discussion, which allows individual participants confronting various perspective concerning functions and their perceptions of ecosystem services or goods before assigning specific values (Spash, 2008; Lo, 2011).

Deliberation valuation is developed on the basis of Dryzek' s theory of deliberative democracy with notions of communicative rationality from Habermas (Howarth & Willson, 2006; Lo, 2011). Advantages of participation and deliberation witnessed in planning and policy analysis also encourage economists to develop a new monetary valuation method to increase 'buy-in' of the outcome (Spash, 2008). To achieve so, legitimacy gained from

mutual consent of social parties affected by the assessing target requires representatives of those social parties to participate in the deliberative process (Howarth & Willson, 2006). From this viewpoint, deliberative valuation is actually a social process to facilitate individuals to look beyond immediate self-interest and toward the common good (Spash, 2007; 2008). Incorporating small group discussion into contingent valuation process results in four types of deliberative valuation approach, depending the objectives (individual or social WTP) and value articulating process (individual in a group setting or group collaboration) (Spash, 2008). A important notion from Spash (2008) that through a deliberative process, economic valuation could not only generate monetary values of ecosystem services, but multiple value dimensions and realms could be revealed and considered by individual participants in value articulation. In fact, deliberative valuation rejects the conceptualization of value in neoclassic economics or any single conceptualization in values, and embraces value pluralism to reformulate the meaning of 'monetary value' (Lo & Spash, 2012). Deliberative valuation methods responding to long-time criticism on conventional monetary valuation methods as well as neoclassic economics about value based on utilitarian individual preference, incommensurability, intrinsic value and social fairness are being increasingly used in valuation practice (Spash, 2008; de Groot et al., 2010b).

Deliberation of monetary value

Economic valuation methods discussed in the previous section suggest several ways to translate human perceptions about ecosystem services into monetary terms of WTP based on market information, behavior observation and direct value articulation. The greatest advantage of identifying monetary values is to make comparison of ecosystem services with different attributes possible as well as trade-off for decision-making. However, one should notice that different approaches of value elicitation or articulation would give monetary value, or simply money, different meanings behind the number. Market-based approaches developed on the basis of and for neoclassic market economy adopts rigorous methodological hypothesis like rational economic actor, perfect information flow and perfect price mechanism, endure challenges from market imperfection and failure (Barbier et al., 1997). Market prices are not able to perfectly reveal individual preference when market mechanism is distorted, which is often the case in reality. Moreover, the assumptions of self-interest, maximum individual utility, and utilitarian human wellbeing (or preference satisfaction) are incapable of explaining altruistic behaviors, intangible values and intrinsic values, and fail to explore multidimensional human wellbeing regarding to ecosystem services (Wegner & Pascual, 2011).

The problem of incommensurability in monetary valuation are often arousing oppositions (Aldred, 2006). Under the prerequisite of value pluralism, values of ecosystem services, especially intrinsic values, cannot be measured in terms of money or any single scale of measurement (Vatn, 2005; Aldred, 2006; Wegner & Pascual, 2011; Chan et al., 2012; Lo & Spash, 2012). Concerns of intrinsic values challenge the basic assumption of TEV that values of ecosystem services could be converted into monetary terms (de Groot et al., 2010b). Monetary value of ecosystem services has been criticized for its reductionist approach neglecting the complex nature of ecosystem services and plural value dimensions. Especially when economic valuation is combined with decision support tools like cost-benefit analysis and returns on investment, which might overemphasize the economic revenues and lead to failure in planning in the long run (Munda, 2004; Alexander, 2009; Wegner & Pascual, 2011).

Money is not a neutral measurement outside economic models, and do not directly linked to values of ecosystem services (Aldred, 2006). Though convenient, using money to identify ecosystem services should be done with caution. The example of 'protest bids' in contingent valuation infers that even directly stated by individuals, WTP could not fully express values they perceived. Reasons behind protest bids should be further explored and interpreted from non-economic perspectives; simply excluding or forcing an equivalent between environment and market values would result bias (Vatn, 2005; Aldred, 2006; Wegner & Pascual, 2011). Vatn (2005) argues that economic valuation ignores the institutional influences on individual perceptions, which might be 'category mistake' for including these people into monetary valuation since they have different rationalities than the logic of market. To capture values derived from multidimensional wellbeing, it is necessary to develop different value articulating institutions. DMV responds to the conflict between value pluralism and monetary valuation by redefining the meaning of monetary value on the basis of deliberation. Instead of WTP, monetary value is addressed as part of the process determining 'agreement to pay' for prompt actions to prevent irreversible human-induced ecological changes from expanding (Lo, 2011; Lo & Spash, 2012). Though it does not resolving the problem of anti-monetization behavior, DMV departs from neoclassic economic principles and presents a rather open and flexible monetary valuation approach. Not only monetary values but also many value realms are revealed through different DMV institutional arrangement (Spash, 2008).

Being aware of the insufficiency of monetary valuation implies that it is necessary to incorporate valuation methods generate multidimensional values of ecosystem services. Considering value pluralism, conventional decision facilitation with single measurement like cost-benefit analysis should be avoided. To incorporate different value dimensions, a broad decision making framework like multi-criteria evaluation is recommended (Munda, 2004; 2005; de Groot et al., 2010b; Gómez-Baggethun & de Groot, 2010).

3.2.2 Non-economic valuation

Economic valuation methods discussed in the previous section provide specific quantitative values of ecosystem service to enhance economic efficiency in environmental decision-making. Although economic valuation attempts to incorporate multiple value attributes of ecosystem services, the utilitarian welfare approach to satisfy people needs through efficient market mechanism constraints its ability to understand and achieve a broad multidimensional human wellbeing. Furthermore, being aware of market failure and incommensurability of plural environmental values, it is necessary to develop valuation methods from non-economic perspectives to elicit true preference of people and capture multidimensional values of ecosystem services without the distortion of market mechanism.

Valuation of ecosystem services could be realized from two aspects. Economic valuation methods, especially market-based approaches, use an existing value articulating institution and progressively translate human perceptions about ecosystem services into economic terms of measurement, that is, money. The other valuation mechanism would be identified following the function-benefit-value chain of ecosystem service conceptualization, in which values are directly linked to multiple dimensions of human wellbeing. Contribution of ecosystem services to multiple dimensions of human wellbeing is well recognized (Wallace, 2007; 2012; Summer et al., 2012; Polishchuk & Rauschmayer, 2012). Therefore, valuation in this sense aims to identify how and to what level that ecosystem services contributes to different wellbeing dimensions but not necessary sum up with numeral value results.

The first challenge in developing non-economic valuation methods is formulating a wellbeing framework. Extensive studies of human wellbeing are carried through without a single consensus on how to define and categorize. Indeed, studies consider different attributes of human wellbeing with distinct concerns and spectrum within their disciplines. Millennium Ecosystem Assessment (MA, 2003; 2005) conducts a comprehensive study assessing the interdependent relations between ecosystems and human wellbeing, though it has been criticized for lacking overview on all wellbeing aspects and its orientation to economic valuation (Summer et al., 2012; Wallace, 2012). Considering the mission of valuation in community-based planning, ecosystem services should be the subject of valuation. In this thesis, a wellbeing framework is employed not for a comprehensive wellbeing assessment, but as means to increase knowledge base of local communities and integrate the concept of ecosystem services for further planning discussion.

The non-economic valuation aims to be context-specific, in which values are directly linked to wellbeing dimensions defined and formulated respectively in different social-political context. Thus, research methods from social science might be helpful for data collection and

further analysis. Unlike economic valuation ends up with numerical values, qualitative description, ranking or scoring might be expected through non-economic valuation via sociological and anthropological research methods like in-depth interview, questionnaire, focus group, citizen's juries, rapid rural appraisal (RAR) and participatory appraisal (PAR) (Christie et al., 2008) help researcher to gain deeper insight of the social-cultural context. Depending on the role of respondents in data collecting process, non-economic valuation methods could be divided into two approaches- consultative approaches and deliberative and participatory approach (Christie et al., 2012).

1) Consultative approach / individual-based survey

Consultative research methods collect people's perceptions of an environmental issue from structured processes on an individual basis (Christie et al., 2012). Depending on methods used, both qualitative data and quantitative data could be collect and serve for further analysis.

Questionnaire: a list of systematic questions are developed from preliminary study are formulated to explore feelings, attitudes, opinions, past experiences and future expectations of respondents (Christie et al., 2008). Ranking, scoring and open-ended questions would generated different data, which could be respectively or mixed used in questionnaire design depending on the characteristics of target group, the objective of research and analysis methods available.

In-depth interview: it provides a way for researchers to directly realize perceptions of interviewees in their own language. By designing the process and questions of interview, it allows researchers to explore deep into a person' thoughts and understand the contextual information from its interpretation.

2) Deliberative and participatory approach/ group-based survey

To measure and weight the value of ecosystem services is not a trivial task at individual level, and it is reasonable to use deliberative and participatory methods to conduct ecosystem services valuation (Málovics & Kelemen, 2009). Using discourse-based, participatory methods for ecosystem services valuation could avoid the problem of incommensurability due to deliberation will allow individuals to look beyond immediate self-interests and constructing preference toward common goods (Spash, 2007). Moral and legitimate concerns about the representation of the powerless, future generations, and non-humans could be mitigated by the transformative moralizing elements from deliberation and by institutional arrangement to include spokespersons from unions or non-governmental organization to represent on behave of those absent (Spash, 2007; 2008).

Focus group: moderating an interview with a group of respondents, collecting data through group interaction on the topic determined by researchers, within which group members are selected to serve the goal of research projects (Beebe, 2001; Morgan & Bottorff, 2010).

Citizens' jury: a small group of people selected to represent the general public deliberate upon an environmental issue or alternative scenarios through a court-like process to obtain carefully deliberated informed opinions (Keyon et al., 2001; Christie et al., 2008).

Rapid assessment: using intensive group interaction to collect and analysis data to develop preliminary understanding of a problematic situation from the insider's perspective in a relatively short time (Beebe, 2001). It is an expert-led data collection method by composing the research group including multidisciplinary researchers and representatives of local community to ensure that local knowledge and information are taken into account and achieve rules of triangulation from diversified participants (Beebe, 2001; Christie et al., 2008). All methods could be applied in rapid research, though it tends to use secondary resource, semi-structured interview and observation (Chambers, 1994).

Participatory rural research (PRA): unlike rapid rural research that information is elicited and learned by outsiders, participatory rural research emphasizes on local knowledge and aims to strengthen local capability and plan on their own in the local context (Chambers, 1992; Christie et al., 2008). Participatory approach differs form conventional methodologies in the power position of researcher and local people in the research process (Cornwall & Jewkes, 1995). Participant empowerment is the core concept, for which extensive training and supports are necessary to ensure there is enough capacity in the local community (Christie et al., 2008). Though there is not a technique *per se* for PRA, some participatory exercises including field visiting, participatory mapping, ranking exercise, transect walk, Venn diagramming and linkage diagramming, trend analysis and seasonal calendar are often used for both data collecting empowering (Chambers, 1994; Christie et al., 2010).

Non-economic valuation for community-based planning

Unlike economic valuation methods determines monetary values of ecosystem services, non-economic valuation methods develop deep insight in different value attributes that are perceived by stakeholders in their everyday life. Non-economic valuation provides better opportunity to investigate multiple dimensions of human wellbeing for quality of life. It allows ecosystem services valuation to develop value expressions more than monetary terms that are able to reveal human needs for being and doing. Moreover, non-economic valuation methods are able to bring interest-based conflicts within the community and motives of stakeholders to surface through value deliberation (Málovics & Kelemen, 2009).

While individual-based survey methods allow inquiring detailed personal experiences and perceptions, group-based deliberative valuation methods could generate collective values through a communicative process that avoids the problem of calculative aggregation. Although non-economic valuation methods reproducing the social and political context of community by investigating multidimensional wellbeing, the issue of unequal power and limited accessibility for underprivileged people need to be considered in valuation design. Group-based deliberative valuation methods considering fair representation of conflicting social groups can reconcile unequal power and ensure achievement of social equality in decision-making (Wilson & Howarth, 2002).

To briefly conclude the discussion about non-economic valuation and their application in community-based planning, the ability to reveal multiple value attributes in various expressions is well recognized. In order to better address and resolve value conflicts, group-based deliberative approach presents higher potential than individual-based calculative approach. Each of the aforementioned valuation methods has specific focus, which should be taken into consideration when selecting and combining valuation methods for planning. Focus group is more opportunity-oriented and explorative than the court-like evidence-based citizen jury. The former one might be suitable for vision building process while the later one providing social legitimacy should be used for evaluating scenarios for implementation to win supports from the general public. Both rapid assessment and PRA emphasize on participation and integrate local knowledge into scientific research, the later one addresses empowering local community and enhancing local capacity. The rapid assessment is efficient for baseline study at the beginning phase of planning, however the expert-led research rationale is different than the stakeholder-oriented feature of community-based planning. For community-based planning, to invoke stakeholders to take actions and share responsibilities for the future visions, it is important to empower them not just for better political influence, but also for the ability to achieve better quality of life by and for themselves.

3.3 Values and valuation for community-based planning

Human enjoy a wide variety of benefits from the nature. Through cognitive and normative process, ecosystems are transformed into valuable components of human wellbeing. Values of ecosystem services are emerging and formulating in the transformation process. To capture contribution to social wellbeing is one of the major drivers behind ecosystem services valuation (Kumar & Kumar, 2008). However, valuation is more than eliciting and aggregating individual preference. A common premise in current valuation methods, especially in economic valuation, is that people assign values based on individually owned beliefs, perceptions and preferences held before entering the valuation process. From an instrumental perspective, valuation methods are designed to 'elicit' individual preferences and formulate into values of ecosystem services. The term of value expression is determined beforehand, like money in economic valuation. As a result, value of ecosystem services greatly relies on the design of valuation methods. However, preference and perception are not statically held by individuals, but socially formulated and evolves continuously even within and after the valuation process. Valuation is important not only for the value outcomes but also for its informative process. Through the valuation process, people would recall the relations and importance of ecosystems to their life, and thus realize how trivial individual decisions contribute to greater collective goals and social wellbeing. From constructivism viewpoint, both social-cultural context and the institutional influence of valuation methods should be considered and elaborated in value articulation (Vatn, 2005). To put it forward, valuation is the first step to integrate the concept of ecosystem services in community-based landscape planning.

As a stakeholder-oriented planning approach, landscape change in community-based planning is formulated as means to adapt biophysical environment to increase community wellbeing by and for the interests of stakeholders (Nelson et al., 2006; Willemen et al., 2010). The performance of planning is determined by added values of landscape. In community-based planning, valuation should provide a forum for stakeholders to exhibit their interests, values and goals, reconstruct them and resolve conflicts through negotiation and interaction. It is believed that group deliberation encourages people to look beyond immediate self-interest benefits toward common good for the collective and future generation (Spash, 2007). Valuation is a potential learning process enhancing both intelligent and social capital of the community by recognizing the links between ecosystem services and multiple wellbeing dimensions. Community values and common visions are emerging from stakeholder deliberation considering values of ecosystem services for themselves and the community as a whole. Therefore, valuation should be incorporated as an essential component of planning not just for the value outcomes but also for advantages obtained from the process of value elicitation and deliberation. It should be developed from

the beginning and along the process of planning and manipulated as a feedback mechanism delivering and reflecting value changes toward the planning targets throughout each planning phases.

Community-based planning involves both individual values and shared community values, which are coexisting and have mutual influence on the collaborative planning process. Although collaboration is initiated by and working toward a common vision, it is not a single unified value but a mutual agreement between stakeholders based on the negotiated diverse value attributes concerning multidimensional wellbeing. Current valuation methods following the MA classification scheme identify ecosystem services with their functions and benefits to a limited range of wellbeing dimensions. Considering the value pluralism in community-based planning, valuation methods should be able to assess multiple value attributes with different value expression. For this reason, a comprehensive wellbeing framework recognizing manifold roles of ecosystem services is indispensable. It acts as a framework for reference to select and combined different valuation methods considering their advantages and limits for using valuation to initiate landscape change. Considering the function-benefit-value chain and the wellbeing conversion process discussed in the first section, ecosystem services could be categorized either by function, the roles in the conversion process or benefits to multiple wellbeing dimensions. A comprehensive wellbeing framework for ecosystem services valuation should include not only benefits contributing to societal, economic and environmental wellbeing dimensions, but also their influences on the process converting services and goods to human wellbeing.

Economic valuation methods based on neoclassic market commoditize ecosystem services to obtain market prices reflecting exchange values. Market-based economic values provide a means to ensure economic efficiency and achieve financial stability of planning alternatives. Non-economic valuation methods reveal values of ecosystem services not only in economic dimensions but also societal and environmental needs for human wellbeing. It provides context-specific information and reveals the true preference of stakeholder without distortion of market mechanism or conception of money. However, it is difficult to express societal values and environmental values in specific quantitative numbers. Using rating and scoring to identify comparative importance of ecosystem services and priorities of wellbeing elements might be feasible.

Valuation for community-based planning is designed to be a mechanism combining different valuation methods. Using the concept of mechanism, it emphasizes not only the value outcome but also the valuation process, composition of valuation methods and different value expressions should be considered from the perspective of planning. It is developed to incorporate the concept of ecosystem services in the planning process, which consists of a

serial of phases in a cyclical process. Valuation is defined as a value feedback mechanism to reveal and reflect value changes during the communicative planning process. It should be developed at the beginning and along the process of planning in order to reduce information asymmetry due to continuous value changes. In the next chapter, a detailed discussion about the concept and content of valuation mechanism will present how ecosystem services valuation cooperates with community-based planning.

Chapter 4. Valuation mechanism for community-based planning

Community-based planning is characterized by collective actions based on the consensus of stakeholders, which assumes that conflicts between individual values and collective goals are diminished through the process of communication. Building consensus is a core concept of community-based planning. However, stakeholders have different interests, motivations, beliefs and social networks. This results in different value interpretations of ecosystem services, which makes consensus building a time-consuming and expensive task. Moreover, stakeholder participation and communication are fundamental but not sufficient to guarantee the outcome of landscape change. To improve quality of life and satisfy societal, environmental and economic needs, stakeholders involved in the planning process need to be clear about how ecosystem services benefits human wellbeing. Following the discussion in the previous chapter, valuation mechanism is designed to provide explicit information indicating wellbeing contribution of ecosystem services. Valuation mechanism aims to improve the quality of landscape design and resource management responding to plural values in the context of community-based planning. The prerequisite participatory-deliberative valuation process makes it a forum for stakeholders working toward common goals and shared values through communication and interaction.

4.1 Valuation within planning process

Considering that values of ecosystem services would change along different planning phases. Integrating ecosystem services valuation into community-based planning is more than inserting the exercise into existing planning agenda. Aiming to provide explicit information about values to facilitate collaboration for landscape change, valuation mechanism should be developed at the beginning and along the planning process.

Revisiting the prerequisites and desired outcome of community-based planning would help to incorporate valuation mechanism in landscape planning. As community-based planning adopts a cyclical planning process, periodic outcomes of a phase will initiate the next one. Different planning phases require distinct information inputs. Valuation conceptualized as value formation along the planning process makes stakeholders aware of different value aspects and roles of ecosystem services to achieve multidimensional wellbeing. It facilitates stakeholders to assess ecosystem services from the actual functioning received and required for being and doing. Also, it acts as a feedback mechanism to inform stakeholders about value changes during the process.

Valuation mechanism consists of several components to provide value-related information for different planning phases. At the beginning phase of building common vision and shared goals, multidimensional wellbeing framework would lead stakeholders to comprehensively consider every aspect of life quality in the discussion about a desired future. Based on the wellbeing priorities, the comparative importance of ecosystem services could be clarified by their relations to each wellbeing dimensions. This would help stakeholders to specify and select objectives on critical ecosystem services and related landscape for further improvement. Analyzing the conversion process make stakeholders understand how ecosystem services are translated into human wellbeing, from which identifies the key factors for designing alternative landscape functions and management strategies (see Figure 4-1).

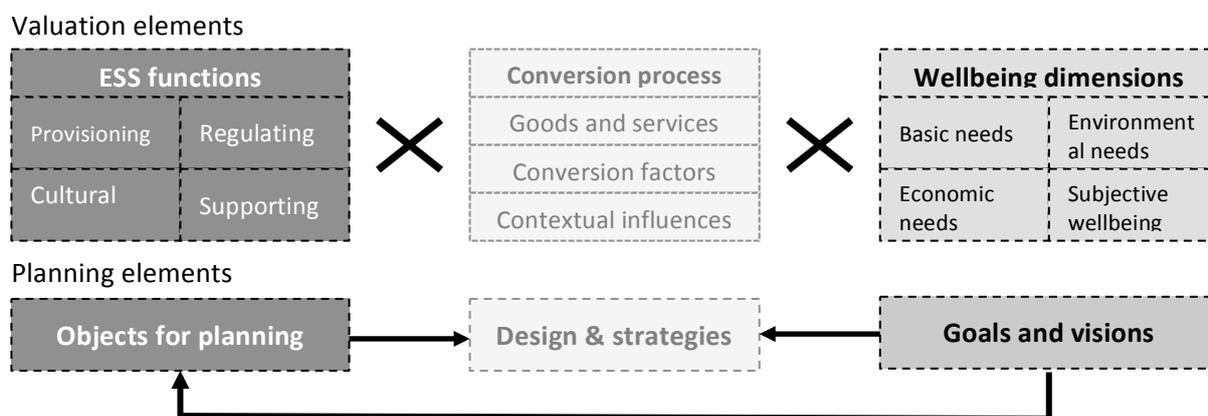


Figure 4-1 Valuation elements and corresponding planning elements

Valuation identifying benefits received from ecosystem services provides a way to motivate stakeholders taking actions and sharing responsibilities. Depending on the valuation methods and value expression, incentives could be transformed from values and interests presented in the value deliberation process. Economic valuation methods with purpose of increasing economic efficiency in the use of ecosystem services, indicates financial revenues or potential costs regarding to landscape change. Although economic benefit is one of the most important incentives for investing ecosystem services, it should not be the only criteria to evaluate planning alternatives. The valuation process and non-economic valuation methods provide abundant contextual information behind the monetary amount, which can motivate stakeholders and potential investors from perspectives of ethics, social cohesion, and sustainability. To ensure value diversity in the planning alternatives, a multiple criteria analytical framework should be adopted to avoid the problem of incommensurability and adapt in the context of multi-stakeholder collaboration. One should notice that values are

negotiated, emerging and changing overtime during the process. Involving stakeholder into a deliberative valuation process can not only allow plural value expression but also help generate shared values and common goals transcending individual interests and persisting overtime.

4.2 Exercises for valuation mechanism

Step 1. Community wellbeing investigation

The ultimate goal of community-based planning is to improve the quality of life in a place through landscape change. Quality of life can be conceptualized as multidimensional human wellbeing. Thus, getting deep insight into wellbeing status of local people, including the dimensions, components and priorities regarding to individual and community goals, is the first step of valuing ecosystem services in community-based planning. Although local wellbeing assessment requires a comprehensive framework (Folker et al., 2005), expert-led predefined framework might intervene and limit stakeholder's expression of true perception. Unlike wellbeing assessment investigating status quo of local community, integrating wellbeing framework into ecosystem services valuation aims to expand the value realms in valuation methods. The wellbeing framework provided here is used as an instructive structure, which allows stakeholders interpret wellbeing elements into local languages and valuable elements in their living environment.

Process: Community wellbeing investigation aims to reconstruct the incomprehensive wellbeing framework adopted in current valuation methods like the MA wellbeing framework. Two folds of wellbeing investigation are involved in this step. First, to investigate multidimensional wellbeing of the local community, asking stakeholders to identify local resources, facilities, activities and personal experience regarding to ecosystem services and natural resources. Using the four wellbeing dimensions (Summer et al., 2012) to structure open-ended questions for in-depth interview. The wellbeing items listed in the predefined framework need to be revised regarding to local context. Wellbeing elements and related ecosystem services mentioned in the answers should be categorized by using wellbeing domains (Smith et al., 2013) for reference. In order to value ecosystem services on the basis of wellbeing, the second step is asking stakeholders prioritize those valuable components identified within each wellbeing dimensions. Asking stakeholders to clarify reasons behind ranking would help to construct local criteria for assessing wellbeing (Pereira et al., 2005).

For community-based planning, building common visions is the first step. Being aware of institutional influences on value formation, the investigation should be carried out on both individual and collective basis. Individual investigation done before group deliberation is able to collect individual preference without interference of group interaction. It aims to reveal wellbeing elements with detailed reasons about the opportunities or obstacles within individual wellbeing conversion process. The aggregation of individual results is not always equal to collective opinions. Thus, group deliberation over the aggregated individual ranking results is expected to bring in concerns about public interests and community norms, from which achieves wellbeing framework representing shared community values.

Table 4-1 Wellbeing investigation step one: individual in-depth interview (questions are adapted from Clark & Qizilbash, 2002; Cast et al., 2008; Pereira et al., 2005)

Briefs for open-ended questions	Example questions
Basic needs: identify the most basic aspects of life (i.e. aspects without which a person cannot cope or manage at all, and without which life is unbearable)	What natural resources/ ecosystem services are necessary supporting your daily life? Why do you think they are indispensable?
Economic needs: identify source of income and economic activities; how and where	How do you obtain financial benefits from natural resources/ ecosystem services? Where are these activities taking place?
Subjective wellbeing: identify satisfaction level of current living and environmental conditions, value priorities	Are you satisfied with the current condition of natural resources/ ecosystem services that you experience in your life? What kind of natural resources/ ecosystem services support your happiness?
Environmental needs: describe required environmental context supporting aforementioned needs and wellbeing	In what status that natural resources/ ecosystem services can support you to achieve aforementioned activities?
Conversion factors: describe the process of achieving needs and wellbeing	Is there anything you wish to obtain from natural resources/ ecosystem services but not able to achieve at the current situation? Why and why not?

Table 4-2 Wellbeing investigation step two: categorizing local wellbeing elements into domains of wellbeing for ranking or scoring (source: Smith et al., 2013)

Wellbeing domains	Descriptions
Health	Personal wellbeing, life expectancy and mortality, and physical and mental health conditions. Lifestyle behavior, health care, food utilization, and environmental quality
Social cohesion	Connectedness, trust, identity, participation, obligation, city satisfaction, volunteering, and length of residence
Spiritual and cultural fulfillment	Opportunities to meet spiritual needs and cultural needs
Education	The outcomes derived from the formal and informal transfer of knowledge and skills
Safety and security	Freedom from harm (physical security-personal and national), but is also described by measures related to financial security; comfort from environmental conservation for sustainability
Living standards	The physical circumstances in which people live, the goods and services they are able to consume and the economic resources to which they have access”
Life satisfaction and happiness	The contentment of life; subjective wellbeing including cognitive aspects and affective aspects
Leisure time	Time for voluntarily engage in pleasurable activities
Connection to nature	Respect and appreciation of nature and other living organism

Expected outcome: A context-specific wellbeing framework consists of local valuable elements and prioritized wellbeing domains represents shared concept of good life quality among stakeholders. In the vision-building phase, stakeholders are able to use the community wellbeing framework to construct goals and visions for the future development. For ecosystem services valuation, a comprehensive wellbeing framework allows stakeholders to recognize multiple value attributes of ecosystem services. The wellbeing investigation allows researcher to realize overall preference over needs and essential elements of the community, which provides criteria to evaluate critical ecosystem services in the area. With prioritized wellbeing elements, it helps stakeholders to identify critical ecosystem services, regarding to their contribution to and facilitation on wellbeing achievement.

Limitation: Notions from capability analysis remind us that local experience reveals only actual functioning filtered by external conversion factors and choice made for socio-psychological reasons. Furthermore, even through collective deliberation, the investigation shows mainly the subjective perspective of wellbeing dimensions, which might need to be supplemented with science-based objective research.

Step 2. Mapping critical ecosystem services

An overall valuation of ecosystem services within the planning area is neither efficient nor effective for community-based planning. I propose to identify critical ecosystem services according to the community wellbeing framework constructed in the previous section. This would help to specify target area for future landscape improvement. It is not only timesaving and effective for resources utilization. From perspective of collaborative planning, specifying target objectives with controllable opportunities and tangible outcomes would increase chances for learning and trust building that are fundamental for multi-stakeholder collaboration toward broader long-term vision (Bouwen & Taillieu, 2004; Huxham & Vangen, 2005).

Identifying local priorities over ecosystem services could be carried out through research methods such as observation, participatory mapping, in-depth interview, ranking exercise, scenario building, and mixed use of abovementioned tools (Raymond et al., 2009; Pereira et al., 2005; Cast et al., 2008). Participatory mapping is adopted with an attempt to incorporate ecosystem services and landscape improvement in the context of community-based planning. The participatory approach is required, which has advantages not only in data collecting, but also in community empowerment. By identifying valuable landscape

functions from their everyday experiences, stakeholders become clearer about the interrelated relations between landscape, ecosystem services and quality of life.

Process: Using land use map as the base map, ask stakeholders to identify the location, range and components of valuable landscape functions as well as ecosystem services that are supporting the existence and functionality of landscape. It is not like traditional valuation method considering a certain type of ecosystem service or wellbeing assessment considering a certain wellbeing dimension. In the mapping process, stakeholders are asked to recall their experience with the biophysical environment, which is associated with ecological characteristics of landscape as well as social-political, economic, and psychological reasons (Alessa et al., 2008; Raymond et al., 2009). Not only valuable elements but also threats to landscape functions and ecosystems should be identified. By this means, it is able to capture a broader range of values assigned to ecosystem services distributing over geographic space (Raymond et al., 2009). Additionally, adequate instructive and prompting questions are needed to facilitate the mapping process and investigate reasons behind. Considering the aim of valuing critical ecosystem services for planning purpose, three elements about landscape functions should be clarified through mapping and prompting, including experiences about the selected landscape type or land use pattern, ecosystem services supporting the selected function, and reasons supporting their judgment of valuableness and threats.

Expected outcome: The mapping exercise is carried out on an individual basis. Overlapping area on aggregated maps indicates the intensiveness of values assigned to ecosystem services over land use patterns. However, simple aggregation is not sufficient enough to determine community values. Group deliberation after the mapping exercise would better identify community preference for ecosystem services. Where conflicts exist, mapping could help stakeholder to understand others' opinion and to negotiate alternative land use patterns or management (Alessa, et al., 2008). Critical ecosystem services are determined from three aspects in planning process, which are planning goals, wellbeing priorities and valuable landscape functions. Mapping critical ecosystem services is a strategic way designed to specify physical objectives for the design phase of community-based planning. Using layer approach to analyze the spatial distribution and configuration of ecosystem services and maps of natural resources, landscape structure, infrastructure, policy objectives, property ownership, etc., would help to identify opportunities over the geographic space for further landscape improvement and management strategies.

Limitation: Participatory mapping is meaningless without inquiry in the reasons and criteria used by stakeholders. It requires an analytical structure to categorize ecosystem services and associated values for valuation purpose. Another problem occurs when comparing

values assigned by different stakeholders. It is difficult to distinguish the strength and contents of values assigned to the same landscape element.

Step 3. ESS-wellbeing matrix

In the previous sections, investigations in community wellbeing priorities and mapping critical ecosystem services present two potential means to make stakeholders aware of the relations between ecosystem services and human wellbeing. Although discussed respectively, these two methods are mutual-supplemental and need to be conducted one after the other to complete the ESS-wellbeing framework for planning. Depending on the orientation of planning, stakeholders can choose either wellbeing investigation or mapping critical ecosystem services to initiate the planning cycle.

For example, planning aiming to improve performance of arable lands is suggested to start with wellbeing investigation to build up a common vision by realizing wellbeing priorities of stakeholders. After that to identify valuable ecosystem services in the planning area, based on the wellbeing priorities to formulate a network supporting production function of arable lands and generate additional benefits like clean air and drinking water, biodiversity and recreation to achieve multidimensional values of land use. For planning with purpose to increase health condition of the community, for example, it is suggested to identify threats and pro-health ecosystem services at the beginning. Noted that ecosystem services and landscape functions serves contribute to more than one dimensions of human wellbeing, a wellbeing investigation would help stakeholders to specify objectives and select alternative solutions.

Process: For ecosystem services valuation, I propose a framework using local criteria and wellbeing priorities to assess critical ecosystem services. A matrix consisting of wellbeing domains and critical ecosystem services is developed to facilitate stakeholders deliberating values of ecosystem services about their multiple value attributes and comparative importance. To describe multiple value attributes, asking stakeholders to identify wellbeing domains that are actually achieved by the ecosystem services assessed in the current situation. The priorities of wellbeing domains uncovered in previous investigation are then translated into weights. Scores are assigned to each ecosystem services considering their contribution perceived by stakeholders in the current situation. The perceived values or comparative importance of ecosystem services would be realized in the results of weighted average. The matrix can be used in the other way around. By means of asking stakeholders to identify ecosystem services that are necessary to support or potential to fulfill prioritized wellbeing domains in an ideal state or visions, the 'potential values' of ecosystem services could be found. The value of ecosystem services is defined in later deliberation about its perceived values and potential values.

Expected outcome: It is assumed that perceived values are not exactly the same as potential values, and potential values might higher or contents more value attributes than what perceived and identified by stakeholders in current situation. To acquire values representing public interests, both of them should be brought into group deliberation and expected to determine community values of ecosystem services through a social process. It aims to determine not just the present values perceived by stakeholders but looking forward to explore the potentials of ecosystem services in the future. For this reason, the gap between perceived values and potential values deserve further analysis. While bringing the results of individual-based matrix exercise, one should notice that it is not just the numbers denoting comparative importance should be considered, but different value attributes behind the weighted average require more attention. From the perspective of CA wellbeing conversion process, it could be understood as the consequences of contextual influences, including social, environmental and personal context. Analyzing the contextual influences is important for developing strategies realizing potential values of ecosystem services for further fulfillment of community wellbeing. Also, these contextual influences should be considered in landscape design and resource management for them might represents obstacles or opportunities to gain higher perceived values from stakeholders.

Limitation: The matrix exercise presents comparative importance of ecosystem services in form of weighted average, which relies significantly on the generation of weights. Regarding to the practical constrains like time and money, using fixed weights derived from wellbeing priorities is preferable. However, being aware of the changing nature of values, weights need to be adjusted according to the vibration of community preference over wellbeing dimensions.

Table 4-3 Example of ESS-wellbeing matrix

Wellbeing-oriented ESS-oriented		Community wellbeing priorities				
		Longer longevity	Easy access to nature	Good living condition	Stable income	Leisure time fulfillment
Critical ESS in arable land	Food production	Way 1: perceived values				Way 2: potential values
	Water purification					
	Pollination					
	Biodiversity					
	Natural heritage					

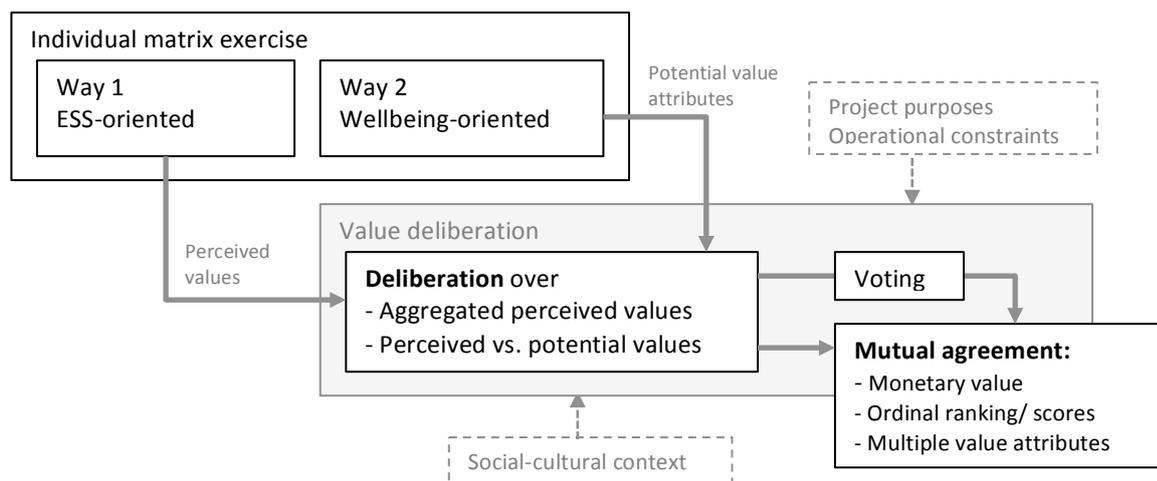


Figure 4-2 Deliberative valuation process with ESS-wellbeing matrix exercise

Integrating valuation exercise into planning process

The three steps discussed in the previous section consist of valuation mechanism for community-based planning. Unlike traditional valuation methods focus on the values of ecosystem services, the valuation mechanism proposed here aims to reconstruct current planning activities into a value-sensitive process. Community-based planning taking form of stakeholder communication and collaboration is also a value formation process. It is believed that values are ubiquitous in every phase of planning, which are delivered by stakeholders and changed due to their interaction and communication. In this sense, values of ecosystem services cannot be fully discovered without considering the influence of planning process. Furthermore, valuation is regarded as the first step to initiate landscape change in community-based planning. To be more specific, stakeholders are driven by their interests and beliefs and seek for change to improve their quality of life. Ecosystem services valuation is employed here to make them aware of the intimate relations between ecosystem services and multidimensional wellbeing. It provides a potential direction to adapt landscape for higher life quality for the community.

Community wellbeing investigation, mapping critical ecosystem services and ESS-wellbeing matrix are proposed to facilitate planning communities to formulating local valuation framework to acquire community values of ecosystem services by their own for themselves. Two possible planning orientations are recognized as biophysical-oriented and wellbeing-oriented approaches. Combining wellbeing investigation and mapping exercise is expected to make stakeholders to better describe their interests and demands in terms of ecosystem services and wellbeing domains. I propose that in the beginning phase of objective setting/ vision building, incorporating wellbeing investigation and mapping exercise might help stakeholders to formulate visions with clear picture of landscape configuration and ecosystem services implicated.

Once the concept of ESS-wellbeing relations is clearly formulated, using the matrix to lead further deliberation to determine values of ecosystem services. Through the deliberative process, values of ecosystem services should be seen as mutual agreement on the comparative importance of ecosystem services regarding to community wellbeing priorities within the planning context. Whether expressing in forms of amount of money or ordinal numbers depends on the purpose and institutional design of future applications. Moreover, comparative importance of ecosystem services could be translated into design principles and criteria to select alternative scenarios for implementation and evaluation.

Integrating ecosystem services valuation in the planning process would enhance information transparency, which is fundamental requirement of community-based planning. Through steps of valuation mechanism, stakeholders are able to discover their internal drivers for pursuing better life quality. It will help them to better express their interests and demands to communicate with each other with mutual-acknowledged concepts like ecosystem services.

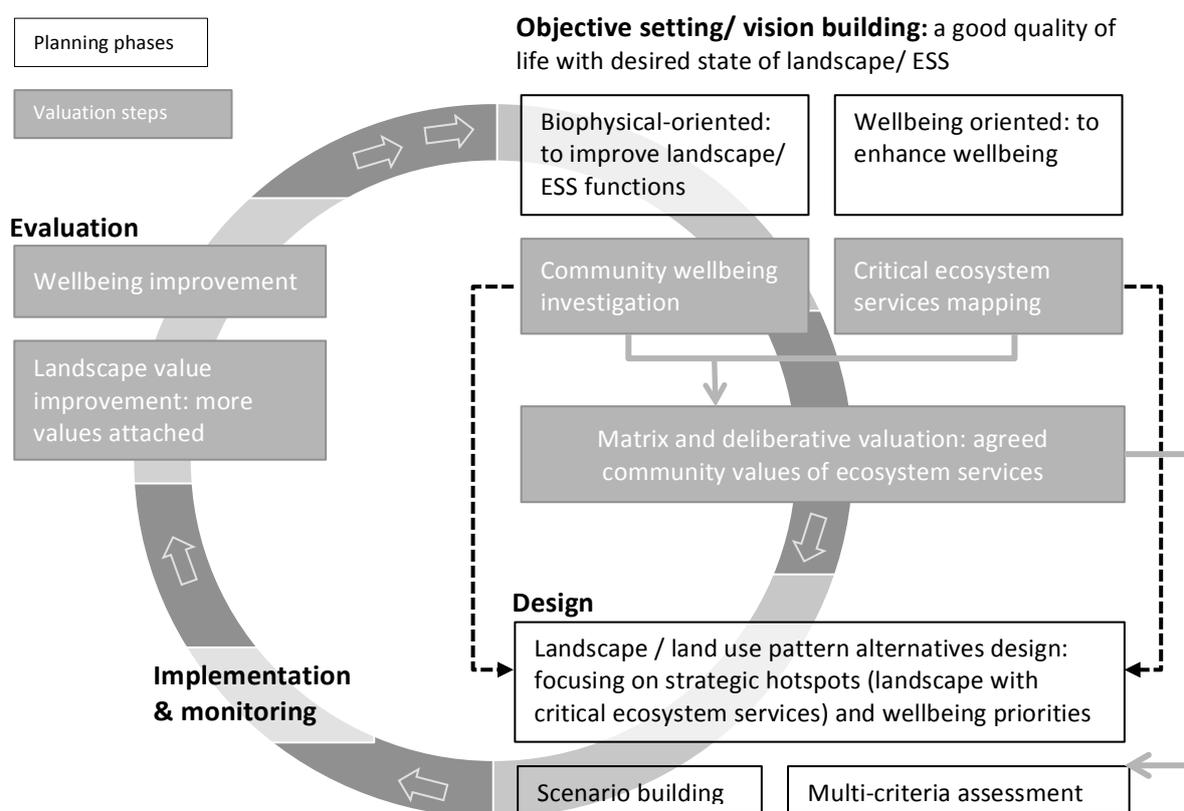


Figure 4-3 Cyclical planning process with valuation

Chapter 5. Discussion and conclusions

In this thesis, I have proposed a prototype of ecosystem services valuation for community-based planning. Responding to the call for interdisciplinary cooperation in ecological science and landscape planning, the valuation mechanism provides a potential way by re-defining and re-designing the planning and valuation process. It aims to integrate valuation exercise into the cyclical planning process. By using the framework proposed here, community-based planning is expected to become a value-sensitive planning approach.

Furthermore, local collaborative landscape development is expected to become a ground for interdisciplinary knowledge production (Termorshuizen & Opdam, 2009). The concept of ecosystem services is employed and elaborated into the function-benefit-value chain. To make the concept of ecosystem services more applicable for planning practice, I interpret the value generation process from the anthropocentric perspective and focus on the issue of human wellbeing. Considering the stakeholder-oriented characteristic of community-based planning, human wellbeing is defined as the preferred end-state of being and doing, which is supposed to be the ultimate goal and main driver for planning. However, current ecosystem services valuation methods are developed independently from the planning discourse. Even though values of ecosystem services are considered in landscape planning, valuation is presented as an independent exercise providing explicit value results for stakeholder to make trade-off decisions about planned alternatives (see de Groot et al., 2010a). By interpreting values as socially constructed and evolving in planning process, the valuation mechanism is designed to derive values of ecosystem services from participatory planning exercises. Values of ecosystem services are presented in terms of comparative importance for stakeholders considering wellbeing components in their everyday life.

The valuation mechanism proposed here aims to provide an alternative way of thinking other than the dominant economic valuation. It acknowledges the value pluralism in the society and planning process involving stakeholders with various interests, values and beliefs. It denies the idea that value could be interpreted into monetary terms regarding to the incommensurability of intrinsic values of nature. It calls for attention on the values of ecosystem services in real life instead of exchange values in the market. The valuation process is expected to provide a deliberative and learning environment for people and evoke pro-environmental landscape changes that generate benefits beyond immediate self-interests.

5.1 Why community-based landscape planning needs valuation

Community-based planning approach has become increasingly applied in both landscape planning and environmental governance. There is a need to facilitate stakeholder communication and interaction towards consensus on sustainable development. I propose to use ecosystem services valuation as the first step to integrate the concept of ecosystem services in community-based planning. It is well recognized that the issue of human values is important while diverse values and political concerns of stakeholders are addressed in the participatory and collaborative planning process (Healey & Shaw, 1994; Wallace, 2012). The valuation mechanism proposed here aims to make stakeholders become aware of different value attributes of ecosystem services, which serves the basis for collaboration in landscape improvement.

The valuation mechanism aims to re-conceptualize ecosystem services in local language and formulate a context-specific valuation framework for the community. The deliberative valuation process allows stakeholders to identify and compare values of ecosystem services from perspective of local wellbeing based on their everyday experiences. It aims to break through the delineation of economic valuation and non-economic valuation and focus on the true values that stakeholders perceive and receive in life wellbeing. Values of ecosystem services are presented in terms of comparative importance to satisfying different wellbeing dimensions. Through such process, stakeholders are expected to address and conduct plural values of ecosystem services in the collaborative landscape development. Using the wellbeing framework to directly assess ecosystem services seeks for chances to avoid the interference of monetary values that emphasizes the economic benefits leading to bias in choosing planned alternatives. From the perspective of local governance, stakeholders involve in the planning and valuation process not just for providing local insights but also expected to acquire social and intelligent capabilities from the learning and empowering process.

Ecosystem and landscape functions need to be integrated in a coherent way to better satisfy human needs and ensure environmental sustainability (de Groot et al., 2010a). It requires improvement of ecological methods as well as cooperation with local stakeholders to create and share spatially explicit ecological knowledge (Berkes, 2004; Termorshuizen et al., 2007). I believe that integrating ecosystem services valuation into planning process will encourage stakeholders to rethink and elaborate the relationship between ecosystems, landscape and wellbeing dimensions from local perspective. For planning, analyzing value attributes addressed by local stakeholders would help to frame the opportunities and obstacles considering added values generated from landscape change. Values interpreted as vital

components in everyday life can be further translated into incentives to motivate stakeholders from being aware to taking action.

The valuation mechanism developed along the planning process may help to better reflect value changes in the communicative process. It is believed that values are socially constructed (Vatn, 2005). In community-based planning, community values are negotiated and emerging in the communicative process. Also, individual values held by stakeholders are changed whether directly in the deliberative process or indirectly by normative influence of community values. In this thesis, I regard values to be anthropocentric but not necessarily individualistic or utilitarian. Community-based planning is expected to become a value-sensitive planning approach, within which values are negotiated and conducted in the communicative process. Integrating ecosystem services valuation in the planning process would facilitate value-centered deliberation and provide an ecosystem-concerned learning environments for stakeholders.

5.2 Reflections on valuation mechanism

The valuation mechanism proposed in this thesis highlights the non-economic value attributes of ecosystem services. I have examined the value formation process of ecosystem services from the beneficiary wellbeing perspective. In my viewpoint, monetary value is regarded as an oversimplified representation of value multiplicity in community-based planning. The most significant difference of economic valuation and non-economic valuation is that the latter allows heterogeneous expressions in a multidimensional valuation framework. Furthermore, values are formulated through a social process of stakeholder deliberation, instead of calculating them with the help of economic models. To briefly sum up, the valuation mechanism could be understood as a process consisting of three key elements: local wellbeing framework, critical ecosystem services and the assessing process based on the previous two elements. The design of the process adopts mixed combination of individual-based investigation and collective deliberation in each valuation exercise. The wellbeing investigation in the valuation mechanism adopts the framework of wellbeing assessment. Considering the direct and significant influence of stakeholders in community-based planning, I focus on the subjective perspective of wellbeing to construct the framework for valuing ecosystem services.

One key issue in the development of valuation mechanism is the definition of ecosystem services. With an aim to apply with the stakeholder-oriented planning approach, I have used a broad definition focusing on the real contribution perceived and received in wellbeing dimensions. Consequently, the gap between subjective cognition and substantial contribution of ecosystems might lead to underestimated values of ecosystem services.

Incorporating the function-oriented categorization scheme, like the MA framework, in identification of critical ecosystem services might help to bridge the gap. In the three-step valuation mechanism, both local wellbeing framework and ecosystem services scheme are incorporated for value deliberation as well as seeking for opportunities to modify current categorization scheme through the valuation process.

The prototype of valuation mechanism and exercises are proposed on the theoretical basis. It is necessary to test and revise it through further empirical research to become applicable for community-based landscape planning. Several research questions for the empirical testing are addressed as follows.

- *For the design of mechanism:*

- How can wellbeing dimensions be transformed into value articulating framework for ecosystem services? Considering the perceived and potential values identified by stakeholders.
- How does the combination of individual-based and group-deliberative process enhance the valuation process like reducing the bias due to issue unfamiliarity?
- Are there any alternative for wellbeing investigation, critical ecosystem services identification and bridging these two perspectives for ecosystem services valuation?

- *For facilitation of landscape improvement:*

- How can the valuation mechanism make stakeholders aware of the multiple value attributes of ecosystem services existing in the real life?
- Can stakeholders communicate and resolve interest-based conflict in the planning process with help of the valuation mechanism? Does it create more opportunities for future collaboration in landscape improvement?
- How can stakeholders bring the values identified in the valuation mechanism into design of landscape improvement?

References

- Albrechts, L. (2004). Strategic (spatial) planning reexamined. *Environment and Planning B: Planning and Design*, 31(5), 743–758.
- Aldred, J. (2006). Incommensurability and monetary valuation. *Land Economics*, 82(2).
- Alexander, E. R. (2009). Dilemmas in Evaluating Planning, or Back to Basics: What is Planning For? *Planning Theory & Practice*, 10(2), 233–244.
- Ansell, C., & Gash, a. (2007). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, 18(4), 543–571.
- Armsworth, P. R., Chan, K. M. a., Daily, G. C., Ehrlich, P. R., Kremen, C., Ricketts, T. H., & Sanjayan, M. a. (2007). Ecosystem-service science and the way forward for conservation. *Conservation biology: the journal of the Society for Conservation Biology*, 21(6), 1383–4.
- Ballet, J., Bazin, D., Dubois, J.-L., & Mahieu, F.-R. (2011). A note on sustainability economics and the capability approach. In R. Ghosh, K. R. Gupta, & P. Maiti (Eds.), *Ecological Economics*, 70, 1831-1834. Elsevier B.V.
- Barbier, E. B., Acreman, M., & Knowler, D. (1997). Economic valuation of wetlands: A guide for policy makers and planners. *Journal of environmental biology / Academy of Environmental Biology, India*, 26. IUCN Publications Services Unit.
- Beebe, J. (2001). *Rapid assessment process: An introduction*. AltaMira Press.
- Berkes, F. (2004). Rethinking Community-Based Conservation. *Conservation Biology*, 18(3), 621–630.
- Berkes, F., Folke, C. & Colding, J. (1998) *Linking Social and Ecological Systems*. Cambridge: Cambridge University Press.
- Bouwen, R., & Taillieu, T. (2004). Multi-party collaboration as social learning for interdependence: developing relational knowing for sustainable natural resource management. *Journal of Community & Applied Social Psychology*, 14(3), 137–153.
- Boyd, J., & Banzhaf, S. (2007). What are ecosystem services? The need for standardized environmental accounting units. *Ecological Economics*, 63(2-3), 616–626.
- Boyer, T., & Polasky, S. (2004). Valuing urban wetlands: a review of non-market valuation studies. *Wetlands*, 24(4), 744–755.
- Brondízio, E. S., Gatzweiler, F. W., Zografors, C., & Kumar, M. (2010). Chapter 4: Social-cultural context of ecosystem and biodiversity valuation. In Kumar, R. (Ed.), *The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations*. Routledge.
- Brosius, J. P., Tsing, A. L., & Zerner, C. (1998). Representing communities: Histories and politics of community-based natural resource management. *Society & Natural Resources*, 11(2), 157–168.
- Brown Jr, G., & Mendelsohn, R. (1984). The Hedonic Travel Cost Method. *The Review of Economics and Statistics*, 66(3), 427–433.
- Bryson, J. M., & Anderson, S. R. (2000). Applying Large-Group Interaction Methods in the Planning and Implementation of Major Change Efforts. *Public Administration Review*, 60(2), 143–162.
- Carson, R. T. (2000). Contingent Valuation: A User's Guide. *Environmental Science & Technology*, 34(8), 1413–1418.
- Cash, D. W., Clark, W. C., Alcock, F., Dickson, N. M., Eckley, N., Guston, D. H., Jäger, J., et al. (2003). Knowledge systems for sustainable development. *Proceedings of the National Academy of Sciences of the United States of America*, 100(14), 8086–91.
- Chan, K. M. a., Satterfield, T., & Goldstein, J. (2012). Rethinking ecosystem services to

- better address and navigate cultural values. *Ecological Economics*, 74, 8–18.
- Chambers, R. (1992). *Rural appraisal: rapid, relaxed and participatory*. Institute for Development Studies Discussion Paper No. 311. Brighton,
- Chee, Y. E. (2004). *An ecological perspective on the valuation of ecosystem services*. *Biological Conservation*, 120(4), 549–565.
- Christie, M., Fazey, I., Cooper, R., & Hyde, T. (2008). An Evaluation of Economic and Noneconomic Techniques for Assessing the Importance of Biodiversity to People in Developing Countries. Defra, London.
- Christie, M., Fazey, I., Cooper, R., Hyde, T., & Kenter, J. O. (2012). An evaluation of monetary and non-monetary techniques for assessing the importance of biodiversity and ecosystem services to people in countries with developing economies. *Ecological Economics*, 83, 67–78.
- Cornwall, A., & Jewkes, R. (1995). What is participatory research? *Social science & medicine*, 41(12), 1667–1676.
- Costanza, R. (2008). Ecosystem services: Multiple classification systems are needed. *Biological conservation*, 141(2), 350–352.
- Costanza, R., D'Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., et al. (1998). The value of the world's ecosystem services and natural capital. *Ecological Economics*, 25(1), 3–15.
- Costanza, R., & Daly, H. E. (1992). Capital Natural Development Sustainable. *Conservation Biology*, 6(1), 37–46.
- Costanza, R., Wilson, M., Troy, A., Voinov, A., Liu, S., & D'Agostino, J. (2006). The value of New Jersey's ecosystem services and natural capital. Gund Institute for Ecological Economics, University of Vermont and New Jersey Department of Environmental Protection, Trenton, New Jersey, 13.
- Daily, G. C., Polasky, S., Goldstein, J., Kareiva, P. M., Mooney, H. a, Pejchar, L., Ricketts, T. H., et al. (2009). Ecosystem services in decision making: time to deliver. *Frontiers in Ecology and the Environment*, 7(1), 21–28.
- De Groot, R. (2006). Function-analysis and valuation as a tool to assess land use conflicts in planning for sustainable, multi-functional landscapes. *Landscape and Urban Planning*, 75(3-4), 175–186.
- De Groot, R. S., Wilson, M. a, & Boumans, R. M. , (2002). A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecological Economics*, 41(3), 393–408.
- De Groot, R. S., Alkemade, R., Braat, L., Hein, L., & Willemsen, L. (2010a). Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecological Complexity*, 7(3), 260–272.
- De Groot, R. S., Fisher, B., Christie, M. et al. (2010b). Chapter 1: Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation. In Kumar, R. (Ed.), *The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations*. Routledge.
- Dempsey, J., & Robertson, M. M. (2012). Ecosystem services Tensions, impurities, and points of engagement within neoliberalism. *Progress in Human Geography*, 36(6), 758-779.
- Dietz, T., Fitzgerald, A., & Shwom, R. (2005). Environmental Values. *Annual Review of Environment and Resources*, 30(1), 335–372.
- Duane, T. P. (1997). Community participation in ecosystem management, *Ecology Law Quarterly*, 24, 771-797.
- Ehrlich, P.R., & Ehrlich, A.H. (1981). *Extinction: the causes and consequences of the disappearance of species*. Random House, New York.
- Fisher, B., Turner, R. K., & Morling, P. (2009). Defining and classifying ecosystem services for decision making. *Ecological Economics*, 68(3), 643–653.
- Folke, C., Fabricius, C., Cundill, G., & Schulze, L. (2005). Communities , Ecosystems , and Livelihoods. In D. Capistrano & C. Samper (Eds.), *Sub-global assessments of the Millennium Ecosystem Assessment* (pp. 261–277). Washington, D.C.: Island Press.

- GómezBaggethun, E., & de Groot, R. (2010). Natural capital and ecosystem services: the ecological foundation of human society. In R. E. Hester & R. M. Harrison (Eds.), *Ecosystem services* (pp. 105–121). Royal Society of Chemistry.
- Gómez-Baggethun, E., De Groot, R., Lomas, P. L., & Montes, C. (2010). The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes. *Ecological Economics*, 69(6), 1209–1218.
- Harrington, C., Curtis, A., & Black, R. (2008). Locating Communities in Natural Resource Management. *Journal of Environmental Policy & Planning*, 10(2), 199–215.
- Healey, P. (1996). The communicative turn in planning theory and its implications for spatial strategy formation. *Environment and Planning B: Planning and Design*, 23, 217–234.
- Healey, P. (2003). Collaborative Planning in Perspective. *Planning Theory*, 2(2), 101–123.
- Healey, P. (2006). *Collaborative Planning: Shaping Places in Fragmented Societies*, Palgrave Macmillan, New York.
- Healey, P., & Shaw, T. (1994). Changing meanings of 'environment' in the British planning system. *Transactions of the Institute of British Geographers*, 19(4), 425–438.
- Hein, L., Van Koppen, K., De Groot, R. S., & Van Ierland, E. C. (2006). Spatial scales, stakeholders and the valuation of ecosystem services. *Ecological Economics*, 57(2), 209–228.
- Hibbard, M., Lane, M. B., & Rasmussen, K. (2008). The Split Personality of Planning: Indigenous Peoples and Planning for Land and Resource Management. *Journal of Planning Literature*, 23(2), 136–151.
- Hibbard, M., & Madsen, J. (2003). Environmental Resistance to Place-Based Collaboration in the U.S. West. *Society & Natural Resources*, 16(8), 703–718.
- Hoch, C. J. (1992). The paradox of power in planning practice. *Journal of Planning Education and Research*, 11(3), 206–215.
- Howarth, R., & Wilson, M. (2006). A theoretical approach to deliberative valuation: Aggregation by mutual consent. *Land Economics*, 82(1), 1–16.
- Huxham, C., & Vangen, S. (2005). The principles of the theory of collaborative advantage. *Managing to Collaborate: The Theory and Practice of Collaborative Advantage* (pp. 30–42). New York: Routledge.
- Innes, J. E. (1995). Planning Theory's Emerging Paradigm: Communicative Action and Interactive Practice. *Journal of Planning Education and Research*, 14(3), 183–189.
- Innes, J. E. (1996). Planning Through Consensus Building: A New View of the Comprehensive Planning Ideal. *Journal of the American Planning Association*, 62(4), 460–472.
- Innes, J. E., & Booher, D. E. (1999). Consensus Building as Role Playing and Bricolage. *Journal of the American Planning Association*, 65(1), 9–26.
- Jacobs, M. (1997). Environmental valuation, deliberative democracy and public decision-making institutions. In: Foster, J. (Ed.), *Valuing Nature? Economics, Ethics and Environment*. Routledge, London, pp. 211–231
- Kellert, S., Mehta, J., Ebbin, S. a A., & Lichtenfeld, L. L. (2000). Community Natural Resource Management: Promise, Rhetoric, and Reality. *Society & Natural Resources: An International Journal*, 13(8), 705–715.
- Kenyon, W., Hanley, N., & Nevin, C. (2001). Citizens' juries: an aid to environmental valuation? *Environment and Planning C: Government and Policy*, 19(4), 557–566.
- Lamarque, P., Quétier, F., & Lavorel, S. (2011). The diversity of the ecosystem services concept and its implications for their assessment and management. *Comptes rendus biologiques*, 334(5-6), 441–9
- Lane, M. B. (2001). Affirming New Directions in Planning Theory: Comanagement of Protected Areas. *Society & Natural Resources*, 14(8), 657–671.

- Lane, M. B. (2006). The role of planning in achieving indigenous land justice and community goals. *Land Use Policy*, 23(4), 385–394.
- Lane, M. B., McDonald, G. T., & Morrison, T. H. (2004). Decentralisation and Environmental Management in Australia: a Comment on the Prescriptions of The Wentworth Group. *Australian Geographical Studies*, 42(1), 103–115.
- Lane, M. B., & McDonald, G. (2005). Community-based Environmental Planning: Operational Dilemmas, Planning Principles and Possible Remedies. *Journal of Environmental Planning and Management*, 48(5), 709–731.
- Leitão, A. B., & Ahern, J. (2002). Applying landscape ecological concepts and metrics in sustainable landscape planning. *Landscape and Urban Planning*, 59, 65–93.
- Leach, M., Mearns, R., & Scoones, I. (1997). Institutions, Consensus and Conflict: Implications for Policy and Practice. *IDS Bulletin*, 28(4), 90–95.
- Leach, M., Mearns, R., & Scoones, I. (1999). Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management. *World Development*, 27(2), 225–247.
- Lead, C., Ruth, A., Pagiola, S., Arcenas, A., Babu, S., Balk, D., Cramer, W., et al. (2005). Analytical Approaches for Assessing Ecosystem Condition and Human Well-being. In D. Capistrano & C. Samper (Eds.), *Sub-global assessments of the Millennium Ecosystem Assessment* (pp. 37–71). Washington, D.C.: Island Press.
- Lo, A. Y. (2011). Analysis and democracy: the antecedents of the deliberative approach of ecosystems valuation. *Environment and Planning C: Government and Policy*, 29(6), 958–974.
- Lo, A. Y., & Spash, C. L. (2012). Deliberative Monetary Valuation: In Search of a Democratic and Value Plural Approach to Environmental Policy. *Journal of Economic Surveys*, (2012).
- Lovell, S. T., & Johnston, D. M. (2009). Designing Landscapes for Performance Based on Emerging Principles in Landscape Ecology. *Ecology and Society*, 14(1).
- Lurie, S., & Hibbard, M. (2008). Community-Based Natural Resource Management: Ideals and Realities for Oregon Watershed Councils. *Society & Natural Resources*, 21(5), 430–440.
- MA, Millennium Ecosystem Assessment, (2003). *Ecosystems and Human Well-being: A Framework for Assessment*. World Resources Institute, Washington, DC.
- MA, Millennium Ecosystem Assessment. (2005). *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.
- MacMillan, D., Hanley, N., & Lienhoop, N. (2006). Contingent valuation: Environmental polling or preference engine?. *Ecological Economics*, 60(1), 299–307.
- Málovics, G., & Kelemen, E. (2009). Non-monetary Valuation of Ecosystem Services: A Tool for Decision Making and Conflict Management. 8th International Conference of the European Society for Ecological Economics.
- Mansuri, G. (2004). Community-Based and -Driven Development: A Critical Review. *The World Bank Research Observer*, 19(1), 1–39.
- Malpezzi, S. (2003). Hedonic Pricing Models: A Selective and Applied Review. In T. O'Sullivan & K. Gibb (Eds.), *Housing Economics: Essays in Honor of Duncan MacLennan* (pp. 67–89). Malden: Blackwell Science Ltd.
- Marans, R. W. (2003). Understanding environmental quality through quality of life studies: the 2001 DAS and its use of subjective and objective indicators. *Landscape and Urban Planning*, 65(1-2), 73–83.
- Morgan, D. L., & Bottorff, J. L. (2010). Advancing our craft: focus group methods and practice. *Qualitative Health Research*, 20(5), 579–81.
- Munda, G. (2004). Social multi-criteria evaluation: Methodological foundations and operational consequences. *European Journal of Operational Research*, 158(3), 662–677.

- Murray, M., Greer, J., Houston, D., McKay, S., & Murtagh, B. (2009). Bridging Top Down and Bottom Up: Modelling Community Preferences for a Dispersed Rural Settlement Pattern. *European Planning Studies*, 17(3), 441–462.
- Nassauer, J. I., & Opdam, P. (2008). Design in science: extending the landscape ecology paradigm. *Landscape Ecology*, 23(6), 633–644.
- Nassauer, J. I. (2012). Landscape as medium and method for synthesis in urban ecological design. *Landscape and Urban Planning*, 106(3), 221–229.
- Nelson, G. C., Bennett, E., Berhe, A. A., Cassman, K., Defries, R., Dietz, T., Dobermann, A., et al. (2006). Anthropogenic Drivers of Ecosystem Change: an Overview. *Ecology and Society*, 11(2).
- Norgaard, R. B. (2010). Ecosystem services: From eye-opening metaphor to complexity blinder. *Ecological Economics*, 69(6), 1219–1227.
- Nyborg, K. (2000). Homo Economicus and Homo Politicus: interpretation and aggregation of environmental values. *Journal of Economic Behavior & Organization*, 42(3), 305–322.
- Oliveira, V., & Pinho, P. (2010). Evaluation in Urban Planning: Advances and Prospects. *Journal of Planning Literature*, 24(4), 343–361.
- Opdam, P., Foppen, R., & Vos, C. (2002). Bridging the gap between ecology and spatial planning in landscape ecology, 767–779.
- Oxford Dictionary. (2012). *Oxford Dictionary of English*. (A. Stevenson, Ed.) (3rd ed.). Oxford: Oxford University Press. eISBN: 9780191727665.
- Pascual, U., Muradian, R., Brander, L., Gómez-Baggethun, E., Martín-López, B., Verma, M., et al. (2010). Chapter 5: The economics of valuing ecosystem services and biodiversity. In Kumar, R. (Ed.), *The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations*. Routledge.
- Pearce, D. W., Markandya, A., & Barbier, E. (1989). *Blueprint for a green economy*. Earthscan/James & James.
- Pelenc, J. (2010). Crossing Sen's capability approach with critical natural capital theory. Toward a new perspective to reconcile human development and nature conservation goals, paper presented at the ISEE 2010 conference, session Needs, Capabilities and Sustainable Develo.
- Pelenc, J., Lompo, M. K., Ballet, J., & Dubois, J.-L. (2013). Sustainable Human Development and the Capability Approach: Integrating Environment, Responsibility and Collective Agency. *Journal of Human Development and Capabilities*, 14(1), 77–94.
- Polishchuk, Y., & Rauschmayer, F. (2012). Beyond “benefits”? Looking at ecosystem services through the capability approach. *Ecological Economics*, 81, 103–111.
- Sagoff, M. (1988). *The Economy of the Earth: Philosophy, Law, and the Environment*. Cambridge University Press, Cambridge.
- Smith, L. M., Case, J. L., Smith, H. M., Harwell, L. C., & Summers, J. K. (2013). Relating ecosystem services to domains of human well-being: Foundation for a U.S. index. *Ecological Indicators*, 28, 79–90.
- Spash, C. L. (2007). Deliberative monetary valuation (DMV): Issues in combining economic and political processes to value environmental change. *Ecological Economics*, 63(4), 690–699.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), 309–317.
- Spash, C. (2008). Deliberative monetary valuation and the evidence for a new value theory. *Land Economics*, 84(3), 469–488.
- Steiner F.R., Butler K. (2007). *Planning and urban design standards: student edition*. Hoboken, NJ: John Wiley and Sons
- Stern, N. (2006). *Stern Review of the Economics of Climate Change*. Cambridge University Press. Cambridge.

- Summers, J. K., Smith, L. M., Case, J. L., & Linthurst, R. a. (2012). A review of the elements of human well-being with an emphasis on the contribution of ecosystem services. *Ambio*, 41(4), 327–
- Talen, E. (2000). The problem with community in planning. *Journal of Planning Literature*, 15(2), pp. 171 – 183.
- TEEB, The Economics of Ecosystem and Biodiversity. (2005).
- Termorshuizen, J. W., Opdam, P., & van den Brink, A. (2007). Incorporating ecological sustainability into landscape planning. *Landscape and Urban Planning*, 79(3-4), 374–384.
- Termorshuizen, J. W., & Opdam, P. (2009). Landscape services as a bridge between landscape ecology and sustainable development. *Landscape Ecology*, 24(8), 1037–1052.
- Toman, M. (1998). Why not to calculate the value of the world's ecosystem services and natural capital. *Ecological Economics*, 25(1), 57–60.
- Turner, R. K., Morse-Jones, S., & Fisher, B. (2010). Ecosystem valuation: a sequential decision support system and quality assessment issues. *Annals of the New York Academy of Sciences*, 1185, 79–101.
- Vatn, A. (2005). Rationality, institutions and environmental policy. *Ecological Economics*, 55(2), 203–217.
- Verburg, P. H., Van de Steeg, J., Veldkamp, a, & Willemen, L. (2009). From land cover change to land function dynamics: a major challenge to improve land characterization. *Journal of Environmental Management*, 90(3), 1327–35.
- Wallace, K. J. (2007). Classification of ecosystem services: Problems and solutions. *Biological Conservation*, 139(3-4), 235–246.
- Wallace, K. J. (2012). Values: drivers for planning biodiversity management. *Environmental Science & Policy*, 17, 1–11.
- Wegner, G., & Pascual, U. (2011). Cost-benefit analysis in the context of ecosystem services for human well-being: A multidisciplinary critique. *Global Environmental Change*, 21(2), 492–504.
- Westman, W. E. (1977). How much are nature's services worth?. *Science*, 197(4307), 960–964.
- Willemen, L., Hein, L., & Verburg, P. H. (2010). Evaluating the impact of regional development policies on future landscape services. *Ecological Economics*, 69(11), 2244–2254.
- Wilson, M. a, & Howarth, R. B. (2002). Discourse-based valuation of ecosystem services: establishing fair outcomes through group deliberation. *Ecological Economics*, 41(3), 431–443.