



# The capacities of institutions for the integration of ecosystem services in coastal strategic planning: The case of Jiaozhou Bay



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## ABSTRACT

This paper explains how the practice of integrating ecosystem-service thinking (i.e., ecological benefits for human beings) and institutions (i.e., organisations, policy rules) is essential for coastal spatial planning. Adopting an integrated perspective on ecosystem services (ESs) both helps understand a wide range of possible services and, at the same time, attune institution to local resource patterns. The objective of this paper is to identify the extent to which ESs are integrated in a specific coastal strategic planning case. A subsequent objective is to understand whether institutions are capable of managing ESs in terms of uncovering institutional strengths and weaknesses that may exist in taking ESs into account in existing institutional practices. These two questions are addressed through the application of a content analysis method and a multi-level analysis framework on formal institutions. Jiaozhou Bay in China is used as an illustrative case. The results show that some ESs have been implicitly acknowledged, but by no means the whole range. This partial ES implementation could result from any of four institutional weaknesses in the strategic plans of Jiaozhou Bay, namely a dominant market oriented interest, fragmented institutional structures for managing ESs, limited ES assessment, and a lack of integrated reflection of the social value of ESs in decision-making. Finally, generalizations of multi-level institutional settings on ES integration, such as an inter-organisational fragmentation and a limited use of ES assessment in operation, are made together with other international case studies. Meanwhile, the comparison highlights the influences of extensive market-oriented incentives and governments' exclusive responsibilities on ES governance in the Chinese context.

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## 1. Introduction

Recently, the concept of Ecosystem Services (ESs) has become a major issue in environmental planning and management at all decision-making levels (De Groot et al., 2010). It is broadly described as the 'contributions of ecosystems to human well-being' (De Groot et al., 2010). ESs capture the interdependent relationships between human wellbeing and the services that ecosystems supply. By making ESs explicit – that is, by identifying and assessing ESs and their relationships at various temporal and spatial scales – it is possible to provide an evaluation of various decisions about the future supply of the whole range of ESs (Hancock, 2010).

Until now, scholars in this field have increasingly focused on analysing institutions for integrating ESs in policies and plans. Institutions, incentives and regulatory mechanisms affect the use of ESs and can be effective in preserving and managing the supply of ESs, thus contributing to the long-term sustainability of management decisions (Hancock, 2010). Institutions are 'enduring regularities of human action in situations structured by rules, norms, and shared strategies, as well as by the physical world' (Crawford and Ostrom, 1995). Consequently, institutional design refers to devising and realizing rules, procedures and organisational structures to enable and constrain behaviour and action so as to preserve values, achieve desired objectives or execute certain tasks (Alexander, 2006).

There are two main objectives of the research that focus on analysing institutions for integrating ESs. The first objective has been to assess or support policy and decision making with regards to ESs through, for instance, the economic valuation of ESs, social value assessment, trade-off analysis, and mapping and modelling.

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Most of these ES approaches have been increasingly used for improving coastal institutions (e.g. Kumar, 2010; Barbier et al., 2011; Pike et al., 2011; Haines-Young et al., 2012; Onaindia et al., 2013; Lopes and Videira, 2013). The second objective has been to examine and understand how specific institutions are related to certain ESs. For example, Namaalwa et al. (2013) analysed the institutional context for management of Namatala wetland to examine drivers of ES changes. Primmer and Furman (2012) reviewed three operational governance settings, i.e. consecration of forest biodiversity, urban land use planning and natural resource strategies, finding mismatch between governance needs and ES approaches. Historical analysis of urban strategic plans in Melbourne and Stockholm was conducted by Wilkinson et al. (2013), revealing a variable and inconsistent attention to urban ES over time. EU policies in the fields of agriculture, forestry, environmental policy, water and regional development were also assessed, uncovering that many ESs were often negatively affected by policies (Hauck et al., 2013). With regards to coastal ESs, the existing studies mainly focus on more comprehensive institutional analyses on, for instance, integrated coastal zone management (ICZM) or ecosystem-based management (EBM) (e.g. Cao and Wong, 2007; Carollo and Reed, 2010; Katsanevakis et al., 2011; Deboudt, 2012; Wu et al., 2012; Cárcamo et al., 2013; Valman, 2013). Only occasionally do these studies identify and assess coastal ESs clearly. Besides, only a few studies have attempted to examine what and how coastal ESs may be included in planning and management, for instance, analyses of Polish coastal municipal strategic plans (Piwowarczyk et al., 2013), English coastal wetlands management (Holt et al., 2011) and financial mechanism design for ESs in coastal and marine settings (Lau, 2013). Nevertheless, they tend either to illustrate an identification of some certain coastal ESs, or these studies are only limited to partial institutional restrictions on ES implementation, rather than assuming a broader institutional design context.

Therefore, the objective of this paper is to identify the extent to which a range of coastal ESs are integrated in coastal strategic planning, and to detect what institutional strengths and weaknesses there could be for ESs use according to a multi-level framework for institutional design analysis as developed by Alexander (2005, 2012). Our purpose is primarily to improve our grounded knowledge of the current institutional capacity of facilitating ES governance, which can be seen as an initial and essential step for designing institutions, not to stress how to develop institutions for identified causal effects by a complete assessment of formal institutional design. This Alexander's framework facilitates a comprehensive analysis of rules, process and organisational structures, which could be important implications for ES governance. Within this broad institutional framework, this study focuses on one particular institution, namely coastal strategic planning. Strategic planning is distinguished by its typical characteristics and its position within the institutional network, e.g., the focus on longer-term goals, the importance of contextual reflection and its comprehensive guiding function for sectoral plans and organisations. These factors imply that strategic planning is unable to ignore the essential planning function of natural resources and ecosystem services, which are suffering from both natural and anthropogenic pressures. Strategic planning could require the inclusion of an ES perspective to make motivating the institutional framework more sustainable.

The central argument of this paper is that it is essential to integrate perspectives from both ecosystem-service thinking and institutions for effective coastal strategic planning. Identifying ESs clearly in coastal strategic planning could remind planners and decision-makers of the significance of the whole range of possible services, including those previously ignored. In turn, clarifying

institutional strengths and weaknesses could provide potential opportunities for evolving institutions to be more effective in implementing ES concept and methods.

The structure of this paper is as follows. First, we introduce the central case and the related coastal strategic plans. This paper uses Jiaozhou Bay in China as an example. There are two main considerations underpinning this case selection. One is the long-term role played by this bay in providing rich ESs to urban/regional planning and development (Zhao et al., 2005; Ge and Zhang, 2011), which implies a potential advantage when identifying multiple ESs in strategic planning. The other consideration is that the case has relatively comprehensive institutional arrangements in place (Li, 2006; Wu et al., 2012), which facilitates its role as an illustrative case, and potentially offers generic insight into the policy implementation for different ESs. Following that, we explain the two methods adopted to operationalize the two perspectives of ecosystem-service thinking and institutions. First, a content analysis method was applied to identify the extent to which ESs are integrated in the coastal strategic plans for Jiaozhou Bay. Second, the multi-level framework of institutional design analysis as developed by Alexander (2005, 2012) was employed to analyse the three levels (the macro, meso and micro) of institutions for the strategic plans concerning to Jiaozhou Bay. After explaining the results, we discuss the capacity of existing formal institutions to manage ESs in Jiaozhou Bay. Finally, we provide general institutional implications for ES governance from this research together with other international case studies.

## 2. Methods

### 2.1. Study area

Jiaozhou Bay is a semi-enclosed shallow-water body situated on the southern coast of the Shandong Peninsula in East China (Fig. 1), surrounded by Qingdao City (7 districts and 5 county-level cities along the Bay with a population of 8.71 million) in Shandong province. In 2012, the Bay covered an area of 343.5 km<sup>2</sup> and had 206.8 km of coastline. Jiaozhou Bay is a typical case in China, as it strongly supports urban development through a wide variety of ESs (e.g. tourism, fisheries, transportation and agriculture: Zhao et al., 2005). Meanwhile, its ecosystem has been altered by climate change, storm surges, seaweed blooms, flooding and various anthropogenic pressures, in particular as a consequence of land reclamation, causing irreversible damage to some ESs (Ge and Zhang, 2011). In this area, strategic planning involves an essential institutional effort to address these problems with regards to managing behaviours or actions of organisations, agencies, groups and individuals in certain geographical areas. The municipal government, provincial government and some national ministries take the main responsibility for developing strategic plans (see Table 1). A particular sector is assigned as a coordinating body to implement planning process. Other government sectors whose authorities may be related to any coastal issue (e.g. the Forestry Bureau, Ocean and Fisheries Bureau and Environmental Bureau) will be typically involved in consultation and final agreement in terms of meetings or official letters. An expert advisory committee is established to provide professional support for assessing feasibility and impact. After the plan draft is formed, it is submitted for public comment. Finally, the State Council, provisional or municipal government have the right of approval for these plans.

We selected four strategic spatial plans for Jiaozhou Bay. All four of these plans were formulated in the last five years (see Table 1). We collected them in March 2013 from official websites and from the responsible authorities. The 'Conservation and Development around Jiaozhou Bay' Strategy of Qingdao (Plan 1) aims to create an

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