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Integrating ecosystem services into coastal and marine governance

Li, Ruiqian

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— CHAPTER 6 —



Reflection and conclusion:

The integration of ES thinking into coastal
and marine governance on the basis of
Chinese experiences

6.1 Introduction

From an economic institutionalist perspective, the central objective of this thesis was to provide a comprehensive understanding of the integration of ES thinking in coastal and marine governance on the basis of Chinese experiences. In this way, this thesis sought to clarify the importance of attuning institutional arrangements with ecosystems, thereby enhancing coastal and marine governance. Four individual studies were conducted to meet the central objective. These studies focused on the following two key challenges regarding the integration. The first challenge is about highlighting ESs and their interrelationships, particularly in coastal strategic planning. It is critical to understand the extent of the dependence that coastal populations have on coastal and marine ecosystems. The second key challenge involves ensuring institutional support for the integration of ES thinking. In this chapter, the critical analyses in Chapters 2–5 of the way in which Chinese coastal and marine governance has attempted to meet both the challenges – and thus integrate ES thinking – will be incorporated to meet the central research objective. This chapter will thus present the reflection and conclusion of this thesis.

The structure of this chapter is as follows. Section 6.2 will provide the answers to the research questions formulated in Chapter 1. These answers are used as the basis for the empirical reflections in Section 6.3. The first part of Section 6.3 is a synthetic discussion of the key findings and empirical implications. Specific suggestions for governance efforts, which planners and policymakers could follow to improve coastal and marine governance, are provided in the second part of the empirical reflections. The theoretical and methodological reflections are presented in Section 6.4 and Section 6.5, respectively. Finally, Section 6.6 concludes with recommendations for further research on the governance of coastal and marine ESs.

6.2 Coastal and marine governance towards the integration of ES thinking

The integration of ES thinking into coastal and marine governance has been addressed through the research questions (RQs) that were discussed in Chapters 2–5. The first challenge has been dealt with in Chapters 2 and 3, while the second challenge has been emphasized in Chapters 2, 4, and 5 to find solutions. Theoretical understandings with respect to ESs, economic institutionalism, and natural resource governance, were applied to gain empirical insights. The in-depth analyses of the Chinese coastal and marine governance have provided on-the-ground knowledge of the required integration, which in turn contributes to the theoretical understanding of the integration of ES thinking. The remainder of this section will offer answers to the RQs formulated in Chapter 1.

6.2.1 To what extent may specific ESs be recognized and incorporated in coastal and marine governance and to what extent are existing institutions capable of managing those services? (RQ 1)

Chapter 2 was an explorative study on the two challenges for the integration of ES thinking, through the case of Jiaozhou Bay. The analysis has presented the explicit level of the different categories of ESs in coastal strategic plans and the institutional capacities relevant to the incorporation of ESs. The content analysis of the selected coastal strategic plans showed that, although the analyzed plans had no explicit reference to the terminology of “ecosystem services,” many references to the benefits that are derived from coastal and marine nature were present. This means that diverse coastal and marine ESs have already been unconsciously considered by planners and policymakers. The analysis also showed different extents of the dependence that coastal development has on ESs. Specifically, among the four categories of ESs, provisioning services (e.g., provision of seafood, biochemical material, and coastal space for industrial development) were the most commonly mentioned, followed by cultural services (e.g., tourism and cognitive values). By contrast, fundamental supporting and regulating services, such as soil formation and climate regulation, have gained less attention in coastal strategic planning. The results imply that adopting ES thinking to conceptualize and categorize all possible ESs is meaningful for coastal and marine governance. The capacity of planners and policymakers may be increased to identify and coordinate all possible ESs.

The idea that the integration of ES thinking should be supported by the existing institutions is one of the key challenges. Chapter 2 focused on the institutional capacities relevant to the recognition and incorporation of ESs from Jiaozhou Bay. For this purpose, a multi-level analysis of institutions (including macro-, meso-, and micro-levels) has been conducted by adopting the framework developed by Alexander (2005, 2012). As shown in Chapter 2, at the macro-level, the Chinese national strategy of marine sustainable development has highlighted economic benefits, as well as ecological benefits, from different categories of ESs. This can be considered an institutional strength, as it results in a range of important ecosystem processes and benefits being centrally positioned in strategic governance discussion.

At the meso-level, the inter-organizational structures, as well as the planning and implementation processes were hierarchical and fragmented. Imbalanced power relations across vertical and horizontal levels in China determined different sectoral influences. Powerful sectors tend to favor only certain ESs in their personal interest. Such matters particularly affected the marine and fishery sector and the environmental sector. Compared to economic agencies, these two sectors had weaker institutional capacities, as a result of which, they often failed to promote conservation actions for fundamental ESs. Hence, services that can create more economic benefits have remained popular, such as the provision of energy and

the cultural service of tourism.

Intra-organizations at the micro-level also affected the incorporation of ESs in different ways. For instance, the limited engagement of specialists, who can provide stakeholders with scientific knowledge regarding cultural, regulating, and supporting services, undermined the accommodation of these services. Moreover, assessment institutions were constrained by limited technologies and guidelines on sea use, due to which they failed to assess less tangible and identifiable ESs objectively in the planning processes. Moreover, the unfavorable position of small entrepreneurs and their low awareness of the influence of strategic decisions on private interests resulted in the absence of social values attached to regulating and supporting services.

By comparing the results from Jiaozhou Bay with other international case studies, the analysis has revealed that fragmented institutional structures and limited ES assessment are the most important institutional weaknesses, resulting in the partial consideration of ESs. Some ESs remained unincorporated in China owing to the considerable economic incentives for development, which led to the prioritization of economic activities over the conservation of non-profit ESs at all levels of the institutions. The strong, exclusive responsibilities of the Chinese government were also striking, since regulatory influence extended to a wide scope of institutional arrangements for ES governance. Thus, the multi-level analysis of the existing institutions in relation to ES integration provided a context and an initial step for the analyses in the following chapters.

6.2.2 How to identify the interrelationships among ESs (trade-offs and synergies) that may have been integrated in coastal and marine governance? (RQ 2)

With respect to the first challenge, many scholars have argued that an explicit and integrated inclusion of ESs and their interrelationships can improve the quality of governance (Sitas et al., 2014; Piwowarczyk et al., 2013). In contrast to specific ESs, making ES interrelationships apparent in coastal and marine governance is difficult. To cope with this challenge, Chapter 3 presented a four-step method for identifying ES interrelationships that may be considered in coastal strategic planning, thus contributing to the evaluation of coastal and marine governance.

The first step of the method involved the selection of strategic plans according to the following three key criteria: (1) plans that were developed within different key sectors, (2) plans that had an overarching and influential view on ES allocation, and (3) plans that involved innovative thinking and arrangements for ES governance. After demarcating the research scope, the second step was designed to identify coastal ESs themselves, thus presenting a foundation for discussions on ES trade-offs and synergies. In this step, each selected plan was examined to code the references to the ESs listed in the coding system,

which was developed to indicate all possible coastal ESs and ensure a coding consistency across different plans. The first two steps led to a more aggregated coding step to identify coastal activities, ESs, and their effects, which was the third step. The aggregation of interrelationships relied on a clear cause-effect mechanism, which has been promoted by Bennett et al. (2009). This mechanism allowed for substantiating ES interrelationships, namely an expanding set of policy interventions as drivers affecting ESs (driver-ES), as well as the interactions caused among the services (ES-ES). Finally, presenting the results of the identified interrelationships in a graphical manner is helpful for the understanding and communication among the actors, with regard to use conflicts. Therefore, the fourth step involved the development of relational diagrams of the identified ES interrelationships. For this purpose, basic symbols were adopted to indicate ESs, their drivers, and their effects.

The case study of Jiaozhou Bay has demonstrated the usefulness of the four-step method in improving the legibility of ES interrelationships in coastal strategic plans. In accordance with other international studies, trade-offs often involve provisioning services because of their relevance to exclusive spatial uses and a popular social preference (Rodríguez et al., 2006), while cultural, regulating, and supporting services are frequently taken into account for producing synergies (Busch et al., 2011; Potts et al., 2014). The four-step method also showed added value in identifying the overlooked ES interrelationships, which was particularly relevant to the regulating and supporting services. Examples in the case study involved carbon storage, algal blooms prevention, and erosion control, which are generally underappreciated and vulnerable to indirect impacts. When analyzing the perceived drivers of ES interrelationships, the results have suggested that the coastal strategic plans failed to capture the spatial and temporal attributes of drivers, such as the frequency and the influence of an activity in the long run. These considerations are crucial for managing ES interrelationships.

Taken together, the four-step method and its application presented the substance and possible ways of identifying and structuring ES interrelationships. This enabled the analysis of complex human-nature relationships in coastal strategic planning, linking ES thinking with coastal and marine governance.

6.2.3 How may rules-in-use facilitate the integration of ES thinking within coastal and marine governance? (RQ 3)

What essentially matters to the integration of ES thinking is how the rules are developed and adopted (Muradian & Rival, 2013). This is considered an important point in meeting the second challenge of the integration, as highlighted in Chapter 4. A framework of ES-specific rules for coastal and marine governance was developed to investigate how the rules-in-use may facilitate the integration of ES thinking into coastal and marine governance. This framework is based on the seven types of rules that are part of the Institutional Analysis and

Development (IAD) framework (Ostrom, 2009) and an intensive review of previous studies. In Chapter 4, this framework has been applied to investigate the coastal strategic planning of Qingdao – a critical action situation, within which a range of rules have been designed to structure the users' choices and ES utilization.

Chapter 4 shows that a range of rules-in-use may accommodate ES thinking. Previous studies on coastal and marine governance have suggested that position rules usually focus on the involvement and the role of governments, scientific groups, and non-governmental stakeholders. The three key groups should perform as 'regulators of competition', supporters of ES knowledge, and users for maintaining ES provision, respectively. The case study of Qingdao revealed that if the capacities of non-governmental stakeholders are limited, it would restrict the promotion of conservation incentives, ecological knowledge, and local ES concerns in governance. The selection of participants could also be a way to include ES perspectives. It means that boundary rules should clarify the selection criteria by considering the responsibilities of the actors, their ecological and social knowledge, as well as potentially affected users of ESs. In relation to the last criterion, the potentially affected users in Qingdao were limited to the intended economic actors for marine industrial development, rather than the potentially affected group for ecosystem changes. It resulted in less concerns on coastal and marine conservation from a long-term perspective. To better detect and address ES-related conflicts, stakeholders should participate early and throughout the entire decision making process. The early involvement of local communities in Qingdao's strategic planning process resulted in the early detection of problems and a further modification of the plans.

Choice rules should clarify what actions are allowed, obliged, and prohibited, by setting choice limitations per coastal and marine zone, based on social-ecological conditions. Meanwhile, each zone associated with use rights seems to provide a useful way of managing the use-and-entry choices of vulnerable ESs. Chapter 4 showed that the choice rules in Qingdao directly constrained specific activities that may reduce natural resources or damage ecosystem functions. It also offered the possibility of accommodating ES thinking to affect the users' choices. One example is, emphasizing wetland connectivity and landscape diversity in zoning, to allow and oblige ES uses. Payoff rules also aim to coordinate ES uses. Such rules are required to influence the benefits and losses from ESs, to establish incentives and deterrents for coastal activities. Therefore, ES values and economic perspectives should be taken into account in payoff rules. The Qingdao practices have proved that marketable ESs and ES proxies, such as the provision of fisheries and sea use, were typically evaluated for the allocation of benefits and losses. This seems very useful in influencing users' choices and producing collectively positive outcomes (e.g., clean water and beautiful coastal landscape).

As discussed in Chapter 4, aggregation rules are required to stimulate a mix of top-down and

bottom-up decisions, to coordinate local uses and higher-level goals regarding ESs. In the case of Qingdao, bottom-up decisions on ES uses appear to be rather limited. To enhance the effectiveness of ES governance, authorities that were traditionally distributed to fragmented sectors should be adjusted based on the characteristics of an ecosystem and collective decision making. In relation to scope rules, the fitness of the existing institutions, based on geographical scales and ES interactions, should be emphasized. However, in practice, such rules seem difficult to operate. For example, the geographical focus of land-sea integration has been promoted for years in Qingdao, to control land-sourced discharge, based on the environmental capacity of the sea water. Due to the lack of a concrete and systematic design, the expected outcomes have hardly been achieved.

Finally, as an essential support for the other six types of rules, information rules are required to specify the provision of knowledge concerning ES conditions, demands, values, uses, impacts, and spatial distribution. This is a crucial and effective way to facilitate ecosystem-based decisions. Among the required information, ES values and impacts have been increasingly available in Qingdao, although restrained from decision making. Insufficient budget and time for ES evaluation and a low level of acceptance among policymakers have caused the restraint.

Overall, by revealing how ES-specific rules may be developed and adopted in practice, the second challenge has been met. The literature review and the empirical analysis on the rules-in-use also clearly illustrated the usefulness of integrating ES thinking in coastal and marine governance.

6.2.4 How may coastal and marine governance facilitate MBIs for ESs? (RQ 4)

In this thesis, MBIs have been considered an operational means to realize ES thinking. Chapter 5 has dealt in particular with the second challenge of ensuring institutional support for the integration of ES thinking, by zooming in on the emerging MBIs in Chinese coastal and marine governance and by investigating how the existing coastal and marine governance facilitate MBIs. The on-going theoretical debate and international discussions show the need to gain better empirical understanding about MBIs and ES governance complexity.

Previous studies have suggested that there are four distinctive governance aspects of MBIs for ESs: price, regulatory support, coordination, and spatial consideration. Generally, to incorporate diverse values of ESs in MBIs, the price is attached directly to ESs or to ES-proxies. Regulatory support is generally considered an important part of MBIs, imposing essential preconditions for MBIs with respect to the rules of assessment (e.g., on uses and impacts), transaction (e.g., allowable total amount), and liability (e.g., permits of fishing rights). Coordination is also considered inherent in the relevant governance of MBIs, to facilitate free choice-making and stimulate the participation level of the actors. Finally, the

governance of MBIs for ESs has gradually been featured due to spatial consideration on causal issues and site-based conditions. This kind of consideration has been argued to make way for MBIs, in which cross-border and site-specific issues can be dealt with.

According to the four distinctive aspects mentioned above, Chapter 5 explored how MBIs for ESs are facilitated by coastal and marine governance. Generally, the case study illustrated that the reliance of the analyzed MBIs on regulatory support appears to be rather strong for providing economic incentives and increasing users' engagement. In reference to coordination, China highlighted this aspect in terms of keeping the transaction costs low. Cost reduction has been realized through regulations and coordinative methods, such as setting flat-rate prices while bidding for sea-use rights and creating the role of 'management intermediary' for coordination. The empirical analysis also illustrated the importance of ES valuation and impact assessment for MBIs, as emphasized in the on-going discussion. However, prices were mainly attached to tangible inputs to assess the value of a sea area and the ecological losses (e.g., infrastructures), rather than a wide range of specific services. This was caused by a weak willingness among the stakeholders to pay for natural resources.

In the theoretical debate, MBIs should facilitate freedom of choice for interactions among the relevant actors. Chapter 5 showed that the freedom of choice was reflected only moderately in the Chinese case. Existing governance has not created a favorable environment for actors to have free meetings, or increase the level of participation in ES-related transactions. The freedom of choice was often influenced by the regulatory power of the governments in relation to, for instance, finance allocation and negotiated price setting. However, as discussed in Chapter 5, there was implicit evidence in China about addressing ES causalities across scales efficiently, such as internalizing costs or revealing causality information. Although zoning schemes and sea use assessments provide essential regulatory support for integrating location-based conditions and ES bundles, the studied MBIs cannot make upstream-downstream allocation or deal with watershed-based causalities. Instead, the MBIs actually highlighted a regulatory way to achieve administrative coordination. Overall, the Chinese case clearly showed that market-oriented methods and perspectives related to ESs have been integrated in coastal and marine governance. Hybrid governance that combines both market and regulatory elements is crucial for the implementation of MBIs for coastal and marine ESs.

6.3 General empirical reflection

6.3.1 Emerging governance efforts in China

From the perspective of economic institutionalism, this thesis has investigated the integration of ES thinking into coastal and marine governance by dealing with the two key challenges (i.e., highlighting ESs and their interrelationships, and ensuring institutional support for the

integration) by focusing on Chinese practices. In this section, emerging governance efforts in China will be gathered to show the extent to which ES thinking is integrated in Chinese coastal and marine governance, while generally presenting the key implications for institutional design.

To begin with, Chinese practices have demonstrated the integration of ES thinking to a certain extent. Although there was no clear reference to the terminology of “ecosystem services,” a variety of ecological characteristics, as well as provisions and benefits from land and sea, were evidently present in the policies. The studied coastal strategic plans showed an awareness of human dependence on coastal and marine ecosystems to varying degrees and in different ways. This can be understood as an implicit integration of specific ESs. However, as previously discussed in Chapters 2 and 3, some fundamental ESs (e.g., supporting and regulating services) and the corresponding indirect impacts on them have been overlooked. This lack of awareness is very likely to increase the ecological vulnerability and restrict the methods and results of dealing with ES complexities. This suggests that a more explicit acknowledgement of ESs in policies is needed. Coastal and marine governance could thus be improved by systematically categorizing and identifying all possible ESs, especially the supporting and regulating services that are crucial to the sustainable provision of other services. Moreover, complexities inherent to ESs and human actions should also be better accounted for, thus enlightening the management of trade-offs and synergies, particularly concerning fundamental ESs in governance.

In spite of the references to specific ESs, more fundamentally, the analyses suggested that an acknowledgement of ES thinking, namely taking decisions on an appropriate geographical scale does not seem evident in Chinese practices. In other words, there is incongruity between ecosystems and institutions with respect to geographical scale. This is relevant to coastal authorities that are distributed in fragmented sectors. Traditionally, the strong sectoral thinking in framing natural use and conservation separately (Primmer & Furman, 2012), and the emphasis on environmental elements (e.g., water) have led to a segregation of ecosystems under different jurisdictions and boundaries. In reality, ecological processes and functions operate at a specific scale, or even across scales, to produce and distribute ESs (Duraiappah et al., 2014). However, as discussed in Chapters 4 and 5, there was no specific authority, organization, or eco-compensation rule that could match with the upstream-downstream scale or watershed-based scale to effectively manage ES causalities. Existing institutional solutions to cross-border issues (e.g., land-sea pollution and watershed eco-compensation) only depend on the decisions of higher-level authority. The issue of scale implies the need for institutional efforts to consider ecological entity and different geographies. More cross-border arrangements and multi-level cooperation among the actors should be emphasized.

The third observation about the integration of ES thinking in Chinese practices involves ES valuation and use. This thesis showed that ES valuation has wielded a rising influence on the way planners and policymakers manage coastal and marine areas. In China, there has been a growing awareness of the value of natural resources and the “free-of-charge” contribution of ESs to the economy. At the strategic level, more attention has been provided to ecosystem conservation, which has led to the structural adjustment of Chinese marine economy (Chapter 2). It suggests that the consideration of ES values provides a common metric for balancing economic development and nature conservation (Daily & Matson, 2008). In particular, economic value entails a strong focus on the utilitarian aspect of ESs as commodities. Planners and policymakers tend to promote economic assumptions about exchanging ESs through the market. The uptake of ES values could also help to understand the incentives that individuals face in using coastal and marine resources. Stakeholders would then be conceived as users who gain benefits or bear costs related to ESs (Chapter 4 and Chapter 5). Thus, this consideration facilitated linkages between various actors (Muradian & Rival, 2012), as well as “a full appreciation of how human activities interact,” to coordinate these uses and change them into sustainable patterns (Halpern et al., 2008, p.204). However, this thesis clearly revealed that among small marine entrepreneurs, coastal citizens, and local government officials, the acceptance of ES value has not been well-fostered (Chapters 2, 4, and 5). Under such circumstances, many Chinese coastal and marine governance activities were restricted, such as the operation of payments for ESs, and the participation of non-governmental actors. To enhance the acceptance of ES values, it is necessary to clarify the ES concept, increase the reliability of ES valuation, and improve communication between organizations.

Lastly, this research argues that the integration of ES thinking is related to an array of institutional arrangements. Regulatory arrangements appear to be essential supporting factors in various ways. For instance, governmental authorities usually set ecological targets, define assessment rules on ESs, make marine spatial zoning, and allocate sea-use right (Chapters 2, 4, and 5). In particular, the institutions of zoning and use right showed the capacity of accommodating ecological attributes and managing different uses. With increasing awareness of ES values and use, more market elements tend to be prominent in Chinese practices. These market components have been characterized as institutional arrangements under a hierarchical framework. Market elements usually functioned on account of the government’s efforts to keep transaction costs low and normalize ES-related assessment. A prominent example is the implementation of MBIs for ESs. The studied MBIs increased the competition and scarcity of access rights to the sea, internalized the cost of ecological damage in terms of fees, and created initiatives for fishery conservation through government subsidy in China. However, the level of freedom in making choices for ES transactions seems low in China, which has restricted the flexibility and effectiveness of ES governance. It has been affected by the strong regulations.

Examples are the politically-set protection liabilities, the political influence on bidders' participation, and the payments set by governments, rather than by markets. A practical recommendation is that the regulations could be less severe. A higher level of freedom is required by private users and buyers to make choices in transactions.

6.3.2 Practical recommendations

As discussed above, four general directions for the design of institutions can be distinguished: integrating fundamental ESs in coastal and marine governance, accommodating different geographical scales, enhancing the acceptance of ES values among organizations, and increasing the level of free choices in transactions. These implications will be specified below, to provide practical recommendations for actions that Chinese planners and policymakers could follow to better attune their institutional arrangements to ecosystems, thus improving the quality of coastal and marine governance.

(1) Integrating fundamental ESs in coastal and marine governance

In the context of insufficient consideration of fundamental ESs and the corresponding interrelationships, which are featured in existing coastal and marine strategic policies, planners and policymakers cannot continue to merely focus on specific environmental factors (e.g., water, soil, species, and pollution control) or certain ESs that directly bring tangible benefits. Rather, they should emphasize the importance of fundamental ESs and the maintenance of these services for the sustainable provision of other services. For example, planners could clarify which ecosystem functions and services may be sustained across seascapes and through time, by maintaining regulating services from the wetlands network. Moreover, the assessment rules in China should support the Strategic Environmental Assessment scheme. The scheme should provide a more holistic analysis of all the possible ESs, with their trade-offs and synergies. It is also necessary to distinguish the drivers between human activities and ESs themselves, for the complex cause-effect relationships. Of course, this is a challenging task, which requires further research and local knowledge about ES production and subsequent distribution.

(2) Accommodating different geographical scales

As discussed in Section 6.3.1, the existing institutional arrangements for coastal and marine governance often do not fit with geographical scales of ecological properties and spatial dynamics. ES-related causalities are normally cross-border issues, rather than local matters with a clear jurisdiction. Due to this, planners are expected to match the institutions with ecosystems. At the early stage of strategic planning, planners are suggested to identify actual and potential geographical boundaries for the affected outcomes, based on ecosystem processes. In coastal areas, a watershed basin and an ocean basin may be rational selections

for drawing a governance boundary (e.g., Jiaozhou Bay basin). After identifying the actual features of a specific ES issue, fragmented institutions need to be adjusted, such as bridging institutions that are able to accommodate jurisdictions for a watershed basin. In the case of Jiaozhou Bay, a new organization, called the “the Jiaozhou Bay Protection Committee,” has been established as part of the Qingdao Ocean and Fisheries Bureau. This initiative should be further developed into useful ocean-basin institutions. Accordingly, efforts should focus on clarifying cross-border jurisdiction, ecological version, leadership, and interdisciplinary collaboration of the organization. The ocean-basin institutions should also emphasize multi-level coordination among local and municipal governments, as well as non-government actors within the geographical boundary. By doing so, more flexible arrangements can be made to deal with the governance problem, especially when marine agencies at the provisional and municipal levels have no direct authority over the local coastal and marine management.

(3) Enhancing the acceptance of ES value among organizations

As discussed previously, to a certain extent, the notion of ES values tends to be embedded in the thought process of the planners and policymakers, to manage the competing discourses between economic development and nature conservation in China. However, ES values have not been established in the regular language or accommodated in the various organizations. To steer the implementation of ES values, a legal basis is needed to reduce confusion among the organizations about the ES concept, and to encourage ES valuation at the assessment and planning stages. With such encouragement, planners are expected to work closely with other disciplines, such as ecological economics and environmental economics, to capture not only the economic value of ESs, but also the social perceptions and local knowledge of ESs from non-governmental groups. This could be realized by building up a learning platform among planners, local groups, and scientists, such as a coastal forum. In the current Chinese practice, the inadequacy of primary data and the unreliability of evaluation remain a problem for diverse organizations to accept the ES value. Therefore, institutions require long-term funding to sustain monitoring and data collection. Ecological baseline, ES dynamics, impacts, uses, and spatial distribution should be made available to support research and planning. The existing fragmented information systems for land and sea need to be coordinated. In the case of Qingdao, it is suggested that the Environmental Protection Bureau and the Ocean and Fisheries Bureau develop an integrated valuation database and increase its extensive use. This way, ES values would be more credible and the extent of acceptance from different organizations could increase. This would further precede specific actions and influence the effectiveness of ES governance.

(4) Increasing the level of free choices in transactions

Although more market elements have extended into the Chinese coastal and marine

governance and improved the quality of governance, it seems that the hierarchical arrangements have restricted free choices for interactions among the relevant actors. More freedom should be provided to local governments, private sectors, and individuals. ES users and buyers need to achieve more competency to freely engage in governance and cooperate with other actors. In the case of Subsidies for Fishery Restoration, ES providers require the power to make their own decisions about how to allocate the government funds to compensate local ecological losses. Coordination of meetings, negotiations, and advice between governments and local ES providers are expected to be enhanced. In relation to the governance of Bidding and Auction for Sea Use Rights, planners and policymakers could consider gradually broadening the scope of allowable sea-use rights for trading. A higher level of voluntary negotiations and exchanges between local private actors should be encouraged under required regulations. It may allow for a quick adjustment of spatial developments and sea-area prices based on the changing environment. These suggested actions could increase free choices in transactions and gather momentum from local groups to carry forward MBIs.

Currently, the State has initiated the establishment of a market system for ecological conservation and environmental improvement, relying on multiple economic mechanisms in China. These circumstances could enable more MBIs to adequately function, such as tradable fishing quotas and marine environmental insurance. Given the Chinese governance context, it might be better to design new MBIs by taking advantage of the regulatory elements in reducing transaction costs.

6.4 Theoretical reflection

This thesis expands the scope of application of ES thinking by turning attention from the governance of territorial ESs to the governance of coastal and marine ESs. It comprehends the integration of ES thinking into coastal and marine governance. On the one hand, this thesis has explored ways of improving the quality of coastal and marine governance based on ES thinking. On the other hand, it has enriched the ES discourse by adopting an economic institutionalist perspective to realize ES thinking.

Firstly, from the perspective of ESs, the analysis has revealed how ESs and human-nature relationships could be considered in the existing coastal and marine governance. Although only a few simple ES thinking has been adopted in the analysis, such as the four general groups of ES classification and the two typologies on ES interrelationships, the content analysis of coastal strategic plans is useful in revealing the extent to which specific ESs and their interrelationships may be incorporated (Chapters 2 and 3). In doing so, this study provided qualitative insights into the unconscious and implicit linkages between ESs and coastal and marine governance. Moreover, an empirical assessment of the coastal strategic plans has found previously overlooked ESs, indirect impacts, potentially affected audience,

and the cause of ES interrelationships. This indicates that ES thinking holds the potential to enhance a holistic consideration of coastal and marine benefits and capture the complex features of ES governance. Thus, this study aims to encourage coastal and marine governance to make ESs and their interrelationships explicit and transparent, in order to allow planners and policymakers to deal with the complexities of governance.

The other important contribution of this thesis is facilitating ES thinking from the perspective of economic institutionalism. This thesis has demonstrated how institutions can facilitate ES integration by looking at the multiple levels of institutions, rules-in-use, and policy instruments, as the key institutional aspects that steer coastal and marine governance. The institutional analyses, based on the theoretical frameworks developed by Alexander (the multi-level framework of institutional design analysis) and Ostrom (the sets of rules from the Institutional Analysis and Development framework), are complementary. As mentioned in Chapter 1, the two scholars have developed their own theoretical framework, by following the same assumptions as that of economic institutionalism. Both of them assume that the origin of institutions can be attributed to voluntary agreement among the actors, with a critical goal of institutions being to ensure coordination to achieve better political outcomes. Ostrom's framework facilitates a basic thinking about coordination and particularly defines a comprehensive set of rules that typically structure actors' interactions. This thesis has taken advantage of this framework to specify the rules-in-use that accommodate ES thinking when they refer to coastal and marine governance, especially to coastal strategic planning. Accordingly, the specified rules contribute to guiding the behaviors of the actors toward sustainable use of ESs. More importantly, these rules can inform other coastal regions about potential ways to explore and refine institutions under their own governance contexts. Ostrom's framework has thus proven to be useful for conceptualizing and analyzing ES-specific rules, which is essential for improving the quality of governance.

From a strategic perspective, both, Ostrom and Alexander, have clarified that there are different levels of coordination, in which various choice processes take place, with different rules playing a role. To better understand the institutional support for the integration of ES thinking, it is necessary to gain an overview of the existing rules, organizational structures, and procedures for coordinating coastal actions at different levels, instead of just one level. Therefore, this thesis was also aimed at gaining a broader view. Compared with the distinction between institutional levels made by Ostrom, Alexander's multi-level framework analyzes coordination more from a planning perspective, with broader institutional-design thinking. Alexander's framework places an explicit emphasis on meso-level coordination (inter-organizational coordination), particularly with respect to strategic planning and its nested institutions. Adopting Alexander's framework seems more appropriate to guide the empirical analysis of coastal strategic planning and obtain ground-level knowledge about the

institutional capacity of governing coastal and marine ESs from multiple levels.

The analysis of MBIs was also aimed at enriching the discourse on ES thinking. By characterizing the governance of MBIs from an economic institutionalist perspective, this thesis has indicated that MBIs are a useful policy tool, influencing the behavior of the actors in pursuit of ES governance objectives. MBIs could integrate ES values, understand ES-related transactions, reinforce the coordination among ES users and buyers, as well as include the spatial features of ecosystems. Focusing on the distinctive governance aspects of MBIs for ESs, especially the coordinative and spatial aspects, this thesis supplements the existing scientific debates on MBIs. This directs the focus of MBIs towards hybrid governance support from both, regulatory and market elements, for achieving ES integration. The suggested efforts could help increase the chances of adopting more market-oriented tools and achieving ES governance goals in effective and flexible ways.

6.5 Methodological reflection

The research methods adopted in this thesis have advanced the understanding of the integration of ES thinking in coastal and marine governance. To begin with, the case study approach has been helpful in revealing how institutions imply ES thinking in a certain context of coastal and marine governance. Although generalization about coastal and marine governance is subject to restrictions, the case of China shares common issues and attributes with many other coastal countries (e.g., Hansen et al., 2015; Lau, 2013; Piwowarczyk et al., 2013; White et al., 2012) regarding, for instance, preferences for tangible services (Chapter 2), difficulties in managing ES interrelationships (Chapter 3), fragmented ways of framing natural uses and management (Chapters 2 and 4), and struggles against adopting MBIs (Chapter 5). A more in-depth analysis of other coastal and marine governance contexts should be conducted. It would facilitate comparisons to reveal how diverse institutional settings may accommodate ES thinking and to what extent.

Secondly, content analysis has enabled the assessment of ES appearance in coastal strategic policies. Even though the content analysis only considered a relatively simple form of ES thinking, its usefulness in revealing how coastal populations depend on ecosystems has been proved. Moreover, to some extent, the analyses of selected policies have shown only a limited reflection on ESs. Although this research did not use designed questionnaires, key planners and experts have validated the results from the content analysis in terms of discussing relevant interview topics, responding to emails, and communicating research outcomes. The content analysis of the policy documents offers a foundation for further investigation into people's perspectives on ESs.

Lastly, to demonstrate an overarching picture of the required ES integration, not only has this study assessed policy documents, but it has also investigated institutional efforts and

limitations, drawing on the method of interview. The empirical data generated from interviews has contributed to the in-depth discussion on the existing rules-in-use and MBIs for Chinese coastal and marine governance. More local experiences and understanding of the required institutions could be collected by involving more local interest groups in interviews.

6.6 Recommendations for further research

In this thesis, the first insights into the integration of ES thinking in coastal and marine governance have been provided by focusing on the Chinese practices. Various contexts should be further considered. The presented four-step method, the evaluative framework of ES-specific rules, and the analytical framework consisting of four distinctive governance aspects of MBIs, should be further developed and adapted to other ecosystems and governance contexts. This will advance institutional analysis by adopting ES concepts, along with comprehending the understanding of diverse methods for enhancing ES governance.

This thesis only takes a preliminary step towards clarifying the consideration of ESs and their interrelationships in coastal strategic plans. Future studies could extend both, the breadth and depth, of the content analyses in this study. To acquire comprehensive and systematic knowledge on how human-nature relationships are considered in policies, a longitudinal analysis of more policies that involve topics around ESs could be conducted. The longitudinal analysis would be beneficial, as argued by Wilkinson et al. (2013), to a better understanding of the evolving institutional contexts that formulate ES thinking, in addition to a better linkage between policy objectives and practical outcomes over time. The incorporation of ESs could also be assessed in a more in-depth manner. For instance, the perceptions diverse actors on ESs could be further explored through interviews. In this context, inspiration for exploring the perceptions of the actors could be gained from, for example, the work of Rall et al. (2015) and Iniesta-Arandia et al. (2014). Based on the four-step method presented in Chapter 3, more spatial, biophysical, economic, ecological, and social methods are needed to explore the mechanisms that underpin ES trade-offs and synergies. The cross-fertilization between research disciplines would help coastal and marine governance to capture complex features of ESs and inspire adaptive solutions.

Viewing the integration of ES thinking from an economic institutionalist perspective can provide more research avenues to improve the quality of coastal and marine governance. For instance, it would be fruitful to further clarify how to draw governance boundaries for impacted ESs and actors (Söderman & Saarela, 2010), how much room is required for empowering local ES users to make their own choices in coordination (Gelcich et al., 2006), how to control transaction costs regarding information and negotiation (Österblom et al., 2010), and how to avoid the new externalities created by certain market-based incentives for a kind of ES (Pittock et al., 2012). Additional research is also needed to analyze the interaction

between different institutions, since the institutions depend on institutional networks. Implementing ES in one institution is less likely to benefit coastal and marine governance as a whole. Therefore, it would be interesting to examine the multiple benefits or conflicts that may emerge among various institutions.

Within the school of economic institutionalism, there are other approaches available to serve institutional analysis. For example, debates on property regimes and transaction costs would offer different views to explore forms, processes, and outcomes of governance, which also can offer explanations about coordination with regard to ES uses. These debates may advance the knowledge on accommodating ES values and managing ES uses through ownership. In spite of economic institutionalism, the schools of historical institutionalism and sociological institutionalism would help to generate improved knowledge of how institutions enable and constrain the integration of ES thinking. For example, observing the evolutionary process of institutions from a historical institutionalist view would reveal how rules are made, modified, and replaced. This can enable a strong illustration of the fitness between institutions and ecological geographies, revealing how institutions can be formulated with or without a capacity of accommodating ES dynamics, while the school of sociological institutionalism can complement the analysis of ES governance with a theoretical foundation for better exploring the individual and collective values of ESs.

Overall, from an economic institutionalist perspective, this study has responded to the two key challenges regarding the integration of ES thinking in coastal and marine governance. In order to realize ES thinking, it is suggested that ESs and their interrelationships be clarified in coastal and marine governance. Meanwhile, this study informs planners and policymakers about the crucial role of institutions in accommodating ES thinking. To turn ES concepts into practice and improve coastal and marine governance, more innovative and in-depth institutional studies under different governance contexts are required.

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