

Exploring the concept of multi-level governance for sustainable natural capital management: Systematic literature review of history and application of multi-level governance concept

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Abstract: Managing environment is a complicated task for the international community because globalization and borderless resource consumption continue. Applying an effective management system to maintain natural capital is needed for keeping resources to the future generation. Natural capitals are often managed at levels of the supranational or national levels under an international treaty or domestic regulation; however, people suffering unreasonable loss from insufficient resource uses are taking place at local scale. Efficient governance of natural capitals requires multi-level nested structure from the planning to the executing stages, but many natural capitals are rarely managed in that manner. Multi-level governance is a concept developed from discussions in political science regarding the development of the European Communities, and it became one main concept of managing natural capitals since the governance structure of natural capital management is analogous. This study aims to analyze the relevance of multi-level governance in natural capital management, investigate issues, and seek a practical multi-level governance by exploring the development of ‘multi-level governance’ for sustainable ecosystem management and comparing cases in literatures. The study found that competing for authority and the existence of numerous projects lead to fail the implementation. Convincing the authorities with scientific evidences and incentives and altering the mindsets of the civil society lead to a successful path, yet implementing a multi-level governance system on natural capital is difficult in reality because the benefits are complexly intertwined among stakeholders. Consolidating authority and responsibility in vertical levels, connecting regions and nations horizontally, and constructing nested structure are crucial to succeed.

Key Words : *governance, multi-level, multi-scale, natural capital*

1. INTRODUCTION

Multi-level governance became one mainstream concept for managing natural capital. Globalization connects economies, and natural resources are consumed far from the origins. Some resources such as water, fish, and air are exchanged beyond the border, and pollution and degradation due to resource exploitation could affect people living in where the products are produced/exploited. Such exchange often takes place between developing countries and developed

countries, and the exchange is called telecoupling in earlier studies¹⁾.

Natural capital is a stock of natural assets, some are renewable and others are not²⁾. If a resource is renewable, the sustainable flow must be maintained for the next generation. If it is non-renewable, the reserve needs to be carefully monitored because the governance affects the livelihood of the future generation. Multi-level governance is a concept developed in the discussion of political science through analyzing the formation of institutional arrangement of the European

Community³⁾, and the concept has been applied to the governance of natural capitals because the decision-making process also involves multi-levels. The advantages of the polycentric system on common-pool resources was pointed at the same time as the multi-level governance concept was published⁴⁾. The early literature reviews indicated that the complexity of environmental issues caused by globalization and borderless resource consumption has led to failing to successfully govern the assets^{5),6)}.

This literature review aims to analyze the relevance of multi-level governance in natural capital management, to investigate key issues, and to seek a practical multi-level governance by exploring the development of 'multi-level governance' concept, how the concept was applied to natural capitals, and looking at governance in practice from literatures.

2. DEVELOPMENT OF THE CONCEPT: MULTI-LEVEL GOVERNANCE

The concept of multi-level governance was developed by Marks (1993) in the discussion of European polity, decentralization and centralization of political power to subnational and supranational levels. Allocating the budget among the member states and reducing disparities of development levels in various regions were important. Programs supported by the structural funds had public and private projects which were designed by the Commission and subnational governments together with national governments, and efficiency of negotiated outcomes was sought among the member states^{3),7)}. The conventional relation between the supranational, national and subnational levels is a flatter structure without a link between supranational and subnational levels while the multi-level concept developed by Marks (1993) is a nested structure in which all levels are bi-directionally connected (p.405). In his concept, subnational levels such as regional and municipal governments have a direct link with the supranational level to facilitate the decision-making process.

Ostrom (1990) addressed the nested structure for governing the commons and showed the robustness by investigating cases around the world. She pointed that 'congruence between appropriation, provision rules, and local condition,' 'nested enterprises,' and 'polycentric system' would lead to successful governance of the commons⁴⁾. Furthermore, the updated framework of the multi-level and nested structure was introduced to evaluate socio-ecological systems⁸⁾. In the updated framework, more systematic approach is taken, and resource system, resource units, governance system and users are differentiated to clarify the interactions and outcomes. Furthermore, concerning issues af-

fecting a larger scale including global environmental change, Ostrom emphasized the need of 'polycentric system,' telling that global solutions to environmental change would not work if efforts by national, regional and local levels do not support⁹⁾.

Managing the commons and an effective polity for a multi-national block have many things in common, such as the involvement of stakeholders with diversified interests, the existence of hierarchy in policy making, and the opaque responsibilities. Stephenson (2013) analyzed the evolution of multi-level governance in literatures and found that the term evolved from the functional changes of the government from state-centric to polycentric through diffusing authorities in Europe to a problem-solving and governing mechanism in regions worldwide. The profound insights in the early 1990's form a basis of the current studies regarding multi-level governance and natural capital. Multi-level governance is not just policy making, but it is a comprehensive approach among nested levels, developing policy, implementing activities, monitoring, and reviewing^{4),10),11)}.

3. MULTI-LEVEL GOVERNANCE AND NATURAL CAPITALS

Natural capitals are the commons because lives in the ecosphere are maintained by them besides being utilized as biophysical resources for economic productions by human¹²⁾. Therefore, natural capitals are better governed by stakeholders in different geographic scales, political levels, and resource systems. The effectiveness and outcomes of the governance are often analyzed by adopting the multi-level governance perspectives in literatures, especially a problem affecting a large geographic scale such as pollution, climate change, water governance and biodiversity conservation.

Greenhouse gas (GHG) reduction in global scale is needed to address climate change. The problem has been discussed in the international negotiations, and the rules are set and agreed between nations; however, local governments are the authorities for urban planning, waste management, transportation, and energy consumption in many countries thus the local level has effective tools to reduce GHG¹³⁾. Cooperation between cities across nations exists such as the Council for Local Environmental Initiatives, but the main actors determining rules are often at the national level. The horizontal network exists at the national level, but the multi-level structure connecting the national and local levels is often missing.

Water is governed at the local and basin levels. Securing freshwater is a critical issue for everyone because water resources are scarce, and a competition

between upstream and downstream regions or between industries such as agriculture and power generation is sometimes observed. The scramble could lead to a conflict between nations if the source is a trans-boundary river. Water management, such as flood control and water utilization, takes place at the national level, but users exist at local levels. Therefore, the governance of water is a political challenge at international as well as local levels¹⁴.

The interest changes with the times, and the focus of resource management in disciplines such as forestry and fishery has also changed from assessing the maximum sustainable yield of a species at a single scale to more inclusive approach with multi-species, requiring multi-level governance¹⁵. Furthermore, environmental pollution is a cross-scale and cross-level issue because it often takes place at local level spreading the damages across areas; however, the discussion of environmental policy takes place at national level. Multi-level approach is a robust approach to control pollution problems because subnational governments understand the situation better. Thus, the environmental policy formation has shifted from centralized to decentralized in Europe¹⁶. Similarly, concerns on scale mismatch are discussed in a literature analyzing natural capital conservation. The cases revealed that selecting a right scale, such as local scale or larger scale, facilitated flood control¹⁷. Moreover, differences in the valuation of ecosystem services at production and benefit areas would cause tensions between local communities, and a literature discussed that the mismatch problem could be solved by focusing on a smaller scale¹⁸. Depending on types of natural capital, service production and benefits areas could overlap or be distant, and considering such spatio-temporal aspects is needed for policy formation¹⁹.

4. MULTI-LEVEL GOVERNANCE IN PRACTICE

The potency of multi-level governance for natural capital management is well explained in literatures, and this literature review explores how the benefits and the issues associated with multi-level governance of natural capital are analyzed in literatures. The study selected twelve literatures studying natural resource governance, and the cases are compared to identify any trends and issues in the analyses. Table 1 presents selected literatures for the review. Among the peer-reviewed publications since 2005, the literatures were selected using the literature database, “SCOPUS” and “Google scholar”, and ‘multi-level’ and ‘governance’ were used as keywords combined with an additional word specifying the issue, described as ‘Issue’ in the table. Literatures analyze the governance of diversified natural

capitals, and this review selected the cases analyzing the governance of natural landscapes and environmental issue such as wetland and park, biodiversity, climate change, water, and forest, considering the scale of the issues. The governance of climate change has intensively been analyzed since 2005, and so many literatures are available. This review selected literatures referred in Ostrom (2010) as cases of climate change.

The main purpose of the case studies in the literatures is to find a process of policy formation, decentralization of power, and implementing processes in each level as well as building coordination across the scale. Some literatures analyzing the decentralization and the effectiveness of the program through interviews and applying scenario analysis and fuzzy-set qualitative comparative analysis^{20,21}, but the most studies summarize implemented policies in a program and describe the process of devolution.

The programs are formulated in order to tackle environmental issues, and Table 1 indicates the target issue, the location implemented, the extent of the impact, the governance approach such as multi-level and multi-scale, the involvement of local levels and civil society, and the method of analysis. Multi-level and multi-scale indicate vertical and horizontal linkages, respectively.

Bottom-up approach draws attention in natural capital governance because local community more closely links to natural resources and knows the effective management^{16,22}. Environmental policies are often formulated at the national and regional level, and many literatures analyze the process of decentralizing decision making or devolution of authorities from up to down. The governances in developed parts of the world are widely available while a few literatures chose the cases from developing countries. The cases from developing countries indicate that the level of economic development matters managing natural capitals, and the environmental policy may be formulated by centralizing authorities of resource management. The literature analyzing the governance in Okavango Delta, Botswana, shows that the resource governance has been centralized from traditional leaders to the government in the recent years, and the extinction of local knowledge on resource management is concerned²³.

The governance is often analyzed by looking at linkages in one direction. For example, a case tackling an issue affecting a small scale or an analysis of a specific program focuses on the vertical linkage, and the horizontal linkage is rarely looked at in the analysis. If an analysis focuses on a small scale, conflicting interest is less tangible because service production and service benefit areas overlap or the area is just one of them. Without a horizontal linkage, understanding values of ecosystems at production and consumption sites is difficult for stakeholders. If coordination across sectors and across organizations is considered to be a horizontal

linkage, a small-scale problem also includes such linkage. Water resource management needs coordination across sectors such as water supply, wastewater management and flood controls; thus, an efficient regional water governance requires to have horizontal linkages in the system¹⁴⁾. The case from Australia

presented that the failure of establishing a horizontal linkage connecting local communities and the development of a division among stakeholders in the process of forming the program were behind the unsuccessful implementation of the water resource governance system¹⁰⁾. Horizontal linkage at local level is an

Table 1. Selected literatures and the summary of the cases in the literatures

Issue	Program	Location	Impact	Analysis	Multi-level ^a	Local-civil ^b	Multi-scale ^c	Author
Agri-environment	Green Low-carbon Agri-environment Scheme	Europe	Regional	Historical analysis	Yes	Yes	No	McCarthy et al. ²⁴⁾
Biodiversity	Agri-environment schemes of Common Agricultural Policy	Germany and Sweden	Regional	Scenario analysis through interview	Yes	Yes	No	Velten et al. ²¹⁾
	Sixteen programs in the National Conservation Area System	Costa Rica	Regional	Fuzzy-set qualitative comparative analysis	Yes	Yes	No	Basurto ²⁰⁾
Climate change	Regional Greenhouse Gas Initiative, European Union Emissions Trading Scheme (EU-ETS), and Chicago Climate Exchange Program	USA and Europe	Global	Case study	Yes	Yes	Yes	Ostrom ⁹⁾
	EU-ETS and Clean Development Mechanism	Europe and others	Global	Case study	Yes	Yes	Yes	Sovacool and Brown ²⁵⁾
	Cities for Climate Protection (CCP)	USA and others	Global	Case study (CCP regime theory)	Yes	Vary	No	Betsill and Bulkeley ¹³⁾
Forestry	Model forest concept	Russia and Sweden	Local	Case study and interview	Yes	Yes	Yes	Elbakidze et al. ²⁶⁾
Natural resource management	Local ecological knowledge	Xingu Indigenous Park in Brazil	Regional	Case study	Yes	Yes	Yes	Brondizio et al. ²²⁾
Marine ecosystems	Ocean governance related policies	Coastal area of Brazil, Amazon	Global, regional, and local	Policy analysis	Yes	Yes	Yes	Gerhardinger et al. ²⁷⁾
Urban environment	City and Environment approach and Crisis and Recuperation Act	Netherlands	Local	Interview	Yes	Yes	No	van Stigt et al. ¹⁶⁾
Water	Integrated Water Cycle Management, eco-compensation payment, European Regional Development Fund	Australia, China, and Bulgaria	Regional	Case study	Yes	Yes	Yes	Daniell et al. ¹⁰⁾
Ecosystem services	Water purification in New York, flood control in Napa, water flow regulation in China, and ecosystem service management in Costa Rica	USA, China, and Costa Rica	Regional and local	Case study	Yes	Yes	No	Turner and Daily ¹⁷⁾
Wetland ecosystem	Okavango Delta Management Plan	Okavango Delta, Botswana	Local	Household survey	Yes	Yes	No	Shinn ²³⁾

^a: investigating the governance in vertical direction, ^b: investigating the involvement of local level and civil society, and ^c: investigating the governance in horizontal direction.

important element in the bottom-up approach for understanding how local knowledges are used in communities, but literatures investigating the approach pay a little attention to the vertical linkage with higher levels²²⁾.

The cases from Bulgaria and Russia also present challenges to adapt a bottom-up approach without a horizontal linkage at national level because of the pre-existed political system in the past^{10),26)}. Although the effort in Bulgaria did not succeed because of the lack of funding, two cases illustrate how horizontal and vertical linkages facilitate the governance. Furthermore, tackling climate change is a global issue, and international conferences have been held to implement programs to mitigate the conditions. Horizontal link certainly exists at the national level, and the Cities for Climate Protection Program (CCP) with over 600 local authorities worldwide bridges the national and local levels in the conferences as well as creating horizontal linkages at the local level¹³⁾. The advantages of multi-level governance are well explained in literatures, and concerns are also raised. Ostrom (2010) points that coordination between levels and scales are necessary for governance, but having numbers of projects and activities without effective rigid support could lead the program to failure. van Stigt et al. (2016) also points that multi-level governance could create an implementation gap between national goals and outcomes at lower levels because the environmental interests are favored at the national level while people favor economic interests at the lower level.

5. CONCLUSION

Natural capitals are more efficiently managed by applying a multi-level governance system because implementing regulations and management are done at the national and regional levels while resources are utilized in local communities. Moreover, local people understand the conditions and the problems of sustaining natural resources better. The advantages of the multi-level governance have been discussed in political science and resource management literatures, and this systematic review found three key points that could complement the existing literatures analyzing the natural capital governance. First, the governance is affected by levels of economic development and political system; hence, the development and the catalyst of multi-level system differ from place to place. The literatures analyze cases in various places, but many cases are from developed countries. Cases from developing countries could also provide lessons for developing a better governance system. Second, decentralizing process and adapting traditional management

systems for resource governance are well explained, but the outcomes are not discussed in many literatures. The outcomes are important to evaluate the effectiveness of a governance system, and policy makers need to have such information for considering a better governance system. Finally, adding the 'scale' aspect in an analysis of multi-level governance or adding the 'level' aspect in an analysis of multi-scale would help to identify advantages and disadvantages of the governing system. The literatures selected in the review tend to focus on one aspect in the analyses such as vertical or horizontal connections. The nested structure exists in a multi-level approach because the number of actors increases from top to bottom levels, and the horizontal linkage exists in levels if actors interact within the levels. Literatures found that missing a linkage in one direction could lead the implemented governance system to an unsuccessful conclusion if a conflict of the interest exists between levels or among actors in the same level.

Multi-level governance has already been applied in natural capital management in many places, and the case studies provide lessons for policy makers and practitioners to develop a better system in different areas. Multi-level approach is considered to be an effective way for resource management, but literatures revealed that the approach does not always lead to a successful outcome if the governance system is not carefully formulated concerning scales and diversified interests of stakeholders. In addition to the involvement of levels and scales, allocating 'authority' and 'responsibility' and establishing a key organization to settle disputes as well as to sort out projects are also needed for implementing a successful governance of natural capitals.

This systematic review selected literatures analyzing the governance of diverse natural capitals and found what are currently analyzed and missing in the analyses. Additional analyses examining cases from developing countries, concerning scales of the problem, considering a linkage between service production and service benefit areas, investigating both vertical and horizontal linkages, and presenting the outcomes will further provide lessons for developing a better multi-level governance system for natural capitals.

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