



Research

The role of social learning for social-ecological systems in Korean village groves restoration

Eunju Lee¹ and Marianne E. Krasny¹

ABSTRACT. Recently, social learning has been recognized as a means to foster adaptation to changing conditions, and more broadly, social-ecological systems resilience. However, the discussion of social learning and social-ecological resilience in different cultural contexts is limited. In this study we introduce the Korean Village Groves Restoration Project (VGRP) through the lens of social learning, and discuss implications of the VGRP for resilience in villages impacted by industrialization and decline of traditional forest resources. We conducted open-ended interviews with VGRP leaders, government and NGO officials, and residents in four villages in South Korea, and found that villages responded to ecosystem change in ways that could be explained by the characteristics of social learning including interaction, integration, systems orientation, and reflection. However, the processes of learning varied among the four villages, and were associated with different levels of learning and different learning outcomes related to changes in village grove management and governance. The cultural and historical context can be used to help understand social learning processes and their outcomes in the Korean cases.

Key Words: *Korean village groves; multiple loop learning; natural resource management; social-ecological resilience; social learning*

INTRODUCTION

The importance of learning, and in particular social learning, finds support among researchers in the field of environmental management as a means to avert past management failures in complex social-ecological systems (Folke et al. 2003, Carlsson and Berkes 2005, Blackmore 2007, Armitage et al. 2008). Social learning has multiple definitions, which can be categorized into two broad categories: individual learning that occurs through reciprocal interaction with others and the environment (Bandura 1977, 1986) and a variety of individual and organizational collaborative learning processes, such as sustained interaction between stakeholders, ongoing deliberation, and the sharing of knowledge in a trusting environment, that are specifically directed at a resource management or governance outcome (Röling 2002, Keen et al. 2005, Blackmore 2007, Pahl-Wostl et al. 2007, Cundill and Rodela 2012). De Laat and Simons (2002) used the term collective learning rather than social learning to refer to multiple individual and social processes that in addition to individual learning, have an explicit outcome such as a practice innovation or adaptation to a changing environment (Mittendorff et al. 2006). The use of the term collective learning helps to address Reed et al.'s (2010) critique of the social learning literature, i.e., that it fails to distinguish between learning processes and outcomes. However, the term social learning persists in the natural resource management literature in referring to learning at the individual and organizational level as well as the collective, resource management outcomes of such learning based on a shared understanding and new insights into problems.

Recently, scholars have explored the importance of social learning for social-ecological systems resilience, or the ability of a system to absorb disturbance and reorganize itself in the face of change (Folke et al. 2002, Gunderson and Holling 2002, Berkes et al. 2003, Berkes and Turner 2006, Fazey et al. 2007, Plummer and Armitage 2007, Krasny et al. 2010). A system in its general sense is an integrated whole whose essential properties arise from the

relationship between its parts (The Open University 1999, as cited in Keen et al. 2005), while the term social-ecological system is particularly used to emphasize the integrated concept of “humans-in-nature” (Berkes and Folke 1998). Within the systems resilience context, social learning is described as an iterative process that enhances the flexibility of management structures and a system’s ability to respond to change, for example, through critical reflection and multiple-loop learning (Armitage et al. 2008, Wilner et al. 2012). Modifications made in an ongoing process of reflection and collective action in resource management are expected to contribute to social-ecological resilience (Plummer and Armitage 2007), and the outcomes of such social learning processes are expected to go beyond personal transformation directed toward the evolution of social structures (Wenger 2000). However, given that there is limited empirical research on the extent to which these expectations are appropriate, it is important to understand the extent to which outcomes of social learning processes might influence social-ecological system resilience.

In addition, most studies of social learning within environmental management and social-ecological systems have focused geographically on Europe and North America with only a small number being conducted in Asia (Rodela 2013). In this study, we investigated the role of social learning in the context of management of small-scale traditional village grove restoration projects (VGRP) in South Korea. In particular, we asked: (1) To what extent do the VGRPs exhibit evidence of social learning processes, including interaction, integration, systems orientation, and reflection (Plummer and FitzGibbon 2008)? (2) What are the outcomes of the social learning process in the VGRP, as evidenced by changes in single-, double-, or triple-loop learning (Armitage et al. 2008)? Our definition of social learning draws from natural resource management scholars and includes learning through interactions with others and the environment coupled with collective action directed at resource management or governance.

¹Civic Ecology Lab, Department of Natural Resources, Cornell University

Table 1. Social learning processes and outcomes (Modified from Armitage et al. 2008, Plummer and FitzGibbon 2008).

	Characteristics	Descriptions
Social Learning Processes	Interaction	Social learning occurs through interactions and communications with other interested entities. Deliberative or face-to-face interactions are highlighted.
	Systems Orientation	The process of social learning involves making connections between people and the environment.
	Integration	Innovation comes from the integration of diverse perspectives, approaches, and sources of information and knowledge.
	Reflection	Action orientation involves modifying procedures through diagnosis, designing, doing, and evaluating.
Social Learning Outcomes	Single-loop learning	Fixing errors from routines
	Double-loop learning	Correcting errors by examining values and policies
	Triple-loop learning	Correcting errors by designing governance norms and protocols

LITERATURE REVIEW

Social learning processes and outcomes

Social learning has been discussed as critical to addressing complex “resource dilemmas” (Blackmore 2007), often using an adaptive comanagement approach (Armitage et al. 2008). Within the context of adaptive comanagement, Plummer and FitzGibbon (2008) proposed an analytical framework that separates social learning as relates to adaptation, from social capital as relates to collaboration. Social learning consists of five elements: interaction, systems orientation, integration, reflection, and multiple-loop learning (Table 1). Plummer and FitzGibbon (2008) applied this framework to the analysis of three adaptive comanagement cases, which although focused on watershed management, are similar in their small-scale and ongoing collaborative processes among local leaders and stakeholders to our VGRP cases. Because of these similarities and our interest in a framework that allowed us to investigate the presence of both adaptive and collaborative processes in resource management, we decided to adapt Plummer and FitzGibbon’s (2008) framework for use in this study. (We report on the collaborative, social capital processes of our case in a separate paper, E. Lee, *unpublished manuscript*.)

Whereas Plummer and FitzGibbon’s (2008) criteria are appropriate for the Korean village grove cases, their work fails to distinguish between social learning as a process (of people learning from each other) and its outcomes (the learning and associated action that happens as a result of social interactions) such as improved problem-solving capacities for participants (Merriam and Caffarella 2007, Cundill and Rodela 2012). In Muro and Jeffrey’s (2008) compound model of social learning processes and outcomes, communication and interaction among different actors are the key process features that may lead to learning outcomes such as the generation of new knowledge, the acquisition of technical and social skills, and the development of trust and relationships. Separated from these outcomes, they suggested social learning’s potential contributions to collective action and social change. Although this work helps to better understand social learning claims that link learning processes, outcomes, and contributions to sustainable resource management, the confusion between learning processes and outcomes persists (Reed et al. 2010).

One possibility for distinguishing between processes and outcomes is to recognize that single-, double-, and triple-loop learning per definition are linked to the underlying processes causing changes in actions, and thus consider them separately from the other elements of social learning, e.g., integration, that are not specifically linked to management or governance outcomes. In the context of resource management, scholars have adapted Argyris and Schön’s (1978) multiple-loop learning in organizational contexts to define single-loop learning as incremental changes in actions without questioning the underlying assumptions, double-loop learning as changes resulting from examining the assumptions that underlie our actions, and triple-loop learning as changes that result from challenging the values and norms that underpin assumptions and actions (Keen et al. 2005, Pahl-Wostl 2009). Maarleveld and Dangbegnon (2002) describe multiple-loop learning in terms of what is learned rather than how learning occurs whereas other authors applying multiple-loop learning to resource management contexts go a step further in talking about not just learning, but also management outcomes of multiple-loop learning. For example, Cundill (2010), in a study of multiple cases of adaptive comanagement in South Africa, found that existing criteria used in monitoring social learning, e.g., engagement of and deliberation among relevant parties, failed to explain institutional innovation outcomes of some cases, whereas triple-loop learning offered insight into the processes that led to innovation. This author suggests that triple-loop learning could be used with other social learning criteria to understand outcomes, provided the two approaches to learning are not conflated. In a paper describing social learning in wildlife management, Diduck et al. (2005) also related multiple-loop learning to innovative change, but focused on single-loop learning practice adaptations and double-loop learning such as modifying precepts of theories-in-use, rather than triple-loop learning. Going a step further, Armitage et al. (2008) refer to single- and double-loop learning as outcomes and give examples of multiple-loop learning, including hosting public open houses to gather information used to prepare “options” for a fishery (single-loop) and double-loop learning incorporating complexity, systems orientation, and public involvement in fisheries management planning, and developing and codifying principles guiding cooperation among heterogeneous actors (double-loop). However, in other studies of adaptive comanagement, multiple-loop learning has been used as evidence

of social learning (Fernandez-Gimenez et al. 2008, Plummer and FitzGibbon 2008) rather than explicitly linked to outcomes.

In this study, single-, double-, and triple-loop learning are translated to corresponding changes in resource management. We separate them as linked to outcomes of social learning, while Plummer and FitzGibbon's (2008) remaining elements, i.e., interaction, systems orientation, integration, and reflection, are considered as characteristics of the social learning process. Using this framework, we hoped to understand different dimensions of social learning in-depth and as well as the role of social learning in improving resource management within a small-scale, adaptive comanagement context.

Cultural contexts in the study of social learning

Although social learning has gained prominence in the resource management literature, only a small minority of studies have explored cultural influences (e.g., Rist et al. 2007, Wildemeersch 2007, Pahl-Wostl et al. 2008) or focused on Asian regions. For example, Marschke and Sinclair (2009) studied the instrumental and communicative aspects of social learning in fishing communities in Cambodia, and working in Japan, Mochizuki (2007) identified success factors of social learning in the pursuit of sustainable agriculture, including the combination of bottom-up and top-down approaches, visionary leadership provided by environmentalists, and the development of trust between environmentalists and farmers. Working in Indonesia, Armitage (2003) explored community-based conservation by linking traditional resource management practices to adaptive management principles, and found that mutual assistance and mutual learning in traditional practices worked as the basis of social learning in local communities. Meanwhile, Wildemeersch (2007) compared cases of social learning in Belgium and Vietnam, focusing on differences in scale and in socio-political traditions. In the Belgium cases, social learning was introduced as a new approach to environmental governance in direct multilateral negotiation, whereas in Vietnam social learning was implemented with more respect for hierarchy and tradition in expert-layperson relationships. This contrast raises questions about how social learning concepts and practices developed in one cultural setting find their way into other settings and the influence of power dynamics on learning outcomes when bringing in different knowledge holders.

Pahl-Wostl et al. (2008), for example, investigated the interdependence between social learning and culture at different scales to consider not only heterogeneous actors in a group but also the cultural differences among groups. These authors argued that to achieve management paradigm shifts, basic changes in belief and behavior systems are not enough; more radical changes, deeply rooted in a cultural change, are required. In this process, social learning is expected to play a role by building the capacity for communication across cultural boundaries and leading to changes in social structure. Moreover, Niewolny and Wilson (2011:341) argued that social learning discourse is framed by socially and culturally structured relations of power and that social learning does not only occur "just inside the head," but in relations of people in socially and culturally organized settings. Thus, contextual factors such as power relations and cultural differences and their influence on the subsequent learning outcomes need to be addressed both theoretically and empirically in the study of social learning (Cundill and Rodela 2012).

BACKGROUND OF KOREAN VILLAGE GROVES

In Korea, villagers traditionally planted village groves (*Maaul-soop*) based on cultural guidelines, e.g., native beliefs, feng-shui, and Confucianism, when they founded a new community. Village groves were cooperatively owned, managed, and conserved by villagers and played an important role in a village's social activities by serving as a meeting and resting place. However, their main purpose was to regulate water and wind for the villages. Still today, village groves have ecological as well as socio-historical value. For example, recent research on ecosystem functions of village groves revealed they act as zones for disaster mitigation and microclimate control, and as biodiversity conservation patches (Hong et al. 2007, Lee et al. 2007).

Although many village groves have been degraded and even destroyed during the past several decades of industrialization, more than a thousand village groves remain in South Korea today providing ecosystem services to the nearby communities. However, they are threatened by recurring floods, fires, insect disease, and more severe natural disasters such as typhoons. In addition, increased human pressure has caused long-term and irreversible ecological shifts and an overall reduction in village groves' ecological resilience. Although village grove social systems have responded to ecological crises in the past, we have little information on how villages today respond to the loss of ecological resilience. Recently, the nongovernmental organization *Forest for Life*, which since 1998 has been collaborating with the Korean government and companies to preserve forest resources, initiated efforts to restore degraded and destroyed village groves across South Korea.

METHODS

Strategy of inquiry

A multiple case study was used to answer the research questions. The case study strategy provides an opportunity to collect comprehensive data to develop a better understanding of a social phenomenon (Walton 1992). In particular, it is appropriate when the contextual conditions are relevant to the phenomenon but the boundaries between the phenomena and context are not clear (Yin 2003). Investigating multiple cases permits comparisons of the social learning processes and outcomes across multiple sites, while increasing the robustness of the study.

Selection of the cases

Purposeful sampling was used to identify information-rich village grove restoration cases through informal interviews with key informants in the restoration projects of the Korean NGO, "Forest for Life." Among 28 cases, four villages were selected based on the presence of village groves that: (a) recently participated in the VGRP supported by Forest for Life, (b) represented a common property not owned by one person or family, and (c) showed a level of involvement of local people sufficient to attract other villagers' attention and interest.

The suitability of the chosen sites, labeled A-D, was confirmed through a preliminary study in 2009. All four cases incorporate community-based village groves management practices, but show different levels of village resident self-organizing and of local government involvement in the restoration projects, and represent different rural ecosystems (Table 2). The villages have a relatively high number of elderly people and maintain the traditions of collective social action consistent with agrarian societies (Fig. 1).

Table 2. Ecological contexts, socioeconomic and cultural considerations, and organizations leading restoration project in four study village groves (VG).

	Case A	Case B	Case C	Case D
Ecological context & restored size	Coastal and mountain ecosystems; restored size 3042m ²	Deciduous broad-leaved forests; restored 12,720m ² of 12,720m ² VG	Riverside pine groves; restored 13,372 m ² of 191,229m ² VG	Pine groves; restored 6540m ² of 21,864m ² VG
Social & cultural consideration	Relatively steady population; dependent on city; strong social movements; population 7358 [†]	Increase in aging population; dependent on agricultural products; strong traditional beliefs; population 158	Mixed with newcomers; partly dependent on agricultural products; impacts of urbanization; population 535	Decrease in population; dependent on agricultural products; traditional organization for VG management; population 830
Leading organization	Led by community-based nonprofit organization; cooperated with local government and local NGO; self-organizing networks	Major role of village committee; existence of VGRP bureau comprises local government, local people, and advisory committee	Led by community-based nonprofit organization; interference of national government institutions; problems with collective resource management	Major role of local government; minor role of traditional community-based management system

[†]The population is based on the administrative district of village groves in 2011.

Fig. 1. Satellite images of village groves in Cases A, B, C, and D in a clockwise direction.



Data collection

Data on the processes and outcomes of social learning were collected using a combination of semistructured interviews, document review, and field visits. The first author conducted a total of 27 interviews in person and over the phone with key actors, village residents, NGO staff, scientists, and government officials who were involved in the projects (Table 3). Key actors were defined as the individuals who played a lead in the VGRP; in Cases A and C the key actor was a female and a male, respectively, active in local governance, in Case B the key actor was the village head, and in Case D, the key actor was a government official. The first author began by interviewing individuals who played an active role in the restoration projects in each village, who in turn made recommendations regarding villagers to select for additional interviews. In Cases A and B, contact was first made

through visiting a local community center where a number of individuals were eager to answer the interview questions; thus in these cases a group interview was conducted. Number of interviewees varied for each village, depending on specific conditions such as levels of literacy and attendance at the group meeting, as well as saturation. The goal was to solicit a deeper understanding of the cases from engaged and knowledgeable stakeholders, rather than to interview a large number of people for representative sampling (Patton 2002). Semistructured interviews were conducted using open-ended questions based on the five social learning constructs identified above. Interviews ranged in length from 30-90 minutes allowing interviewees sufficient time to tell a story about their personal experience.

Documents, including project proposals, interim and final reports, news articles, web logs, field notes and photos, and published literature, were reviewed in each case. All collected information was compiled and organized into a database. Audio-recorded interviews were transcribed and text, audio, digital photos, and PDF files were coded using QSR NVivo 10 software (QSR International Pty. 1999-2012).

Data analysis

Pattern matching logic (Yin 2003) was used to compare the empirically based and predicted patterns. Preliminary concepts of social learning gleaned from the literature (see Armitage et al. 2008, Plummer and FitzGibbon 2008) were used to label data and identify patterns. For example, interview responses and sections of documents about town meetings, workshops, and face-to-face interactions were grouped into the theme of “interaction,” and the information about using expert knowledge and/or traditional knowledge was grouped under the theme of “integration.” In this process, multiple data sources were analyzed by comparing identified codes in the literature with themes and patterns that emerged across data. New emergent themes and patterns also were identified for further analysis. After the initial analyses revealed preliminary evidence of social learning outcomes in two villages (A and B), additional interviews in these villages were conducted to gain deeper understanding of these outcomes.

Table 3. Interviewees for each village grove case.

	Case A	Case B	Case C	Case D	Whole
Interviewee	1 key actor; 3 village residents; 1 NGO staff; 1 local government officer	1 key actor; 8 village residents; 1 social scientist; 1 social studies teacher	1 key actor; 2 village residents	1 key actor; 1 local government officer	1 NGO staff; 1 social scientist; 2 ecological scientists
Total	6	11	3	2	4

We followed Yin's (2003) suggestions about how to ensure study quality by determining construct validity, internal validity, external validity, and reliability. Construct validity was satisfied using multiple sources of evidence, such as interviews, documentary evidence, and physical artifacts. Also the draft of case study analysis was reviewed by three key informants including two social scientists and one staff member of the leading NGO. For internal validity, we used pattern matching logic and for external validity, multiple cases were investigated using replication logic. To increase the reliability of the study, we used the same case study protocol in all four villages.

RESULTS

We present evidence of the interaction, integration, systems orientation, and reflection of social learning process characteristics in the four villages (Table 4). We also explore evidence of multiple-loop learning to examine the contributions of social learning to the management of the village grove social-ecological systems (Table 5).

Social learning processes in village groves restoration projects

Interaction

Interaction refers to deliberative or face-to-face interactions, for example, through workshops with natural resource users during environmental decision-making processes (Rist et al. 2007, Plummer and FitzGibbon 2008, Reed et al. 2010). In all four cases in our study, interaction occurred through town meetings and workshops during the VGRP. Village committees, charged with jointly making decisions regarding any issues confronting the village, held town meetings to discuss the problems of village groves with local residents and later to introduce the Forest for Life restoration project. All key actors or individuals who took leading roles in the VGRP in each village attended the workshops. Local government officers, local NGO staff, and landscape architects also participated in the workshops. The town meetings and workshops focused on exchanging information and sharing perspectives while permitting considerable dialogue among interested actors. According to a Forest for Life staff person in charge of the restoration project at the national level, the number of meetings was important for successful communication. She mentioned that "certainly the villages that had several workshops showed more successful features, greater understanding [of the restoration projects], and continuous management efforts after the projects." Local people seemed to prefer direct over internet-based means of communication, so that face-to-face interactions including both formal workshops and informal town meetings commonly took place in all cases. For example, one interviewee remarked "this is the first project we did together [for village groves], so we met as much as we can. No telephones, no emails;

the best way is seeing each other face to face whenever needed. Because of that, I think, we had little problems, proceeding smoothly as planned."

Systems Orientation

Systems orientation refers to the interplay between social and ecological systems (Keen et al. 2005, Keen and Mahanty 2006, Dyball et al. 2007). In all four cases, villagers recognized the importance of the socio-cultural elements of the restoration project, as evidenced by them recounting the history of the groves (sometimes using artifacts such as a historic map) and by their wanting to incorporate cultural features in the VGRP. For example, villagers in Case B mentioned a big fire 300 years ago as the reason for village grove construction, and Case C villagers talked about how groves were built 200 years ago as part of an irrigation and flood control project. In Case D, a traditional management system, *Sasan-Songgye* (Chun and Tak 2009), to secure the communal use of village groves dating back to the late Chosun Dynasty persists. Further, it seems that the division between social and ecological systems itself is artificial and arbitrary to villagers. Villagers commonly regard the village grove as a symbol of their home and their fate in Korea. No predetermined boundary between people and the environment is mentioned in discussions of village groves. One resident from Case D said that "for outsiders, this [village grove] looks "green" and good, but to us [villagers] this is the place of our daily life, just part of our life like air."

Not only ecological concerns but also human interests are addressed throughout the VGRP. Villagers are interested in renewing cultural connections to their village groves through traditional ceremonies, cultural events, and artifacts, e.g., a totem pole and stone tower, in conjunction with the plantings that occur as part of the restoration projects. However, the extent of these efforts varied across the four cases. In Case B, villagers were very interested in recreating a turtle shaped stone that was previously used as an altar of worship, the loss of which in 1988 had prevented them from holding cultural ceremonies in their village grove. One local government scientist recounted how excitement around restoring the turtle stone fostered more active engagement in the village grove restoration, which she hadn't observed when the focus was solely on trees: "They are very excited about the revival of their culture through the [restoration] project. When the turtle stone was being returned to its place, if I remember right, almost 98% of villagers came out and joined. Without cultural items, it could be hard to stimulate such active community involvement."

Similarly, the revival of an annual cultural festival was included in the restoration project of Case A. In Case D, human interests were slightly acknowledged such as in villagers' demand for a

Table 4. The characteristics of social learning processes similar to those discussed in Plummer and FitzGibbon (2008) present in Korean village groves restoration projects.

	Case A	Case B	Case C	Case D
Interaction	Town meetings, workshops	Town meetings, workshops	Town meetings, workshops	Town meetings, workshops
Systems Orientation	Relationship between people and village grove was recognized and human interests were emphasized	Relationship between people and village grove was recognized and human interests were strongly emphasized	Relationship between people and village grove was recognized but not pursued	Relationship between people and village grove was recognized and human interests were slightly acknowledged
Integration	Expert and outsider knowledge applied to restoration project	Expert and local experiential knowledge applied to restoration project	Expert knowledge applied to restoration project	Expert and traditional knowledge applied to restoration project
Reflection	Some reflection and modification of process was evident	Some reflection and modification of process was evident	Some reflection was evident but no modification	Little evidence of reflection

pavilion nearby the village grove, but its building was not a main concern of the project.

Integration

The term integration refers to weaving together diverse perspectives, approaches, and ideas to reveal the nature of the complexity and to maximize learning through differences (Dyball et al. 2007, Plummer and FitzGibbon 2008). As government officers, NGO staff, local residents, scientists, and landscape architects were involved in the Korean restoration projects, multiple perspectives on village groves were revealed. For example, the landscape architects' main concern was the visual effects of restoration, while NGO staff were more interested in the community-wide impacts. One villager in Case A said that "Up to now, I thought without question that this type of work [restoration] should be done by local or city government. But after the project I came to better appreciate different roles of community, local government, and scientific expertise." The NGO Forest for Life further recognized the benefits of and need for multiple knowledge sources in recommending that the project utilize scientists' ecological knowledge and landscape architects' technical expertise. In addition, outsider knowledge was sought out and integrated when key actors from Case A visited similarly restored seaside forests in Japan, to incorporate the Japanese's advanced experiences and knowledge. In Case B, local people's practical knowledge of the village grove in times past and how it changed over the years played a role in restoration, whereas in Case D, those involved in the restoration drew on their knowledge of traditional management practices.

Reflection

Reflection means carefully rethinking "the value of what we know and how we know it" through the sharing of experiences and knowledge (Dyball et al. 2007:183). Evidence of reflection regarding both technical and fundamental issues was exhibited in the cases. As an example of technical issues, the size of trees was mentioned by a staff member of Forest for Life as changing directions of the restoration project. "We did not really care about the size of trees; we simply thought that the bigger one is better. However, at the workshop, one old man from [other village] disagreed with the idea of big size trees and said that "we need a young plant which can grow up with us together. Because of strong

winds in our region, trees need to be adapted to such environment, while we develop intimate relationships with those trees."

After that, specific guidelines on the size of trees were included in the manual for restoration projects. Case A experienced a similar issue when some villagers wanted the groves to be restored to previous conditions with big size trees. Their different ideas on the restoration process led to reflective thinking on project goals regarding whether they wanted a professionally designed park or to be more engaged in designing and managing their own village groves.

A more fundamental difference in understanding of restoration goals between local government and villagers occurred in Case B. Although local government initially limited restoration goals to physical features of the groves, villagers in Case B regarded spiritual aspects of village groves as embodied in replacing the stone turtle as the subject of restoration. Local officials and project leaders recognized their different views on restoration and with the help of a local government official who supported the villagers' point of view, adjusted the project from more narrow ecological restoration to incorporate restoration of cultural features. After the project, villagers in Case B showed more interest in their village grove and visited other villages to get insights on sustainable use and management of village groves.

In Case C, disputes over property rights brought out divided perspectives on the value of village groves. More specifically, the restoration of the village grove and its designation as a national monument led to a decrease in land prices in the area surrounding the grove because of restrictions on development. The leader of the restoration project commented: "There is a fundamental difference between the two points of view [ecological value versus economic value]. I think it is hard to overcome this gap without intentional learning experiences." While such dissension certainly raised some degree of reflection, the actors in Case C did not undertake shared actions to modify their practice. Also in Case D, villagers showed some evidence of reflection regarding planting practices and cost-cutting issues, but no critical reflection on the project itself. When asked about reflective moments related to disputes in Cases C and D, some interviewees did not want to answer the questions or just said that the project went smoothly without any big problems.

Table 5. Social learning outcomes with the evidence of changes related to multiple-loop learning in two village groves restoration projects.

	Case A	Case B	Case C	Case D
Single-loop learning	A problem with the size of trees was solved by communication and compromise; means of collecting survey forms adapted	Learning how to deal with sick trees; villagers' manpower and resources were used when needed	N/A	N/A
Double-loop learning	Local government policy was changed	Restoration goal was revised	N/A	N/A
Triple-loop learning	A new type of village grove was created along with new governing structure	(No evidence found)	N/A	N/A

Outcomes of social learning processes

Reflection is a key process in multiple-loop learning (Wilner et al. 2012). Because we found evidence of reflection only in Cases A and B, we limited this aspect of the study to these two cases.

Single-loop learning

Single-loop outcomes were investigated through evidence of changes in village grove management practices. Informants in both Cases A and B clearly described examples of adapting management practices based upon trial and error experience. In Case A, for example, villagers learned how to canvass residents' opinions regarding village grove issues, e.g., landslide damage prevention and typhoon relief efforts; the information they collected during three consecutive years of the restoration project was used by the project leader to forge agreement on the proposed restoration plan. One staff member of a village organization related how the survey improved their methods for gathering information from villagers. "First time we got the survey forms, approximately one third by visiting door-to-door, the other one third by mailing for long distance residents, and the last one third by an outsourcing company. But second time, we did it differently. We put forward this issue as one agenda item at the town meeting and gathered 360-370 survey forms in one night. Because we did it before, the second time was much easier."

In Case B, examples of adapting management practices included deciding to utilize villagers' manpower as much as they could, in response to a perception that they had spent too much money using construction equipment. They also learned how to deal with diseased and dying trees from observing failures in the conservation of three rows of spindle trees (*Euonymus fortunei*), which were registered as a local monument. At first, villagers relied on external experts' knowledge and local government resources to protect these trees. However, after the trees died, villagers replaced the dead trees with other spindle trees from a nearby hillock. Afterward, they were less dependent on outside resources and utilized their resources to care for village groves.

Double-loop learning

We used evidence of changed policies and goals as well as changes in stakeholder behavior (cf. Armitage et al. 2008, Pahl-Wostl 2009) as the evidence of double-loop learning outcomes. In Case A, results of the restoration project inspired change in local government policy. The project leader of the village organization in this case remarked that "the local government did not pay attention to what we did in the beginning of the project. However, when they saw changed behaviors of citizens who voluntarily took

care of the restored site with shovels, they decided to support our efforts with the city policy, at least here in this city. So, they allocated some local budgets for installing leisure facilities in this site."

After the restoration project, some residents organized a social gathering for the management of restored sites. These formal and informal behavior changes were facilitated by changed views on the value of village groves and on the power of collective action. One staff member of the village organization mentioned that the most difficult part of the project was changing people's perspectives on the importance of the groves, and that after the restoration people became more engaged, which seemed to lead to other tangible results such as citizen's active involvement and support of local government.

In Case B, the project goal was changed from ecological restoration to cultural and ecological restoration based upon a compromise between local residents and local government. One local government scientist who participated in planning the project recounted: "I was more interested in ecological features of village groves. At first, I just planned where to plant trees and what to plant in village groves through the project. But now, after meeting people who have different perspectives and after learning about why villagers built village groves, [I realized that] there is something more than ecological meanings in village groves. Cultural meanings are strongly embodied in village groves."

Such changed views on the part of key actors influenced the direction of the project, from ecological restoration to cultural and ecological restoration. However, unlike Case A where local government changed policies to incorporate funding for village grove restoration, double-loop learning outcomes in Case B did not lead to changes in government policies.

Triple-loop learning

We found evidence of triple-loop learning outcomes, defined as changes that result from challenging the values and norms that underpin assumptions and actions, only in Case A, which instituted a new structure of governing systems for reconstructed village groves. After two years' experience with the restoration project in various sites in this city through which villagers, local government, and Forest for Life learned how to work together, citizens in Case A gained enough confidence to start rebuilding seaside village groves in a vacant space created by Typhoon Rusa. The leader of the village organization confirmed their willingness to engage and their pride in the collaborative work as follows:

“We are very proud of what we have done. We also have confidence in doing another work, because we did it before ... we could finish the former project because we did it together.” The active involvement of local people coupled with the typhoon disaster made Case A unique among the restoration cases across Korea.

Local government of Case A had originally planned a parking lot in the empty space. Instead, influenced by the nationwide restoration movement, the local government partnered with Forest for Life to support construction of a new village grove by local residents and professional landscapers. One local government officer remarked, “Usually in such cases, the area is used as a parking lot ... It is good to see that many people enjoy the site having a rest time in the grove. After that, we [local government] have a responsibility to manage the area, along with the help of the Community Center, and financially support it through the parks and landscape management budget of the local government.” The local government assumed property rights for what prior to the typhoon had been private land, registered the grove as a park, and set up a new governing structure to manage the park that encouraged inclusion of villagers’ views and collaboration with a community organization. Change in the underlying governance system in Case A provided an example of triple-loop learning that was unique among the four cases.

DISCUSSION

In applying the framework of social learning processes and outcomes to village grove restoration in four Korean villages, we found varying evidence of social learning elements and outcomes, which can be related to differing social and ecological changes in the four villages and to aspects of Korean culture.

The nature of social learning in Korean village groves restoration

The finding that interaction as well as integration of multiple perspectives and knowledge occurred in this study suggests that, similar to Plummer and FitzGibbon’s (2008) and other studies, social learning processes in the Korean VGRP are consistent with a broader literature in communicative action (Habermas 1987), and communicative learning through interaction (van der Veen 2000). However, the Korean cultural and historical context was important in understanding social learning, and was evident not only in the integration of traditional knowledge, but also in how such knowledge may have influenced systems thinking. Korean villages have a long history of linking social and ecological processes in village forest management. According to Chun and Tak (2009:2024), “Songgye [traditional Korean village forest management system] was not simply an organization for stewarding local forests, but it played an essential role in the social life of the local community. It wove the social fabric of the village to keep the community united and to help each other in various agro-forestry activities.” In our study, linking of social with the ecological elements of the village groves was most evident in Case B, where the focus of the project was the restoration of a cultural symbol (stone turtle) that had once served a role in cultural activity in the village. This interweaving of social and cultural aspects is similar to that of the *satoyama* system in Japan (Takeuchi et al. 2003), *muyong* system in the Philippines (Butic and Ngidlo 2003), and *kebun* system in Indonesia and Malaysia (Christanty et al. 1986).

The more limited evidence of critical reflection in the Korean VGRP might be explained in part by cultural factors. Similar to

Asian countries in the comparative study of social learning in the North and the South (Wildemeersch 2007), the Korean villagers in the cases with less critical reflection (C and D) might feel uncomfortable in situations where they are asked to solve problems or modify procedures by reflecting on conflicting perspectives, because of high respect for traditions and authority. When asked about reflective moments related to disputes, some interviewees refused to answer the questions (Case C) or responded that everything was going okay with them (D). Several villagers also said that they did not know many things like scientists did so they just followed experts’ advice on project implementation. Although interactions with local government, the NGO, and expert group enabled villagers to realize the value of village groves, Korean villagers still relied on authority in many such interactions.

Despite high respect for authority, similar to many Western countries, Korea has a tradition of civil society, for example in the Songgye village forest management system. Although the Songgye systems and civil society more broadly were eroded during the Japanese occupation in the early 20th century and afterward through industrialization and urbanization, the VGRP spearheaded by the NGO Forest for Life beginning in 2003, and involving significant participation of village heads and residents in some villages, may be evidence of an increasing role of civil society in Korea. An increasing level of civil society activity may have not only enabled the VGRP but also created the conditions that fostered social learning, including integration and critical reflection (cf. Maloney et al. 2000, Olsson et al. 2004, Plummer and FitzGibbon 2008, Whitelaw and McCarthy 2008). For example, in Case B, the local government scientist transformed her thinking about the goals of the project, from ecosystem to cultural value based, and in Case A, critical reflection among government officials enabled changes in land use, from planned parking lot to village grove, and governance systems, from private property to local park.

The role of social learning for social-ecological systems resilience

Social learning incorporates not only reflection, but also a planning process and action that lead to desirable changes and sometimes transformative outcomes in resource management (Keen et al. 2005, Dyball et al. 2007, Wilner et al. 2012). In the face of change, social learning is expected to enhance the flexibility of management structures and the systems’ ability to respond to change for systems resilience, for example, through multiple-loop learning (Loeber et al. 2007, Plummer and Armitage 2007, Armitage et al. 2008). Although learning processes and their associated outcomes start at the individual level and lead to changes in individual understanding, they may scale up and result in local or system-wide change (Reed et al. 2010, Rodela 2011).

We found evidence of more transformative changes or double-loop learning outcomes at the individual level in Cases A and B, in which VGRP participants, including villagers, NGO staff, and external experts, changed their perspectives on the benefits of collective action and on the value of village groves. However, systemic level changes were not easy to observe in this study. Only in Case A was there evidence of more significant changes in the social-ecological system, as evidenced by the villagers self-organizing efforts to restore two village groves and create a new one following a typhoon. Their efforts resulted in a new

governance structure for reconstructed village groves that encouraged inclusion of villagers' views. In that polycentric governance systems are an attribute of resilient social-ecological systems (Walker and Salt 2006), this result suggests that at least in some cases, the changes that occur through VGRPs may contribute to social-ecological systems resilience. However, a need exists to explore the differences among the cases with a focus on enabling factors that could influence larger system-wide changes and resilience.

In the resilience context, changes at smaller scales such as those observed in the Korean village groves can enable, yet may be constrained by, transformations at larger scales, (Gunderson and Holling 2002, Folke et al. 2010). Studying stewardship practices in urban areas, Krasny and Tidball (2012) have hypothesized that small-scale, self-organized restoration or civic ecology practices, such as the Korean VGRP, may result in positive, expanding feedback loops between social capital, natural capital, and ecosystem services, and thus may have impacts that scale up through the larger social-ecological systems in which they are embedded. The changes at the level of a village, village A in our study, suggest shifts not only in the physical aspects of the village groves, but also in associated organizational and institutional arrangements. Triggered by the typhoon disaster, social and ecological changes in Case A show the possibility of system-wide shifts for "deliberate transformation" that involve processes of breakdown and recovery for desirable changes while paying attention to the linked and nested systems (Folke et al. 2010).

CONCLUSION

The term social learning can easily lead to confusion because it means very different things to different people. In the field of environmental management, social learning means not just collaborative learning processes through interaction and communication, but also the management outcomes of such processes based upon a shared understanding and common interests. In applying natural resource management frameworks of learning processes and outcomes to Korean village groves restoration efforts in four different villages, we found that multiple elements of social learning were present, but did not always lead to management outcomes, viewed through the lens of multiple-loop learning. The findings of this study showed different dimensions of social learning in the cultural and historical context of Korea.

By distinguishing social learning outcomes from the characteristics of learning process, we hope to shed light on the vague notion of social learning. In particular, focusing on multiple-loop learning as an indicator of the outcomes of social learning can provide insights into the linkage between perspective transformations and social changes in nested systems. Although it is often expected that social learning will lead to sustainable behaviors or social actions (Pahl-Wostl et al. 2008), the empirical evidence presented in this study shows that such changes cannot be guaranteed. Further research on enabling/disabling factors based upon contextual factors is needed to develop more effective social learning interventions and foster substantive learning outcomes.

Our study within the Korean context suggests conditions for social learning that could benefit studies of social learning more broadly. It is notable that the VGRP was evidence of a national

movement linking civil society activity to environmental stewardship, bearing similarity to a civic environmental movement in the West characterized by collaboration among communities, interest groups, and government agencies, and offering an alternative to more adversarial forms of environmental activism (Sirianni and Friedland 2001). Whereas the ability of Korean villagers collaborating with the national NGO to restore local village groves is impressive, it remains to be seen whether local VGRPs are part of a larger restoration movement linked to increased civic society activity in Korea, and whether they will have significant implications for larger systems transformation. Further studies are needed to explore impacts of VGRPs more broadly and deeply for the systems resilience.

Responses to this article can be read online at:

<http://www.ecologyandsociety.org/issues/responses.php/7289>

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