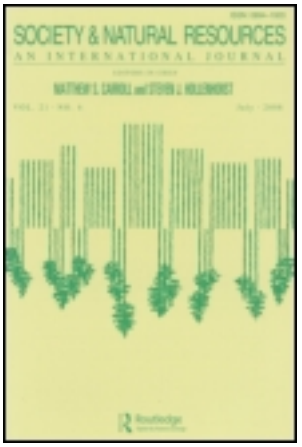

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How Long Does Social Learning Take? Insights from a Longitudinal Case Study

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Insights and Applications

How Long Does Social Learning Take? Insights from a Longitudinal Case Study

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Social learning continues to attract the attention of researchers in natural resource management, yet little published research focuses specifically on social learning time frames. This article aims to redress this knowledge gap through presenting insights from a longitudinal study in Australia. The study involved four interview rounds from 2004 to 2009 with landholders taking part in a program focused on managing dryland salinity. The results demonstrate that participants were initially frustrated by the slow pace of social learning. Evidence of social learning occurred after approximately 1 year, but was initially restricted to an increased understanding of the problem without improved knowledge to address it. This knowledge emerged during the third year of the program. Based on the findings presented here, comparable social learning programs should consider a minimum of 3 years to allow enough time to develop new knowledge for tackling complex problems.

Keywords community-based research, participatory approaches, social learning, sustainable agriculture

The proliferation of interest in the role of social learning in addressing environmental challenges reflects both the great potential and the ambiguity associated with this concept (Wals 2007). For the purposes of this article, social learning refers to the learning that occurs among individuals and groups when they join together to understand environmental challenges and to develop practical responses to them (Keen et al. 2005; Cundill et al. 2012). However, social learning doesn't represent a single

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methodology so much as a range of approaches (Muro and Jeffrey 2008). This article refers particularly to the body of social learning literature that draws on situated learning: a constructivist approach that focuses on developing shared knowledge through social participation in a particular context (Lave and Wenger 1991; Kruger and Shannon 2000). This raises the importance of observation, experimentation, and reflection, as part of a systemic approach to learning in groups (Keen et al. 2005; Blackmore 2010).

While much has been written about social learning and its role in addressing the relationships between society and natural resources, little research has focused specifically on social learning time frames and their implications for research and management. Extended time frames are considered relevant in achieving social learning because developing shared understanding may take considerable time (Schusler et al. 2003; Pahl-Wostl et al. 2007; Armitage et al. 2008). Moreover, the duration of social learning has been hypothesized as a factor impacting these initiatives. Specifically, some authors have suggested that insufficient time frames may curtail social learning (Schusler et al. 2003; Ison et al. 2007; Allan and Wilson 2009; Cheng and Mattor 2010).

On a practical level, these suggestions of extended time frames have significant implications for research and management, given the time frames of funding mechanisms, policy cycles, and student programs. On an empirical level, there is a wider need to understand social learning time frames as part of a broader program of reconciling the intentions of social learning initiatives with the realities of implementation. Some authors have observed that there is a tendency to conflate the process of social learning and its potential outcomes, identifying the need for clear evidence that a change in understanding has taken place (Reed et al. 2010).

In order to better understand the time frames associated with social learning, a body of empirical cases is required on which to refine existing understanding. The longitudinal study presented in this article represents a step in this direction and is provided with a view toward encouraging further research on social learning time frames. It is important to clarify that social learning can occur among actors of one type within a community of practice—that is, a group of people who share a craft or profession (Wenger 1998); or between different types of actors (Pahl-Wostl et al. 2007). The social learning described in this article represents the former (i.e., collective learning within a community of practice), through active experimentation, discussion, and invited input from other actors.

The expected outcomes from social learning include new knowledge, cooperation among actors, and increased capacity to manage complex challenges (Keen et al. 2005). ''Capacity'' is defined here as an individual's or group's ability to understand and act (adapted from Thomson and Pepperdine [2003]). Social learning processes alone—such as open communication, diverse participation, and constructive conflict—may be insufficient to achieve changes in management processes and outcomes, unless sufficient capacity is achieved (Schusler et al. 2003.) For this reason, capacity is a key focus of this article.

Problem Context

Dryland salinity is a type of land degradation that generally results from land clearing for agriculture. The removal of deep-rooted vegetation leads to a rise in water

tables, which elevates salts in the soil, thereby poisoning crops, native vegetation, and waterways. Dryland salinity occurs in Argentina, Australia, Canada, India, South Africa, Turkey, and the United States (Pannell and Ewing 2006). It has been particularly acute in dryland regions of Australia, where approximately 2 million ha of agricultural land is affected (ABS 2002). Despite a decade of biophysical science through the National Dryland Salinity Program (Pannell 2001), salinity remained a nationally recognized concern in Australia when this research commenced in 2004. Depending upon the local groundwater hydrology, the causes of salinity can be remote in distance and time. Therefore, those who are confronted with this problem may not have caused it, and their ability to respond to salinity depends greatly on their position within the catchment and their individual circumstances (Robertson, Kingwell, et al. 2009).

From 2003, a government program in Western Australia took a new approach to addressing dryland salinity. It made $A6 million available to local farmer groups to trial salinity management options under the heading of Catchment Demonstration Initiatives (CDI). These options included alternative crops, revegetation with native species, and a range of engineering mechanisms including pumps, syphons, and deep drains. This article focuses on one of these initiatives, conducted in the Wallatin and O'Brien subcatchments approximately 200 km east of Perth, a region of family-operated wheat and sheep farms ranging in size between 1500 ha and 4000 ha. The program was led by the residing farming families who represent a community of practice demonstrated by regular participation in a catchment group (Wallatin Wildlife and Landcare).

The program was supported by an interdisciplinary team of researchers with diverse backgrounds, including agronomy, hydrology, soil science, economics, and human geography (Measham 2009). This article is based on the social science component of this larger integrated study, which was responsible for tracking the impact of the trial program on the participants themselves (i.e., among landholders). Due to small numbers and high staff turnover among the researchers, it was not possible to track learning between different types of actors (i.e., landholders and researchers) over the same period. However, it was possible to compare perspectives between landholders and researchers early in the program, which has been described elsewhere (Measham et al. 2007).

The CDI was developed in two stages. The first involved 15 projects testing a wide range of plant-based and engineering-based options around the catchment, combining local knowledge and technical advice to design and implement each trial. In a second "rollout" phase of the project, landholders were able to access a 50% subsidy to implement their own designs based on the lessons from the first phase (Robertson, Measham, et al. 2009). Importantly, the whole project was led by a committee from the local catchment group (Wallatin Wildlife and Landcare), who met monthly with all landholders, either in a local hall or at one of the trial sites. The committee aimed to encourage social learning among landholders through field visits, focus groups, and deliberative processes to balance innovative "thinking outside the box" with judicious use of public funds. For example, focus groups were conducted to debate what constitutes best practice for salinity management. The participatory nature of the trials program was supplemented with an extended program of expert speakers on a wide range of topics including the agronomic, economic, hydrological, and biodiversity dimensions of salinity management, all at the invitation of the local coordinating committee.

Methods

The research presented in this article draws on four sets of semistructured interviews. The unit of analysis for the interviews was the farming household. During the research, the total number of properties in the catchment varied between 25 and 27 (due to land sales during the period). The proportion of properties represented at each round of interviews was very high: 26/27, 23/25, 23/25, and 23/25, respectively (referred to herein as participants). Taking part in each interview were between one and four individuals per property, giving a total of 55, 38, 37, and 33 individuals in each round, respectively. The relatively high number for the first interview reflected initial curiosity among family members who had not previously participated in interview research. Only one landholder didn't take part in any round of interviews: an absentee owner who declined the invitation to participate. Although there was some turnover of the population during this time, 20 households participated in all four rounds of interviews, representing the vast majority of properties in the catchment.

The timing of the interviews was an important factor in designing the research program. The following stages were deemed to be most critical for the interview schedule:

1. When the trials program was first announced (August 2004).
2. During the first phase of trial implementation (October 2005).
3. After distilling the lessons from the first phase to inform the second phase (February 2007).
4. After the second phase was underway (March 2009).

The following topics were discussed in each round of interviews to facilitate comparison over time:

- The effect of salinity on individuals and the catchment at the time of the interview.
- Assessment of constraints on individual capacity to manage salinity.
- Assessment of constraints affecting collective capacity to manage salinity.
- The overall, biggest constraints to managing salinity in the catchment.

Capacity was defined in terms of finances, knowledge, skills, time, and labor (Thomson and Pepperdine 2003). A key focus of this study was to determine which of these were constraints from the point of view of managing salinity, and how these changed over time. Participants were also invited to identify other factors (such as cooperation between landholders). The "overall, biggest constraints" question was always the last question of each interview, and served as a weighting process, reflecting the relative importance of the constraints discussed during the interview.

In addition to the questions asked in every interview, a number of questions were asked relating to the specific stage of the CDI process. In the first interview, participants were asked to describe their expectations for the program; in the second interview they were asked whether they had revised expectations for the remainder of the program. From the second interview onward, participants were asked if the CDI had led to improvements in their capacity since the previous interview. From the third interview onward, participants were asked what they had learned about social learning processes. The duration of the interviews was between 45 minutes and 2.5 hours.

The interviews were conducted by the author at the landholders' properties. All interviews were recorded and transcribed as per the research protocol agreed to by

the participants. The interviews produced a large volume of qualitative data, which was impractical for a detailed grounded analysis. Rather than line-by-line coding, the analysis proceeded in a three-stage process. The first involved preparing an initial impression of the interviews, including quantitative tallies of constraints and most frequent messages. The second involved inviting all interviewees to a presentation and discussion of the initial stage of analysis, following each interview round. Each presentation was well attended, with participants commenting on most frequent messages and discussing suggestions for prioritizing further analysis. The discussion provided the basis for the third stage of analysis, which involved a focused qualitative coding of the interview material assisted by NVivo software (QSR 2013). Due to space constraints, only an overview of this material can be presented here, along with the quantitative summaries that were shared with the research participants.

Findings

Impacts on Individuals

The baseline interviews in 2004 demonstrated that participants were struggling with the challenges before them and saw the CDI as their best hope to address them:

> Advice is the first thing we need. We don't really know what is the best thing to do.

> The CDI represents the only decent crack at this. If this doesn't work, nothing will.

In the first and second interview rounds, knowledge and finances were two constraints which stood out from the others, as shown in Figures 1 and 2. Lack of cooperation was also a constraint at the beginning of the project. From the second

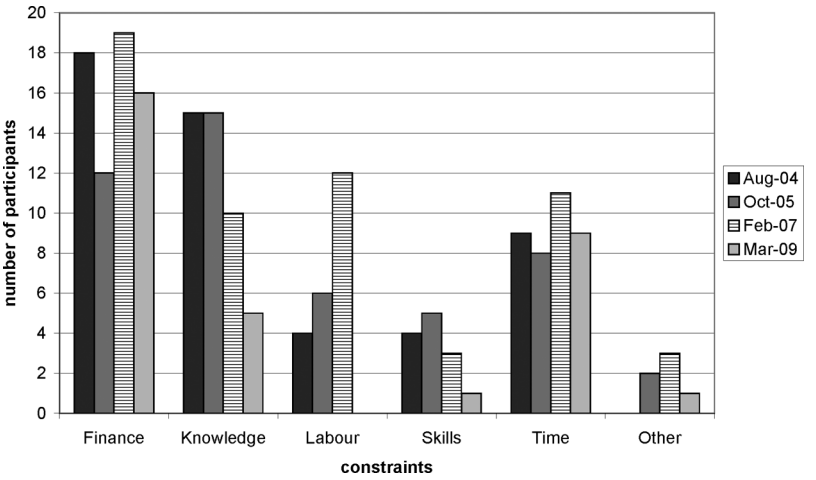

Figure 1. Factors identified as constraints on individual capacity to manage salinity at each interview, $n = 26$.

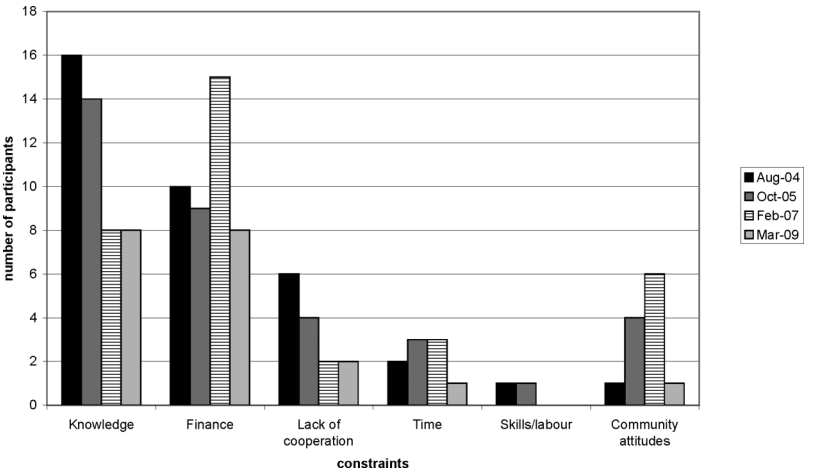

Figure 2. The overall biggest constraints identified at the end of each interview, $n = 23$. *Note.* Some participants identified two interrelated, equally important factors (e.g., the *knowledge* to manage salinity in a *financially* viable way). Therefore the sum of "most important factors" is greater than the number of interviews in rounds 1–3.

interview onward, the majority of participants reported that their knowledge had improved (Figure 3).

In 2005, participants demonstrated that they had been disappointed by the slow progress but that this was starting to be overcome 15 months into the program, indicating initial signs of social learning. However, they were not yet confident with how to address the problem in a cost-effective way:

> Six months ago I was very frustrated. I just thought we were wasting our time at meetings because nothing was being achieved. We were doing all the right things but it didn't produce anything much. I think that is out the way now.

> I need to have the knowledge to be confident to be able to spend the money. At this point in time I'm still learning.

> We know we've got to get the water out, but how? . . . we know what's got to be done . . . But what to do, where?

This final quote highlights the spatial dimensions of salinity even within individual properties. Many participants emphasized that uncertainty over subsurface hydrogeology was a major limitation. As a result, some scientific studies were commissioned by the steering committee on this issue. However, the results were viewed as unsatisfactory by most participants because the wide error margins in the data provided little confidence. Following the second round of interviews, farmers supplemented the available scientific information through digging their own test holes on multiple properties and comparing the results across each other's farms.

During the third year, participants reflected on the lessons from observation during the first project phase prior to implementing new actions during the second phase of the

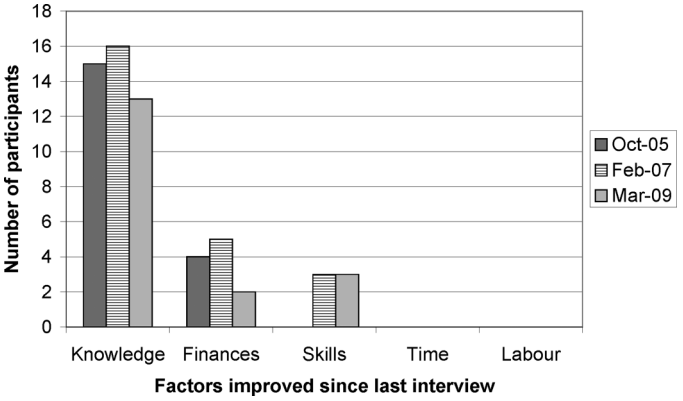

Figure 3. Areas in which individual capacity improved as a result of the program, $n = 23$.

project. This process of jointly reflecting and considering new actions led to limited confidence on specific aspects of responding to salinity in certain areas of the catchment:

> I'm reasonably confident I can provide advice to similar parts of the catchment for similar treatments.

Cooperation between participants improved throughout the program. Conversely, the attitudes of the wider community (i.e., nonparticipants) posed an increasing constraint until the final year of the program ("community attitudes" in Figure 2). In 2009, most participants felt that they had learnt enough to act with confidence regarding salinity management, as illustrated by the following quotes:

> The CDI was the catalyst which led to knowledge and skill increases.
>
> It's given us a new way to fight the problem.

Based on this buildup of knowledge and skills, the vast majority of participants were highly satisfied that they had learned sufficiently from this program but noted that it had been much more time consuming than they had imagined. For both these reasons, they universally felt it was appropriate to close the trials program and associated research program.

Community Impacts

In addition to tracking change in the self-reported capacity of individual landholders, the research program also tracked the change in "collective capacity," that is, the combined ability of the group as perceived by the members. The collective capacity was assessed in terms of the same constraints as for individual capacity. In the first round of interviews, constraints on collective capacity appeared overall fewer than those on individual capacity (Figure 4). In the second round of interviews, all categories of perceived constraints rose, reflecting an increased awareness of the scale of constraints experienced across the catchment. From the third interview onward, collective constraints reduced, reflecting an increase in perceived collective capacity due to the CDI program. In the final year, finances, time, and labor remained higher

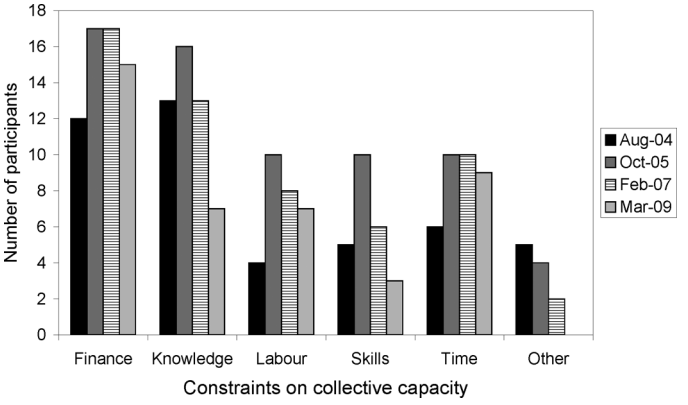

Figure 4. Factors identified as constraints on collective capacity to manage salinity at each interview, $n = 23$.

than baseline, demonstrating increased recognition of these issues as a result of the social learning program.

Two types of capacity emerged from the social learning process: resource-specific knowledge, and a better understanding of the social process of resource management. Regarding salinity, participants reported that they had learned effective use of diverse abatement techniques. Regarding the social process of resource management, participants refined their understanding of the time frames required for participatory processes and how to deal with disagreements between individuals, and demonstrated increased appreciation of the value of local leadership.

> It's achieved a lot, it's just taken a long time to get there.

> People have grown in terms of being able to . . . accommodate differences to bring people together to work as more of a team.

> Leadership here's critical . . . I'm very comfortable with the leadership . . . at the moment, but there was a time where I thought that they were foundering a bit.

Some individuals were disappointed that the CDI had not discovered "the silver bullet" to eradicating salinity, yet were resigned to the fact that no silver bullet existed.

Discussion

The results demonstrate that changes in understanding did occur during this study. Social learning, defined as collective learning among landholders within a community of practice (Wenger 1998), was observed to have occurred after 15 months. However, the early signs were restricted to better understanding the problem faced within the community of practice. It was only during the third year, after jointly distilling lessons from observation during the first phase of the project to inform actions in the second phase of the project, that participants felt they had an improved ability to manage the problem. Learning continued until the fifth year, when knowledge,

skills, and cooperation were sufficient and continued involvement in the program was no longer a priority.

If the study had stopped before the third interview (i.e., before 30 months), then social learning would have been limited to increasing understanding of the problem without sufficient time to develop solutions. In this way, the research raises an additional challenge to social learning scholars and practitioners. Not only should social learning initiatives demonstrate that a change in understanding has occurred (Reed et al. 2010), but furthermore, this change should better equip participants to deal with the problems they face. This point should not be taken for granted; the results presented here demonstrate that increased awareness of a problem may not be a sufficient outcome of social learning. These results further suggest that developing practical responses to mutual problems (Keen et al. 2005) may extend beyond the bounds of research funding and policy initiatives, due to a plethora of practical and institutional constraints (Allan and Wilson 2009).

A limitation of this study was that it only assessed one type of social learning, that is, among actors of one type in a community of practice (Wenger 1998; Blackmore 2010). This raises an important challenge for further research: to assess time frames for social learning between different types of actors (Pahl-Wostl et al. 2007; Reed et al. 2010). Further questions include whether the time frames required for social learning vary according to problem context, and whether projects can be redesigned to incorporate adequate time frames for social learning. Based on the findings presented here, comparable social learning programs focused on complex problems should allow at least three years in order to develop not only an increased understanding of mutual problems but also practical responses to address them.

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