Linked and Situated: Grounded Knowledge*

Loka Ashwood
Department of Community and Environmental Sociology
University of Wisconsin–Madison

Noelle Harden
Center for Family Development
University of Minnesota Extension

Michael M. Bell
Department of Community and Environmental Sociology
University of Wisconsin–Madison

William Bland
Department of Soil Science
University of Wisconsin–Madison

ABSTRACT Local knowledge registers prominently in scholarly efforts to resolve environmental problems, ushering in widespread use of participatory practices of deliberation. Without the incorporation of local knowledge, many scholars contend that environmental science and planning remain beholden to the unbridled reign of the expert, and the daunting complexity of environmental problems remains seemingly impossible to penetrate. Following in this vein of work, we formed our participatory research project on nonpoint water pollution in two watersheds around four action clusters. On the local side, we included a cluster of farmers and farmland owners and a cluster of general community members. On the expert side, we included a cluster of researchers and another of government officials. However, we found in our research that the development of democratic deliberation depended more on whether participants situated and linked their knowledge than whether it was local or expert in origin. We suggest grounded knowledge, situating one's experiences in a way that enables participants to actively link with other knowledge, as a concept useful for scholars to better understand which ways of knowing enable deliberation in the participatory processes.

Introduction

Local knowledge still enjoys preeminence as a noble, postmodern means of countering the still dominant industrial agriculture engine of

research and policy. Kloppenburg's (1991) initial conception of local knowledge as a tool to facilitate more equitable research in agriculture has amassed a considerable following (Csurgó, Kovách, and Kučerová 2008; Fonte 2008; Kaup 2008). In addition, participatory action research promotes the incorporation of local knowledge (Fisher and Ball 2003; Johnston 2010; Stoecker 1999), developmental and international studies recognize local knowledge as a piece in the sustainability puzzle (Flora 2010; Nadasdy 1999), science and technology scholars see it as a key element in achieving democratic science (Frickel and Vincent 2011; Irvin and Stansbury 2004; Kinchy 2010; Moore 2006; Moore et al. 2011; Wynne 1996), and for others it plays a primary role in promoting greater democratic deliberation (Fung and Wright 2001). Scholars often couple their call for more local knowledge with a discussion of the means available to elevate its place in academic research. Participatory research and its various strains, including public sociology and community-based research, have become popular strategies to make use of and valorize local knowledge in rural and environmental scholarship (Adjei-Nsiah et al. 2008; Cohen 2008; Cuéllar-Padilla and Calle-Collado 2011; Fisher 2000).

As an ideal, local knowledge serves the valuable purpose of pointing to inequitable research relationships and the shortcomings of expert-driven modernization schemes. When coupled with participatory research methods, however, we find that the efficacy of local knowledge becomes less clear. Based on our participatory action research on nonpoint water pollution in two watersheds, we found that actors from across the spectrum of local to expert—for example, professor, farmer, activist, resident, and agency worker—were often able to work together to achieve meaningful dialogue in the participatory setting, despite their different social locations. The local-versus-expert distinction did not pose the most significant barrier in our two watersheds. The key in our research was not where actors' knowledge came from (i.e., local or expert), but whether participants were able to understand their knowledge as situated in the ground of their own experience, and able to link that knowledge to the ground of others' experience, building a kind of landscape of knowledge that connects one ground to another. To better capture what we found key to participatory deliberation, we propose *grounded knowledge* as a phrase that describes participants' ability to recognize and link different grounds—different theories and practices—of knowledge in the participatory setting.

Embedded in our proposal of grounded knowledge is a critique of the sometimes effuse application of local and expert typologies to knowledge. Local knowledge can serve as a lump-sum categorization of the way

people belonging to a particular place know, which simplifies the complex power relationships and widely varied contexts that local (and expert) actors operate in. Moreover, the enactment of local knowledge in the participatory space is not necessarily deliberative, nor contextualized. In the rest of this article, we document grounded knowledge as a way of knowing that encourages deliberation through contextualization. Particular situations and social positions enable and disable the grounding of knowledge within the participatory space, as our article proposes and describes. In an effort to capture local knowledge, researchers have sometimes assumed that if a person knows "locally," a person knows in ways friendly to deliberation, which can serve to derail researchers who come into participatory research projects with good intentions, but come out with discouraging results. By no means do we suggest discarding the terms *local* and *expert* as ways of referencing the situatedness of knowledge, power differentials, and institutional challenges for deliberative work. But we do suggest that to facilitate action-oriented research with meaningful exchanges of dialogue, we need other conceptual tools to understand how and when people can share what they know and listen to each other.

We first review scholarship and related literature on participatory research and local knowledge to make the case for a paradigm shift in thinking about participation and local ways of knowing. We then draw on the deliberative democratic literature to understand the situational conditions that favor and hamper the practice of grounded knowledge by actors across action clusters. The institutional backdrop that participants operate in, the nuances of their identities, and the interests they hold from disproportionate burdens to collective benefits all shape the capacity for grounded knowledge to be practiced in the participatory space. Our documentation of these conditions serves only as a modest piece of the substantial work necessary to better understand what hampers the linking and situating of knowledge within participatory space. We hope that our empirical documentation of grounded knowledge can serve as an initial step to help scholars better understand the inner workings of participatory deliberation.

What Is Grounded Knowledge?

Grounded knowledge is contextually situated, and actively links to other ways of knowing. Our use of the metaphor "grounded" nods to the richness of the environment that inspires our use of the term. Land, like knowledge, varies by field and geographic region. Canyons, ridges, deserts, fences, legal boundaries, and countless other attributes can

serve to prevent the linking and conjoining of the land. But the possibility of crossing those barriers always remains, as long as actors recognize the situated differences of each locality and respect them. Like the land, diverse bodies of knowledge have the potential to connect to each other, linking across large expanses of space and time, and cross-cutting positions like expert and local, while retaining the richness of situation and context. And through connection comes creativity and surprise; grounded knowledge comes from difference and leads to difference, but difference that is embraced. Grounded knowledge describes when that bridging and situating happens, and actors from different knowledge localities are able to link what they know in the participatory space.

Grounded knowledge thus departs from previous understandings of knowledge production in the participatory setting in four ways. First, we approach any situated knowledge as critical to participatory research, whether expert, local, or otherwise, rather than privileging the local. Second, in addition to where knowledge is situated, we propose an active, linked conceptualization of information exchange. The participatory meeting provides a structural opportunity for different ways of knowing to mix. We argue, though, that participants must link and share what they know with one another in that space. Otherwise, the meeting and attendance serve as institutional fulfillment of the need to have a process (Fung and Wright 2001), but not of the situating and linking of knowledge that we argue is required for that process to be deliberative. Ryfe (2005:54) asserts that "researchers have been less interested in deliberation itself than in measuring its effects," using participation rates and attendance as measures of the exchange of knowledge. We help fill a void in empirical documentation of what deliberation looks like (Schneiderhan and Khan 2008) by bringing the ideas of Haraway and Bell to bear on successful deliberation in the participatory space. Third, the activeness of grounded knowledge leads to creative encounters and welcomes surprise, as knowledge is linked through new connections. Fourth, scholarly focus on local and expert can lead to a disregard for the diversity of contexts that individuals operate in outside the participatory space, and which inevitably influence their capacity to act. We document the conditions that enable and disable grounded knowledge, paying attention to literature on power and deliberation.

We began our participatory research project by drawing on literature that suggested conjoining local and expert knowledge promoted effective and equitable environmental reform (Cuéllar-Padilla and Calle-Collado 2011; Franks and McGloin 2007; Kuper et al. 2009; Moore 2009; Pahl-Wostl, Kabat, and Möltgen 2007; Rhoades 2000; Sherwood 2009). We came out of our project realizing that participants' respective

knowledge dynamics, regardless of whether they were local or expert, profoundly shaped their capacity to discuss solutions to the problem of nonpoint water pollution. Our project in this article is thus twofold: We explain grounded knowledge as an empirical finding that we discovered over the course of our research that helps explain the achievement of deliberation; and we seek to understand what conditions enable and disable grounded knowledge.

We owe much of our conceptualization of grounded knowledge to Donna Haraway's ([1988] 1991) notion of situated knowledge, a central facet of grounded knowledge. Haraway offers a remedy to what she calls the overbearing universality of experts and scientists, by calling for them to situate their knowledge relative to their own experiences. Haraway writes that scientists, like other actors, possess partial vision that is relative to "politics and epistemologies of location, positioning, and situation" (195). She recommends that instead of "universalizing" the scientist's position as the only one, discounting other ways of knowing, scientific claims should remain situated "where partiality and not universality is the condition of being heard to make rational knowledge claims" (195). We see grounded knowledge as belonging to those who practice knowledge situated in their own experiences and perspectives. Actors who embed and situate their knowledge can later link to other ways of knowing, recognizing their situatedness through recognition of their own, without universalizing their position and ignoring another's.

The importance of practicing embedded and situated knowledge applies not only to scientists. Grounded knowledge extends Haraway's situated scientific self-awareness to also include local self-awareness. However, scholars primarily incorporate Haraway's theory as a rebuke of the reign of the expert. Kloppenburg is a case in point. His far-reaching call was "to explore the theoretical and practical opportunities for using local knowledge to reconstruct science" (1991:531). Kloppenburg parallels local with a more holistic way of knowing that academics at the time were largely ignoring and, as a result, marginalizing. His highlighting of local knowledge served to combat the authoritative knowledge of science that often excluded and delegitimized lay knowledge (Tovey 2008). Many scholars followed suit with Koppenburg by advocating the integration of indigenous or local knowledge into research frameworks (DeWalt 1994; Flora 1992; Hendrickson and Heffernan 2002). Nadasdy (1999:15), for example, suggested that "as long as ultimate decision-making power over the land is held in distant administrative centers, local ways of life will continue to be undervalued or ignored in favor of the illusion of scientific universality." In his call for more nonexpert involvement in policymaking, particularly in the environment, Fisher

(2000:xiii) cites local knowledge as "the primary product of participatory inquiry," similar to what Scott (1999) refers to as *metis*, a local way of knowing that administrative elites pick away at. In addition to counteracting disempowerment, local knowledge became synonymous with place-based knowledge that incorporates the variability of the landscape, often in opposition to expert, top-down imperialism that treats all geographic spaces as the same (Kaup 2008; Tovey 2008). For example, Fonte (2008:210) writes that lay knowledge is "acquired through particular experiential circumstances. . . . Its variability (linked to specific places and cultures) has earned it an inferior status in relation to 'scientific' knowledge."

This was a useful, even crucial, intervention. But as important as the valuing of local knowledge is, and as central as it has become to participatory scholarship, critics charge that a broad idealization of local or lay knowledge ignores the diverse situations in localities that shape conflict and power relations (Cooke and Kothari 2001; DuPuis and Goodman 2005; Hayward, Simpson, and Wood 2004). There are often locals who win while others lose (Watts 2000). Power infuses situations in ways less structured than the dichotomy of local versus expert suggests. The ability for local nonelites to engage in participation depends on local ideologies, susceptibility to myths perpetuated by elites, and potential feelings of powerless (Gaventa 1980). And local knowledge is richly complex, with various actors possessing different types of situated knowledge. Agrawal (1995:433) writes that it is "potentially ridiculous" to try to fix local and scientific knowledge, and that the very terms "indigenous, local, primitive, savage, or western, rational, scientific, modern, and uncivilized" serve to dichotomize local and indigenous versus modern, rational, and scientific. Locals can marginalize other locals, and experts can marginalize other experts (Agrawal and Ribot 1999).

By focusing on local as the type of knowledge to promote through participatory processes, scholars have overlooked some of the complexity of deliberation in the participatory space. With the concept of grounded knowledge, we draw on the concept of dialogics (Bakhtin 1986; Bell 2012; Bell et al. 2011; Gardiner 2000) to gain an analytic window on an important element of this complexity: the linking of situated knowledge. Bell (2012:246) uses the concept of dialogics as a theory founded in the action of "engaging others and linking knowledge and identity." Bell (6) suggests that actors are "ever working out our ever-changing sameness and differences, connections and disconnections, in the practical art of living." Participatory processes require ample attention to the negotiation of these differences and to the contexts that afford respectful engagement with other ways of knowing to facilitate

dialogue. But grounded knowledge adds a caveat to dialogics by coupling it with Haraway's politics of location. For knowledge to actively link through dialogue, it must also be situated, by an expert, by a local, or by any other.

Our linked and situated understanding of grounded knowledge takes a pragmatic and interactive approach, similar to that advocated by grounded theory. Glaser and Strauss (1967:2) first introduced the concept by contending that there existed an "overemphasis" on verifying theory and a "de-emphasis" of discovering what concepts and hypotheses first were relevant in a particular area. This inductive approach to research emphasizes developing theoretical ideas during the data collection process, rather than gathering data to answer hypotheses conceived before ground truthing. Our action-oriented research did not begin by hypothesizing outcomes, but used literature to guide the formation of a deliberative process to work toward a solution to nonpoint water pollution. Through this process, we, as outlined in grounded theory, theoretically rooted ourselves in Dewey and Mead's pragmatism, as well as in symbolic interactionism, a theory rooted in pragmatism (Strauss and Corbin 1990). Pragmatic knowledge exchange is at the heart of much participatory research. Scholars may diverge over the particulars, but they widely agree that participatory processes aim to solve problems (Fung and Wright 2003; Kothari and Minogue 2002; Stoecker 1999). Grounded theory speaks to this goal by promoting the exploration of how actors "respond to changing conditions and to the consequences of their actions" (Strauss and Corbin 1990:5).

Our use of the phrase *grounded knowledge* thus takes on a quadruple significance. First, it serves as a metaphor of situatedness of the place-based ground of all knowledge. Second, it serves as a further metaphor of the potential linking of knowledge, just as one patch of ground connects to another on a round world. Third, the deliberative dynamics of situating and linking emerged from our use of grounded theory methods in the fieldwork we will shortly report. And fourth, we apply our work in this article to environmental issues of the ground (and its waters), although we believe its significance is not limited to deliberation over environmental matters.

In the rest of this article, we move from establishing grounded knowledge as an empirical finding to also describing the conditions that allow individual participants to practice deliberation. Some of the conditions we document correspond with existing literature on democratic deliberation, while others suggest new ways of thinking about deliberation.

Participatory Action Clusters

The growing national and global focus on water quality has created a recent scramble to find creative means to resolve daunting levels of pollution. Rhoades (2000) writes of the growing global enthusiasm for using participatory methods to resolve watershed-scale pollution. More generally, participatory processes are understood as a central tool to achieve sustainability (Pahl-Wostl et al. 2007). Proponents view participatory work with multiple stakeholders and local knowledge holders as critical to addressing the complexity of landscape-scale problems (Kuper et al. 2009; Moore 2009; Sherwood 2009; Walker et al. 2002). Research shows that involving farmers in conjunction with other community actors is especially critical to coming up with effective solutions to pollution, implementation, and movement toward sustainable agriculture (Cuéllar-Padilla and Calle-Collado 2011; Franks and McGloin 2007). Particularly for nonpoint water pollution, the source of contamination is nearly impossible to trace because of its dispersed sources, making the science and knowledge necessary to solve the problem contested and stakes and uncertainties high (Batie 2009; Carpenter et al. 1998; Gergel 2005). In such a situation, Funtowicz and Ravetz (1993) posit that the democratization of science becomes most pressing.

In line with this literature, we formed our 2010 participatory research project around what we termed *action clusters* that situate and group the knowledge of those operating in an ecological context. We focus here on the intergroup dynamics of action clusters, leaving other constraints to participation like general apathy aside for purposes of this article (Thomas 2001). We defined these clusters as farmers and farmland owners, researchers, community members, and government workers, similar to the EU CORASON Research Project's division of knowledge into scientific knowledge, political and managerial knowledge, and local knowledge (Tovey 2008). Our two case-study 12-digit watersheds contained water bodies that were listed on the Environmental Protection Agency (EPA) list of impaired water bodies for phosphorus pollution. We use the pseudonyms Ruritania and Agraria to protect participants' identities. Both of these watersheds are classified as rural in the U.S. census and are within 20 minutes of state universities and community colleges housed in nearby towns of less than 20,000.

We sequenced the conversations in the four clusters, moving from local knowledge to expert knowledge, as we then conceived the dynamics of participation. The farmer–farmland owner cluster and the community member cluster launched the process by designing and voting on top strategies to reduce phosphorus pollution. The academic and

government clusters then discussed the strategies that received the most votes, and explored possibilities for achieving the strategies.

We identified farmers and farmland owners through tax parcel data and reconnaissance interviews, and invited them to attend the meeting with formal letters and phone calls. Outreach to the general community action cluster included personal invitations at civic meetings, phone calls to interest groups, posting of fliers, and local media coverage before each meeting. In Agraria, 45 farmers and farmland landowners attended the meeting, and 35 attended in Ruritania. We had 15 community members attend in Ruritania and 14 in Agraria.

During two-hour meetings, we asked participants to first identify strategies on easels to address the focus problem of reducing phosphorus pollution in groups of four to six to ensure everyone had a chance to voice his or her ideas (McAreavey 2006). Then the subdivided groups presented their strategies to the rest of the action cluster. We as facilitators guided the conjoined group in consolidating and discussing popular strategies. Participants then nominated five people to represent the strategies with the most votes. The top strategies and their representatives were voted on through anonymous ballots. The five participants voted in as the representative board then continued to advocate for the cluster ideas in consequent meetings that we do not discuss in this article. The specifics of our methodology are important, as Barrateau, Bots, and Daniell (2010) suggest, because the steps of facilitation can substantially affect the process. For more detail on our process, see Ashwood et al. (2011).

From there, we took the top strategies to the government and academic clusters. We invited participants to these meetings by e-mail, by phone calls, or in person. Because we anticipated attendance would be small, we held these meetings as general focus group discussions. Fifteen government representatives attended our meeting in Ruritania, and eight government representatives in Agraria. Ten academics attended in Agraria, and six academics in Ruritania. In total, we had 148 participants in our eight action clusters.

After the farmer and farmland owner meetings in Ruritania and Agraria, we interviewed 45 participants individually. We began by interviewing interested farmers and landowners who attended the action cluster meetings. During interviews, farmers pinpointed on maps of their property the areas that they thought could be contributing runoff to the nearby polluted water body. We then employed snowball sampling of nonparticipants. We analyzed interview and action cluster focus group recordings and observation notes through transcription, coding, network mapping, and memos (Emerson, Fretz, and Shaw 1995).

Grounded Knowledge Conditions		
	Linked and Situated	**Bounded and Universalized**
Institutions	Adaptive ⟵――――⟶	Rigid
Identities	Situated ⟵――――⟶	Universalized
Interests	Shared Benefits ⟵――――⟶	Disproportionate Burden

Figure 1.   Grounded Knowledge Conditions.

We distributed evaluations at the end of each of the four action cluster meetings, which asked participants to rate the meeting on a series of criteria. For the purpose of this article, we only reference the responses to open-ended questions. Our response rate was 75 percent (111 of 148).

Conditions for Grounded Knowledge

As we discussed earlier, grounded knowledge focuses on two components: the linking of knowledge enabled by the situating of what one knows. To understand knowledge interaction, we study narratives and consensus building in our action cluster meetings, interviews, and surveys. Much attention has been afforded to analyzing how personal narratives and story-telling serve as an agent of successful deliberation (e.g., Polletta and Lee 2006), but less attention has been afforded to what conditions allow participants to listen to each others' narratives within the deliberative space. We argue that actors' ability to link and situate helps explain their ability to engage in deliberation. The grounding of knowledge depends on conditions that shape participants' interactions in the participatory space: institutions, individual identities, and collective interests. (See Figure 1.) To understand what prompts situatedness and linking and what prevents these facets of grounded knowledge, we combine dialogics and Haraway's poststructural theory with mainstream accounts of institutional conditions for deliberation. By describing these conditions, our intention is to help researchers begin to better realize what obstacles they face, and what opportunities they can capitalize on to facilitate the grounding of knowledge in participatory research.

Rigid Institutions

Our first brush with rigid institutions that constrained participants' ability to situate and link what they knew arrived with a berating phone call from the local public works director, Eugene, after we had just begun our research in Agraria. He accused us of inappropriately

describing the local water body as "polluted" on posted fliers welcoming the public to attend the meeting. At his request, we met with local government officials, where Eugene took a primary role in refuting the legitimacy of our project as his superiors listened: "Phosphorus is an unregulated substance as far as the EPA is concerned," Eugene said. "That is what applies to our water supply. I think [the flier] could have been worded much better than reducing pollution." Even after one of us reminded Eugene that the water body was listed on the EPA's impaired water bodies list for phosphorus pollution (EPA 2011), he continued to press his point: "When we're talking about a public water supply, and people start using the word *pollution*, it creates a public perception that is, uh, not exactly conducive to our consumer confidence." Because he objected so strongly to our language, he requested that our group discontinue research in the area. When we chose to continue our work, Eugene later came to the community meeting, forced his way to the front of the room, and announced that the water body was not polluted. Eugene's position in the government was threatened by our project, which became more obvious later that night when he sneaked an evaluation of us into the pile that gave the lowest marks possible on every criterion.

Local control tied to voting patterns deterred Eugene's interest in cleaning up the water, rather than promoting it, because citizens were not informed of the pollution in the first place. Without informed local actors, devolution of power to local experts encouraged them to rigidly maintain the status quo, rather than flexibly working toward change. Eugene's institutional position required him to defend the legitimacy of his own claims, in order to keep the mayor in office and consequently ensure his own job security. If it was to become widely known that the water people drank was polluted, people would "storm city hall," as an elected official mentioned to us. The win-or-lose water-quality goals of institutions can create a highly competitive setting for workers like Eugene that hampers the linking of their knowledge with other ways of knowing. Workers may not be afforded the tools necessary to reach these rigidly defined goals, and consequently become disenchanted and suspicious of ideas outside existing bureaucratic frameworks. Garnering community participation becomes a threat to their power and positions.

Tying job security to institutional outcomes, whether local or state based, hampered bureaucrats' interest in experimenting with creative deliberation. Dan, a county board member in Ruritania, was optimistic about local engagement and the potential for reducing water pollution through farmer and community action. At the Ruritanian government action cluster meeting, Dan responded to the strategy "more

monitoring," which received the most votes from farmers, landowners, and community members: "I know I have members of the Park Commission that would be more than willing to volunteer doing the monitoring in spots, and take training, because they really respect the [water body]. I think there are residents who would take on a task like this, if their local government put out [it was] looking for volunteers." As an unpaid elected official, Dan had more flexibility in service of the public good to situate what he knew about the Park Commission and simultaneously link it to potential action. Mary, who directed a local regional state-sponsored water quality program, though, refuted Dan's suggestion: "We've never had anybody who's in—County who is willing to do the organization of the training or to call us and say, we want you to train down here and we'll help you." Mary then suggested that the top-voted-in strategy of more monitoring was brainstormed by uneducated participants: "There are a lot of models, rather than monitoring, that a lot of people who come to these meetings wouldn't know about. They wouldn't understand modeling." Because Mary's position was directly tied to reducing water pollution, her protectionism made it difficult for her to link what she knew with others.

More classically resonating with deliberative democratic literature are the rigid agency goals that construct different ideals of farmers and citizens—some productivist, others conservationist, and some preservationist. Gaventa and Blauert (2000:231) warn that participatory projects often directly affront the rigid and hierarchical goals of institutions that conflict with the "sharing, flexibility, negotiation and learning" inherent in such projects. Often lacking bottom-up participation and instead rendering top-down demands from Congress, institutions like the federal Natural Resources Conservation Service (NRCS), the state Department of Natural Resources (DNR), and the USDA's Farm Service Agency (FSA) sometimes placed government workers at odds with one another over whether to approach farmers and locals as possessing an ingrained ability to resolve pollution or whether to consider instead that they had an ingrained proclivity to pollute. The NRCS is charged with keeping waterways clean, protecting nonrenewable resources like the land, and distributing the funds to support these goals. Conversely the FSA predominately distributes crop subsidies and now insurance that supports more production of grain by offsetting risk or the price when the bottom falls out. In Agraria, the DNR provides information about local wildlife around polluted water bodies, but unlike the NRCS, it does not bear responsibility for cleaning up the water. These competing policies made agency workers defensive of their institutions, sometimes resulting in a bounding of their agency knowledge, rather than individually situating what they knew.

For example, Agrarian farmers identified their farming methods as the primary source of water pollution by voting in as their top strategy "erosion control." After reading the strategy, Tom, who worked for the NRCS, said: "Most of it's probably come from ag land, but as you see, farmers are going to say they think it's coming from the phosphorus in the soil." Even when offered farmers' self-admission of their pollution contribution, Tom paradoxically chose to refute a strategy that would likely reduce the phosphorus running into the nearby water body. Sitting across the table, a DNR representative, Carl, responded to Tom with open frustration: "Usually when there's a problem out there and a group has been identified as responsible," Carl said, beginning to pound the table with every other word, "then this group blames the other group, and back and forth." He continued pounding the table, rattling drinks and pens, asserting that the NRCS, along with local farmers, was a problematic group in regard to water pollution. "But I think that the money should be spent where the problem is," said Carl, agreeing with farmers that erosion was the problem, and addressing an earlier admission by Tom that he struggled to distribute available government funds to farmers and landowners designed to clean up the water. Carl could link what he knew with farmers, but he remained unsympathetic to Tom's plight, and blamed him for the local failure in distributing funds. The institutional polarization and lack of shared responsibility created an antagonistic environment for the linking and situating of what government workers know.

The disciplinary boundaries of the academy, like the rigid agency goals, also sometimes prevented the interlinking of knowledge with community and farmer strategies for water pollution reduction. Without the voice of social scientists or humanists, the physical scientists who attended our academic meeting in Ruritania had few prompts, except from us as facilitators, to link what they knew to other ways of knowing. Of the over 30 strategies identified by farmers, landowners, and community members, the academics spent the duration of the one-and-a-half hour meeting talking about the strategy of "monitoring" regardless of attempts on our part to ask their opinions about other voted-in strategies, such as developing a website with information about the water body or changing policy to allow wider buffer strips.

Adaptive Institutions

Institutions that operated based on multiple funding streams from federal agencies equipped their workers to practice more flexibility, even in the absence of the formal local action networks Fung and Wright

(2001) call for. Gaventa and Blauert (2000:231) suggest that, for participatory projects to work in dialogue with institutions, there must be "inter-organisational collaboration" that allows institutions themselves to learn and change. Ruritania used local county positions to distribute a multitude of federal and state funding schemes for agriculture and the environment, making state structure more adaptive to different problems. Stan, a county conservationist, renowned for his work with farmers and other agencies, said of the structure: "I think the biggest thing is because we're local it allows us to make decisions. We can decide how we want to run our program. Versus somebody saying, 'no no, you're going to do this.' " While still benefiting from nationally identified funding schemes, Stan could navigate bureaucracy more gracefully as a county worker. At the government action cluster meeting, he both defended farmers and provided some painful examples of failures, while being open to the critiques of other agencies. Stan was even eager to link with us as UW–Madison researchers, hoping to further promote outreach to farmers, landowners, and community members.

Stan and fellow county workers did not face the same competitive and pressured work setting that made agencies antagonistic in Agraria, allowing them more flexibility. For example, Mary asked: "Do you have many farmers coming to you and requesting more help than you can give because of staffing?" John, Stan's coworker, replied, "No, we can adequately serve them." "Really!" one of us researchers facilitating the meeting said, a bit in shock at how directly this statement countered what we heard in Agraria. Dan said, "Generally the biggest problem we find is getting people in." Gary, another county worker responded, "Yeah, Stan's beating down doors and sending letters." Mary asked, "Do you have time to get out and knock on doors?" Stan replied, "Yeah, well, you make time, you know." For John, Gary, and Stan, institutional flexibility allowed them to work outside the bounded expectations of the state— they knocked on doors even though it was not required of them. They situated their knowledge, and consequently could link their funding streams to the knowledge of farmland owners, academics, and other government workers.

Universalized Identities

Deliberation is not a black box, as Schneiderhan and Khan (2008) put it, but requires the positioning of knowledge within one's own framework. Individuals with "universalized" identities do not position their knowledge, but rather aggrandize it over that of others, a condition that Haraway ([1988] 1991) identifies as a major flaw in the academy.

To understand deliberation, we propose that individual subjectivity, as well as institutional constraints, needs to be considered. Although we found aggrandized identities across all clusters, two of the most pertinent to our discussion of local knowledge surfaced with farmers who participated in our action clusters. Grain farmer Jared harbored a steady belief across topics that his and any other farmer's knowledge was preferable to expert and state approaches to problems. Of the government, he said: "Any government program is a carrot or a stick. Here's what we're going to do for you, and here's what you're going to have to do. I'm not interested in what I'm going to have to do. I pretty much like to figure for myself what I'm going to do." Of academics, Jared said: "They don't know what makes the world turn. They couldn't run a pop stand at a softball tournament and make it work. What they know is this: they are guaranteed a cost of living raise every year, and after they teach about three years, they are on for life. That's what they know." Jared dismissed the academy as overpaid, underworked, and privileged. Jared mentioned to one of us researchers that hybrid seeds have improved yields. The researcher then asked Jared why he thought they improved yields. Jared responded: "You know, I don't know. I have no idea." The researcher then commented, "That's something to ask my agronomy professor, I guess." Jared replied incredulously, "Yeah, yeah. Ask him that. He won't know, but you can ask him." Jared insisted on universalizing his knowledge to all around him by projecting his vision onto those of others. He was unable to move forward by linking what he knew with other forms of knowledge to clean up the water body.

The universalized identity also applied to organic farmer George. Unlike Jared, George insisted that he and other farmers knew little about the local sources of phosphorus pollution and maintained an antagonistic attitude toward the process being led locally. He argued that Ruritanian farmers and landowners (himself included) have no business in determining where phosphorus comes from: "This whole process is totally wrong. The research is possible to do, but apparently nobody wants to really do it. It's really *stupid*," he said, drawing out the word, "to have a problem looking at ways to reduce the phosphorus level in the [water body] without knowing the source of the phosphorus." We shared with George our knowledge that nonpoint phosphorus pollution comes from nutrients that cannot be traced directly to a source unless it is purposefully radiated or there is access to individual field monitoring. George remained impenetrable and unwilling to participate, even when his own son and other farmers suggested to him that farmer knowledge was pertinent to resolving phosphorus pollution. His inability to situate his

knowledge stifled participatory progress at his table and the broader goal of reducing pollution.

Situated Identities

Some participants overcame constraining contexts to situate their identities, marking a stark contrast to the universalized identities of Jared and George. Deliberation is defined by the "disturbance of everyday reasoning habits" (Ryfe 2005:56). For that disturbance to happen, individuals must situate what they know to allow themselves to link with other ideas—something that can happen for experts or for locals. For example, disciplinary rewards can sometimes encourage work and personalities that aggrandize, rather than situate, as Haraway warns. In contrast to the Ruritanian meeting, at the interdisciplinary meeting in Agraria, four researchers were able to exchange their ideas: "We have boil orders all the time," said Jeremy, a sustainable agriculture professor, about the nearby public water supply. "But I don't think people are aware of the phosphorus pollution." A local program director responded with a joke: "My mind went to the doomsday clock," he said, referring to the Union of Concerned Scientists' symbol that reflects the current potential for nuclear war. "There needs to be, like, a lake closure—a lake doomsday clock—for the phosphorus level." A few people laughed, but another agronomy professor, Ralph, took the comment seriously. "You could almost do that, if like you're saying, we're taking in 3,500 more pounds of phosphorus every year," he said, "and we're having little go out." Jeremy then responded: "Do we have a growing problem of eutrophication in the lake?" The dense growth of toxic algae that results from an overload of phosphorus could eventually cause eutrophication, a loss of oxygen in the lake that results in fish kills. A professor of biology, David, responded, "You know, I don't have the data on that." Over the course of the next year, David would apply for and receive a grant to begin a Geographic Information Systems project, with the help of others who attended the meeting, to trace eutrophication in the lake. These academics were able to situate their individual disciplinary identities and talk across structural differences to facilitate action through the participatory space.

Rigid institutions serve as a disincentive to situating what one knows and linking to different ways of understanding a problem, yet some individuals still manage to counter the sometimes suffocating bureaucracy. This was particularly the case if academics or government workers had intimate connections with other social networks that enabled them to situate the demands of their formal work. Dan, the local county board

representative mentioned earlier, responded to a suggestion from a fellow participant that farmers generally were polluters: "I've probably had three different renters on my farmland. All of them practiced good farming practices," Dan said. He went on: "I come from a farming background. But the siting process of dairy farms, and the process of injecting manure in the ground versus applying it to the top is problematic. I've seen it set on top of the soil, and if it rains during that time, you have runoff. Those are things that we need to look at or study." By situating his experiences, Dan was able to work around negative stereotypes in favor of pinpointing certain practices polluting the water body. By doing so, he linked his knowledge, rather than closing down dialogue by stereotyping farmers and universalizing his position at the expense of others'.

Government officials who were able to situate their identities, despite inflexible institutional settings, were widely renowned to local citizens and farmers. Jill, for example, received praise from Agrarian farmers for implementing conservation projects outside rigid mandates that did not necessarily complement the landscape. Agrarian farmer James said: "Boy, . . . [the NRCS office] go out there and shoot all the stuff, and then they put it in the computer. And that darn computer don't know everything. And that's a fact!" James proceeded, though, to recognize one government worker, who consistently situated what she knew with farmers. She drew on the institutional guidebook, but simultaneously worked around it by listening to what farmers had to say. "[Jill] is good enough that she can kind of do what she thinks ought to be done," James said. "[The terrace builder] called me one day and said, 'James, I really think this terrace ought to go up the grade a little bit further than where they're putting it.' And I just jumped on the phone called [Jill], and she said, 'I'll be out there at 1 o'clock,' " James said, imitating the phone call. "And she come out there and changed it. She said, 'I believe you're right.' "

The process of linking and situating what one knows in the participatory space sometimes results in aggressive and uncomfortable dialogue. For example, Jerry, a local board representative and an out-of-town government employee, responded stingingly at the Agrarian community meeting to Kristi, a farmer, who suggested that farmers should be given money to implement cleanup strategies: "All right, if you are going to make it about money, scare the farmer, penalize them. Fine them," Jerry said. Kristi responded, "Thanks a lot, don't you think we have enough expenses?" Jerry quipped back: "No, I mean if you are going to make it about money then you have to. I don't care if it's a farmer or a shoe store, it's about money. Fine them!" he retorted loudly. "Monsanto pours

something into a [water body] we fine them. BP, we are going to fine the hell out of them," he finished. Kristi paused while writing strategies on the easel, and responded apprehensively: "Wow."

Continuing his challenge, Jerry said: "See, this is where we are going with this. You don't like it, I don't like it." As they continued to banter, a concerned citizen at the table, Shawn, offered jokingly: "There's some blunt objects over there." Everyone laughed, and Kristi wrote down the strategy on the easel: "Penalize polluters. We'll scare them now," she said incredulously. Jerry and Kristi directly addressed water pollution, but danced dangerously close to representing only their interests, without situating their ideas to enable linking to each other. Yet the conversation continued. Jerry moved on to suggest that the approach to cleaning up the polluted water body could not be fragmented. Kristi jumped in agreeing, and said, "Because you know that wouldn't be to my benefit if I spend the extra money to do this and then if the guy next to me, his water comes on me, and then it all goes into the [water body]." Jerry responded, "You are entirely correct," linking to Kristi's ideas. Kristi replied, "Okay, see? We came together." She started to write the strategy on the easel. "Regional," she said and paused. Michelle, a member of a local environmental group, offered a clarifying term, "Required." Kristi struggled with the word, pausing before writing it down, "Required . . . required. . . ." Michelle then asked, "Isn't that sort of a red flag for some farmers?" Within earshot of Kristi, Jerry said to Michelle, "She isn't going to like 'required' is she?" They all laughed together. Jerry then offered, "Regional shared," and simultaneously Shawn suggested, "Cooperation." Jerry agreed: "Cooperation is good." Shawn finished the phrase by saying, "Regional cooperation between farmers and landowners." Each of the participants—farmer, government worker, member of environmental group, and a generally interested citizen—linked his or her ideas together to develop a new idea. The ability to discover commonalities through small group discussion is a cameo of the participatory process. Lang (2007) concludes as much in her study of deliberation, where she finds that urban and rural citizens are able to find common ground that elected officials could not. Yet, though small group discussion gives the structural possibility for deliberation, it does not ensure it. Kristi, Jerry, Michele, and Shawn each situated what he or she knew, without overwhelming each other's knowledge, to come up with an idea for cleaning up the water that linked their ideas together.

Shared Benefits

The identification of shared benefits, in addition to the esoteric goal of clean water, greatly encouraged actors to link their knowledge with that

of other participants. Despite their diverse experiences and types of knowledge, Agrarian farmers shared a positive attitude toward corn and soybean farming, and each situated his or her knowledge in that experience. They freely spoke of their respective contributions of phosphorus to the polluted water body. Erik said: "On some of our farms there's buffers and riser pipes that were used twenty to thirty years ago that are rusted out. They're washing out, and sucking water through them. And going right into the [water bodies]." This linking of pollution contribution also prompted a linking of shared benefits, without the risk of pointing at the bad guy in the corner or shoving all the rewards toward one type of farming. A promising outcome of participatory processes is when creative deliberation takes place, and participants can find new and unique pathways to resolve a problem (Bell et al. 2011; Lang 2007). Through deliberation, farmers and landowners designed some creative strategies, including bioenergy production, which received the fourth most votes: "Look at miscanthus and switchgrass," a farmer said. "They require phosphorus, and if you leave that crop, and it collapses, and adds decay to the soil, you're not getting the phosphorus reduction from the soil. So by taking off the green crop, you're taking away not only more phosphorus out of the soil but you're also utilizing it for crop producing." The shared benefits were twofold: cleaning up the water and reaping money for producing an energy crop. Each farmer and landowner in the room could share in these benefits. Simultaneously, the suggestion was revolutionary. Although talking about perennializing the landscape is not the same thing as doing it, the idea of growing grass instead of corn and soybeans is not often attributed to the farming community. But in this action cluster space, these farmers and landowners actively linked their knowledge and learned from one another by debating soil testing costs and the countering different ideas about the best farming practices that could reduce soil runoff.

Agrarian farmers and farmland owners linked the water cleanup to other shared benefits. An open-ended question in our evaluations asked, "As a farmer and/or landowner, do you think you can benefit from cleaning up the water? If so, please list some of the benefits you foresee." One participant responded: "Everybody benefits because whenever you protect the ecosystem you protect everything and everyone." Another said, "Yes. Seen as connecting with community leaders and people, particularly if farmers are proactive in attaining results." A third commented, "(1) Improved image of farmers (2) better water quality." Another respondent wrote, "Cleaning up the [water body] should result in us being more efficient farmers." The farmers and landowners identified both as a collective group responsible for the pollution and as

collectively positioned to benefit from the cleanup. As a result, they were able to ground their knowledge with each other and cultivate their knowledge in tandem with those suggesting the water needed to be cleaned up. Some farmers have followed through on their optimism with action. Three farmers have worked across property boundaries to plant waterways. They have signed up for cost-share conservation programs as part of a $200,000 grant that local agency workers two months earlier were unable to fill. Their linking and situating of their knowledge prompted action.

A particularly vibrant example of action is a father-and-son farming duo who got tired of waiting on the local NRCS office to come out and survey their ground during the prime time of seeding grass in spring 2011. Instead, they paid for the seed themselves and planted a half-a-mile buffer strip. Prior to their planting, the father, Matt, said: "A lot of the area right here that we farm is probably high in phosphorus because of the livestock. Where we have our alfalfa field back there, we have sort of a natural waterway where all the water from this farm tends to go into the [water body]. We are thinking about turning that into a permanent grass, such as orchard grass or something that we could harvest for hay." Brandon, the son, later referenced the local agriculture teacher as formative in his ideas for reducing phosphorus through rotational manure application, and how by cleaning up the water body, they could also benefit their own farm. By situating what they knew with what others knew, they made change on the landscape that they recognized as a benefit to themselves and the nearby water body.

Disproportionate Burdens

The greater the polarization in a community between benefits and burdens, the more difficult the participatory agenda becomes. Acute disproportionality for farmers and farmland in Ruritania, although not Agraria, corresponds to Nowak, Bowen, and Cabot's (2006) finding that a small number of bad behaviors often bear responsibility for a disproportionate amount of nonpoint water pollution. Out of this environmental disproportionality grew strained local relations. One Ruritanian landowner had a restraining order against him for punching a farmer over pollution. Another participant's buildings were burned in an apparent case of arson while we were researching in the area. With such venom came substantial barriers to situating individual knowledge.

Disproportionate polluters—like concentrated feeding operations and other industries—are increasingly prevalent in rural areas. The costs of such industries disproportionately fall on some community members,

while they affect others to a lesser extent. For those who cope with pollution, the stakes are high, and participants can be motivated to come to meetings (Ryfe 2005). But we found that high stakes can also lead to the universalizing of one's knowledge in the process of deliberation, rather than engaging with other ways of thinking about a topic. In the farmer and landowner meeting in Ruritania, Steve and Diane focused for the duration of the two-hour meeting on their painful experience with a large dairy operation and their inability to influence any change: "Oh my God," Steve said, as his voice shook. "He put the lagoon about twice the length of his building right behind my house. I mean *right* behind. He could have put it on his side. I mean, he deals with that stuff all day long," he said, getting louder. "But he put it right behind my house. If I had a good arm, I could throw a baseball into it. I've got flies. I've got odors. I can't invite the friends over for cookouts or anything." Ron, who was sitting next to Steve, quipped back, "You mean for some reason they just don't want to go to Steve's house." Steve replied, "Well, not anymore. I don't know where everybody lives, but until you've lived in the middle of one of these farms, you have no concept of how bad it is." Diane, Steve's wife, jumped in: "They have to be permitted, and they are supposed to be monitoring that. My experience, however, has been that when you go to meetings to discuss these things, it's the good old boys network. They slap each other on the back, and say hey, how are you doing, buddy. And you complain until you're blue in the face, and nothing happens."

At the Ruritanian civil society meeting, landowner Bud sat with his farmer friend James and three concerned citizens. Bud dominated the conversation, loudly refusing to accept the boundaries of the polluted water body, focusing his energy on attacking the maps of the watershed. We were initially puzzled when he said: "The picture makes no sense because in 90% of the picture there isn't any [water body] in it. And these two lines that go up here." Bud looked down at the map incredulously and yelled at us, "That's not even a [water body]!" Although Bud certainly did have a good point, his refusal to negotiate his knowledge with ours or any of the people at his table led him to loudly and doggedly project his ideas onto those around him. Bud said, "Then further down south on the picture they didn't put in where some of the real problems are in my opinion. Where the two processing plants are right out of town, that's not even on the map." The portion of the water body that the state identified as polluted did not include the site Bud was talking about. Bud was angry. We left the table, but later in the recording, Bud said in a low voice, "Those freezer plants are dumping down here that go through my farm, and when they start doing the processing of the

vegetables, you can't stand on the road. It stinks too bad." Bud had a critical point. These plants likely were polluting. Yet Bud could hear of little else because he was so focused on his own field of vision and his own disproportionate burdens. He was unable to ground his knowledge and instead projected it onto the rest of the group, stifling progress.

Although they were unable to practice grounded knowledge during our initial action cluster meetings, eventually Bud, Steve, and Diane were able to move past only talking about their own problems and toward practicing grounded knowledge. After the initial meeting, Diane and Steve, for example, began to look into a citizen-monitoring program and talk about engaging neighbors to do the same. With the space to first address these grievances, they then allowed their concerns to motivate work toward resolving environmental problems.

A Grounded Participatory Pathway

Participatory processes aim to reroute the academy toward the inclusion of marginalized voices. In an effort to do so, local and expert forms of knowledge have sometimes been glorified or vilified. Grounded knowledge provides a tool to help realize why some actors stall and others bloom in the participatory context. The deciding factor is not where actors' knowledge comes from, but how participants situate and link what they know. We fully embrace that certain types of knowledge are critical to resolve certain problems, as our action clusters show. Scholars can remain mindful of categories, such as expert and local, while simultaneously realizing that they are not universal. Any knowledge holder who is able to situate what he or she knows can link with others through dialogue to produce meaningful deliberation in the participatory space.

This article's presentation of two case studies of nonpoint water pollution reveals limitations to and opportunities for grounded knowledge, and thus participatory processes broadly. Our case studies are richly endowed with diverse power dynamics shaped by contexts, from the immediacy of the action cluster meeting to individual identities and broader institutional settings. Sometimes, the conditions we describe may seem to negate each other: A situated identity can challenge a suffocating institution, but a rigid institution can sometimes stifle the best of individual intentions. Indeed, there are possibilities and constraints for participation in any context. But when researchers are aware of the conditions that can help, and on the other hand hurt, they will be better equipped to facilitate processes that work. Nonetheless, the generalizability of the conditions we report on in this article will require further research. We fully anticipate that other case studies will reveal additional opportunities for and constraints to grounded knowledge.

More broadly, gaining data on the limiting and liberating contexts for grounded knowledge may help facilitate policy changes necessary for participatory science, and encourage greater scrutiny of the ripple effects of environmental injustices. Soliciting the involvement of community members in participatory research or mandating citizen participation in policy is not enough to achieve the important goal of more equitable research and policy that works to reduce environmental problems. Gaventa (1980) suggests as much when he argues that inaction by nonelites may stem from an elite-controlled power field that makes the possibility of reform seem empty, even when structural methods exist for reform. (On a brighter note, though, Gaventa's later work has embraced participatory research and detailed ways to make it more inclusive and effective [Gaventa and Blauert 2000].) Preexisting policy constraints and environmental injustices can seed dissatisfaction with the idea of participatory processes before they even begin, particularly when interests fall into a polarized spectrum, where certain participants possess the benefits and others the bulk of the burdens. As researchers continue the important endeavor of involving localities in their research—and we contend that this work remains very important—it is simultaneously critical that sociologists also document what is happening outside the participatory space that constrains actors' involvement. We suggest that by looking at how knowledge is practiced, both the way it is situated and the way it links, scholars can better understand the many challenges to participatory deliberation, and the many opportunities it affords.

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