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Talking About Talk: The Problem of Communication as an Object of Study in Public Participation Research

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The Problem of Communication as an Object of Study in Public Participation Research

by

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ABSTRACT

When citizens participate in risk assessment and decision-making for environmental and other issues that affect members of the public, more robust decisions may be made. Public participation in policy decisions is not only more democratic, but it also enables members of the public to contribute valuable expertise to the decision-making process. However, the development of an effective forum for such participatory projects has been difficult. Participation mechanisms that foster dialogue and interactive exchange between participants have been regarded as the most beneficial, but the practical application of these mechanisms has been observed to be problematic. The goal of this study is to examine the role of talk as a contributing factor to the limited success of dialogue-based participation mechanisms. To do this, this study performs a qualitative analysis of the dialogue that takes place when a group of scientists and a group of farmers participate in a project concerning sustainable biofuels in Iowa. This analysis finds that the scientists and farmers, as members of distinct communities of practice, have different ways of talking about their work, even as they talk about the same subjects. This observation illustrates that the discourse that takes place within participatory mechanisms, and not only the mechanism forum itself, is an important contribution to the success or failure of a citizen participation project.

CHAPTER 1:

AN INTRODUCTION TO CITIZEN PARTICIPATION

A turn has been well underway toward increased citizen participation in public policy, technology development, and risk assessment. Citizen participation in decision-making regarding issues of public concern has emerged as a common practice and is even in many cases mandated. However, current literature on the subject demonstrates that how to do this and how to overcome the range of obstacles that citizen participation frameworks present is not yet clear. Indeed, despite the growing literature on how to conduct citizen participation in technology development, serious questions remain about the best way to enact participation and how to design participation mechanisms so that citizens are actively involved and so their input has meaningful consequences. Because current trends in participatory research suggest that the most effective participation mechanisms provide a forum in which discussion takes place between citizens and technical experts, research in rhetorical and professional communication studies has much to add to this discussion. For years, work in rhetoric and communication has identified discourse as a rich object of study and has argued that speech is a community-specific practice and not a universal practice. Namely, the work of Stanley Fish, Patricia Bizzell, Jonathan Swales and Leslie Olsen has shown that there exist linguistic variances across communities that affect the ways people within those communities think, understand, and communicate. This distinction has significant implications for public

participation mechanisms in which experts and citizens, as members of different communities, must talk to one another in order to participate in risk assessment and technology development. Because discussion has been identified as a significant component of effective public participation, the nature and complications of discussion itself must be further analyzed. Rhetorical studies provide a way to do this.

Research on citizen participation has taken the form of several distinct threads of conversation within the field. Early research considered the normative value of and rationale for citizen participation, of its usefulness and contributions to risk assessment and technical decision-making. A popular consensus is that citizen participation is a more democratic and therefore more desirable approach to risk assessment, as citizens have a right to influence decisions that affect them (Reich 1985; Laird 1993; Dryzek 1997 Nelkin 1984; Fiorino 1990). Also, work done in the sociology of scientific knowledge has discussed the substantive benefits of public participation, since citizens may have knowledge and experience that can enrich scientific understanding and decision-making (Richardson 1983; Collins and Evans 2002). In a case study that compared technocratic and collaborative approaches in a decision-making project, Futrell (2003) showed that collaborative processes are more successful. Furthermore, public participation in technological processes can enhance public legitimacy, credibility, and trust in scientific decision-making (Katz & Miller 1996; Waddell 1996; House of Lords 2000; Burton 2009).

Public Participation Mechanisms

An acceptance of the necessity for public participation in scientific and technical

issues opened up much debate about what that participation should look like. Questions have been raised about the extent to which members of the public should be involved in decision-making (Fiorino 1990; Rowe and Frewer 2000), which members of the public should be involved and what their roles should be (Collins and Evan 2002), and how public involvement should take place.

The mechanisms through which public participation might take place are being thoroughly investigated in the literature, with several studies discussing the range of participation that various mechanisms allow for and offering methods for categorizing (Rosener 1975; Nelkin and Pollak 1979; Wiedemann and Femers 1993; Maloff, Bilan, and Thurston 2000; Rower and Frewer 2005) and evaluating commonly used mechanisms (Rowe and Frewer 2000). Mechanism evaluation has tended to be based on a variety of procedural (Carr and Halvorsen 2001; Rowe, Marsh, and Frewer 2004) and outcome-based criteria (Chess and Purcell 1999; Einsiedel, Jelsoe, and Breck 2001), though Rowe and Frewer (2000) comment that considerations of both criteria are needed to sufficiently evaluate participatory mechanisms.

Many studies have found that to achieve the greatest potential benefit from public participation, a variety of participatory mechanisms should be used in a collaboration project and that the desired mechanisms will vary depending on the particular project and its goals. However, “high-level” participatory mechanisms are commonly seen as preferable to “low-level” mechanisms (Rowe and Frewer 2000). This is because “high level” participatory mechanisms, which includes citizens’ juries, planning cells, and focus groups, allow for two-way interaction, discussion, and deliberation between technical decision-makers and the public (Abelson et al. 2003) and allow for integration

of public participants' experience in order to create sounder policy decisions. In contrast, "low-level" participatory mechanisms, such as public hearings, surveys, and questionnaires, tend to consist either of communication that flows from the top down in a one-way exchange or offers the public limited ability to affect decision-making (Rowe and Frewer 2000; Abelson et al. 2003). Grabill and Simmons (1998) have also pointed out that linear, one-way communication from technical experts to members of the public creates problems with the public's perception of a risk because the communication is unable to consider audience or other contextual factors that will increase public understanding (416). Indeed, Rowe and Frewer (2005) put so much emphasis on the two-way exchange of knowledge as a necessity for participation that they proposed the term "participation" only be applied to mechanisms that allow for two-way deliberative processes (255).

Criticisms of Public Participation Mechanisms

Futrell (2003) argued that "the best decisions (i.e., decisions that are technically adequate based on criteria drawn from a wide range of perspectives and that are politically viable) are produced when public involvement is maximized rather than channeled, suppressed, and controlled" (455). This reflects an increased interest in participatory evaluation research for public involvement to do more than simply fulfill governmental regulations. Participation mechanisms that do not allow for two-way communication are often seen as less successful because they can "fail to provide meaningful involvement for interested citizens," therefore at times becoming "settings of adversarial confrontation between … experts and the public" (Futrell 2003, 459).

Likewise, Grabill et al. (2008) made similar observations about two-way participatory mechanisms. Situations in which citizen expectations for participation are not met tend to occur through participatory mechanisms that occur in "highly controlled, adversarial environment[s] in which [public participants'] concerns are often marginalized and delegitimated" (Futrell 2003, 256), that is, in situations where collaborative participation is mostly nominal and public participants are not able to productively affect policy decisions. Besides frustrating citizens' expectations for participation, such adversarial processes miss an opportunity for beneficial collaboration and actively damages public acceptance of decisions and policies.

Because public participation has begun to be mandated by governmental policy, much critique has turned to participation mechanisms that are only nominally participatory—mechanisms through which participation is allowed, though not seen as an obvious citizen right or as a vital contribution to decision-making (Futrell 2003; Nielsen, Lassen and Sandøe 2011). Such participation is mostly appeasing and political and does not seek to or expect to actually improve policy or risk assessment through citizen participation. These participatory experiments see citizen participation as a requirement that must be fulfilled in order to make the process seem more democratic or to give the appearance that the organization is meeting the needs of the public. Such nominal participation occurs often in low-level participatory mechanisms such as opinion polls, surveys, or public hearings, in which communication occurs one-way between the participants and is unlikely to affect policy decisions (Arnstein 1969; Rowe and Frewer 2005).

It is important to note, however, that nominal participation occurs also in high-

level participatory mechanisms, and this is one cause for critique in much of the public participation research. An example of this can be seen in a case study described by Futrell (2003). Futrell's account of the case study is telling:

> Technical adversarialism emerged in this case within a context of federal procedural regulations intended to compel meaningful collaboration between the army and citizens. But the settings in and the process by which collaboration was to occur failed, in practice, to meaningfully involve citizens. Such instances where participation is collaborative in theory but not in practice has been noted in the research. Information was highly controlled, and army interaction with citizens was mechanistic and dismissive, reflecting the common top-down model of communication in which technical experts dominated decisions. The result was hollow proceduralism, tokenistic consultation, and conflict as citizens sought a meaningful role in the process. (460)

In Futrell's case study, the project called for two-way communication between the public and governmental experts, but meaningful communication was blocked for a number of reasons. For one, issues of authority and hierarchy were at play; Futrell described instances of governmental officials distorting information in an attempt to obscure communication and avoid difficult questions posed by the public as an effort to maintain authority (461). Actual collaboration did not occur until it was compelled through political action. This shows that situations do occur in dialogic participatory mechanisms in which formally accredited experts may not recognize the legitimacy of public participants to engage in deliberation, which seriously undermines the process. In this case technical adversarialism dominated over true collaboration because procedural

concerns took precedence over the substantive benefits of public participation and collaborative learning. Even worse, the experts were dismissive and cynical of the opinions and contributions of the public.

Another issue represented in Futrell's case is that while two-way communication was made possible, the public's participation was not solicited early enough in the process to actually provide the participants with an opportunity to affect policy decisions. In this case, the public participants' community report, procedurally designed to inform the army's Environmental Impact Statement (EIS) was due less than a month before the EIS' scheduled completion, though the EIS had been in the works for nearly four years (462).

These issues with high-level participatory mechanisms have been acknowledged by the existing scholarship, and in an effort to develop better ways of involving the public at high levels of input, researchers have begun to develop procedural and outcome-based evaluation frameworks, as previously described, for conducting and evaluating future participatory projects. Existing frameworks have recommended that mechanisms have standards of early involvement, fairness, transparency, and genuine influence on policy, among other criteria (Webler 1995; Bickerstaff and Walker 2001; Rowe and Frewer 2000). Specifically, participatory measures should begin before policy decisions have been drafted to ensure that the deliberation between experts and citizens actually creates and critiques suggested policies. Such evaluative frameworks are designed to increase the success of participatory mechanisms for achieving the full range of substantive benefits that collaborative approaches theoretically provide.

It is difficult, however, to evaluate the success of outcomes and results of public

involvement in participatory projects (Rowe and Frewer 2004; Webler and Tuler 2002). This is because it is difficult to determine the extent to which even meaningful collaboration actually affects policy. There is no clear assessment method to determine to what extent these mechanisms effectively meet the goals of those involved, how much collaboration occurs, and how the participants perceive their experience. It is true, however, that high-level mechanisms do offer greater opportunity for public involvement to be substantial and for the role of the public participant to be that of an open, at times even an equal, participant in decision-making. Therefore, while success in terms of outcomes is difficult to evaluate, the consensus is that mechanisms that open up opportunities for discussion and deliberation are preferable. This research, in contrast, does not seek to evaluate participatory mechanisms in terms of their variant degrees of usefulness, benefits or drawbacks—researchers before have taken up this task. However, this research rests on the assumption that mechanisms that enable high-levels of participation offer the most opportunity for actual, as opposed to nominal collaboration. The purpose of this work is to illuminate the reality that while these mechanisms offer the most *opportunity* for such collaboration to occur, in practice this kind of ideal collaboration is not always experienced.

The hypothesis of this thesis is that the talk that goes on in these high level deliberatory mechanisms—and not only the mechanism forums themselves—can create obstacles that impede successful participation. Research in rhetorical and professional communication suggests that different communities of practice may have distinctly different rhetorical habits for expressing the experience-based knowledge of the community. Further, this research suggests that these differences may be obstacles to

communication and collaboration across different communities of practice and forms of expertise. Currently, however, there is a lack of direct evidence that explores these differences as they occur in participatory projects and therefore how they may function to create problems with successful collaboration.

Talk as an Object of Study in Public Participation

Many scholars have expressed this felt gap between the extent to which high-level participatory mechanisms should be mutually beneficial to the parties involved and the actual outcomes of such mechanisms. The goal of this research is therefore to investigate why such successful collaboration is not experienced in practice. Particularly, this research considers an alternative possibility at play here that has not been substantially investigated in participatory research: the issue of talk itself. To do this, a set of transcripts have been compiled from a participatory project that includes both farmers and scientists sharing their knowledge to make decisions regarding the use of biofuels in Iowa. The transcripts are then analyzed to identify the types of occurrences that take place during communication that may cause problems for collaboration.

Rowe and Frewer (2005) described that “the act of dialogue and negotiation serves to transform opinions in the members of both parties (sponsors and public participants)” (255-56). The distinguishing feature of these "high-level" mechanisms that I would like to emphasize is that they call for *face-to-face dialogue* between the participants (Fiorino 1990), and as Rowe and Frewer have argued, this is a positive thing. These mechanisms are places where discussion occurs. Individuals from different backgrounds, areas of expertise, education levels, and professional affiliations are placed

in a situation where they must literally talk to one another, and as a result of this talking, information exchange, collaboration, assessment, and policy-making is supposed to occur. Little or no research has been done, however, that thoroughly investigates precisely what it means for these participants to talk to one another. The act of discussion and deliberation between participants actually involves several processes in and of itself:

- Participants must describe their own positions to others and often defend them.
- Participants must listen to the positions of other participants.
- Participants must attempt to understand the position of other participants.
- Participants must rely on their own language and language practices to describe their viewpoints, and must listen to and understand the language and language practices of other participants that may be unfamiliar to them.
- Participants must ideally accept the positions of others as legitimate as a result of this conversation.

Current discussions of procedural problems with deliberatory participatory mechanisms have not discussed the issues that arise as a result of the aforementioned processes; that is, the processes involved in talking and the variant ways of *talking about* their subject matters that participants use. The omission of "talk" as an object of interest in participatory studies has, however, recently been noted by Harvey (2009). Harvey argued that "current evaluation frameworks tend not to be sensitive to what actually happens in terms of the actions of participants (including facilitators/chairs) and how these influence the proceedings and outcome, as well as the experience of participation"

(139). Harvey's study showed that current evaluation of participatory mechanisms has important limitations that do not account for, among other things, "talk" as it occurs in participation. One example of the effect different language usages have on communication is given in his discussion of Shaw's (1995) work on cults:

> In terms of experience, the problem of reducing dramatic and emotional experiences to measures and performance indicators can be illustrated with reference to the work of Shaw (1995) on cults. … Shaw complained that academics prefer to ignore the term "cult" completely, preferring "New Religious Movement." Shaw felt that replacing the word "cult" with more technical-sounding alternatives and defining cults in detached terms like "negative uses of mind control" that "disrupt an individual's identity" (p. xvii) preclude an appreciation of the intensity of participants' experiences. (qtd. on 146)

Harvey observed that academics use a different "technical-sounding language" to discuss issues that public participants may discuss in a more emotional or personal way and that those language differences have a significant effect on the participants' experiences. This *may* be a result of intentional manipulation on the part of the academics; indeed this has been observed before. In his earlier described case study, Futrell (2003) acknowledged a "great potential for distorted communication between competing knowledge claims whereby competing groups manipulate arguments and analyses to favor their policy positions" (452). This acknowledgement shows that different ways of talking can in at least some ways affect the experience of participation. However, different ways of talking do not only occur as manipulation techniques, but also occur naturally as a result of language differences participants may have formed through their own experiences with

even similar subject matter. Put simply, academics have different ways of talking about their work than the public that is not necessarily reflective of their levels of expertise and that occurs even when the work under discussion is similar in nature. Collins and Evans (2002) showed that "experts" do not necessarily need to be academics or scientists; however, formally accredited experts have different ways of talking about their expertise than non-accredited experts, and these differences may obscure communication.

To gain a deeper understanding of the effect "talk" has on the experience of participants in a collaborative project, Harvey's study proposed discourse analysis as a framework for evaluation. Through analyzing the discourses used in dialogue that takes place in collaborative participation, Harvey noted that researchers can obtain a further sense of the "experience of being a participant" and can gain a deeper understanding of the difficulties that arise practically in participatory situations (145). The present study responds to Harvey's observation that existing research does not account for what actually happens in participation projects and how the communication that goes on influences the proceedings and outcome. This study of the transcripts of a participation project that includes both farmers and scientists provides an accurate representation of what goes on in the room itself and attempts to characterize those goings-on in terms of the ways that farmers and scientists express themselves differently even when discussing the same topics.

High-level participation mechanisms in which face-to-face dialogue takes place have an inherent difficulty that has gone under-studied: the problem of talking. Experts with different backgrounds and experiences may have different ways of talking about, and subsequently thinking about, their knowledge that complicates and obscures

communication. Seen in this way of understanding, the focus on which mechanism allows for the most "open" discussion does not get at all of the problem; open discussion and face-to-face dialogue, for all its benefits (which I do not deny), also exists with a set of problems that have heretofore gone unexamined in participatory assessment research. These problems exist beyond issues of early involvement, fairness, transparency, and genuine influence on policy. Even when undertaken with good will, dialogic participation mechanisms can be complicated by problems of talking that are not made immediately clear even to the researchers and participants themselves as they experience it.

The goal of this work is to develop ways of identifying and characterizing the issues of talk that take place in high-level mechanisms through a discourse analysis of a group of Iowa scientists and farmers as they engage in a participatory biofuel production project. Unlike many attempts to close gaps between expert knowledge and public understanding, this approach is not to close the gap in only one direction—by helping the public to understand the technical knowledge of the experts, for example—but instead to show that communication barriers exist on both sides. I hope to illuminate the different ways of talking about and thinking about their expertise that collaborative project participants use that makes communication difficult and that therefore complicates participatory processes.

CHAPTER 2:

RHETORIC AND TECHNICAL COMMUNICATION LITERATURE REVIEW

The communication difficulties created by talk are not necessarily problems of clarity or problems of logic. That is to say, the different ways of talking used by participants creates problems of understanding and acceptance that cannot be remedied merely by extra careful explanation. There are more complex issues at play. In fact, what counts as clarity or logic is not neutral or universal, but differs across intellectual groups.

Every individual, of course, has his or her own unique way of talking. What makes "talk" an important object of investigation in citizen participation is *not* that different ways of talking is necessarily a significant problem from person to person; rather it a significant problem from community to community. Different communities share ways of understanding that make differences in expression used by community members non-problematic, because deeper language patterns and frames of reference are familiar and shared by the group that facilitates communication. Communication across different communities, thus, involves not just different ways of talking—instead, it positions different ways of talking, understanding, value systems, deeply-entrenched rules of communication, and ways of thinking against each other, and asks them to come to mutually beneficial agreements. What occurs in citizen participation, then, is more

than talk. It is an experience of trying to make your own position understood while also understanding another, which may be unfamiliar and strange.

I am thus bringing "talk" under investigation within citizen participation research. To explore this topic, research in rhetorical and professional communication offers analytic tools as a basis for investigation. These concepts offer us, in short, new ways to talk about the "talk" that goes on in citizen participation situations.

Reader Response Theory and Interpretive Communities

In literary theory, a conversation began in the early 1960's concerning the appropriate way to interpret a text. In response to this argument, Stanley Fish wrote a groundbreaking article in 1976 entitled "Interpreting the Varorium." Though Fish's argument focused on the reading of texts and not on the nature talk, his findings are useful here. Fish argued that no text has an inherent meaning inside of it, but rather that individuals interpret texts based on cultural assumptions that they develop as members of particular *interpretive communities*, or communities that share similar strategies of interpretation. Fish argued that existing inside of interpretive communities gives individuals particular ways of actively making sense of texts. For Fish, this theory explains why some readers develop the same interpretation of a text: these people share similar interpretive strategies, and as such their interpretations of texts tend to be similar. More interesting for us, it also explains why members of different interpretive communities develop different interpretations of the "same" text. Another valuable contribution of Fish's argument is his insistence that because of the existence of interpretive communities, there can be no such thing as an interpretive strategy that is

natural or universal—rather, *all* interpretive strategies are learned and contextual (484). It may be easy for one member of an interpretive community to see his or her own ways of interpreting information as the natural way, because that is the way that he or she has learned to see as natural. But, Fish insisted that all interpretive strategies are learned. And, because of the learned nature of interpretive strategies, "communication is a much more chancy affair than we are accustomed to think it" (484).

Discourse Communities

In 1992, Patricia Bizzell drew from Fish's theory of interpretive communities to develop a theory of *discourse communities*. In "What is a Discourse Community," Bizzell offered a definition of a discourse community as "a group of people who share certain language-using practices" (222). While Fish's term "interpretive community" primarily emphasized the ways that readers interpret text, the term "discourse community" focuses on a community formed by the way it uses language. These terms are of course not mutually exclusive, because members of different discourse communities do a good deal of interpreting work as well. However, discourse community is a term more suited to the purposes here because it links people together by the ways that they use language—that is, people within a particular community develop a shared discourse, a shared way of speaking and understanding one another. Bizzell argued: "stylistic conventions regulate social interactions both within the group and in its dealings with outsiders . . . [and] canonical knowledge regulates the world views of group members" (222). The theory of discourse community also differs from the theory of interpretive community in that the term "discourse community" tends to put more emphasis on the practical knowledge and

experience that specific communities gain that forms their different ways of using language. But, for either term, neither language use nor practice takes precedence over the other.

Jonathan Swales' research on discourse communities begins to get into this concept of work and practice and how work relates to discourse more deeply. Indeed, Swales argued that a discourse community is a group that uses language to accomplish shared goals or perform work in the world (5). In her discussion of Swales' work, Bizzell remarked that these communities participate in a discourse "that encourages a certain kind of thinking," suggesting that community members both speak and think in shared ways (227). This research heartily agrees. It is the practices of these groups, the interpretive strategies that they use to do their work and to communicate about their work to one another that necessitates a particular and shared way of thinking and communicating. These shared communication patterns also necessarily becomes second nature to the members of the community. As Bizzell suggested, "ultimately, discourse community membership probably affects a person's world view in ways of which the person must remain unaware on a daily basis, in order to participate comfortably in the community's work" (227). It is precisely because of these learned and often difficult to recognize worldviews that people within communities share that makes deciding what counts as authoritative across communities problematic.

Swales' theory of discourse communities offers to this study a way of thinking about specific language practices as group members use them in an effort to get their work done. These groups are not members of the same discourse community because they share language practices—rather, they have developed shared language practice to

work successfully within their communities. Thus, studying discourse community theory allows us to think about the communities in which people develop and share practices that allow them to do shared work and how people within these communities interpret, talk, argue, and interact in ways that reflects the shared purposes, values, and strategies that frame their work.

In her exhaustive review of research on discourse communities, Leslie Olsen characterized the studies as an exploration of "the ways values, assumptions, and methods shared by [members] in a given community . . . affect the type and nature of communication produced and accepted by [members] in that community" (181). That is to say that members within a community that does shared work may rely on shared values and assumptions, without necessarily realizing it, that shape the way they think and speak about issues related to their work. Olsen described that research on discourse communities can be particularly beneficial for study of specific *communities of practice* because such research "focuses on the communication between individuals or within groups in the workplace and on how the contexts in the workplace affect and are affected by the writing and speaking that occur" (181). The hope of this research is that illuminating the speaking and thinking practices within specific communities will help to make communication across communities more effective.

Communities of Practice

Both of these terms—interpretive community and discourse community—generally describe groups of people who share similar communication practices. However, the term "community of practice" most nearly gets at the concept of

communication this study illuminates. People in communities of practice belong to a community insofar as they work on similar problems and perform similar practices, that is, do similar work. As such, they form practice-specific, community-specific, communication patterns that enable them to do their work with ease. In this study, I analyze two groups with very specific practices: a group of scientists and a group of farmers. During a participation project, while these groups sit at the same table and work on the same problems, they still remain, nonetheless, members of separate communities of practice with already-established "languages" representative of and specific to that community. Lave and Wenger (1991) enforced this point exactly by discussing the experience of newcomers who join a community of practice—for whom "the purpose is not to learn from talk" but rather "to learn *to talk*" (109)—to learn the language of the group that enables help them get their work done.

Herndl et al. (1990) demonstrated the difficulties that can arise from communication across communities of practice in their article that investigates the role of "communication and social structures" (280) in the disastrous launch of the space shuttle Challenger in 1986. In the initial accident report of the tragedy, a "breakdown of communication" was cited as a contributing factor. Herndl et al. showed that miscommunication and misunderstandings occurred partly as a result of the specific linguistic practices of members—taking the form of emails, memos, and the like—within technical groups, as "technical people tend to distinguish themselves from managers linguistically" (280). They thus found that members within distinct social groups—even working within the same organization—can develop communication practices that may lead to problems of miscommunication or misunderstanding across

social groups (303).

Such communities, which this research terms "communities of practice," develop a shared language structure that enables smooth, unhindered communication to take place within the group, but does not necessarily translate well to those "outside" the group. As Lave and Wenger described, group newcomers must not only learn to do the work, but to talk the talk. Citizen participation mechanisms in which different communities of practice must communicate is therefore much more than a group of people working together—it is group of people who must learn to talk to one another so that they can work together.

Earlier, this research argued that face-to-face participatory mechanisms call for a variety of processes involved in talk, including *describing*, *listening*, *understanding*, and *accepting*. By now it should be clear that these processes are more complicated than they might immediately appear. But it is not enough to acknowledge that ways of talking within particular communities exist; we must also acknowledge, as Herndl et al. did in their study of the Challenger tragedy, that the communication barriers that separate different communities of practice sometimes *cause problems*. The discourse analysis presented in the next chapter explores how this rhetorical reality is manifest in one case of public participation in technology assessment.

CHAPTER 3:

DISCOURSE ANALYSIS OF A PARTICIPATION PROJECT

This chapter describes the communication practices of a group of scientists and farmers based on a qualitative analysis of their participation in technology assessment workshops concerning sustainable biofuels in Iowa. The overall analysis identifies several distinct communicative tendencies exhibited by each group. These discursive tendencies are presented and categorized in this chapter. A description of the methods used to identify and categorize these language patterns is introduced below. Then, the distinct tendencies and language patterns observed in the discourse of each group are presented. Following this categorization, a succinct overview of the general observed patterns is outlined. Finally, the conclusions of this analysis in terms of the importance of discourse in public participation projects, as well as suggestions for further research are presented.

Methods

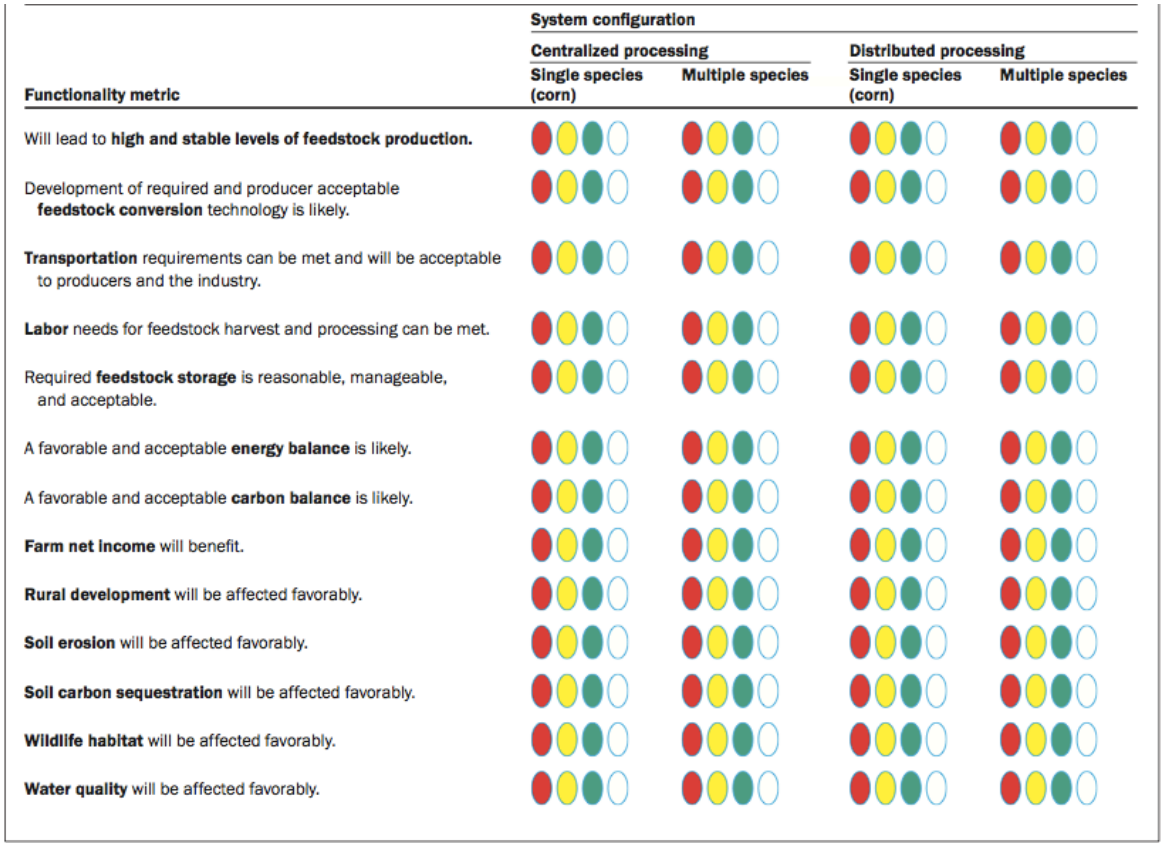
This focus group workshop was undertaken in an effort to address the challenges facing the cellulosic biofuel industry in the United States. Prior to its start, the project received approval from the Iowa State University Institutional Review Board, and following its conclusion, the implications of the project on sustainable fuels were presented in Cruse et al.'s article, "An Assessment of Cellulosic Ethanol Industry

Sustainability Based on Industry Configurations," published in the *Journal of Soil and Water Conservation.* Cruse et al.'s work is the starting point from which the transcripts and thus the following discourse analysis come. As such, for purposes of clarity, the following brief explanation of the project and its goals comes directly from their work.

> Renewable liquid fuel goals for the United States are based on a combination of fuels produced from starch, oil seed crops, and cellulose. The biodiesel- and starch-based ethanol industries are arguably fully developed, although there may be future market-based expansion or contractions. While this segment of our renewable liquid fuel portfolio is significant, it is overshadowed by the expected ethanol contribution from cellulosic sources (CAST 2007; Perlack et al. 2005). Thirty six billion gallons of renewable fuel is currently mandated by 2022 (Energy and Natural Resources Committee 2007), of which approximately 21 billion gallons will originate from cellulosic sources, assuming suitably rapid development of this technology occurs. The Energy Independence and Security Act of 2007 indicates that cellulosic ethanol will enter the market in substantial quantities by about 2016 (Sissine 2007), but in 2011, there were few independent commercial suppliers of this fuel. This presents a challenge to the cellulosic biofuel industry, although it provides a window of opportunity to bring vision, policy, and science together to guide the industry's sustainable development. (67)

Thus, during their participation in the project, the farmers and scientists met with a research team in separate groups for daylong workshops to discuss biofuel possibilities and preferences and to provide knowledge based on their expertise. Each workshop was

structured by an identical matrix that described four potential configurations of the emerging cellulosic biofuel industry, shown below as Figure 1.



Functionality metric	System configuration: Centralized processing — Single species (corn)	Centralized processing — Multiple species	Distributed processing — Single species (corn)	Distributed processing — Multiple species
Will lead to **high and stable levels of feedstock production.**				
Development of required and producer acceptable **feedstock conversion** technology is likely.				
Transportation requirements can be met and will be acceptable to producers and the industry.				
Labor needs for feedstock harvest and processing can be met.				
Required **feedstock storage** is reasonable, manageable, and acceptable.				
A favorable and acceptable **energy balance** is likely.				
A favorable and acceptable **carbon balance** is likely.				
Farm net income will benefit.				
Rural development will be affected favorably.				
Soil erosion will be affected favorably.				
Soil carbon sequestration will be affected favorably.				
Wildlife habitat will be affected favorably.				
Water quality will be affected favorably.				

Figure 1. Configuration matrix. For each cell in the worksheet, participants were asked to mark red if a configuration suggests major challenges will likely occur, yellow if a configuration suggests caution is advised or if insufficient information is available to draw a reasonable conclusion, green if the configuration currently offers or will likely offer a favorable opportunity, and white to signify no opinion or not applicable. This matrix is presented elsewhere in Cruse et al. Copyright permissions for the redistribution of this figure are listed as Figure 2 in this piece and can be found in Appendix A.

Workshop participants were asked to evaluate the long-term sustainability of each of the four likely industry configurations according to thirteen environmental, social, and technical criteria listed on the matrix. At the beginning of each meeting, each group was given a copy of the matrix to fill out through the course of the day. The criteria and

biofuel options listed on the matrix, as well as a corresponding agenda (see Table 1), which served as a guide for the conversations during the focus groups.

Table 1. Meeting agenda sent out prior to the farmer and scientist focus groups.

I. We will have a broad conversation about the biofuel industry and the issues you think are important from the perspective of long term productivity. We will organize this conversation with the following three questions:

1. In your view, what issues do we face today in developing the biofuel industry? From a producer's perspective, what are the important issues, both opportunities and problems?
2. How would you describe a biofuel production system that can function over the long term without degrading the resources on your farm and in your community?
3. How do you feel about government policies designed to guide producers toward specific kinds of practices? For example the CRP program?

II. We will review the results of the survey that you and other producers filled out at Rick's talk at the ICM conference. And we will discuss the matrix and your thoughts about the matrix. We will organize this conversation with the following five questions:

1. Here are the results of the matrix that producers filled out at the ICM conference. What do you think this response means?
2. Which pieces of the matrix are most important to you as a producer?
3. Are there things we have left out of the "matrix"? Issues that you think are important to long term functioning of biofuel production that we have overlooked?
4. What concerns do you have about removing residue from fields?
5. What would constrain residue removal from your fields?

III. We will present the results of a workshop with scientist that we conducted here at Iowa State evaluating the functionality of the same matrix. And we will ask you to share your thoughts about this scientific evaluation. We will organize this conversation with the following three questions:

1. What pieces of the scientists' evaluation do you agree and disagree with?
2. If you disagree with the scientists' evaluation, would you share your thoughts with us?
3. What would make the system recommended by the scientists acceptable and practical for you on your farm?

IV. We will open the conversation on the issue of policy and how you think it should be developed in the context of biofuel production. We will organize this conversation with the following four questions:

1. What are the pressing issues that you face on your farm that you think policy makers should include in their consideration?
2. What kind of policy would you like to see that would encourage a functional system?
3. What kind of policy incentives would you like to have?
4. What ways might producers such as yourself participate in policy discussions and development?

*This agenda framed the discussion of both groups, so the topics under discussion were the same for each.

The participants were chosen based on their expertise and knowledge of the area in an effort to gather the best existing knowledge about biofuels and surrounding issues so as to inform decision-making regarding sustainable biofuel use in Iowa. The scientists were invited to Iowa State University to participate in an annual Integrated Crop Management Conference at which they had been asked to give talks because of their reputations, publications, and expertise. Fourteen scientists participated in the workshop, and their areas of expertise reflect the particular areas of focus under discussion during the project. Each scientist present was an expert in at least one of the thirteen criteria areas given in the matrix criteria that guided the group discussions (as shown in Figure 1). Their specific areas of expertise include "agronomy (2 representatives), soil science (2 representatives), engineering—conversion (2 representatives), sociology (2 representatives), forestry (1 representative), wildlife biology (1 representative), engineering— harvest and transportation (1 representative), engineering—feedstock storage (1 representative), engineering—conversion plant design (1 representative), and economics (1 representative)" (Cruse 68).

The farmer-participants were selected by Dr. Rick Cruse, the Principle Investigator and organizer of the project, who has been working with Iowa farmers for over 30 years. From a group of 145 farmers who attended a 50-minute session of Iowa's Integrated Crop Management Conference, a group of five farmers and one seed-developer (hereafter simply referred to as farmers) were invited to participate, selected based on their own interest in participating in the workshop (Cruse 69). All of the farmers but one came from Iowa, and all of the farmers from Iowa came from different parts of the state. Many of the farmers who were invited to participate had been farming for over

40 years, though a few had begun farming more recently. All of them identified themselves as members of the farming community.

Because each workshop was structured by the same research instrument and evaluative criteria and mediated by the same researcher, the goals and topics each groups talked about were the same. The discussions that took place in these workshops were recorded and then transcribed into a set of transcript texts, which were used as the basis of this analysis. The transcripts consist of five documents. Three documents comprise the discussions that took place during the farmers' meetings, and two documents comprise the scientists' meetings. The body of text representing the farmer transcripts consists of 180 pages, which corresponds to 16 hours of conversation. The scientists' transcripts include 106 pages of text, representing 7 hours of conversation. The whole transcript body makes up 286 pages of standard formatted text (Times New Roman, size 12 font, double-spaced) and represents 23 hours of conversation.

To code the transcripts, a team of two readers worked independently to develop a list of coding themes for qualitative analysis. The two readers then met together to code in order to achieve inter-rater reliability. The farmers' and scientists' transcripts were coded independently using the developed master list of coding schemes. We then narrowed our selection of coding categories from each set of transcripts to coding schemes that reflected significant differences between the talk of the two communities of practice. Finally, we used these contrasting categories to code the entire set of transcripts. The final coding of the entire transcripts was performed by the author.[1]

[1] This thesis is, as stated, as a response to a focus group done in Iowa that was organized by Dr. Rick Cruse and Dr. Carl Herndl. The thesis has been written by the author as a portion of a larger research project and with the intention of revising it as a co-authored article consisting of three authors, including Dr. Carl Herndl, Sarah Beth Hopton, M.A., and myself.

For example, the initial list of coding categories included the themes “past” and “future” for qualitative analysis—indicating that the readers would read the transcripts with attention paid to the ways each group spoke about the past and the future. When this coding scheme was applied to the initial reading, we found that both groups asked questions about the past and the future, but they did so in different ways. This led to the development of an “active” versus “passive” coding category, which resulted from our observation that scientists tend to discuss the future passively, discussing what *may happen* and what needs *to be done*, whereas farmers tend to ask active questions, as in what *will happen* and what someone *is doing*. The entire set of transcripts was then coded using the contrasting “active” and “passive” categories as one frame for the analysis. The other coding schemes used for analysis of the transcripts were similarly developed in this way, and include the following contrasting themes: (i) abstract versus concrete, (ii) global versus local, (iii) formal versus personal, and (iv) general versus specific.

The texts from the transcripts used for the discussion below have been slightly altered, where appropriate, to most accurately convey the speaker’s intended meaning and to improve clarity. Some words, especially insignificant utterances characteristic of informal speech like “um” or “uh” have been omitted for these purposes. No quotations have been given out of context, and the omission of text from any of the quotations in no way alters the original meaning of the language. Also for clarity, some words have been inserted into the transcribed quotations. These instances are identified through the use of brackets.

The following analysis provides an overviewed discussion of the speech patterns observed in each group’s meeting based on the qualitative methods described above.

Discourse Analysis Overview

Order in the court: Structuring the conversation, forming definitions

The scientists' first meeting begins with order. The research team leader begins by introducing the agenda, explaining the day's goal of eliciting expert opinions, and introducing the workshop moderator. The research team asks for permission to record the workshop and then distributes the matrix on which group members are asked to note their preferences regarding fuel sources. The moderator also hands out the workshop agenda (see Figure 2 above) with the order of discussion itself determined by the participant's schedules. One scientist requests that the order of the conversation be altered so that the issue of "actual feed stock" be discussed last. When there are no objections, the moderator alters the discussion agenda accordingly.

Once the order of the discussion is decided, the research team leader explains the parameters of the selected topics. One scientist asks if the issues will be considered at a national level, not just a state level; the answer is yes. One participant is unclear on what types of fuel are under discussion and asks for clarification,

Scientist Speaker 1: So we are focused clearly on liquid fuel production by cellulosic means?

Team Leader: Liquid fuel I think is not imperative at this point in time. So fuel.

Scientist Speaker 1: What's that?

Scientist Speaker 3: So are you going to broaden that to any kind of fuel?

Team Leader: I wasn't expecting that question. We were intending to talk about production ethanol through cellulosic means . . . If it

> emerges from the conversation . . . we are perfectly happy to be educated. But to start with I think we are going to focus on cellulosic ethanol."

Throughout the conversation, more questions arise concerning the scope of discussion—later someone asks "Is starch part of this?" referring to existing starch-based ethanol production. The answer is no. The second half of the meeting following the break begins in much the same way, with the order of the discussion decided and any changes in structure proposed by polite suggestions like "I would like to violate perhaps the order of things." The value-system of this group in terms of communication can be tellingly summed up by one speaker's comment at the end of the "What is fuel?" discussion. He says, "As long as we understand the rules at the beginning, then that is okay with me."

Rules, order, and definitions are clearly important to the communication style of the scientists. Defining the parameters of the conversation is a natural part of the discussion for them. They take the time to precisely define what is under discussion and to ensure that those parameters are made clear to everyone, as these parameters guide for the group what will be discussed and what will not. Questions raised that are outside the scope of the conversation are seen as irrelevant. When someone asks, "Is there any infrastructure to transport these materials in rural areas and in the country?" The answer is "Not at the scale we are talking." The answer is not yes or no—the answer is that *this is not part of our discussion*.

This structured approach to conversation continues through the whole of the scientist transcripts. A great deal of time is spent creating and clarifying definitions of the

terms under discussion. In addition to defining what counts as fuel, they also discuss the definition of the *distributed* versus *centralized* industry configurations that structure the matrix; they distinguish the term *processing* as referring both to "partially energy densified" and "processed completely"; and they question "what we mean by a biorefinery." One scientist even asks for a distinction between the distributed processes for single species and multiple species, and a discussion follows to clarify the distinction. One scientist criticizes the use of the term "byproducts" and suggests that the term "co-products" is more accurate, because the products are "going to go back to maintain the soil that sustains the human population . . . and I would prefer to call it a co-product rather than a waste product." Spatial parameters are questioned as well. "I got a question more related to the distinction between distributed and centralized," one scientist asks. "I was wondering where do we draw the line on this thing. Are we talking about distributed as soon as we get to a radius of 20 miles or less? Or we do we have some kind of sense of that?" Tellingly, the research team leader responds by referring to the technical analysis in the most recently published economics analysis of biofuel feedstock transportation.

The scientists thus begin their discussion by meticulously delineating the objects under consideration, and those parameters are maintained throughout by additional clarifications and distinctions and narrowing of definitions. For example, late in the discussion, one scientist suggests that "the word diversity is something that has got to come into our vocabulary" during their discussion of distributed systems. This launches a discussion of "diversified crop rotations," which itself cannot be proceeded with until the terminology used to discuss carbon in the soil is clarified; this is then done through a

discussion of the distinction between "carbon balance" and "carbon sequestration," and how those terms express carbon levels in the soil in different ways.

Similarly, the scientists break other concepts down into component parts as well; one example of this is the concept of " precision conservation" which is discussed in terms of its practice at the "institutional" level "as well as all the way down to the individual farmer." Another example is the use of the term climate change, which in one instance is separated into two separate components identified as "mitigation" and "adaptation." Finally, the accuracy of terms is strictly adhered to and self-enforced by the group. In an exchange held late in the discussion, one scientist politely corrects another's use of the term "most farmers:"

Scientist Speaker 1: Most farmers in Iowa have GPS systems and they use them.

Scientist Speaker 2: I am going to disagree with you.

Scientist Speaker 1: Okay.

Scientist Speaker 2: I am going to disagree with you from this standpoint. Most of the acres in Iowa may be under a GPS system, but most farmers is the wrong term.

This way of talking, characterized by a shared insistence on technical accuracy, precise definitions, and methodological clarity, is vastly different from the structure of conversation identified in the farmers' transcripts.

The conversation amongst the farmers begins similarly enough—each person is given a copy of the matrix of the likely industry configurations that structures the conversation and instructions for filling out the matrix. But there, the similarities end. No one asks for a definition of what counts as fuel. The participants are not immediately

interested in defining the parameters of what they are talking about—instead they focus for the first several minutes on whom they are talking to. Carl introduces himself as the mediator. Mark and Eric are brothers who share a farm. Jossie is here to learn. Jim is a retired farmer. They go around the room, giving brief introductions, and explaining the various reasons why they are participating. Then it is decided that Dave will stand up and talk about "the critical issues" and then the group will discuss them together. No one asks for a clarification of the area to which these issues are applied, or the time frame from which the issues are chosen. Dave stands up and talks, and the group listen for a while. The conversation then flows organically from there, with comments from the group arising spontaneously in response to the natural flow of the discussion, in a fairly logical order, but with the conversation carried out in *general*, rather than strictly defined, terms.

For example, unlike the scientists, the farmer group does not discuss the distinction between centralized and distributed systems, nor do they discuss the intricacies of the terms carbon balance and carbon sequestration. These terms are used in their discussion—but the definitions are assumed to be understood by the group and are not explicitly expressed.

The "general" manner of discussion characterized by the farmers can be seen in the exchange that takes place after the first speaker, Dave, ends his initial account of the major issues. He offers the floor to the group, saying, "I am going to open it up for questions." The first farmer to respond to this invitation offers not a question at all, but rather "an idea that I have been kicking around here and [that] you have been talking about as well." He then continues to express that idea, which he presents as "I think one possible answer" to the biofuel issues that Dave has just brought up. This is strikingly

different than the manner of exchange seen in the scientists' discussion, which tends to discuss definitions of issues before the issues themselves. The farmers, however, are comfortable discussing concepts without the need for definitions.

Despite, or perhaps because of their comfort with correcting one another during discussion in order to maintain clear boundaries, the scientists' speech patterns also exhibit an observable attention to courtesy and decorum that is not seen in the farmers' way of speaking. At one point, for example, one scientist group member interrupts a line of inquiry by politely asking, "Can I put a piece of housekeeping business on before we pursue this really useful question?" The scientists demonstrate a tendency for order regarding not only what is spoken about, but also regarding who does the speaking. They take turns. The discussion is characterized by deference between group members, and there is a high occurrence in the transcripts of phrases like "excuse me" and "you're the expert" within the scientist group. In a number of instances, before a speaker is changed, someone says something like "if I could add to that," framed as a request. If an interruption does occur, the interruption is accounted for. "And I'm sorry to cut off your question," one scientist apologizes, "but I wanted to make sure we could actually capture the discussion. Sir."

The discussion among the farmers is not done in this way. The farmers talk over one another and frequently interrupt. They do not *request* to add to the discussion as the scientists do ("If I could…"); rather, their phrasings are more blunt, taking the form of direct statements like "I am going to add to that." There are also a number of places in the farmer transcripts where the content is inaudible because too many people are speaking at once. Interestingly, however, the farmers do seem to exhibit deference to one another

through frequent use of the first names of the group members to whom they are speaking. Also, notably, unlike the scientists, who cannot make concrete claims without formalized, time-consuming observation without risking professional credibility, the farmers live in a world where not speaking up immediately is costly, and sometimes even deadly. Because of this, the group of farmers does not exhibit any frustration or uneasiness toward interruptions. Instead, interruptions are an unremarkable part of the discourse and is accepted by the group without tension.

Here's what I figure: Measurements, figures, predictions, and uncertainty

"In the next ten years there'll be 300 bushel corn…"

"I don't think that's that far-fetched."

"No, I don't either. I think."

"I think you'll see 300 bushel corn."

"I think you're right."

(A conversation amongst farmer speakers)

Perhaps not unsurprisingly, the group of scientists who took part in this project shows great care and precision when discussing data, figures, and measurements. This is significant because conversations about "possible scenarios" regarding biofuels and related issues are a large part of the talk that goes on in the scientist group. The term "scenario" is of course not unique to science, but the use of scenarios as a rhetorical commonplace comes from the prominence of models and modeling in science. In fact, scenario analysis is very commonly used by the fourth IPCC report on the future of

climate change, a report mentioned by this group of scientists several times. Scenarios are thus a daily familiarity to the scientists.

To discuss scenarios, the scientists use a number of figures and variables. A definite emphasis can be seen on the importance of representing these figures *with precision* whenever possible, even when these figures relate to hypothetical situations. If during the course of conversation a figure must be discussed that is not certainly known, the scientists make note of it. Someone says, for example, "this is more of a personal bias and not really with data to back it up." Or a speaker who is not confident in his figure asks another group member, "can you back me up on that number?" In one case, a participant incorrectly estimates the acreage of an average farm and is corrected by a group member:

Scientist Speaker 1: A 640 acre farm [may] need a 10 ton per day plant.

Scientist Speaker 2: I believe the average farm set is 355 acres.

Scientist Speaker 1: Is that what it is? Okay I'm sorry. 355 then.

When uncertain figures must be discussed, the scientists clearly struggle with and are uncomfortable with the imprecision. This can be seen in a discussion about distribution related to cost:

> I realize that this is not very precise, but the definition of distributed is going to depend on cost per bale, and a distributed system is going to function [differently] if you are paying $35.00 as opposed to $65.00. So if you can live with imprecision we are going to have to ask you to do that. (Scientist Speaker)

Precision is such the rule that there is the possibility a scientist could not live without it.

The farmers, in contrast, do not talk this way during their discussion groups. They talk much more frequently in generalities—they use general terms like "such and such a date" and "who knows where it will lead to." They make general assertions like "it's a moving target figuring out what the gain versus loss is" and "the soil loss in Iowa has to go up again." They use imprecise figures like "thirty-some dollars" or "x dollars." Unlike the scientists' way of speaking, the farmers' terminology is vague and non-definitional, and they seem to be comfortable talking in these general terms, which is shown by the reaction of the group members when vague terms are used. For example, one farmer says, "I think it's going to come to the point where government or policy makers, the EPA, whoever, is just going to look at that producer and say, 'You know what? You're above *this* level and, and *here* you're fine,' and I think that's where the road will end up going down to [in] my honest opinion"—where the terms "this" and "here" refer to imaginary unknown figures. In response, a second farmer speaker says simply, "I want to add to that."

This represents a level of comfort discussing vague terms, as the group members rarely ask for corrections, specifications, or more precision. Instead, they are able to even add to discussions based on uncertain figures The numbers themselves, and discussing figures with precision, do not seem to matter as much to them as the issues themselves. Tellingly, there are no instances in the farmer transcripts of a farmer speaker asking for a figure to be verified by data.

Farm versus system: System analysis and concrete issues as systems

This category is a perfect characterization of the "different ways of thinking" behind "different ways of talking" that can create communication difficulties in participatory projects. When a farmer thinks about and talks about his farm, he thinks of it in a number of ways. He thinks about the crops, the feed, tilling and watering the soil, harvesting, selling, making a profit, taking care of the land, and he thinks of these activities in relation to himself. Scientists, however, discuss these same issues in a different way. They discuss a farm, for example, as a system, or, in their own words, they "talk about creating a system from the farm … [for which they] have to create the parameters for decision metrics." Perhaps not surprising from a group of people that speaks in an orderly fashion, the scientists also often discuss concrete issues in terms *components* that can be arranged in a variety of ways. For example, scientists see decisions related to biofuels as determinable by sets of parameters and metrics regarding the farm "system" and the different ways that the system can be arranged. This distinction between a "farm" and a "system"—two terms that the groups use to essentially refer to the same thing—illustrates the powerful change in thinking that corresponds to a change in terminology. A farm, for example, is a place you can visit. You can stand on the grass, sit on the ground, and dig your hands into the soil. A system, however, is a not a place—it is a thing, a grouping of parts that can be analyzed. You can't visit a system; you can only talk about it.

In the transcripts, scientists tend to break down issues into "systems" made of various components and then describe them as such. For example, in one instance they describe issues of transportation in this way: "Basically, we are [discussing]

transportation as a bit of combined system. It [is] done with transportation materials and the distance we have to travel. And because of the density of the materials that basically brings in two issues . . . ". This is a very propositional way of describing the transportation of actual goods. Thought of as a system, transportation is made up of materials, distances, and figures related to weights and densities. It is a problem of logistics. The scientists' use of the words "because of…" and "so…" are markers that indicate a particular arrangement between the system's components. In contrast, farmers, who discuss the same issues, and even talk about systems, talk about them using much more concrete terms. One speaker describes,

> But as far as the organic matter, I agree with you guys, that I think you're going to have to start seeing more cover crops, and double cropping systems in Iowa, where with those, I think there is a great advantage as well with water quality because you're take a lot of your nitrogen, and eating up your P and K, so I think that's a plus. (Farmer Speaker)

The farmers are less likely to talk abstractly about "materials" without also describing what those materials are. They talk about water quality and P and K. They talk about *a guy* and *a truck*, including details like a "1972 Chevy truck [gets] 9 miles a gallon." They talk about the reality of "whether there [are] enough trucks" to haul the needed amount of fuel sources. They talk about the time it will that guy to drive that truck, and how if the load materials are dense "it's going to take a lot of trips." They talk about the consequences of "a lot of trucks running through town [when] you got somebody's four-year old daughter riding a bicycle." The difference in these ways of talking is that transportation as a system does not reflect the actual *doing* processes that take place—the

focus instead is on the *done*. The farmers discuss issues like transportation instead in the active, and spend time describing what the doing will look like.

The tendency of farmers to discuss concrete details is not just a result of their own personal experiences with those issues. Actually, in a number of places throughout the transcripts, the farmers acknowledge difficulty thinking in terms of the abstract systems involved in issues of fuel production. One farmer openly discusses his difficulty. "I have a hard time dealing with [this]," he admits. "Realistically, it's quite a bit to chew on. Things are occurring all the time, you know. The pace of change is so fast. I still talk to most people in my own county—it's hard to be aware of some of the issues," he says. Another speaker echoes this same difficulty with tackling the complexity of these large-scale issues, noting, "there's lot's of factors to consider."

I know this guy: Talking globally, locally, and using analogies

Scientists therefore tend to talk about issues on a larger scale than the farmers do, and as such have a more large-scale way of applying outside knowledge to a localized situation. This can be broadly characterized as a "global versus local" way of speaking and thinking. Farmers, for example, often talk about practices they have seen personally, or they use analogies on a local level, referring to a nearby farm, for example. Because the scientists talk in terms of systems, they often use system analogies that refer to other technical fields or that compare far-away locations. Simply put, farmers tend to use anecdotal evidence and local analogies to discuss local circumstances, whereas scientists' are able to apply a wide range of data from the global to the local much more easily.

For example, in their discussion of bio-fuels in Iowa, the scientists discuss situations, materials, and practices all over the world. One scientist describes, "a guy from [the] Peace Core in Canada [who] developed a process where you actually put urea into the biooil and made a super fertilizer." They describe practices done in Oregon, Wisconsin, Missouri, Illinois, Mississippi, Indiana, Minnesota, Nevada, Nebraska, Kansas, Louisiana, Australia, and Africa, as well as possibilities garnered from Monsanto and the *Journal of Agronomy*. When discussing the densification of fuels, they even make a comparison to iPods:

> There is this terrible thing called the economies of scale that nix's the notions of small is beautiful. It is just a very difficult one to address. It is [the] notion that if you build a plant bigger, [then] the unit costs [of] whatever you are trying to produce is cheaper. You can do it all different ways, and it just doesn't work out. There is the one exception and that is producing iPods. You book and go to the factory, and you can capture the economies of scale in that giant factory, and when you can mass-produce small units that don't have that economy of scale, you can [produce a small] iPod or big iPod for the same unit of cost of function. In principle, we can do that with a conversion technology that would allow you to say I can build smaller and still get ethanol produced at the same price if I build in a bigger plant. (Scientist Speaker)

In another instance, there is an extended discussion about the potential application of bio-fuel practices done in Oklahoma:

> In Oklahoma, you bring this sweet sorghum to the side of the field and put it into the trench and put it into the bag and do the fermentation right there and then take

> the beer to a simple facility for distillation. The one possibility that looks very attractive for distributed, in my view, is the motion that [the farmer] could use, something called fast paralysis, on charcoal making that could be done in a small scale and then you would have basically a preprocess of the material in the form that needs to be transportable. It would probably allow you to move it to a centralized processing facility. The next step would be to produce biooils. Without too much effort you can turn solid biomass into a liquid. That could go to a centralized site. All kinds of things you could potentially do with that and it is not clear what that would be. You could produce a green diesel. You could run it through a gasification process and produce power, and you could produce a liquid fuel. You could produce hydrogen from it. The other thing you could do is produce a pure charcoal from that and look at the charcoal as a densified material energy source. And that is what happening in the third world today. It is not done very efficiently but it could be done a lot more efficiently and those all have prospects for distributed processing.

There are a number of notable speech trends that can be identified in this discussion. At first glance, this way of speaking may appear to be dissimilar to the precision and certainty with which the scientists have been described thus far. But here, the scientists are discussing *possible future scenarios*. They are discussing what could be, given a certain set of conditions. The terms used here like "probably," "you could potentially," "the next step would be," "it could be done"—these all represent abstract possibilities, based on the present situation, that are not currently done in Iowa, *but that could be*. The

scientists are able to discuss possibilities for a smaller location based on approaches used in other global systems.

The farmers on the other hand tend to discuss issues locally and personally. They talk about what they know through personal experience. Their evidence is often anecdotal, and the examples they use most often are explanations of their own practices, which are naturally described in a personal way not found in the scientists' manner of speaking. For example, the farmers make statements like "One of the things that we do where I'm at from in Michigan…;" "I work for CARD, and when we...;" "I guess one of the things that we see in southwest Iowa is…;" and "I see it every single day at my job…." Another farmer talks about transportation from his own localized perspective, saying, "Being from Boone, we'll have to put in four or five rails to transport this stuff all over." In another instance, a farmer responds to the question of whether or not farmers would give corn stalks to the ethanol industry by saying,

> I am a minimum no-till farmer and I have been drilling beans and corn stalks since 1991, and the drilled beans yielded just as well the 30-inch row beans, and I cannot see raping the ground of the corn stalks when you all ready got five dollar corn, so you are grossing $600.00 and you think, 'Oh boy now if I bale the corn stalks I will gross $1,000.' Why would I want to do that? Because corn stalks mean so much to me, I will not take them off.

This excerpt shows a number of different things. For one, the language is not only personal but emotional, specifically the use of the term "raping the ground" when discussing cornstalks that "mean so much to me." This personal, experiential evidence frames the way that the farmers see larger processes. For example, one farmer accounts

his confusion over the lack of solutions to biofuel production based on what he has seen over the years:

> I mean any of this stuff that we are talking about today, I honestly have a hard [time believing] that we can't overcome [it]. Growing up on a farm, working with four generations of farmers in my family, and seeing what we have done to the landscape… [they came] across from the east to Iowa, and it [was] nothing but swamp in north central Iowa, and [they got] up one day and [said] 'I am going to dig a ditch from here to Alaska to drain the damn thing so I can farm [my] ground to be productive while we are dwelling here.' For me, it [is] hard to believe there is nothing that we can't overcome. (Farmer Speaker)

Another common way the farmer group uses analogies is to describe the practices of their neighbors or people they know, drawing on knowledge like "There is [this] guy, oh I wish I could remember his name, down in southern Iowa—he does 1,000 to 1,200 acres of cover crop behind his beans every year." However, the farmers seem much more hesitant to discuss practices outside of the local area, presumably out of a concern that the conditions of a different area might not be applicable to Iowa. For example, one farmer notes,

> One guy that I know of—and of course this is Michigan, so we can do it out there, because our climate's different than it is here—but he plants winter wheat, and takes that off in July, and plants soybeans, and still can get 50 plus bushel an acre, but he doesn't have real early frost. (Farmer Speaker)

Done vs. doing: Let me give you a scenario or three…

Because the scientists discuss issues in terms of systems, they talk about system "components" as collapsed terms and therefore can discuss systems on a much larger scale. For example, a driver and his time, driving distance, and truckload are all components that can be described by the single term "transportation." This term can then be applied to a number of scales—it can be scaled outward to apply to a broader system, or inward for a focus on the smaller, but still collapsed, system components—as one scientist speaker breaks it down, "From the transportation side we are looking at both two things. One is the cost issue and there is also the labor issue. "

Both groups collapse terms in this way, of course, as this is a natural pattern of speech that most people use. However, the scientists use this way of speaking much more frequently to discuss broader concepts while rarely discussing the smaller-scale issues within those broad concepts. In this way of speaking, "the cost issue" and "the labor issue" are abstractions; they are spoken of as problems to be resolved. Speaking and thinking in this way causes the scientists' discussion of actions to focus much more on what should "be done"—a passive way of speaking—rather than the more active "what a person does." The groups thus have different ways of talking about "issues." The scientists use additional collapsed terms like "labor" and "logistics" to characterize actions and processes that the farmers, in contrast, spend time discussing in detail. For example, a scientist speaker talks about issues regarding land use by using phrasings like "the logistics of the field" while farmers name those logistics, using phrasings like "I don't know how they can get a plow that close to a fence." Likewise, the farmers describe the "distance issue" of transportation, more concretely, as "a lot of trips with a truck."

One especially interesting finding is the way that each group talks about what sustainability means. Unsurprisingly, in the scientist group, sustainability is described as a complex dynamic between a number of factors. One speaker explains,

> The reason we are discussing cellulosic processes in itself is due to some larger issues clearly reducing reliance on foreign oils, the food security issues associated with that, but there are others that are linked to climate change and the concept of sustainability. When you look at sustainability in trying to work with this concept, one of the problems I have is that we are assuming that the system that we have operated under for the last 20 to 30 years is going to extend lingeringly out into the future, and everything I have read in the IPCC reports is that we cannot afford to make that assumption. There are two key aspects. There is mitigation and adaptation associated with climate change. I think what we are really talking about is adaptation. How do we build a system—and I am talking about both agriculture and energy, food, fiber, an energy system that system is capable of dealing with the climate systems of tomorrow. We can't look at the climate systems of yesteryears as designed with today's systems. We have to look at the climate systems of tomorrow. Extreme events are going to be a critical part of that. (Scientists Speaker)

In striking contrast, for one farmer speaker, sustainability is spoken of in a much more local thing. "Sustainable [agriculture]," he says, "is that you are going to have to take care of your water quality, your soil erosion, and your soil quality." For the farmers, these issues are personal and also active—sustainability is a thing that *I must do*, rather than something that must be done. Indeed, the farmer's describe sustainable agriculture as

something that is “going to be on the producer’s shoulders and I'm going to take that [on] as my own producer.” This is perhaps not totally surprising, because the farmers are, after all, the producers, people who work very literally with the land, while scientists are not.

This ability to separate themselves from these issues on a deeply localized level, however, does enable the scientists to express a better grasp on the interrelationships between complex systems. The global verses local speech patterns identified in the transcripts show that the farmers prefer to talk about what they know first hand or from neighbors. It also shows that the scientists spend a great deal of time discussing possibilities, and they do this through the frequent use of scenarios. In fact, scientists discuss possible scenarios and potential variables more often than they discuss concrete issues. Tellingly, as already mentioned, at the start of their first meeting, the scientists specifically requested to discuss *actual feed stock*—a concrete issue—last.

Rather than discussing actual feed stock, for example, the scientists more often talk about “what kind of system would tell us what kind of feed stock would be needed in terms of transportation quality and conversion.” The system approach to thinking and speaking allows the scientists to imagine several possible scenarios in order to determine the best approach to take. They ask questions like, “What [are] the factors that would make transportation sustainable and functional?” and “What would be the value of corn stock before [the farmers] will consider the grain and the stover equally in terms of the harvest decisions?” These questions are then followed by calculations of variables. For example,

> Lets say we are looking at 200 bushels just to make a calculation. That is making $800.00 an acre. You got $800.00 in the corn. You got four tons so you are looking at $200.00 a ton. (Scientist Speaker)

This is significant in that this way of speaking allows the scientists to discuss these concepts as systems and to discuss the abstract implications of a number of possible scenarios for both a single system and for many systems. In essence, this way of speaking allows the scientists to effectively do their work as scientists.

Money matters: Cost versus cash

The scientists' conversational patterns have been characterized by a heavy use of figures and variables in scenarios. One of the most common variables discussed by the scientists are figures of cost. This is seen, for example, in the quotation above. The issue of cost thus characterizes a very important distinction in the ways that the scientists and farmers speak and think, because largely, for the scientists, money is *a variable*—it is a factor in an equation; the costs related to fuel production are figures inputted into a scenario in order to solve a mathematical problem. The analysis of money in the scientist transcripts is very detailed, but it is hypothetical. It lacks valuation, personal identification, and personal valence. The numbers are abstract, and they carry meaning only within the hypothetical scenario under review. This occurs throughout the scientists' discussion, but can be captured by a few examples that illustrate this general tendency.

In one instance, for example, the scientists discuss the amount of profit necessary to motivate farmers to produce corn stover: "John Tindall was here at Iowa State and I heard him give a presentation yesterday at the bioenergy conference. He has done a

survey of potential stover producers and he indicated on an average that, I think it was, $56.00 a ton [that the producer's] would seriously consider starting to produce a market stover." Here, money is spoken of through its functional role—what is the minimum amount needed for a particular system to work. In another example, two participants are discussing how to determine the best density of fuel for transportation:

> Scientist Speaker 1: What [is] the best density or the break even distance for transportation at today's cost?
>
> Scientist Speaker 2: It boils down to what the present price is. If you are looking at $25.00 a ton—and most of my working force is—we are looking at somewhere to 10 to 15 miles since we are dealing with the breaking point at 35. If you are looking at 65 [dollars per ton], you can probably go after that 35 to 40 miles, but after 35 to 40 miles there is not a very large premium on those outer producers.

Again in this example, money is spoken of in terms of its functionality—what the figures can do for the system. This also illustrates the *If A, Then B* way of speaking and thinking typical in the scientists' discussion. Here, if the cost is A, then B will be possible.

In contrast, farmers tend to talk about money both in terms of figures, but also in unknown, emotional terms, saying things like, "I can't imagine the cost." This way of discussing money has sound reasoning behind it. For farmers, who are the producers of the fuels that both groups discuss, cost represents a personal, not just a mathematical, problem. Money, to the farmers, is more than a figure—it is a mortgage payment.

Farmers thus tend to talk about the costs related to biofuels with statements like

"the ideal would be to make a high-value product from what we're growing and the organic residue that comes from that, enriches the soil as well as our wallets." Also, when discussing money, they tend to get emotional in a number of places. They use words like "outrageous" and "ridiculous," whereas the scientists rarely utilize emotional diction. While the scientists think of "costs," the farmers think of *cash*, and indeed, unlike the scientists, they talk about money in this way, using the term "cash rent" rather than describing money in only numerical terms. The scientists do not use the term "cash rent" even once. This is, of course, perhaps not surprising, as the costs related to biofuels are connected to farmers' livelihoods in a much more direct way than it affects the scientists. As such, farmers ask questions like "If all this corn is going towards exports and for fuel, what's it going to do to your grocery bill?" The consequences are measured directly, personally and in experiential terms.

Interestingly, in this example concerning the grocery bill, the farmer is discussing a system. He wants to know, essentially, *If A, then what about B?—If food is sold as fuel, then what happens to my grocery bill?* He is asking a question about a scenario, about what will happen in the future, but he is talking about this system as a series of a fragmented things; he is not talking about the interconnections of multiple system components. That is, he does not articulate the systematicity of it. Rather than talking about the future as a scenario with multiple future outcomes, he wants to know if one thing happens, then what comes next. He's talking about the future as a result of a sort of linear domino effect rather than as a scenario with multiple possible outcomes. And the potential conditions discussed in his scenario are concrete, local, and very personal.

Stories about the future: Talking about uncertainty and what may happen vs. what will happen

The most straightforward way to characterize the different ways that scientists and farmers speak about the future is to suggest that while scientists talk about what *may* happen, the farmers talk about what *will* happen. Scientists look at potential futures—what may happen under given conditions (variables). As discussed above, farmers are more interested in knowing "What is going to happen?"

The scientists speak about the future as a testing ground for alternatives. For example, Rick Cruse, the scientist lead researcher who organized the workshop, describes that

> Having understood some of the science and some of the research that has been done, we should start to have a decent feeling about [what is going to work and what is not]. When we are asked questions [about] where we should be focusing research dollars [and] where we should be focusing research efforts, if there is one of those configurations or troubles within a set of broad-based configurations, we may want to start shifting resources away from that and towards something else that looks like that it will be more functional.

Here, the scientist is grappling with what will need to be developed in order for things to be made possible. Farmers do not discuss the future in this way. For them, the testing ground is the present, not the future. Again, an analysis of the transcripts shows that while the scientists discuss what *may* happen, the farmers almost exclusively talk about what *will* happen. This determination can be made quite simply by analyzing in what

contexts the different groups use the term "happen." Naturally, they both use the term in a number of ways, but there are some notable distinctions.

For example, in a number of places the scientists discuss "what is happening"—in the third world, in England, in Des Moines, and in Australia. Basically, the scientists contemplate what is happening now in places around the world, again, so as to help them create scenarios of what may be applied in Iowa. The scientists also use this term in a few instances to ask questions about "what happens if" or "when" certain circumstances occur. For example, one speaker notes that "the private sector is spending a lot of money on corn yield increase, and so if you assume if that didn't happen and corn yields are fixed, and then you switched over to switchgrass, then you could revert that completely." In this instance as well, the scientists are describing possible "ifs" in order to predict potential future "thens." And, characteristically, they articulate assumptions about background conditions that must remain fixed.

In contrast, the farmers are much less interested in talking about what may happen and ask many more questions about what will happen. The farmer speakers make statements like:

> *"Do we have enough information to know with various soil, soil types, textures, organic matters, and anything else, what happens under all these scenarios? Do we have good data or are we doing a lot of guessing or what?"*
>
> *"Biooil is new to me, and I have heard the term is not stable. What happens to it, what causes it to change?"*
>
> *"What happens if you use the biomass as fuel to heat the ethanol plants that we currently have?"*
>
> *"I would argue the same thing is going to happen as did happen with corn…"*
>
> *What happens if oil goes down to…"*

"What happens, how fast, [and in what] capacity?"

"What happens if the funding ceases?"

"I don't think it is going to happen."

"We are going to make this happen."

"What happens if I…"

One difference in these speech patterns is that the farmers discuss "happenings" as it relates to *here*—not there. The farmers want to know what will happen, and if they cannot know that, they want to know what is happening right now and how that affects them in their location. Also, unlike the scientists, the farmers position these issues personally, in terms of themselves. The scientists, for example, never say things like "What happens if I…"

In some instances, the farmers do discuss what "may" or "could" happen, but these potential situations are discussed in a different manner than the scientists express them. The farmers do not discuss possible outcomes objectively, as neutral potential scenarios under discussion. Instead, they discuss them more personally and emotionally, for example in terms of their *hopes* about what may happen. One participant muses, "they're doing some research with double cropping, which is, I think, far-fetched in Iowa, I do really think, but it sounds like it actually could happen." The farmers also use this "may/could happen" construction to characterize their *fears* about what could happen. One farmer gives a bit of a "scenario" that characterizes his fear in this way, describing a future scenario in fearful, emotional terms:

> I see it every single day at my job that, once [a farm owner] pass[es] away, it goes to the heirs, and guess what? It goes to the son that lives in Dallas and the

> daughter that lives in LA. And, guess what? They either sell that for a fortune or they're going to hand it over to the local farm manager, and basically what happens then is that [they] want [the] cash rent, [so] when it comes [to needing] to put [in a] terrace or [a] water way or what ever it is, it's like "no way," because guess what? I can buy a vehicle, a brand new vehicle, every darn year, and I want two vacations, and, you know, that's what I mean. It's scary. And it turns into a mine. (Farmer Speaker)

The future thus tends to be discussed in emotional terms by the farmers especially when they are discussing uncertainty. For example, one farmer asks the mediator of the workshop, "What happens two years from now if oil goes down to 50 dollars a barrel? What [is going to] happen to the ethanol industry then? What could happen to corn prices? All this stuff we're sitting here doing, talking about, [is it] going to matter then?" Similarly, later in the transcripts, another farmer posits, "All of a sudden we're talking about making ethanol and chemicals out of residue that may or may not come back as organic residue. And if it doesn't, then we not only have a chance for a lot more soil erosion, but deterioration of the organic matter contents of the soil and declining health of the soil."

Uncertainty for the farmers is emotionally charged and un-measurable; for them, uncertainty tends to be a "yes" or a "no," either black or white, not shades of gray—"Is it going to matter then?" (or not?) Their distrust of the uncertain tends to result in their discussion of uncertainty as a dwelling point and therefore a stopping point, a problem that cannot, or perhaps should not, be worked with, because the consequences are unknown or potentially dangerous.

Scientists, on the other hand, are able to discuss levels of uncertainty much more comfortably. They discuss uncertainty as a means to an end. For example, in a discussion of whether or not farmers will cooperate with corncob biofuel production (a subject of uncertainty), the scientists break down the uncertainty into parts, analyze each part, and move on. For example, they first discuss the issue in the context of "current policies." Then they discuss a scenario in which policy change gives the farmers the incentive to "move away from corn based ethanol," which removes the factor of "willingness"—a main source of uncertainty—from the analysis and allows them to continue the discussion. Next, they consider the uncertainties of plant availability and petroleum alternatives. This approach allows the scientists to effectively work through the issues of uncertainty and incorporate them into their discussion.

General Findings

The ways of speaking exhibited by the scientists and farmers as members of distinct communities of practice have revealed several general patterns within each group's conversations. Some of the patterns of speech described in the categories above overlap and thus are representative of patterns with which that group can be characterized. Generally speaking, these characterizations can be captured by the following succinct categories.

- **Active versus passive:** The farmers tend to use active phrasing, asking questions like "what can I do?" whereas the scientists tend to talk more about what can *be*

done. As such, the scientists often collapse a great deal of active work into a single term, whereas the farmers will spend time discussing that work.

- **Abstract versus concrete:** While the scientists talk in terms of systems and variables, the farmers discuss concrete examples and objects and use personal experience and observation in their discussions, rather than focusing on possibilities or abstractions. Scientists talk in terms of facts and data, whereas the farmers often rely on anecdotal evidence. In addition, scientists discuss monetary figures abstractly, referring to them as variables, whereas farmers talk about money in concrete, personal, and sometimes emotional terms, describing it as "cash" in their "wallet."

- **Global versus local:** The scientists consider global issues as they can be applied to local areas, whereas farmers tend to keep their discussion limited to local practices as applied to local areas. Scientists also discuss issues in terms of systems, using analogies from multiple separate fields to apply to the issue under consideration. Interestingly, this global versus local perspective frames the way the group members define terms. For example, the scientists defined "sustainability" from a global perspective, whereas the farmers defined it locally (and personally).

- **Formal versus personal:** The scientists organize their discussion strictly, in contrast with the loose organizational style of the farmers' discussion. Scientists

spend time defining the parameters even of their own conversations, whereas the farmers discuss issues more fluidly, often interrupting one another or changing topics. The farmers also utilize emotional phrases in their speech, whereas the scientists do not. This is particularly true when the conversation turns to issues that significantly affect the farmers' personal lives, such as cash flow and the state of the land in the farmer's area.

- **General versus specific:** Farmers are able to talk in general terms, while scientists talk with notable specificity. Even when they use hypothetical figures to discuss hypothetical scenarios, the scientists are careful to talk about figures accurately. The farmers on the other hand are comfortable discussing concepts utilizing unknown or vague figures, using terms like "such and such" that are not characteristic of the scientists' speech patterns.

Conclusions

Here I have not described an instance of farmers and scientists talking to one another, but rather I have described the talk of the two distinct groups of people as they talk amongst themselves. Based on this characterization, we have to imagine the difficulties that might arise when these two communities—with two distinct ways of talking—must communicate with one another. Though they are discussing the same issues, they negotiate them in very different ways. When these distinct tendencies are put in a room together, both ways of speaking cannot occur at the same time—one must defer to the other in some way. Compromises must be made. Either one or both groups must

communicate in ways that are uncomfortable for them. The result may be frustration for both parties. The result may also be miscommunication or misunderstanding.

Earlier in this thesis, the discussion and deliberation that takes place during face-to-face public participation mechanisms was described as consisting of several processes:

Participants must describe their own positions to others and often defend them.

Participants must listen to the positions of other participants.

Participants must attempt to understand the position of other participants.

Participants must rely on their own language and language practices to describe their viewpoints, and must listen to and understand the language and language practices of other participants that may be unfamiliar to them.

Participants must ideally accept the positions of others as legitimate as a result of this conversation.

The difficulties with which these seemingly simple processes may be undertaken in a discussion-based participation project should now be much clearer.

The conversational style of the farmers is a more colloquial, fluid, yet chaotic style than the structured, formal conversational style observed in the scientists' discussion. The farmers' way of speaking is also much more personal, emotional, concrete, and localized, whereas the scientists, perhaps unsurprisingly, discuss issues on a range of scales from the local to the global, and discuss them in detached, objective, and precisely-defined terms. This thesis hypothesizes that such differences in discursive tendencies have the potential to impede understanding and acceptance between participants in different communities of practice. This consequence also has the potential to decrease the likelihood that the less-prestigious knowledge and expertise of non-credentialed experts

(in this case, farmers) be acknowledged and incorporated by credentialed experts in a public participation project, thus hindering effective participation. This reflects Futrell's (2003) point, referenced earlier in this work, that participation mechanisms tend to fail that are "highly controlled" or in which the public's concerns "are often marginalized and delegitimated."

This study has shown that differences do exist in the ways that these groups talk about even the same topics is reflective of different ways of making arguments, expressing knowledge, and thinking about their work that is shared within and formed by their own communities of practice. Understanding talk in this way, we can begin to speculate about the consequences that may result when groups from distinct communities of practice, relying on distinct conversational schemes (sometimes unknowingly), must talk to one another.

For example, scientists may feel frustrated if a discussion is begun before the group takes the time to clearly identify what *exactly* will be discussed and to define all pertinent terms. In contrast, farmers may experience frustration over time spent on definitions that takes away from time spent on discussing the issues at hand. Frustrations could easily occur as each side attempts to assert its own positions, which may conflict with the way the other wants to approach the issue. In practice, which group's preferences would be honored? How would a potential communication clash affect the results of the discussion if farmers, urgently interested in discussing current, local conditions, were forced to wait until the end to get those points across? How might that affect the ways that the farmers listen to and perceive the points of the scientists while they discuss future scenarios?

It's also easy to imagine that the scientists might have a negative perception of the farmers' tendency to discuss these issues in emotional terms, or to readily interrupt a line of thought, which is clearly out of synch with the structure and order with which the scientists approach communication. It's also just as easy to imagine the farmers feeling stifled or unable to express themselves freely and clearly when operating under the more organized and structured approach taken by the scientists. Furthermore, it is certainly possible, perhaps even likely, that the objective conversational style of the scientists the farmers feeling that their personal livelihoods are of little concern.

The point that this analysis proves is not that people belonging to different communities of practice cannot communicate with one another at all, or that that they speak different languages—they don't. In fact, this study argues that they often talk about exactly the same things, and they often have expertise about the same issues that enables them, in a beneficial way, to work together to develop informed and robust decisions. But they talk about these issues in different ways. This study applies this knowledge and explores its consequences in the specific context of citizen participation in technology assessment and hypothesizes about likely consequences. Studies of this kind, which apply the concept that no way of talking is neutral or natural to a specific case study, help increase the awareness and recognition of these issues at play in participatory projects. The hope is that this increased recognition can increase understanding and communication across communities of practice and improve the outcome of two-way dialogic public participation projects. In order to gain a clearer understanding of the role talk plays in the successful participation of different types of experts, studies are needed that further identify the discursive tendencies characteristic of particular communities of

practice. Studies are also needed that perform analyses of the two-way dialogue that goes on in a participatory project so as to identify the consequences that distinct language patterns have on understanding, acceptance, and effective participation.

One major limitation of this study is that it does not analyze the two-way deliberation that takes place in a participation project, only the talk that goes on within two groups representing specific communities. The benefit of this is that it enables a clearer picture of some of the discursive patterns that characterize each group; the drawback is that it does not demonstrate the ways these distinct patterns of talk create problems for communication across groups. However, this type of study does accomplish one very important task: it introduces talk as an object of study within citizen participation research. Hopefully, as well, it will initiate further studies that answer Harvey's call to investigate "what goes on" in two-way dialogic participatory mechanisms, so that we can gain greater insight into the way that talk impedes the beneficial collaboration that public participation projects are designed to produce.

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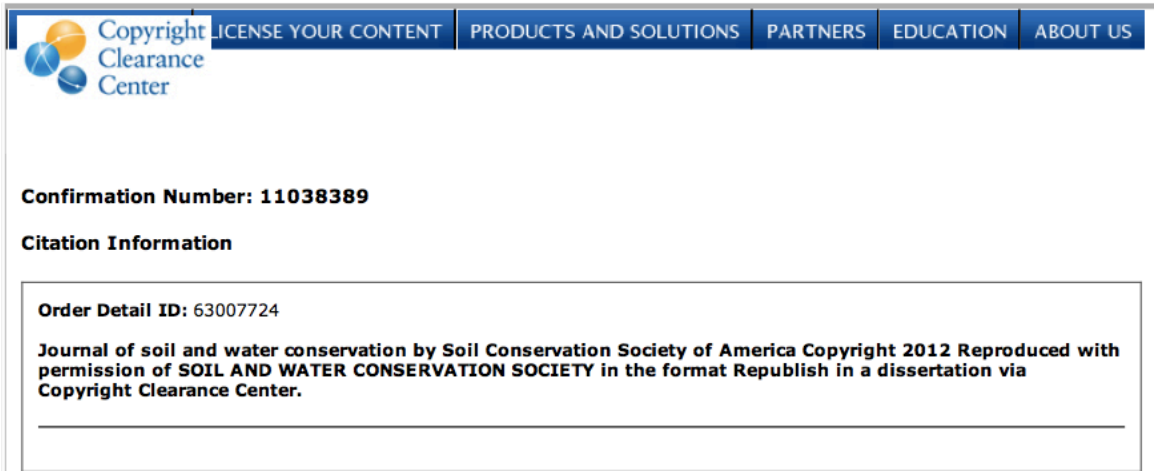
APPENDICES

APPENDIX A: PERMISSIONS



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