

PUBLIC PARTICIPATION GIS AS A CULTURAL PROCESS: CULTURAL THEORY,
PARTICIPATION PREFERENCES, AND GIS-AIDED DECISION MAKING AMONG
FARMERS IN CENTRAL ILLINOIS

BY

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DISSERTATION

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ABSTRACT

This dissertation is a three part examination into the cultural influences on stakeholder involvement in participatory environmental decision-making processes, including public participation GIS (PPGIS), in the context of agricultural watershed management. The dissertation consists of three papers addressing theoretical and empirical questions that contribute to understanding how culture influences the design of public participation processes and affects the involvement of representative stakeholders in adaptive management more broadly. I discuss and develop an innovative theoretical framework called Grid/Group theory that investigates the production of culture in society and reveals different participation preferences deriving from four distinct cultural groups. In the final two chapters, using statistical methods and a GIS aided-focus group, I provide empirical evidence of differences in participation preferences among farmer cultural groups, and diverse understandings of environmental and economic impacts of bioenergy crop development. Results suggest a practical need to integrate participation preferences in adaptive management strategies, particularly regarding farmer involvement, while Grid/Group theory provides a unifying framework for interpreting participants' beliefs and values throughout a PPGIS process.

Key words: Public participation, Public participation GIS, cultural theory, adaptive management, stakeholders, farmers, central Illinois

Dedicated in loving memory of my grandparents:

Julius and Lillian Cope
Isadore and Dorothy Kavka
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CHAPTER 1

INTRODUCTION

INTRODUCTION

Over the past 30 years, environmental management frameworks have shifted from implementing top down regulations devoid of place specific needs and interests to requiring the inclusion of local stakeholders in policy making to better reflect the interconnected set of environmental, economic and social problems within specific locales (Sabatier et al. 2005; Larson and Lach 2007). Passage of the National Environmental Policy Act opened up decision making processes by requiring government agencies to conduct an environmental impact assessment (EIA) before implementing a plan, and include interested stakeholders at the start of the decision making process (Sabatier et al. 2005). The EIA requirement emerged in response to charges by environmental groups that federal agencies manipulated analyses in favor of special interest groups, and it initiated public access policy debates. In water resources, the culture of coordinated management between scales of government emerged in part from the 1972 Water Pollution Control Act Amendments. This act mandated providing grants to local and state agencies for capacity building; included incentives for states to meet designated pollution control standards; and mandated greater federal oversight of state and local water management. At the same time that local level officials acquired greater levels of technical expertise, federal oversight legislation motivated local officials to work more closely with stakeholders to promote compliance with new standards in water quality and water pollution (Sabatier et al. 2005). Legislation passed in the 1970s set in motion a still developing culture in U.S. natural resources management, one that institutionalizes collaboration and public participation (Lubell 2004).

This dissertation is a three part examination into the cultural influences on stakeholder involvement in participatory environmental decision-making processes, including Public Participation GIS (PPGIS), in the context of agricultural watershed management. The dissertation consists of three papers addressing theoretical and empirical questions that are important in understanding how culture influences the design of public participation processes and affects the involvement of representative stakeholders. I discuss and develop an innovative theoretical framework drawn from cultural theory that investigates the production of culture in society, and reveals different participation preferences deriving from four distinct cultural groups. In the final two chapters, using statistical methods and a GIS aided-focus group, I provide empirical evidence of differences in participation preferences among farmer cultural groups, and diverse understandings of environmental and economic impacts of biofuels crop development.

Adaptive Environmental Management

Since the 1970s, public participation has emerged as a key component of local and federal environmental management in the U.S. Currently, the Department of the Interior (DOI) implements *adaptive management*, an environmental management paradigm that emphasizes collaboration through learning, structured experimentation, and decision making in the context of multiple objectives and uncertainty in dynamic physical and ecological systems (Williams et al. 2009). Although it places a high premium on scientific information, a core component of adaptive management is its incorporation of stakeholder participation in decision making (Hillman and Brierley 2002). The DOI maintains that due to their local knowledge and existing levels of engagement, citizen residents are optimally positioned to identify environmental

problems, participate in developing local solutions, monitor results and provide data to mitigate or address changes and uncertainty in natural resources management. Stakeholder involvement in environmental management is also institutionalized at local scales. Conservation districts across the U.S. train managerial staff on participatory approaches for local planning, emphasizing the significance of reaching out to the public in establishing district priorities and setting goals based on public needs and input (NACD 2010).

Researchers and practitioners across policy domains find that citizen participation in decision making helps reduce conflict and improves the means through which scientists, experts, and community members manage uncertainty in the face of environmental responses to human induced change (Wiedemann and Femers 1993; Creighton 1998; Nyerges et al. 2006; Few et al. 2007; Reed 2008). However, as public involvement in environmental management is increasingly desired in policy processes (Sabatier et al, 2005) few studies examine the role of culture and its influence on participation. Extensive research examines collaborative engagement processes (Lubell 2003; Sabatier et al. 2005; Pahl-Wostl et al. 2007) participatory methods and evaluation (Lynam et al. 2007; Ferreyra and Beard 2007; Huitema et al 2009) and theories of environmental governance (Ostrom 1990; Lubell 2004; Antunes et al. 2009). However, the influence of culture, I contend, is essential to understanding the idea of “authentic” participation, which in turn has important ramifications in applying adaptive management strategies at local scales.

Public participation refers to decision making processes between governmental and non-governmental stakeholders (Huitema et al. 2009). At stake in public participation is the question of what makes decision making processes and outcomes politically and socially valid. In her ground breaking analysis on urban development, Arnstein (1969) demonstrates that local

planning boards coerce or manipulate citizens into agreeing to policies that negatively affect them, or which only benefit a select few. In these cases, public participation is passive, decisions by a few have already been made on behalf of the collective, and individuals are manipulated into believing that their involvement in decision making constitutes an acceptable form of public participation. Instead of being relegated to top down and passive decision making, Arnstein (1969) calls for citizen empowerment: those affected by policy decisions should control the policy making process, induce social reform, and partake of the benefits of those decisions. Full public control might not be realistic, as policy decisions ultimately require some form of official approval. However, Arnstein (1969) doubts that existing forms of decision making truly represent citizens' needs and interests, and she envisions full citizen control as the primary goal.

The rise of collaboration and participatory processes in environmental management draws from the broader movement towards citizen control that Arnstein (1969) advocated (Few et al. 2007). If full control is untenable, then environmental management requires participatory processes that legitimize and facilitate the inclusion of diverse needs, experiences, and interests in official policy decisions. Collaborative processes envision full public involvement in decision making, even if not full control. For public participation to be collaborative, it must include a diversity of citizen stakeholders, officials, and groups; permit groups' equal involvement in developing decision making rules and procedures; engage in fact-finding intended to facilitate common understanding about environmental problems; and help create solutions that address interrelated environmental and socioeconomic problems (Sabatier et al. 2005 p.49; Lubell, 2004). Legitimacy in collaborative and participatory decision making efforts requires a full range of stakeholder representation, genuine consideration of stakeholder needs, and broad consent to policy decisions by all actors involved (Trachtenberg and Focht 2005). The shift towards greater

public ownership of decision making processes fits within a democratic tradition that continually reflects upon and refines the ability of citizens to “choose the rules under which they live,” (Trachtenberg and Focht, 2005).

Within collaborative processes, there nevertheless arise critical barriers to meeting the criteria of broad citizen representation. For example, the variation of interests, knowledge, technical expertise and demographic factors that characterize the participants might increase the total time it takes to communicate and present one’s needs or goals. This in turn alienates potential stakeholders (McKinney and Harmon 2008) and diminishes representation of the collaborative process. Furthermore, some potential participants may opt out of the process altogether because of time, financial and/or knowledge barriers. In terms of the design of the collaborative process, officials may lack the capacity to organize and manage a collaborative process, or instead over-rely on technical data for decision making (Huiteima et al. 2009). These barriers and exclusions engender processes that in many ways return decision making back to a top-down process.

The use of geospatial information in collaborative processes, investigated under the umbrella term of Public Participation GIS (PPGIS), raises many similar issues concerning participation. The training and data required to fully engage stakeholders in GIS guided fact-finding and problem solving may pose barriers to effective participation and collaboration (Barndt 1998). New users of GIS, especially those in grassroots organizations, may not be familiar with principles in map projections, for example, or have limited knowledge about statistical processes that underlie data interpolation techniques (Barndt 1998). Data collection and access is another problem related to GIS use in public participation. Official data might exclude citizens’ knowledge and relevant information, thereby yielding GIS models that

propagate marginalizing practices. Legal restrictions prevent stakeholders from accessing otherwise available GIS data. This forces individuals, and particularly non-profit organizations, to use scant resources and collect their own data or partner with external community organizations or researchers (Sieber 2000; Leitner et al. 2002; Sieber 2006). Excluding local spatial knowledge from official data by definition leads to unequal participation in GIS based problem understanding and problem solving. However, geospatial technologies and information can facilitate problem understanding over time, even if individuals have varying levels of professional knowledge or technical expertise (Duncan and Latch 2006; Wright, Duncan and Latch 2009). WebGIS, multimedia, and mobile technologies increasingly offset these constraints in data acquisition and geospatial knowledge production (Elwood 2006a).

Research Problem and Context

In this dissertation, I examine the role of culture and how it constructs social barriers to participation in adaptive management and PPGIS for environmental decision making in an agriculturally intensive conservation district located in the Midwestern U.S. Researchers across public participation and public participation GIS contend that values, beliefs, and culture affect stakeholders' decisions and ability to participate (Creighton 1998; De Man 2003; Carver 2003; Sieber 2006). Culture refers to one's set of taken for granted beliefs about how the world and society ought to be (Lubell 2004). De Man (2003) contends that since culture conditions one's fundamental beliefs about the world at large, it acts as the very means through which individuals make decisions in their everyday lives. For de Man (2003) participation is "behavioral in nature." Given the role that culture plays in filtering our interpretation about the world at large, and its influences on participation, this dissertation traces the role of culture in PPGIS through a

discussion of cultural theory and PPGIS, and two empirical investigations. The three papers in this dissertation focus on the following research questions: 1) What theory explains how values and beliefs influence citizen stakeholders' decisions to participate in a PPGIS process? 2) How would such a theory account for social barriers found in participation frameworks and procedures? 3) Is there variation in farmers' participation preferences due to cultural beliefs and values? 4) In a GIS decision making context, how do values and beliefs emerge in discussions and influence the criteria for determining suitable areas for planting perennial energy grasses?

The overarching theme of this dissertation is culture and the interaction between belief systems, norms, values, and assumptions that call into question how individuals make everyday decisions -- including decisions in public participation GIS and watershed management. This dissertation conceptualizes public participation and public participation GIS as cultural processes in which variation in stakeholder involvement reflects competing beliefs about the validity and value of collaboration and policy outcomes.

The study area for the empirical analyses is Macon County, Illinois, an agriculturally intensive rural area in central Illinois. Situated almost entirely within the Upper Sangamon River Watershed, Macon County is home to 708 farms and a total population 110,768 (NASS 2007; US Census 2010). Approximately 78% (290,603 acres) of land in Macon County is farmland, with 177,506 acres planted to corn, and 94,793 in soybeans. There are a total of 1,047 farm operators in Macon County whose responsibilities involve either day to day farm work or decision making about planting, harvesting and marketing (NASS 2007).

The City of Decatur is the largest city in Macon County with a population of 82,000. Archer Daniel Midlands (ADM), a global food, feed, and fuel processor, is headquartered in Decatur. Founded in 1902, ADM is a central component of the agricultural, industrial, and

political economy in Illinois and beyond. The city is responsible for managing Lake Decatur, a reservoir built in 1922 to meet an increasing demand for water by industrial, commercial, and residential users, and particularly, ADM. Lake Decatur was created by impounding the Upper Sangamon River, a tributary of the Illinois River and part of the Upper Mississippi River Basin (Minch 2009; Keefer and Bauer 2011).

Historically, Lake Decatur has experienced high levels of siltation. In 1943, the City of Decatur engaged the assistance of conservationists from the newly formed Macon County Soil and Water Conservation District (MCSWCD) to introduce farming practices that help minimize nutrient runoff and soil erosion that impair the lake. The MCSWCD has the same jurisdictional boundary as Macon County, and for that reason, the county serves as the scale of analysis for this research.

The MCSWCD has remained an active partner with the city by bringing together local farmers, landowners, environmentalists and conservationists to address watershed management issues and develop watershed management plans. Additionally, the Agricultural Watershed Institute, a non-profit research organization, coordinates education and outreach activities related to conservation and watershed management and partners with the MCSWCD in its work with farmers and civic and business leaders to test and promote new conservation initiatives. The research questions addressed in this dissertation on farmers' participation preferences, interest in participation in general, and the role of culture in environmental decision making stem from the evolution of partnerships and interests in watershed management local to Macon County. More importantly, farmers are key actors in environmental decision making due to their occupations as landowners, renters, and managers of highly productive agricultural land that drains into Lake Decatur. Macon County serves as an important location and scale of analysis for investigating

the cultural influences on participation among key stakeholders, in this case, farmers and landowners in an agricultural watershed.

OVERVIEW OF CHAPTERS

Chapter 2: Grid/Group Theory and Cultures of Participation in PPGIS

This paper examines the cultural influences on participation in Public Participation GIS using Grid/Group theory (Douglas 1979). Public Participation GIS research investigates the social, economic, political, spatial, and cultural processes affecting the diverse and ethical involvement of community members in the production of geospatially enabled policies and decisions (Harris and Weiner 1998; Aberley and Sieber 2002). Embedded in public participation GIS is the goal of empowerment, that those affected by decisions have the fundamental right to construct the policies affecting such decisions (Arnstein 1969). However, PPGIS research identifies barriers to representative involvement of affected stakeholders, (Laituri 2002; Sieber 2006; Elwood 2006a), that include time and financial constraints on participation, lack of access to technical expertise (Ghose and Elwood 2003; Elwood 2006b), and challenges in designing collaborative decision making frameworks (Nyerges et al. 2006; Sieber 2006). Findings also demonstrate that beliefs, values, and norms condition a number of factors that affect participation including, how individuals evaluate whether or not to participate at all (Creighton 1998; Schlossberg and Shuford 2005); agreement with specific goals and activities (participation frameworks) related to GIS use and decision making, (Rundstrom 1995; Schlossberg and Shuford 2005; Reed 2008), and involvement in PPGIS discussions and outcomes (Nyerges et al. 2006). According to Sieber (2006), the cultural context affects PPGIS acceptance and implementation in local communities.

Culture refers to the taken for granted beliefs and norms shared among individuals and groups (De Man 2003). In this chapter, I argue that culture conditions the values and beliefs that affect social interactions, technologies, and procedural aspects associated with PPGIS, including how individuals respond to each other and the types of knowledge represented in spatial data. This chapter aims to develop a robust cultural theory for examining what types of beliefs and values influence inclusion or exclusion of participants in PPGIS design and deliberations. This paper discusses grid/group cultural theory (Douglas 1979) as a framework for understanding participation in PPGIS.

Grid/group theory (Douglas 1979) identifies four primary combinations of social arrangements and rules that amount to divergent cultures, which are termed “ways of life.” These four ways of life -- hierarchical, egalitarian, individualistic and fatalistic --simultaneously contain and produce beliefs and values that guide everyday decisions. Each “way of life,” through its degree of social interaction and rules guiding interaction, produces a type of cultural outlook that frames beliefs about how the world ought to be and beliefs about the best way to achieve societal goals. This paper delves into how individuals and society produce these four ways of life, the values that derive from them, and how they come into contact with each other in the public sphere (Thompson et al. 1990). In participatory decision making processes, these ways of life may compete over resources and policy solutions, affect subtle changes in each other’s way of life, and ultimately affect policy outcomes. Public Participation GIS is itself a public forum which critically seeks to bridge individuals and groups from disparate backgrounds to produce effective and representative policies. In applying grid/group theory to PPGIS, this paper argues that public participation GIS is not only applied within a given cultural context, but also produces its own cultural context.

Chapter 3: Public Participation in a Rural Conservation District: Investigating Cultural Influences on Participation Preferences among Midwestern Farmers

This paper begins to fill the gap in knowledge of how culture influences participation preferences among farmers by examining the cultural context of farmers' levels of engagement in environmental and civic activities in a rural, agriculturally intensive region in central Illinois. Farmers, as landowners and renters, represent an important group of potential participants in public decision making processes for conservation and, broadly speaking, natural resources management (Cope, McLafferty, and Rhoads 2011). In the study area for this paper, a variety of public and non-profit organizations are developing policies and implementing conservation measures to protect water quality from the harmful effects due to agricultural runoff and soil erosion. Part of the effort in managing soil erosion and water quality involves engagement with farmers and landowners in budgeting decisions and identifying specific areas and strategies for implementing new soil conservation measures. The rich history of farming in this area and its varied settlement patterns and beliefs about farming (Salamon 1994; Walter 1997), combined with the city and conservation district's efforts to manage water and soil resources by including farmers, make it an important and appropriate case study for examining how culture influences public participation.

The theoretical framework guiding this research paper argues that social interactions and rules produce shared meanings among individuals and groups in society (Douglas 1979; Danesi and Peron 1999). Furthermore, such shared meanings produce cultural contexts that include 1) distinct beliefs about participation activities and 2) beliefs about a range of social values towards society at large (Lubell 2004). Through a mail survey and quantitative analysis, I investigate beliefs and attitudes towards an array of issues related to farming practices, nature, and

community that together, are argued to constitute a set of cultural identities unique to farmers (Walter 1997; Wilson et al. 2003). Using statistical analysis, I then test whether those cultural identities significantly relate to varying levels of preferred participation in environmental and civic decision making activities. I hypothesize that farmers' beliefs and values constitute distinct cultural identities (or ways of life), and that participation preferences, that is, the importance assigned to different activities in decision making, will vary based on specific cultural identities. Findings improve our understanding of the opportunities and constraints that affect the success of adaptive management and other collaborative processes in rural, agricultural watershed management contexts.

Chapter 4: Farmers' attitudes toward production of perennial energy grasses in east central Illinois: Implications for community-based decision making

This paper combines survey methods with a GIS aided focus group to investigate farmers' beliefs and attitudes towards direct participation in growing perennial energy crops as part of a community-based, environmental decision-making initiative based in East Central Illinois. The initiative aims at encouraging farmers to plant perennial energy grasses on lands vulnerable to soil erosion in an effort to reduce runoff of agricultural chemicals into local waterways and to increase production of domestic, renewable energy.

In the U.S., the suitability of bioenergy crops for marginal and environmentally-sensitive land is frequently cited as an advantage (Nelson et. al. 2006). Ecologists and agricultural scientists typically define marginal land in biophysical terms, as land that is unproductive due to physical properties such as soil quality or slope. Despite the emphasis on marginal and degraded land as suitable for perennial energy crop cultivation, the concept of marginal land has been neither clearly-defined nor critically analyzed. This paper argues that economic and biophysical

definitions of marginal land used in community based resource management are limited because they ignore the social and political-economic valuations and meanings of land in particular geographic contexts. In the intensively-cropped landscapes of the Midwestern U.S., farmers make land use decisions not only based on economic imperatives, but also pragmatic concerns related to farming practices, social relations such as tenancy, aesthetic judgments about landscape appearance, values about environmental stewardship, and attitudes towards nature, family, and community (Nassauer and Westmacott 1987; Salamon 1994; Walter 1997; Wilson et. al. 2003; Urban 2005; White, Brown, and Gibson 2009).

This chapter examines farmers' willingness to plant perennial energy grasses, barriers to cultivation, and farmers' definitions of 'marginal' land suitable for energy grass cultivation. A mail survey and GIS-aided focus group are used to elicit farmers' perspectives on these issues. Findings indicate that farmers perceive an array of economic, social and geographic barriers to energy grass cultivation. Approximately one-third of farmers are willing to plant energy grasses if a local market exists. Through GIS-based discussions, participants defined lands suitable for energy grass production – 'marginal lands' -- not purely in environmental terms, but in relation to existing cropping patterns, farming operations, land parcel characteristics, and the social relations of farming. We find that farmers' planting decisions are bound up with their understandings of land suitability for planting at the farmstead and regional scales.

CONCLUSION

This dissertation argues that public participation and public participation GIS are cultural processes, ones in which stakeholders' and conveners' views about decision making processes, procedures, and policy outcomes derive from culturally specific ways of life. These views, and the competitions among them, influence the outcomes of participatory decision-making

processes by affecting who participates as well as the negotiations and conversations that take place in participatory deliberations. The chapter on cultural theory examines how participatory decision making processes in general reflect specific cultural beliefs and practices, and can be applied to PPGIS. The empirical chapters investigate how unique cultural identities relate to specific participation preferences among farmers, and through a GIS based discussion, query beliefs and attitudes towards direct participation in a multi-purpose conservation initiative, growing perennial energy grasses. A robust investigation into the role of culture contributes to a more thorough understanding of barriers to participation in adaptive and participatory environmental management processes

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CHAPTER 2

GRID/GROUP THEORY AND CULTURES OF PARTICIPATION IN PPGIS

INTRODUCTION

This paper examines grid/group cultural theory (Douglas 1979) and applies it to interpreting cultural influences on participation in Public Participation GIS (PPGIS). Public Participation GIS research refers to the systematic examination of the social, economic, political, spatial, and cultural processes affecting diverse and ethical involvement of community members in the production of geospatially enabled policies and decisions (Harris and Weiner 1998; Aberley and Sieber 2002; Tulloch 2002). Guiding principles in PPGIS assert the goal of empowerment; that those affected by policies deserve to be involved as fully as possible in the GIS-facilitated discussions and analyses that produce policy outcomes. However, central to PPGIS is the idea that GIS is a socially constructed technology; that geospatial data and technologies are constituted by the people and contexts guiding GIS adoption, analyses, and applications (Sheppard 1995; Pavlovskaya 2006). Research on “participation” in PPGIS therefore examines both the technical and social dimensions of GIS use and access, since GIS is not separate from the social conditions that produce it. Important research emphases include the integration of local knowledge in spatial data sets, equitable access to geospatial software, and the channels -- both face to face and online -- for transparent and broad community involvement.

PPGIS research identifies a number of limitations to enabling full community participation in GIS based decision making. Barriers include difficulties in involving representative affected stakeholders, (Laituri 2002; Sieber 2006; Elwood, 2006), organizational hierarchies and the absence of technical expertise which can limit full community involvement (Ghose and Elwood

2003; Elwood 2006), and challenges in designing inclusive decision making frameworks (Nyerges et al. 2006; Sieber 2006). These uneven processes simultaneously empower and marginalize communities and stakeholders resulting in what the literature terms “contradictions” in PPIGS (Harris and Wiener 1998).

Findings also demonstrate that culture affects representative participation in a number of ways. Beliefs, values and norms condition how individuals decide to participate (Creighton 1998; Schlossberg and Shuford 2005), the specific goals and activities (participation framework) related to GIS use and decision making, (Rundstrom 1995; Schlossberg and Shuford 2005; Reed 2008), and discussions and outcomes within decision making processes (Nyerges et al. 2006). According to Sieber (2006), the cultural context affects PPGIS acceptance and implementation in local communities.

Despite the limiting effects of culture on participation, however, the literature does not develop a cultural theory for examining what types of beliefs and values influence local participation, including decisions to participate at all, preferred levels of involvement in policy discussions, or how culture impacts the design and interpretation of PPGIS goals and activities. Cultural theory furthers our understanding of the limitations on local involvement in GIS based policy processes and it guides interpretation of the social inclusions and exclusions in the process of developing GIS based policy solutions. The purpose of this paper, therefore, is to outline a cultural theory that explains how beliefs and values within cultural contexts inform participation in PPGIS.

Culture refers to the beliefs and values that define, in a taken for granted manner, how individuals and groups view themselves and the world at large (De Man 2003; Lubell 2004). It is also a set of signs (e.g. words, gestures, and visual symbols), codes (language) or texts

(compositions) that individuals and groups use to carry out everyday practices and routines (Danesi and Peron 1999). Geographical thought emphasizes the spatial and material production of culture, as well as extant everyday social practices that engender beliefs and cultures at multiple scales of space and society. In this study, I emphasize the social and cognitive aspects of culture, suggesting that *participation* as a concept in PPGIS aligns more closely with the social production of culture, rather than the material or spatial¹. By way of the shared meanings and taken for granted beliefs it produces, culture necessarily conditions the values and beliefs associated with social, technological, and procedural aspects of PPGIS (De Man 2003) including individual decisions to participate, how participants interact with each other and the types of knowledge they bring to PPGIS deliberations. Although the literature provides ample discussions of social and cultural barriers to participation, it does not provide a robust theoretical discussion of how culture and personal beliefs and values guide PPGIS participation. I contend that cultural theory in general, and Grid/Group theory (Douglas 1979) in particular, fills an important gap in the literature by explaining how values and beliefs produce barriers to participation.

Grid/group theory argues that there are four primary combinations of social arrangements and rules termed “ways of life:” hierarchical, egalitarian, individualistic and fatalistic (Douglas 1979). Each “way of life,” through its degree of social interaction and rules guiding interaction, produces a cultural context defined by beliefs about how the world ought to be and beliefs about the best way to achieve societal goals. It is these four ways of life that come into contact with each other in the public sphere, that is, in debates over resources and policy solutions (Thompson 2006). Public Participation GIS arguably *is* the public sphere in which individuals, interest groups, and officials from different backgrounds debate solutions and produce effective and

1. This would not necessarily be the case if the research emphasis was on mapping and/or spatial analysis in PPGIS. However, mapping as an (integral) component of PPGIS is beyond the scope of this paper.

representative policies for resolving spatial problems. The cultural beliefs and values that individuals harness and use to make decisions with fit within one of these ways of life.

I argue that the same mechanisms that explain the production of culture according to grid/group theory apply to PPGIS. The concepts of autonomy, perceived effectiveness, and competition are introduced in grid/group theory to explain how individuals use their beliefs and values to protect their way of life and/or attempt to convince others to join them in it. In PPGIS, these same concepts help uncover 1) how beliefs about the world *a priori* motivate participation in GIS based decision making processes; 2) what may constitute meaningful and effective participation frameworks (goals and activities) within GIS based decision making processes and 3) how individuals seek to engage in deliberations. In applying grid/group theory to PPGIS, I argue that Public Participation GIS is a cultural process, one in which debates over spatial problems, policies, and problem solving amount to debates about ways of life and the social conditions that produce them. Conceptualizing PPGIS as a cultural process (Figure 2.1) illuminates how beliefs and values operate as barriers to participation.

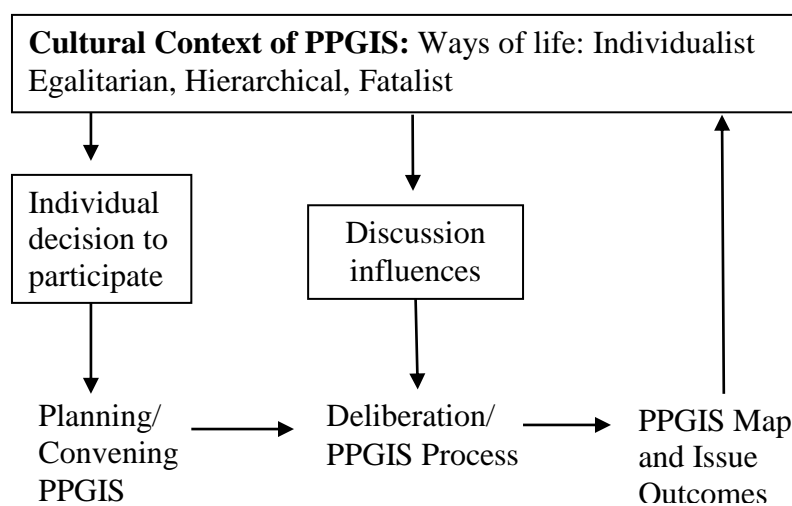


Figure 2.1: PPGIS as a cultural process. Based on De Man 2003; Nyerges, et al 2006.

There are several reasons why I selected Grid/Group theory over other cultural frameworks for conceptualizing PPGIS. First, Grid/Group theory's four ways of life help uncover assumptions embedded in normative participation (Reed 2008), which is the bedrock of PPGIS: that everyone has a democratic right to participate. Once participation is understood as a norm, we can then understand how different groups and individuals value it in divergent ways. In so doing, Grid/Group theory positions us to address problems and criticisms regarding what constitutes "appropriate" levels of participation in public participation and public participation GIS (Arnstein 1969; Sieber, 2006). Second, Grid/Group theory seeks to account for cultural change, depicting the individual as an active agent in the production of culture. This theoretical aim is closely tied to structuration theory (Giddens 1984), which depicts the individual as an active participant in a society orienting subjective beliefs and practices. However, Grid/Group theory provides *four* overarching "structures", through its conceptualization of grid or rules, and thus helpfully moves beyond traditional binaries in cultural thought, beginning with structure-agency. Finally, participation as a concept arguably falls into the realm of Behavioral Geography, which examines the way cognitive processes simultaneously influence and link to the material and socio-spatial production of culture. With its emphasis on social beliefs and practices, rather than material or spatial conditions of culture, Grid/Group theory makes a forceful theoretical contribution to participation in decision making (in this case PPGIS), itself a combination of behavioral and cognitive processes.

As noted above, other researchers have introduced grid/group theory to explain participation in PPGIS. De Man (2003) contends that participation in GIS decision making processes is behavioral in nature. Drawing on Douglas (1979), De Man (2003) argues that the four ways of life influence acceptable solutions to spatial policy problems are identified and how data and

information are collected. He calls on further empirical studies into how ways of life influence the way individuals address spatial problems and deliberate in PPGIS. Carver (2003) affirms that individuals draw on their cultural values within PPGIS discussions to defend or argue for a certain policy position. He also outlines how the four ways of life might threaten or facilitate public participation and adds belief in a technologically driven society as an additional way of life. However, neither researcher adequately addresses Douglas' contention that individuals actively produce culture. Douglas (1979) contends that a theory of culture needs to accommodate not just how cultures persist over time, but also how they evolve. De Man reviews the four types of culture in grid/group theory but does not examine the underlying mechanisms that *a priori* shape or alter those beliefs; cultural ways of life for him seem more or less a given. On the other hand, Carver (2003) finds that people *do* change their beliefs and attitudes towards spatial problems, and argues that grid/group theory's shortcoming is that it cannot adequately account for how a person might hold one belief in one setting, but another in a different PPGIS setting. I argue, however, that because grid/group theory sees culture as actively produced, it does provide a good framework for interpreting how peoples' positions might vary and change in different public participation settings. Once the idea of an active, socially produced culture is introduced, then we *should* expect that some people will alter their beliefs, over the course of a single PPGIS, or over time in multiple decision making instances. .

The rest of this paper is divided into four sections. The first part discusses briefly the emergence of GIS as a socially constructed technology, the conceptualization of PPGIS, and how the literature has discussed beliefs and values as barriers to participation. The second section discusses grid/group theory in detail. It covers the emergence of ways of life, beliefs and values within each way of life/cultural context, and the concepts that explain how cultures evolve and

persist over time. The third section applies grid/group theory to PPGIS, identifying how the active production of the four ways of life affects participation frameworks, discussions, and who participates. This section critically addresses how researchers interpret participation and the contributions of cultural theory to PPGIS design and evaluation. The paper concludes with thoughts on future research and the implications for conceptualizing PPGIS as a cultural process.

LITERATURE REVIEW

GIS as a social technology

PPGIS emerged in the 1990s in response to criticisms of the positivist theories guiding GIS research and application. Early proponents of GIS defined the technology as a computerized system for storing and managing spatial data, and for analyzing spatial relationships among objects (Goodchild 1995). However, masked in this definition were inequalities concerning geospatial data access, geospatial data representation, and uneven levels of communication within a burgeoning information society (Sheppard et al. 1999). GIS research of the early 1990s largely neglected questions concerning who communicates the spatial identities and narratives of people living in places represented in GIS, and how geospatial technologies advance or limit community and social goals (Sheppard et al. 1999).

In the first broad-based volume examining the social implications of GIS, Pickles (1995) critically analyzed GIS research and argued against the instrumentalist approach to GIS research and development. Pickles (1995) contended that GIS were applied in absence of any wider social theorizing and that spatial outcomes could not be taken at face value because of their origin in “business, state, and military sources,” the very heritage of geospatial technology (Pickles 1995). Instead, he argued that a GIS must be seen as “a cultural practice” and “a socially embedded

technology” (Pickles 1995). In any given instance, GIS outcomes depend on the actors involved in all facets of GIS use, including programming, data development, analysis, and modeling (Pickles 1995). As Sheppard (1995) further explained, GIS is not a problem-solving instrument but a socially constructed technology. Value-laden societies shape the political, social, and economic needs of individuals and steer the broad range of GIS development: from software design, to data collection, to geoprocessing and display (Sheppard 1995).

The GIS and Society research agenda of the 1990s grew out of these criticisms and formally adopted a social constructionist conceptualization of GIS (Sheppard et al. 1999). Significantly, criticisms of GIS pointed to the role of values and culture in shaping how GIS are developed and applied in society. Deriving from the GIS and Society research agenda, PPGIS research investigated the use and theories of GIS in community decision-making contexts. Public Participation GIS bridges the concepts of public participation from the planning literature (Obermeyer 1998), with the definition of GIS as a socially constructed technology (Pickles, 1995; Sheppard et al, 1999) to examine how “non-experts” (those are who not officials or technical/GIS experts) harness and use GIS in their everyday lives.

Conceptualizing PPGIS

“Public participation” is the practice of “involving members of the public in the agenda-setting, decision making, and policy forming activities of organizations or institutions responsible for policy development” (Rowe and Frewer 2004: 512). In general, participatory processes gain legitimacy when they involve those who are affected by decisions and those who can implement decisions based on new information (Few et al. 2007). The social science literature on public participation examines issues such as who participates, to what degree, and

how (Arnstein 1969; Wiedemann and Femers 1993; Schlossberg and Shuford 2005). PPGIS adopts the goals and methods of public participation to enable a diversity of community members in the production of geospatial knowledge for use in addressing local policy problems.

“Participation” in PPGIS research includes both social and technical aspects of GIS use in decision making. Technical factors refer to GIS data collection, spatial analysis, and production skills in desktop and online decision making (Laituri 2003; Nyerges et al. 2006b) and the use of geospatial devices for sharing personal geographic information through social media (Elwood, 2008). Social factors refer to agenda setting by local communities (Harris and Weiner, 1998), identifying, inviting and including diverse stakeholders, and policy making that engages stakeholders with local officials (Schlossberg and Shuford 2005; Sieber 2006). The combined levels of GIS use and involvement in decision making are unpacked in PPGIS by critically examining the degree to which stakeholders have control and ownership over final policy decisions (Sieber 2006).

With its emphasis on broad involvement in GIS based decision making, PPGIS is conceptualized as a way of achieving social goals such as empowerment (Harris and Wiener 1998; Aberley and Sieber 2002; Corbett and Keller 2005; Sieber 2006) and as a means of broadening local community members’, non-experts’, and organizations’ involvement in GIS use (Schlossberg and Shuford 2005; Nyerges et al. 2006) including data collection, spatial analysis, classifying land cover, creating geodatabases, and mapping. Aberley and Sieber (2002) propose a set of “guiding principles” that outline the desired technical, social, geographic, and institutional properties of PPGIS: that it is validly practiced in different political and social scales; can be applied via partnerships, integrates qualitative methods, and promotes software development that is easy to use and accessible. Although often focused on benefiting

marginalized groups and communities, PPGIS is also implemented in instances where conditions for public engagement exist but the willingness to become engaged in a decision making process is relatively limited (Carver 2003). In such instances, PPGIS becomes a tool to increase public involvement in policy decision making (Carver 2003; Sun et al. 2009).

The range of case studies in PPGIS led Nyerges and Aguirre (2011) to divide research into three prominent themes which they refer to as “metadimensions:” People, Process, and GIS Technologies (Nyerges and Aguirre 2011). Research on *people* examines how individuals and groups, particularly those at the social margins of economic or political power, access and use geospatial technologies. *Process* focuses on the deliberative aspects of GIS based decision making, often described under the rubric of Collaborative GIS. Sieber (2006) adds discussion of decision making frameworks, the conceptual models that evaluate levels and types of stakeholder participation to the process category. *GIS technologies* refers to the digital tools, hardware, and processes used in implementing PPGIS (Elwood 2008; Sui 2008). The role of culture -- beliefs, values, and norms -- as a barrier to participation emerges as an important subtheme within each of these metadimensions.

Under the theme of “people,” Kyem (2001) finds that individuals with opposing values who occupy the same “social system” are less likely to join a participatory GIS process. However, once representative members do come together, as occurred in Kyem’s case study of a dispute over forest resources in Southern Ghana, GIS analysis can introduce new conditions for building friendships and increasing trust. Sieber (2003) contends that while PPGIS intends to unpack assumptions embedded in geospatial hardware, data and software, it may inadvertently introduce new assumptions and challenges about the social aspects of participation. Conveners, in these cases, officials or grassroots organizations leaders may purport inclusiveness in GIS use

and analysis, but in fact, fail to critically evaluate the social dynamics and complex exclusions within a participatory process (Elwood 2006). Representatives from grassroots organizations may not necessarily present the array of issues and needs of the members they represent (Elwood and Craig 1998). This has implications on how policy outcomes genuinely reflect the needs and aspirations of an organization and its constituents. Nyerges and Jankowski (2003) see an “ironic dilemma” embedded in the idea of inclusion: both an increase in and an exclusion of, participants will lead to conflict and challenges in GIS decision making. They argue that it is best to convene an “appropriate” group of stakeholders, even if that extends the time it takes to meeting objectives of the PPGIS project (Jankowski and Nyerges 2003). However, this ultimately begs the question of *who* is participating. More importantly, one must ask who decides who ought to participate, and on what basis?

The problem of expertise in PPGIS is discussed as a cultural influence on participation because of the different beliefs about knowledge that people involved in PPGIS may hold. Experts may inadvertently privilege their own knowledge and values over the knowledge and values of community members and thereby present a barrier to genuinely participatory decision making (Rhoads et al. 1999). Expertise is thought of as formal and specialized knowledge (Sieber 2003). This is in contrast to the everyday knowledge and beliefs that characterize grassroots organizations, community members, and non-expert participants. When a researcher serves as a topical expert, their role in PPGIS decision making may be viewed as distinct from-- or superior to-- the role of an official or planner (Aitken and Michel 1995). Such a detached role might lead to the erroneous belief that the researcher’s GIS findings are similarly detached, and therefore neutral. However, if adopted, those findings might be implemented in ways that obfuscate and silence community participants’ values raised in PPGIS deliberations.

Furthermore, acceptance of expert opinions and knowledge, from researchers or officials, undermines grassroots' and local community objectives as their beliefs about an issue begin to conform with objective and professional assessments (Sieber 2003). In her research with Native American populations, Laituri (2002) maintains that a GIS should be developed in a manner that promotes "self-determination in the research process itself."

Cultural incompatibilities have been identified in participation frameworks used to design and evaluate *processes* in *PPGIS*. Participation frameworks such as Arnstein's (1969) ladder of citizen participation are widely used to design and measure levels of stakeholder participation in policy processes, and are applied to PPGIS (Schlossberg and Shuford 2005; Sieber 2006). Arnstein's (1969) ladder of citizen participation seeks to achieve (and evaluate) a broad societal goal, full citizen power over a policy process (Figure 2.2). In this ladder model, the ideal forms of public participation are activities that achieve that goal, such as community members serving on boards or running local programs (Arnstein 1969).

Degrees of Citizen Power	Citizen Control
	Delegated Power
	Partnership
Tokenism	Placation
	Consultation
	Informing
Nonparticipation	Therapy
	Manipulation

Figure 2.2: Ladder of citizen participation (Arnstein 1969).

Other participation frameworks envision full participation in final decisions, conflict resolution, and ongoing involvement in policy processes as the ideal goals of public participation (Wiedemann and Femers 1993, Schlossberg and Shuford 2005).

However, the goals embedded in a public participation framework may be unsuitable in specific instances and incompatible with local cultural values and beliefs. For example, collective processes in participation frameworks contrast starkly with the needs and beliefs in indigenous communities where decision making practices restrict inclusion by age, experience, or gender (Rundstrom 1995). Arnstein's ladders of participation presupposes a western, democratic culture that values equal participation whereas some cultures presuppose status requirements for participation based on sociocultural factors (Rundstrom 1995). The design and use of participation frameworks require an acknowledgement of the local cultural context in which they are applied (Sieber 2006).

Cooke (2001) cautions organizers of participatory activities to be aware of these social and cultural barriers to participation and not to anticipate successful outcomes of public participation processes even when the procedures used to facilitate participation are inclusive. Cooke (2001) identifies three barriers within public participation processes. First, not all participants are necessarily willing to subject their needs to a group decision. He labels this barrier as "risk," since individuals perceive a risk in disclosing their concerns to others. Second, general misperceptions and failures to communicate may occur. This barrier emphasizes that how problems are defined, interpreted, and argued are subject to individual levels of knowledge and understanding, and require time and intentionality to resolve. Third, stakeholders may fear losing social status in the group. Here, someone with a minority opinion may not want to sacrifice how others perceive them in order to state their genuine concerns. These barriers to participation emerge when individuals bring varying beliefs about decision making and deliberation into the PPGIS process, and they influence participation even when decision making processes are open and collaborative,

The research focus of *GIS technologies* emphasizes the development of new GIS methods and tools, including development of online decision support systems and data portals (WebGIS). WebGIS research and design recognizes that access to face to face PPGIS is problematic for many potential participants because of social, geographical, and cultural constraints such as time, distance from meetings, physical disabilities, and access to transportation (Kingston, et al, 2000). In developing a WebGIS for transportation, for example, Nyerges et al (2006b) interviewed intended end-users of the GIS about their needs and priorities. The researchers collected data on the values, needs, and knowledge of the intended end user group (or groups) and embedded that data in programming online decision support tools.

Sui and Goodchild (2003) and others (Crumplin 2007), argue for a reconceptualization of GIS as *media* in order to remove “the false conception of [technological] objectivity in public discourse” and affect a more critical view of how data are interpreted, manipulated and visualized in a GIS (Sui and Goodchild 2003). Viewing GIS as a media, researchers and practitioners ideally would be more attentive to how social norms, values and knowledge bases influence geospatial technology use and data construction in the first place. In researching how stakeholders use a customized water management tool in GIS, Nyerges et al (2006a) call for further investigation into software tools that better elicit and spatially depict the “multiple meanings about concerns that stakeholder groups maintain about their community” (Nyerges et al. 2006a: 720). Here, researchers emphasize the role that values play in stakeholder’s choices about how to model water use in GIS.

The examples above draw attention to how participants’ values and beliefs limit or affect participation in the research areas of *people*, *process*, and *GIS technologies*. In *people*, groups from opposing value systems may not want to participate at all in a GIS based decision making

process. There are problems too of how conveners identify stakeholders, gauge appropriate numbers for inclusion, and facilitate the integration of multiple beliefs about an issue into discussions and outcomes. Expertise is problematic because domain experts such as researchers might privilege their own knowledge, or communities might reinterpret a problem in a way that conflicts with their original interests or beliefs.

Culture also affects *processes* and *GIS technology* development. In *processes*, we see that activities and goals might not conform with the participation norms of given communities. This is seen as an incompatibility between western, democratic norms of participation and indigenous norms that by custom, limit the types of individuals permitted to make decisions. Finally, GIS technologies are evolving to incorporate tools in which stakeholders can introduce their beliefs and values about a spatial problem and better represent the divergent meanings they assign to features modeled in GIS.

In summary, those involved in implementing PPGIS will continually face cultural beliefs and norms that affect the people, processes, and geospatial technologies that comprise GIS decision making processes. Through grid/group theory, we can better understand exactly how beliefs and values create barriers to participation in PPGIS. The next section discusses grid/group theory and its applicability to PPGIS participation and decision-making.

GRID/GROUP CULTURAL THEORY

The discussion and application of grid/group theory to PPGIS is divided into two sections. The first section provides an overview of grid/group theory and the four ways of life or cultures argued to exist in society: Egalitarian, Hierarchical, Individualistic and Fatalistic. These ways of life categorize the types of values and belief systems of participants in PPGIS, including affected

individuals/stakeholders, government officials, and other key experts. Grid/group theory posits that individuals actively construct their culture, their way of life. The concepts that theoretically fuel that construction are: perceived effectiveness, autonomy, and competition. The second section applies these concepts to explore specific barriers to stakeholder participation decisions, participation frameworks, and GIS based discussions.

Grid/Group Theory Background

Douglas' Grid Group theory (1979) seeks to bridge two disparate theories of culture which she perceives as inadequate in explaining the production of culture in society. One theory treats culture as "autonomous," as existing independent of the individuals who produce it, and another suggests that cultures determine social behavior, that individuals are limited in their ability to reconstitute for themselves new beliefs or patterns of everyday life. The result of these cultural theories is that they fail to allow for an active participant, an individual, who provides and produces meaning in his or her society (Douglas 1979; Spickard 1989). Without allowing for individual agency, Douglas argues, cultural theory becomes limited as it cannot account for the emergence of different worldviews, preferences, and beliefs about how people want to live in society or the changes found in a society's dominant culture over time (Douglas 1979)

Douglas argues that theoretical frameworks that treat culture as "autonomous" fail to explain how the beliefs being studied originally derived from social interaction. The disconnect between the existence of certain beliefs and practices, and the individuals and groups who act on those beliefs and practices results in treating culture as "something independent on which the rest depends," requiring no explanation, only analysis (Douglas 1979: 3). As something removed

from society, or an object to be studied, there is no way to explain how a culture either emerges or evolves over time within a given society (Douglas 1979).

The second problem Douglas identifies in classical cultural theory is that it is overwhelmingly deterministic. Douglas (1979) points to the work of cultural anthropologists who regard society as operating on a normative feedback loop. In such theories, families, for example, might have specific child rearing customs which shape personality development and “fix” a set of cultural norms and meanings argued to be reproduced by offspring and without interruption from the surrounding social or natural environment. The problem here is that humans do adapt and modify their behavior over time, thus deterministic theories cannot account for how existing cultures might change over time and how people alter their customs and beliefs (Douglas, 1979: 2). Douglas’ grid/group theory introduces the idea of movement between cultures; that individuals are also agents in the production of culture. By positing this, cultures can reproduce or become modified over time.

Although Douglas does not explicitly discuss it, the role of an individual within a given context, and their ability to interpret and produce meaning in a given place, is framed in Giddens’ structuration theory (Giddens 1984). Agency refers to the capability to act, to do *something*, whereas structures refer to properties that orient actions of individuals in society, defined further as “rules” that imply methodological procedures guiding social interaction (Giddens 1984). Geographers have debated the role of place and the state in facilitating the interactions between the individual and their context (Flint 1993). Pile (1993) draws on psychoanalytic theory to explain how interrelationships between the personal and society guide the development of a sense of self in the world. This “self” both absorbs meaning produced in a given place and also generates new meaning through interaction with others. Relationships

between the individual and social rules produce a distinct cultural context – a perspective consistent with grid/group theory.

Four Ways of life

Grid/group cultural theory presents a typology of four distinct cultures defined by two axes: Grid and Group. *Group* refers to the level of incorporation of a person in specific groups or organizations, and *Grid* refers to the existence and number of socially imposed rules that define social roles and shape interaction among individuals. By placing the level of group inclusion (Group) along the horizontal axis, and the degree that rules regulate social interaction (Grid) along the vertical axis, a typology of four social arrangements emerges (Figure 2.3).

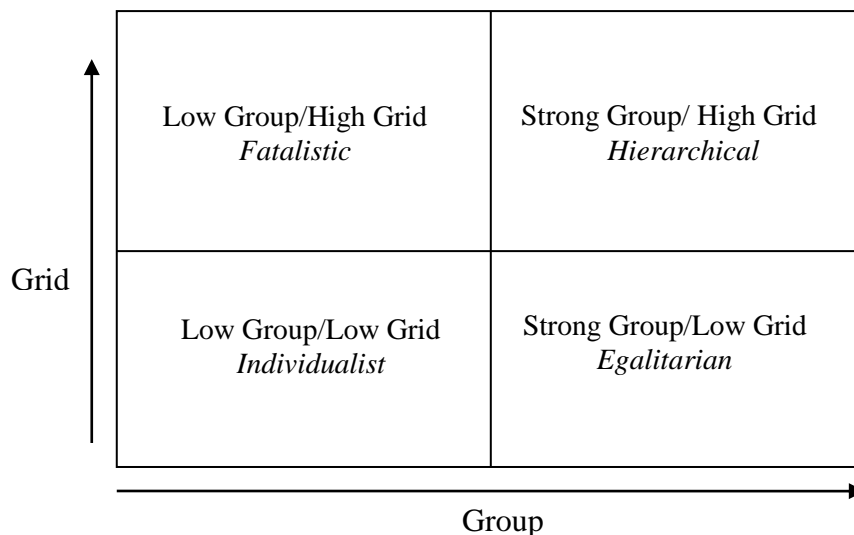


Figure 1.3: Grid/Group typology of cultures (Douglas 1979).

Douglas posits that the interactions of: 1) people with each other, and 2) people with a set of rules, produce a unifying culture that contains beliefs and values that are adaptable, but also may remain relatively stable. These individual “unifying” cultures are termed “ways of life.” “Ways of

life” form a cultural context: they describe the beliefs, ideas, norms and customary social interactions among individuals and groups residing in a given place.

The Group axis represents incorporation within social groups. A person in a society at the far left(zero) position may move freely in and out of different social networks and groups. As an individual moves along the horizontal axis in the direction of strong group, a person might belong to several organizations at the same time, but no single group completely defines their social boundaries. The extreme end of the group dimension represents a commitment to a single group which a person’s entire social identity revolves solely around belonging to that group. The higher the degree of social incorporation, the more a person becomes defined by rights and needs as determined by the group. Degrees of group inclusion also signify a type of loyalty, as Douglas explains, “for a group to exist at all, there will be some collective pressure to signal loyalty” (Douglas, 2006; 3). That “signal” of loyalty may range from showing up to religious services once a week to living in a monastery or convent (Douglas 2006).

The Grid dimension represents guiding rules in a society that constrain or allow individual interactions and behaviors (Douglas 2006). On the *Grid* axis, the zero point refers to complete autonomy--complete freedom to enter into relationships and conduct transactions with others. Moving up grid means that the freedom to enter into social transactions decreases, while the rules dictating individual behavior increases. The resulting cross-hatch of grid/group dimensions produces four social arrangements that yield four distinct ways of life: Egalitarian, Hierarchical, Fatalistic, and Individualistic, (Douglas 1979: 1992; Thompson 2006).

1. High Group, Low Grid (Egalitarian)

The egalitarian context includes high levels of group involvement but with very few rules regulating individual behaviors and interactions. The lack of rules serves to ensure equal status among members of the group. Individuals in this quadrant do not have assigned roles, and few, if any formal divisions exist among them. Dissent from the goals of the collective may catalyze the development of covert factions within the group which can lead people to feel disenfranchised or to defect from the group (Douglas 1979). This can occur because the few rules in existence may be insufficient to resolve serious conflicts, while the lack of assigned roles and leadership means no one person is responsible for resolving disputes.

The extreme version of the egalitarian way of life is when individual action is justified *only* in terms of how it benefits the collective. That is, decisions must serve to benefit the whole, and personal gain must come with collective benefit. An example of the egalitarian society is the Kibbutz movement in early 20th century Palestine. The explicit goal of the Kibbutz movement was to create communities in which members collectively provided for the welfare of adults and children, shared in ownership the local means of production and consumption (Atar Hakibbutzim 2011). Rules of the Kibbutz required that every member share duties in labor, child rearing, management and education on behalf of the collective. In this traditional arrangement, income produced by the members was not directly tied to the individual but rather was distributed equally to all members and families. Here, the egalitarian principles are at their strongest. No one has a defining role, labor and profit is even shared among members, and behavior is directed at enabling equal outcomes in society.

2. High group, High grid (Hierarchy)

In the hierarchical context, individuals are members of groups in which they have different roles, resources, and degrees of control over their choices. Their position in the group can be either compulsory or voluntary. In hierarchical cultural contexts, group organization revolves around internal specialization of duties. Roles in a group might be based on birth order or gender, and subsequently “ranked” in terms of function or duty within the group. Rules exist for managing conflict between individuals, which in turn arguably helps retain individual commitment to the group’s long term viability. Motivation for remaining in the group is an assured level of control over one’s self, role and satisfaction with the degree of available material and social resources.

3. Low group/High grid (Fatalistic)

The Fatalistic quadrant is associated with very low levels of individual autonomy as well as low levels of group membership. In the extreme case, individuals situated here have little to no control over issues affecting their lives. Examples of individuals in this category include prisoners, those who have transgressed societal rules and are forced to live separately from society, or a modern-day monarch, whose life and activities are completely regulated by custom, and whose authority is largely symbolic. Other examples include those excluded from society or those with an inability to compete in an individualistic cultural context. Like the hierarchical arrangement, a person’s role in this context is completely defined. Unlike the hierarchical context, however, this person is by definition isolated from mainstream society.

4. Low group/Low grid (Individualistic)

Individuals in this context interact freely and without any constraints except the ones that they choose. The main purpose of social interaction in the individualistic context is to secure allies in order to increase the overall scope of one's social, economic, or political mobility; status, interpersonal relations, and decisions here are fluid and negotiable. Those in the individualistic context rely on contracts and negotiations to advance their specific needs. The disadvantage of this system is that there is little recourse if someone fails to meet his or her obligations in a contractual agreement, and there is no support structure if people fall on hard times. In the hierarchical context, a conflict can be managed by higher-ranked managers. In the egalitarian context a problem can be addressed by the group. In contrast, the individualistic cultural context lacks well-defined mechanisms for addressing problems.

Grid/group theory stresses that individuals actively create culture (Douglas 1979). Beliefs and values from each way of life may dominate a group or individual, but theoretically, a person (or group) can move up or down grid, or across levels of group incorporation. This means that the egalitarian can move towards an individualistic context or way of life, while a person from the individualistic way of life might be inclined towards greater social inclusion and move towards the egalitarian way of life.

The concepts of autonomy, competition and perceived effectiveness fill in the gaps as to how individuals move up or down grid and affect change in specific ways of life (Douglas 1979; Thompson 2006; Lubell 2004). Autonomy refers to the degree of full control a person has over their own actions. Competition refers to rivalry over a resource. The resource may be a material good, social good, or a belief system. From a cultural theory perspective, a belief system is viewed by the group or individual as a resource since it defines how people should interact to

effect desired outcomes. Lastly, perceived effectiveness asks: how well does a certain way of life produce the outcomes it claims to achieve? Perceived effectiveness links autonomy and competition because it provides the basis on which a person chooses whether to remain within a specific way of life. How beliefs and values intersect in PPGIS can be further explained by these concepts.

Two factors validate applying these concepts to PPGIS. First because of its pluralistic nature, PPGIS rests on an egalitarian way of life. It is a theory and practice concerned with the ethical and equal involvement of all individuals in GIS decision making processes, independent of their status, occupation, gender, or place of residence. Second, according to grid/group theory, movement between ways of life occurs in the public domain (Thompson 2006). It is here where individuals and groups meet to resolve an issue beyond their immediate control. PPGIS is a process in which individuals from varying socioeconomic, political, religious, and cultural backgrounds converge to address an issue of public concern and participate (or not) in policy making. The following section discusses how participants' four ways of life influence decisions to participate, participation frameworks, and GIS based discussions. The discussion uses the concepts of perceived effectiveness, autonomy, and competition and contends that PPGIS is itself a cultural process.

Grid/Group theory applied to PPGIS

Who Participates?

The important question of “who participates” in PPGIS can be addressed in part by drawing upon the concept of perceived effectiveness. Perceived effectiveness is a belief on the part of an individual about how well a policy decision achieves its stated goals (Lubell 2003).

Perceived effectiveness consists of two components, an assessment of the processes by which decisions are made, and an evaluation of how well outcomes from previous processes have met their stated goals. In deciding whether or not to participate in a PPGIS, potential participants review and evaluate perceived effectiveness.

According to perceived effectiveness, individuals synthesize their beliefs with knowledge about decision making processes and evaluate 1) how well similar processes have previously achieved their objectives and 2) the degree to which the PPGIS process will match the individual's beliefs based on his or her position in the four ways of life. Those from low grid/low group (individualist) contexts interpret participation, activities, and policy problems through the lens of how participation benefits them personally: to what degree do decisions present opportunities or threaten choice (De Man 2003). Those from the low grid/high group (egalitarian) context frame participation in terms of the degree to which processes and outcomes support the collective good and the redistribution of resources in society. Individuals from this context may be predisposed to participate in collaborative decision making activities. Those from high grid/high group (hierarchical) contexts interpret participation in terms of the roles and rules assigned to participants and to individuals within their way of life. They might evaluate participation in PPGIS in relation to their preference that decisions should be expert-driven, or they might prefer that more highly-ranked individuals from this way of life participate in PPGIS processes. Finally, people who experience minimal opportunities for choice, (fatalistic) may truly not have a choice to participate, or may choose to not to participate, believing that their input will have only a minimal impact on the outcome (De Man 2003; Carver 2003).

Participation Frameworks

Participation frameworks in PPGIS aspire to high levels of empowerment and collaboration for participants (Rundstrom 1995; Sieber 2003; 2006) but such goals may not be possible, or desired by those involved. Participation frameworks also include activities, the specific forms of participation used to make final decisions. Typically these activities are designed to foster open discussion and collaborative, participatory decision-making. However, individuals from different ways of life have different preferences for decision-making activities. Some may prefer collective, egalitarian decision making, whereas others may prefer more passive or individualistic forms of engagement like voting or completing a survey. It is critical in PPGIS to recognize that when opportunities to participate do exist (Carver 2003), not everyone will participate.

The choice—and lack thereof—to participate in PPGIS fits closely with the concept of autonomy: people from the various ways of life have differing levels of autonomy, and these varying levels of autonomy enable movement between different ways of life. For example, in the egalitarian context, members remain out of a preference for few rules and to benefit from an equal distribution of goods, labor, and authority. In hierarchical settings, individuals have well-defined roles, and certain people have a degree of leadership over others. Those in a hierarchical setting may have less autonomy but remain because they benefit from the group's efficiency, stability, and reward for loyalty (Douglas 2006). Autonomy is highest in the individualist way of life. Here, a person is the least attached to a set of rules and groups to whom she or he may be accountable. There is a high level of autonomy here but very little attachment to others. Autonomy in the fatalistic quadrant is limited or does not apply. De Man (2003) suggests that

people in this quadrant may indeed have an opportunity to choose, i.e. limited autonomy, but believe there is little point in so doing.

By drawing on the concept of autonomy, grid/group theory provides a way of accounting for different levels of participation, especially non-participation, with respect to varying ways of life. Collaborative activities in PPGIS appeal to those from egalitarian ways of life because of the preference for high group involvement, concern for collective welfare, and higher levels of autonomy. However, a person from an individualistic way of life may prefer only to be informed or consulted, or not participate at all. This would reflect not only their ability to choose to be involved, but also their preference for activities that do not involve a high degree of commitment to others. Those from hierarchical ways of life, some indigenous or religious groups for example, might prefer to appoint representatives rather than participate directly. Sieber (2006) identifies the need to find recourse for those who cannot or are unwilling to participate. Although critical, the goal of finding “recourse,” to involve those who cannot or do not participate, is admirable, it is also important to acknowledge and respect individuals’ genuine decisions to not participate.

Participation frameworks have sought to accommodate instances where due to low levels of autonomy, participation is limited or not possible. In Tainan City, Taiwan, researchers brought mobile GIS platforms to residents (Sun 2009) to circumvent barriers to participation arising from limited autonomy. In that case study, citizens in Tainan City in southern Taiwan had been seeking government assistance in remediating environmental damage to ground water and soil due to petroleum leakages at an old factory. Frustrated with inefficient government responses and limited inclusion of their concerns, citizens stopped participating in the planning of

remediation projects. In response, researchers initiate the mobile GIS process as a means of integrating citizens' needs and knowledge into GIS.

Of course, a PPGIS may be designed in such a way that there are no options for *how* to participate: People who prefer less active forms of participation may not have the opportunity, because activities are only highly collaborative. Grid/group theory raises the important question: can participation frameworks in PPGIS be designed and interpreted to reflect participants' ways of life, or, does doing so compromise the egalitarian perspective embedded in PPGIS? In some situations, participation activities that reflect less active forms of involvement may be more compatible with local ways of life. Adapting to these forms of involvement may enable people to express their views in ways consistent with their beliefs and preferences, and in the long run may lead to fuller forms of participation. That a collaborative outcome isn't achieved immediately doesn't mean that the PPGIS has failed; rather, different taken for granted beliefs may be encountering one another in a productive exchange of ideas that ultimately minimizes forms of exclusion.

Autonomy and perceived effectiveness arguably go hand in hand when designing and interpreting participation frameworks. Perceived effectiveness accounts for personal decisions to join a PPGIS, while autonomy explains the ability to join and to select a specific participation preference within a given framework.

PPGIS: Discussions and GIS Use

Along with design and evaluation of participation frameworks, a key aspect of PPGIS, the most vital perhaps, is how individuals deliberate different policy solutions using GIS. The concept of "competition" characterizes how beliefs and ways of life operate as barriers within

PPGIS discussions. Competition is a contest: individuals publicly define their ways of life and seek to successfully draw others into it. In the process, they also preserve their culture and way of life. Competition occurs over a set of resources, prestige, and social interaction defined by or promised by context-specific ways of life (Douglas 2006). In PPGIS, competing beliefs and goals materialize in discussions and GIS use for modeling outcomes. These competing beliefs, and competition over beliefs, can exist among PPGIS participants or between participants and those who convene and manage PPGIS sessions (e.g. PPGIS staff and GIS experts).

In his case study on collaborative water resources modeling in Idaho, Ramsey (2009) describes how staff in the Idaho Department of Water Resources (IDWR) developed a GIS model of water use in an area known for high demand and recurring water shortages. The IDWR invited stakeholders to assist in developing GIS scenarios to model water use in the basin. However, in the course of discussions and modeling various water use scenarios, stakeholders discovered that the GIS model only contained data on surface water use downstream from a specific point and excluded upstream ditches and rivers located in the study area as well as data on groundwater use. Such data exclusions were interpreted by resident water users as impacting total availability of water resources and therefore prematurely limiting the potential allocation options. Ramsey (2009) concludes that stakeholder participation was limited to problem solving activities rather than to both problem understanding and problem solving activities; without involving stakeholders in problem understanding activities, agency staff predefined the problem space as one that necessarily excluded and limited stakeholders' needs, knowledge and options for resolving the water allocation issue at hand.

From a grid/group theoretical perspective, the differences between stakeholders and staff that emerged in PPGIS discussions reflected competing beliefs about scarcity, in this case water

scarcity (Thompson et al. 1990). In the case of scarcity, an egalitarian would want to allocate water evenly across users and in a way that ensures the resource lasts as long as possible. Here, the goal of conserving scarce resources derives from --and reinforces-- the belief that natural resources need to be evenly distributed now and in the future. An individualist will view water as a resource for personal benefit. To the individualist, scarcity is problematic only to the extent that it reduces personal benefits. The hierarchical member believes in managing scarcity; everyone will sacrifice so that the resource is preserved for the future. The rules and regulations that limit autonomy in this way of life reinforce a commitment to “shared sacrifice” (Thompson, et al 1990).

In the case of the IDWR, neither the individualists’ nor the egalitarians’ interests could be legitimately discussed or geospatially analyzed due to data exclusions in the design of the PPGIS. The GIS data and model limited options that would satisfy egalitarians’ belief in an equitable distribution of resources and minimal water use during instances of scarcity. The same data limitations excluded options representing the individualist’s ways of life – options that would maximize water use for individual stakeholders. The very process of selecting data and not engaging stakeholders fully in problem understanding not only perpetuates top-down forms of decision making, typical of a hierarchical way of life, but has the additional effect of limiting outcomes based on alternative ways of life. For IDWR staff, the act of pre-selecting data, reflects a top-down approach to participation, which from a grid/group perspective reinforces a hierarchical belief in managing shared sacrifice. Egalitarian, individualistic, and fatalistic beliefs and representations are excluded.

The discussions above help explain cultural influences on the simultaneous inclusions and exclusions found in PPGIS (Wiener and Harris 1998) “Who participates” in PPGIS is

influenced by peoples' evaluations of the perceived effectiveness of participation in relation to their own ways of life. Although people often participate because they live in proximity to a spatial problem or have an economic investment at stake, they also think about whether or not participation is beneficial from the perspective of their own grid/group position. Creighton (1998) suggests that a policy decision might threaten one's beliefs or way of life, motivating them to participate. Perceived effectiveness also explains why people might decide not to participate, as participation may go against their hierarchical, fatalistic or individualistic ways of life. Potential participants weigh whether specific decision making processes fit within their own belief system and are likely to result in solutions consistent with their particular way of life. In sum, perceived effectiveness suggests that individuals harness beliefs to evaluate whether or not participation is worth the effort, while balancing the potential benefits to be gained by protecting specific economic or spatial resources at stake in PPGIS.

Each way of life has varying degrees of autonomy that by definition limit social interactions and affect how people participate or not in PPGIS. Full participation is an egalitarian goal embedded in PPGIS participation frameworks and does not entirely match beliefs and goals in hierarchical, individualist or fatalistic contexts. The PPGIS literature often treats this incompatibility as something to overcome, and interprets lack of participation as evidence of exclusion. However, individuals have autonomy in deciding whether or not to participate. They may choose not to participate at all, or they may prefer less active forms of participation such as becoming informed about an issue – forms of participation that are inconsistent with the egalitarian emphasis of PPGIS. “Top-down types” of activities might be preferred by individuals from hierarchical or individualistic ways of life who favor a process in which experts make decisions. In this regard, a PPGIS activity isn't necessarily exclusive, but reflects a preference

from a competing way of life. In PPGIS discussions, competition may occur between ways of life that seek to assert themselves in the policy process, for example, between hierarchical beliefs in expert-driven decision-making, individualistic beliefs in personal benefit, and egalitarian beliefs in the collective good. Thus, from decisions about whether or not to participate, to PPGIS deliberations and discussions, PPGIS encompasses a range of cultural beliefs and processes.

CONCLUSION

Grid/group theory posits the existence of four distinct ways of life, hierarchical, egalitarian, individual, and fatalistic. These four ways of life condition how people interact with each other and how they construct beliefs about the world at large. As these four ways of life encounter each other due to a perceived public need, they will compete to assert their way of life, and try to preserve it or encourage others to adopt some of their values and ways of life. PPGIS becomes more than a decision making process; it serves as a public forum in which ways of life converge and compete over policy processes and outcomes. With its guiding principles of partnership, shared decision-making and equality of access (Aberley and Sieber 2002) we also see that PPGIS is itself grounded in an egalitarian way of life. PPGIS evolved precisely to make an egalitarian way of life more competitive in the public arena.. As such, PPGIS inherently contains barriers to participation because the individuals involved will often hold beliefs and values from competing ways of life that conflict with the egalitarian goals of PPGIS. Through the lens of grid/group theory, PPGIS becomes not just a tool for resolving spatial policy problems, but also a test bed for integrating culturally contingent rules and social arrangements through GIS-based deliberations. We can conceptualize PPGIS as a cultural process, one that

seeks to respect a diversity of voices and cultures, and one that will continually wrestle with competing beliefs about participation.

Newer research agendas that derive from PPGIS, such as Qualitative GIS and Volunteered Geographic Information (VGI), can also gain insights from grid/group theory. Qualitative GIS uses ethnographic methods along with GIS to reach individuals who otherwise cannot or do not participate in digital spatial data production. Introducing qualitative methods such as interviews and participant observations makes GIS and the production of spatial knowledge more “relational” but also more negotiable. In this regard, qualitative methods might be able to broaden the range of data incorporated in GIS to include the voices and experiences of individuals from individualistic, fatalistic, or hierarchical ways of life. Similarly, VGI benefits from theorizing geospatial data production as a cultural process. VGI refers to the spatial data created by citizens using geotagging, GPS and mobile devices, and social networks (Elwood 2008). The VGI research agenda arguably “hybridizes” egalitarian and individualistic ways of life by encouraging individuals to produce geospatial that can then be used for collective purposes. Also, research into the purposes and outcomes of VGI can be interpreted through grid/group theory; VGI for the Occupy Wall Street Movement serves different cultural purposes than VGI for marketing.

There are several limitations of grid/group theory. The theory is very broad, individuals may shift their positions on issues (Carver 2003), and not every instance of GIS use fits neatly into one specific way of life. However, as a way of systematically understanding the production of culture in society, grid/group theory offers new interpretations and understandings of cultural barriers to participation in PPGIS. These insights can reveal innovative ways of implementing and designing participatory decision making processes that align with diverse ways of life.

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CHAPTER 3

PUBLIC PARTICIPATION IN A RURAL CONSERVATION DISTRICT: INVESTIGATING CULTURAL INFLUENCES ON PARTICIPATION PREFERENCES AMONG MIDWESTERN FARMERS

INTRODUCTION

Environmental management frameworks have shifted in the past 30 years, from implementing top down regulations devoid of place specific needs and interests, to requiring the inclusion of local stakeholders in planning and policy making to better reflect the interconnected set of environmental, economic and social problems within specific locales (Sabatier et al 2005; Larson and Lach 2007). In recognizing the benefit of involving the “public” in local planning, the Department of the Interior (DOI) intentionally seeks citizen involvement in developing and implementing adaptive management resource conservation measures (Williams et al. 2009). The DOI maintains that citizen residents are positioned to significantly help identify and resolve environmental problems, monitor results, and provide data to mitigate or address changes and uncertainty in natural resources management. Similar changes have occurred at the Environmental Protection Agency (EPA) which mandates public involvement in many of its acts such as the Solid Waste Disposal Act, Safe Drinking Water Act, and the National Environmental Policy Act (Harvard 2007).

At more local levels, conservation districts across the U.S. train staff on participatory approaches for local planning in conservation districts. Conservation district supervisor training modules emphasize the significance of reaching out to the public in establishing district priorities and setting goals based on public needs and input (NACD 2010). Though not a perfect solution, many argue that the involvement of citizens in decision making through participatory and public

participation approaches to policy making helps reduce conflict over outcomes and improves the means through which scientists, experts, and community members manage uncertainty in the face of environmental responses to human induced change (Wiedemann and Femers 1993; Creighton 1998; Nyerges et al. 2006; Few et al. 2007; Reed 2008).

Public participation in policy making, including environmental management, seeks to democratize decision making processes, involve individuals in public processes that affect their own lives, and provide a pathway for durable and locally manageable policy outcomes. The theory is that when local needs, knowledge, and support are taken into consideration and implemented in policy making processes, solutions become sustainable over time. Public participation may be further conceptualized as processes of problem understanding and problem solving (Flora et al. 2000) that actively engage community members in decision making with officials and even researchers. The emphasis on such processes is (ideally) the full inclusion of public needs and knowledge in policy outcomes. Involving a broad spectrum of individual citizens is essential to the success of public participation. However, one of the recurring problems in public participation is in facilitating broad and relevant public involvement.

Findings in the participatory decision-making literature suggest that the cultural context of public participation serves as a barrier by regulating who participates and their preferred levels of participation (Rundstrom 1995; Carver 2003; Sieber 2006; Harvard 2007). Culture refers to the taken for granted beliefs a group has towards itself and society at large (De Man 2003; Lubell, 2004). Culture also refers to the rules and social interactions among individuals that produce a shared meaning (or meanings) in society (Danesi and Peron 1999). Societies produce multiple systems of shared rules and interactions, which in turn yield variegated cultural contexts that distinguish individuals and groups within a spatially and temporally bounded location.

Beliefs, rules, and values produced and reinforced in given cultural contexts may partially explain why people prefer not to participate. Moreover, culture is geographically-specific, resulting in particular opportunities for and constraints on participation in particular settings.

Building on these themes, and the role of cultural contexts in public participation, this paper asks: how do beliefs and values among farmers affect the importance they assign to specific levels of participation in public and membership organizations. Specifically, I ask: how do farmers value participation in local policy decision making and what are their preferred levels of participation? I hypothesize that farmers' beliefs and values constitute distinct cultural identities (or ways of life), and that participation preferences, that is, the importance assigned to different activities in decision making, will vary based on specific cultural identities. Following de Man (2003), I argue that understanding cultural norms and beliefs helps uncover important and different participation preferences of potential participants. Findings related to cultural practices would further our understanding of the opportunities and constraints that affect the success of adaptive management and participatory processes in rural agricultural contexts.

The theoretical framework guiding this research argues that social interactions and rules produce shared meanings among individuals and groups in society (Douglas 1978; Danesi and Peron 1999). Furthermore, such shared meanings produce cultural contexts that include 1) distinct beliefs about participation and 2) beliefs about a range of social values towards society at large (Lubell 2004). Through a mail survey and quantitative analysis, I investigate farmers' beliefs and attitudes towards an array of agricultural issues that together, are argued to constitute a set of cultural identities unique to farmers (Walter 1997; Wilson et al. 2003). This study then tests whether those cultural identities relate to varying levels of preferred participation in decision making activities.

This paper begins to fill the gap in knowledge of how culture influences participation by examining the cultural context of farmers in a rural, agriculturally intensive conservation district in central Illinois. Farmers, as landowners and renters, represent an important group of potential participants in public decision making processes for conservation and, broadly speaking, natural resources management (Cope, McLafferty, and Rhoads 2011). The Macon County Soil and Water Conservation District in central Illinois covers 925 square miles of land. Corn and soybean are grown on over 80% of the land which drains into Lake Decatur, the primary drinking supply for the city of Decatur, IL. The Conservation District, City of Decatur, and a grassroots watershed management organization have worked both collaboratively and independently over the past 25 years to reduce soil erosion and nutrient runoff into the streams that connect to the lake. Part of the effort in managing soil erosion and water quality involves engagement with farmers and landowners in budgeting decisions and identifying specific areas for implementing new soil conservation measures. The rich history of farming in this area and its varied settlement patterns and beliefs about farming (Salamon 1994; Walter 1997), combined with the city and conservation district's efforts to manage water and soil resources by including farmers, make it an important and appropriate case study for examining how culture influences public participation.

This paper is organized as follows. Section one begins with an overview of the public participation literature, examining important conceptualizations of public participation, barriers to participation, and how stakeholders are conceptualized. It then discusses the participation frameworks used in public participation that have traditionally structured and guided interpretations of public involvement. Section two discusses culture, both in terms of the cultural theory guiding the study and the specific cultural context that serves as the case study. This

section first presents a cultural theory of participation (Douglas 1979) and then discusses culture in the context of Midwestern farmers, drawing upon ethnographic research to provide specific examples of attitudes and beliefs concerning land use, nature, community, fiscal matters, and technology that inform farmers' ways of life (Walter 1997; Salamon 1994). Different farmer "types" are hypothesized to exist in the sample and have varying attitudes towards the importance of participation due to culturally distinct ways of life. Section three describes the case study, sample, survey questions, and statistical methods used in this research. Section four presents a statistical test of the hypothesis based on responses and analysis from the mail survey. Findings are discussed in this section. The conclusion discusses the importance of local values and beliefs on assessing public participation in a rural conservation district, and assesses the implications of cultural contexts on further research in public participation for conservation in an agricultural setting.

Before beginning, it is important to draw attention to the use of the terms "public" "stakeholders," and "participant" with respect to a particular policy issue. "Public," refers to citizens situated on a spectrum of interest and engagement, from levels of informal interest to being directly impacted in economic, social, political, spatial or other relevant ways (Schlossberg and Shuford 2005). In the literature, the term "stakeholders," has been used reference those who are externally thought to be affected by policy outcomes. Additionally, though not without concern (Sieber 2006) stakeholders may or may not reference those who have actually participated in public participation (Creighton 1998; Reed 2008). This papers uses the term "participants" to describe anyone who may or may not participate (e.g. "potential participants") in public participation independent of how an outcome might affect them personally. That is, these individuals may or may not be stakeholders, and the terminology reflects my position of

allowing people to “self-identify” as stakeholders. This analysis focuses on the cultural contexts of farmers, rather than, for example, the cultural contexts of officials or other groups relevant to a specific public participation process. This narrows the scope of this research but is also an important distinction.

BACKGROUND

Public Participation

Public participation entails: “involving members of the public in the agenda-setting, decision making, and policy forming activities of organizations or institutions responsible for policy development” (Rowe and Fewer 2004: 512). Such activities may be conceptualized as either problem-understanding or problem-solving activities (Flora 2000). Problem-understanding activities are those in which researchers, community members, and officials “work together in designing, implementing and evaluating the discovery of problems.” Problem-solving activities build on results from problem understanding processes to implement solutions in a collaborative framework (Flora et al. 2000). Public participation activities involve both problem understanding and problem solving forms of participation. The public participation literature research examines ways that citizens are excluded from these processes, as well as how convening entities fail to integrate the interrelated components of problem understanding and solving in decision making processes (Ramsey. 2009).

Public participation is argued to be “authentic” when citizens are as close to the issue as possible and when those in charge are not reliant on expert driven models or technologies (King et al. 1998). To achieve authentic participation, problems of transparency, access, and communication operating in the following three components of public participation must be

addressed and resolved: 1) administrative structures and processes, 2) officials, and 3) citizens (King et al. 1998: 323). Research on processes and officials reveal multiple forms of stakeholder marginalization such as deliberate exclusion by local government agencies (Arnstein 1969; Ghose and Elwood 2004), tokenism, in which individuals are invited to participate but without those in charge yielding any decision making authority (Arnstein 1969; Wiedemann and Femers 1993), and exclusion due to a lack of technical and/or “professional” knowledge that limits opportunities for individuals and groups to contest claims made through spatial modeling or scientific analysis (Duncan and Lach 2006; Elwood 2006; Aberley and Sieber 2002).

Barriers to authentic participation also emerge in the process of identifying relevant participants. Ideally, participants should represent the diversity of stakeholders affected by an issue. However, limitations in identifying and including stakeholders persist and remain well recognized (Creighton 1998; Schlossberg and Shuford 2005; Sieber 2006; Few et al. 2007; Reed 2008). Creighton (1998) and others (Schlossberg and Shuford 2005; Reed 2008) suggest three methods for identifying participants: self-identification, in which individuals ascertain their own interest in a policy problem; official selection, in which agencies use specific criteria for selecting groups and individuals to participate; and third-party selection, in which representatives of known interest groups help identify and invite potential participants. Each method, however, may unintentionally result in uneven levels of inclusion. Following an iterative self-identification process for example, Reed (2008) proposes identifying relevant stakeholders through focus groups, interviews, or snowball sampling. Reed (2008) contends that stakeholders in public participation are not necessarily self-evident to conveners. In general, selection methods are subject to changes in social, economic or political circumstances that alter the composition of potential participants and stakeholders over time (Schlossberg and Shuford 2005).

Creighton (1998) provides five main reasons, (which he also refers to as “criteria”), as to why individuals may qualify as stakeholders. They may live in proximity to the problem; incur potential economic impacts; use an area subject to the problem; experience a social impact, that is if a project threatens or enhances a community’s tradition or way of life; or discover that their values or sense of how things ought to be may be affected in a decision making process (Creighton 1998). Creighton (1998) views these reasons as independent of each other, but with the potential to overlap. At various stages in convening a public participation process, Creighton (1998) encourages everyone involved to return to these objective criteria in order to continue outreach. Schlossberg and Shuford (2005) view these criteria as a means for anticipating public involvement. For example, spatial proximity corresponds to anticipating a smaller, more focused set of stakeholders whereas values alignment represents a more amorphous set of participants and those whom officials may find difficult to engage.

However, determining the involvement and role of stakeholders is by definition an uncertain and exclusionary process (Creighton 1998; Schlossberg and Shuford, 2005; Sieber 2006; Few et al. 2007; Reed 2008). In methods such as official and third party identification, conveners may correctly infer that individuals or groups qualify as stakeholders due to potentially significant impacts from policy decisions. However, such persons may not desire involvement in the process. With self-identification, exclusions necessarily occur if participation is of little interest even to those who may be greatly impacted. Such uncertainty in stakeholder identification leads Creighton (1998) to argue that whether bottom-up or top down, stakeholder identification is a matter of perception from both the perspective of officials who identify relevant individuals, and from the perspective of potential participants.

Frameworks and Processes

Public participation research uses “ladders” of participation to interpret increasing levels of public involvement in decision making processes (Reed 2008). The ladder metaphor refers to the activities or goals that public participation seeks to achieve. Goals might be broad, such as empowerment of individuals and communities, or narrow, such as satisfying government mandates for citizen inclusion in specific planning and management issues (Schlossberg and Shuford, 2005).

A widely used and discussed ladder of participation (Figure 3.1) is Arnstein’s “Ladder of Citizen Participation” (Arnstein 1969). Researchers and practitioners use the ladder to explain citizen empowerment in terms of the levels of increasing public involvement in decision making (Schlossberg and Shuford 2005; Sieber 2006; Reed 2008). Levels of involvement from more passive activities, including non-participation, to more active forms of citizen control over the policy process (Arnstein 1969; Reed 2008).

Degrees of Citizen Power	Citizen Control
	Delegated Power
	Partnership
Tokenism	Placation
	Consultation
	Informing
Nonparticipation	Therapy
	Manipulation

Figure 3.1: Ladder of citizen participation (Arnstein 1969).

Arnstein (1969) explains that the lowest rung of the ladder, nonparticipation, refers to situations in which officials educate, persuade or advise citizens on issues. In these instances, citizens believe that they have participated in decision making but realize instead after a decision is made that they were excluded from any meaningful involvement in the process (Arnstein 1969). The

middle rungs of informing or placating signify token levels of participation because communication flows still remain top-down: citizens' opinions are neither genuinely solicited nor sufficiently integrated into policies and plans. At the highest rungs of the ladder, citizens possess the most influence over decisions that impact their lives, through partnerships, community panels representing delegated power, and full citizen control. These highest rungs are distinguished from the lower ones by virtue of citizens controlling a greater share of decision making processes and outcomes. Arnstein (1969) acknowledges that her typology simplifies extant power structures, the role of competing interest groups, and divergent viewpoints that interact and shape participation (Arnstein 1969).

Wiedemann and Femers (1993) propose a ladder of participation with activities designed to address conflict management (Figure 3.2). Their ladder begins with the right to be informed and moves towards participation in the final decision (Wiedemann and Femers 1993; Schlossberg and Shuford 2005):

Public Participation in Final Decision
Public Participation in Assessing Risks and Recommending Solutions
Public Participation in Defining Interests Actors, and Determining Agenda
Public Right to Object
Informing the Public
Public Right to Know

Figure 3.2: Ladder of participation (Wiedemann and Femers 1993).

Wiedemann and Femers (1993) acknowledge that not every participant “gets what they want,” even in a transparent decision making process where parties share information and consider all alternatives.

Arnstein's (1969) and Wiedemann and Femers' (1993) participation ladders combine theories and specific activities that respectively seek to broaden citizen engagement. However, plain use of the ladders as a methodology for inclusion or assessment is problematic. A ladder embeds a hierarchical norm in which the activity or goal at the "top" is interpreted as the "best" means of citizen engagement, regardless of what activities stakeholder might believe to be more appropriate for their needs, interests and contexts. Rundstrom (1995) points out regarding the top rungs of the ladders, "equal participation represents a Western fixation" and that, "indigenous rules about who should and should not receive geographic information are far from democratic" (Rundstrom 1995; Sieber 2006: 500). Bailey and Grossardt (2010), in a multisite survey, demonstrate that stakeholders in sustainable transportation planning preferred degrees of partnership and involvement of experts rather than full ownership of policy processes even though they were affected directly by final decisions. This survey allowed for implementing planning processes in which stakeholders' needs were more fully integrated into final decisions via their stated participation preferences, while professionals' roles as experts were transparently valued and still integrated.

Davidson (1998) calls for removing a "ladder" of participation and situating activities within what he terms a "wheel" of public participation. Doing so removes the implicit judgments about participation associated with a hierarchical construction of participation; that "up" the ladder means "better" forms of participation. Instead, a wheel metaphor acknowledges participation goals and activities may be judged based on the degrees of inclusion and activities that local stakeholders and conveners determine are most suitable for the policy context. A wheel metaphor suits the goals of authentic participation by legitimizing citizens' participation preferences independent of where activities fall on a ladder. This study conceptualizes

participation more in terms of a wheel, where activities and goals from the ladders of participation can be interpreted based on the levels of participation that fit the needs and interests expressed by potential participants. Conceptualizing participation goals and activities independent of hierarchical structure may expand the range of options for engaging participants.

The public participation and stakeholder literatures reveal the extent of barriers to citizen participation. However, the types of barriers and exclusions are not always external impediments to individual participation. Rather, cultural contexts and cultural identities may also influence how participation is valued, and who participates. This is not to say that external barriers do not exist. Rather, I suggest that participation preferences are *a priori* shaped by local cultural contexts and that such preferences need to be considered in designing public participation procedures, evaluating representative participation, and in assessing outcomes (Carver 2003; De Man 2003). The next section explores the idea of culturally influenced participation preferences, beginning with an overview of a cultural theory of participation.

Culture

The discussion of culture is divided into two interdependent sections. The first section presents a “macro” cultural theory of participation based on Douglas (1979). It describes four typologies of social interactions and rules argued to regulate life choices, participation preferences, and activities to varying degrees. This theory supports the argument that culture includes beliefs about participation per se. The second section provides an overview of Midwestern farmers, discussing their everyday beliefs, norms and practices. This addresses the second component of culture, the taken for granted beliefs a group has towards itself and the world at large.

Cultures of Participation

Beliefs about legitimate decision making processes result from four distinct cultures, or “ways of life” (Figure 3.3). These ways of life are: individualism, hierarchy, egalitarianism and fatalism. Individualism refers to the degree to which decisions present opportunities or threaten individual choice. Hierarchical expressions of participation emphasize the role of experts in technological, political or environmental decisions.

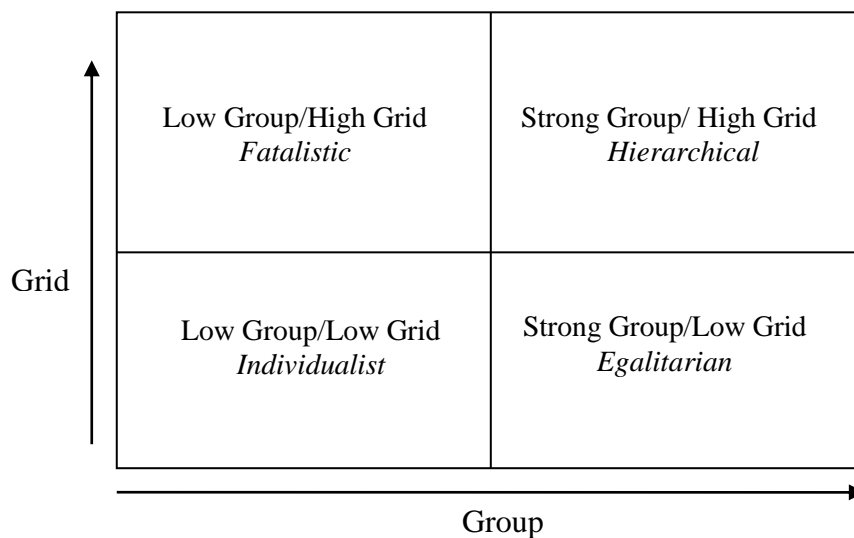


Figure 3.3: Grid/Group typology of cultures (Douglas 1979).

In an egalitarian context, participants share an evenly distributed level of decision making power, and decisions themselves concern the degree to which outcomes support a common good.

Finally, fatalism refers to the context in which individuals believe they have no control over a decision (Douglas 1979; Man 2003; Thompson 2006). These “ways of life” are determined by the degree of an individual’s social integration in society, termed “group,” and the degree to which rules and regulations govern a person’s range of choices in their social environment,

termed grid. Social interactions in these four grid/group contexts persist over time and reinforce one another, producing four primary cultures, each with a way of life and reinforced beliefs about participation.

In public participation, taken for granted beliefs from these four cultures can come into contact, resulting in competition over the rules and content in policy making (Thompson, 2006). In terms of rules (or procedures) an egalitarian might prefer collaborative activities, while the individualist may prefer more private and self-motivated activities such as voting. While both have personal motivations to participate,--which may even be identical--they will differ over what constitutes legitimate decision making rules. In terms of policy content, the egalitarian perspective favors the common good, and sharing resources for the collective. This view would likely conflict with that of an individualist who believes that resources should be appropriated for personal gain. I contend that the values and preferences associated with these four ways of life influence public participation, as they guide participants' preferences towards both decision making activities and outcomes. However, this theory is very broad. To understand where individuals fit within these four cultures, it is necessary to explore their everyday values and beliefs. The next section presents a discussion of the beliefs, practices, and norms of Midwestern farmers.

Midwestern farming culture

The literature on Midwestern farming culture examines variation in farm management styles, perceptions of "good farming," and what constitutes quality of life for farmers in the Midwestern U.S. These interrelated factors constitute the cultural context of farmers' livelihoods which I argue influences participation preferences. Studies reveal considerable cultural diversity

among farmers, diversity linked to farmers' ethnic heritage, attitudes about individualism and quality of life, farm management, and attitudes toward nature (Nassauer and Westmacott 1987; Walter 1997). In this section, I outline major themes identified in the Midwestern farm literature and then discuss primary "types" of farmers based on research by Walter (1997). I note that while organized around correlated themes and beliefs, the primary types of farmers identified by Walter (1997) are still generalities and not all farmers will conform to these types.

Historic Settlement Patterns

The rural Midwest was settled by farmers who came from predominantly German or British backgrounds. Midwestern farm settlers were either immigrants or first generation Americans who continued their parents' settlement and farm practices (Salamon 1992; 1994). In Germany, agricultural production varied geographically, but individual farms operated according to similar social and occupational beliefs such as a commitment to continuous land ownership, reliance on family farming, and subsistence farming. Even after settling in the Midwest, German farmers continued to intensively work their land, maintain relatively small family farms, and avoid risky investments to keep the farm in the family (Salamon 1992; 1994). They also maintained a common language and networked through church and community functions.

Farmers of British descent ("Yankees") tended to view land as a commodity from which farming generated an income. This attitude is thought to have emerged in part as a response to the economic conditions in Britain from which farmers migrated. In the late 1800s, tenancy in England was high and landlords focused on making a profit required that tenants incur the start-up and operation costs involved in farming (Salamon 1994). This perpetuated a belief and socio-

economic system in which land was considered a means to generate profit. The Yankee farm ethic revolves around efficiently managing the farm as a business that optimizes profit.

Family Farm Management

Among central Illinois farmers, roles and rules governing farm management differ between the primary ethnic groups of German and British farmers. Although both groups embed hierarchical divisions of labor within the family unit, factors such as seasonal planting, harvesting and management decisions vary along grid/group dimensions in ways that produce and reproduce distinctive labor roles and beliefs about farm operations and tenure. Among German farmers, high group membership is preserved while rules structuring roles depend on seasonal farming needs. Male heads of household tend to make most of the management decisions, indicating a hierarchical norm. However, everyone contributes to fieldwork during planting and harvest seasons, reasserting the value of decisions that benefit the family as a whole and land (Salamon 1992).

Among British or “Yankee” farmers, married owners view themselves as partners in running the farm. However, gendered divisions of labor persist. Viewed as a business, women are more likely to work off the farm to support the farm business as a whole, while male heads of farm families organize field work and make operational decisions. This gendered division of labor seems to embed a contradiction of sorts from a cultural perspective. On one hand, women of British descent exhibit a higher degree of autonomy than their German counterparts precisely because they work outside the farm. However, equality in performing the same type of on-farm labor does not exist: women are traditionally excluded from field work and related decisions.

With British farmers, individualist and entrepreneurial motivations guide operational decisions made in the name of benefiting the family farm.

Individualism and Quality of Life

Midwestern farmers have long linked quality of life with a high regard for independence (Ahnstrom et al. 2008). A report on country life in America, commissioned by the federal government in 1910, reported that, “the farmer does not easily combine with others for financial or social betterment... The training of generations has made him [the farmer] a strong individualist” (Bailey 1917: 111). While interpreted as a stereotype of “the” American farmer, this history of individualism plays out in recent studies of central Illinois farmers who identify themselves as “real-world” stewards of the land and who resist urban and governmental intrusion on their way of life (Wilson et al. 2003).

Progressivism and Nature

“Progressivism” refers to values that motivate farmers to adjust practices in ways that constitute “good” farming, where “good farming” is partly an aesthetic judgment (Nassauer and Westmacott 1987). In the Midwest, Nassauer and Westmacott (1987) find that “good farming” is practiced when farmers push back “unruly nature,” or when farmers value neatness on the landscape in its numerous forms (e.g. straight rows). For these farmers, good farming is as much about the appearance of the farm-- tidy, neat rows and well maintained equipment --as it is about high yields and soil quality.

Progressivism also yields important insight into how farmers perceive themselves as environmental stewards. Studies have found that farmers are more concerned with preventing

soil loss and minimizing fertilizer and nutrient applications to ensure that farming continues for the next generation rather than to protect ecologically significant biotic diversity (Urban 2005). Whereas farmers seek to manage nature, conservationists advocate preserving diverse and untidy natural habitats (Ahnstrom et al. 2008). In this regard, farmers' beliefs about nature, rooted in their progressive conceptions of good farming, contrast strongly with those of conservationists.

Midwestern Farmer Identities

Walter's (1997) study of Midwestern farmers' values nuances many of these ethnically divergent attitudes. Through a qualitative analysis, Walter identified four primary models of the "successful" Midwestern farmer: the Steward, the Manager, the Conservative, and the Agrarian (Walter 1997). The Steward believes s/he is a link with nature, prioritizes high crop production, and believes in a moral duty to conserve soil for the next generation (Walter 1997). The Manager type is a businessperson and risk taker. The Conservative avoids financial risk, and the Agrarian believes that "farming is the source of societal values" (Walter 1997). The Agrarian also believes that farming is more than an occupation; it is also a lifestyle (Urban 2005). Each of these traits reflects German or British farming beliefs, but the traits are not mutually exclusive. For example, the Manager as a risk taker points to a Yankee value, whereas the Conservative suggests a risk adverse farmer such as the German descendant. However, the Agrarian and Steward ideals combine elements from both German and Yankee farming approaches. This dovetails with Salamon (1994) who finds that social interactions in local education, government, and business spheres historically provided avenues for exposure to competing farm values. This

means farmers of different backgrounds interacted in ways that exposed them to alternative practices and values, suggesting ways for new values to be internalized over time.

In conceptualizing cultural influences on participation among Midwestern farmers, passive levels of stakeholder involvement in participation activities do not necessarily mean that farmers have been marginalized or discouraged from participating. Rather low participation may reflect cultural preferences that emphasize individualism. I hypothesize that different farmer cultural types (e.g. Manager, Agrarian) may be associated with different kinds of participation preferences. To evaluate this hypothesis, I conduct a survey of farmers in Macon County, Illinois, a highly intensive agricultural area that includes several environmental organizations and agencies that aim to increase farmer participation in watershed planning. The survey relocates the question of participation from that of a strictly structural one in which external powers and controlling influences serve as primary barriers to participation, to one that examines subjective perceptions about the importance of participation. This involves reconceptualizing ladders of participation as ranges of activities situated to participants' contexts, interests, and needs rather than as specific levels of engagement that necessarily seek to intentionally include or exclude individuals.

CASE STUDY BACKGROUND

The research is conducted in Macon County in central Illinois. Farmers first settled the Macon County area in the early 1800s. Since then, grain production has grown from 73,000 total acres planted in 1860 to 177, 506 for corn and 94,793 for soybeans as of 2007. The county is presently home to 708 farms and just over 110,000 people (Census of Agriculture, 2007; U.S. Census Bureau, 2010). There are a total of 1,047 farm operators in Macon County, those whose

responsibilities involve either day to day farm work or decision making about planting, harvesting and marketing (NASS 2007).

A wide array of local government, educational, agribusiness, and grassroots organizations have ties to local farmers. For example, the Macon County Soil and Water Conservation District (MCSWCD) was formally established in 1943 by a public vote of farmer landowners (Craft 1986). One farmer interviewed for this research indicated that his father helped organize and establish the MCSWCD. Conservation District staff report to an elected advisory board consisting of full or part time farmers at the time of this study, and staff decisions are made with final board approval.

Water quality is an important farming-related issue in Macon County. In 1985, the mayor of Decatur formed a taskforce to address siltation in Lake Decatur, the city's water recreational area and drinking supply. In 2003, the taskforce broadened into a committee tasked with responding to a set of interrelated issues concerning the economic, physical and social issues pertaining to watershed management, and sought to strengthen the involvement of farmers and residents in research, planning, and long term management goals. More recently, a Decatur based watershed research institute sought farmers' active involvement in producing a local market for perennial energy grasses, conceptualized as benefitting businesses and investors, regional growers, and the watershed ecology. Farmer involvement in this initiative is limited, although the institute has a few key farmer stakeholders involved and continues to seek new farmer members.

Macon County, importantly, is home to the Archer Daniels Midland Company (ADM), which was founded in 1902 and is today one of the world's leading food, feed and fuel processors. Agribusiness has a very large presence in the area, suggesting that cultural beliefs

about farming are tied to extant economic factors in and around the county, although exploring those relationships in detail is beyond the scope of this paper.

METHODOLOGY

To examine the association between farmers' cultural identities and their participation preferences, I conducted a mail survey of a sample of farmer renters and owners in Macon County. The survey asks farmers about their current involvement in Conservation District programs, their preferred level of participation in public, community and agricultural organizations, their values and beliefs about farm management and related practices, and basic demographic information. The survey questions are discussed in more detail later in this section. Survey responses provide data used in examining the types and variability of farmers' participation preferences and how these differ among culturally distinct types of farmers, those with varying beliefs, values, and occupationally distinct practices that construct unique cultural identities.

The MCSCWD, which assisted me on a previous study, (Cope, McLafferty and Rhoads 2011), partnered with the Farm Service Agency (FSA) to facilitate my access to a database with names and addresses used for the mail survey. The FSA administers a database with the names, addresses and farm data of approximately 1200 farm operators in Macon County. Operators may be either landowners, farmers, or both, and may either be resident or non-resident. I requested the names and addresses for 400 *resident* farmer "operators," those whose primary occupation is related to the day to day needs of the farm or decision making involving planting, harvesting, ownership and marketing of the land. Farmers in this sample may include owners, renters, managers or retirees. I mailed surveys to the 400 randomly selected farm operators in Macon

County. Additionally, I handed out surveys and return envelopes at a seed demonstration and grain elevators, ensuring that 1) respondents had not already mailed in the survey and 2) respondents were resident farmer operators in Macon County. This survey excludes non-resident landowners because the research focuses on traditional, face to face participation, which presumes geographical proximity to organizations in Macon County, and also due to limited funds for conducting the mail survey.

For the mail survey, I received a total of 53 completed surveys for a response rate of 13%. Statistically, this is a low response rate but a number of reasons explain why. First, the research budget did not allow for a cash incentive, post card reminders or a second mail survey to be issued, all of which are shown to increase the response rates among farmers (Pennings et al. 2002). Additionally, due to research time constraints, I mailed the survey in June which is seasonally a busy time for Midwestern farmers as they may be in the field for long hours.

I collected another 11 surveys following visits to a grain elevator and seed demonstration. At the grain elevator, I left questionnaires and envelopes for farmers to voluntarily complete and mail, instructing the manager that questionnaires were only for Macon County based farmers. At the seed demo, I was given a few minutes to explain my research (and presence) and the voluntary nature of the questionnaires. The owner of the farm hosting the seed demonstration helped hand out surveys to attendees who rent or own/operate farms in Macon County.

Of the total respondents, the majority of respondents were between 50-59 years old (37.5%). 29.7% were between 60-69 years old, while 25% were under 50. The vast majority of respondents (92.2%) grow both corn and soybeans.

Survey Overview

The survey consists of four main sections (See Appendix A). The first section asks questions about respondents' participation preferences. The second section of the survey asks questions about farm management beliefs and values using a 5 point Likert scale for all questions. These beliefs and values reflect an array of attitudes towards farm management that are argued to discriminate between five predominant types of farmers. The third section collects demographic and agricultural data from respondents. A fourth section asks respondents about their use of computer and mapping technologies, but these topics are not examined in this paper.

Survey Section 1: Participation Questions

The participation related questions query: 1) farmers' participation with the MCSWCD; 2) importance of different participation levels in public or membership organizations; and 3) importance of involvement in agricultural organizations that differ by collective, individual and/or hierarchical arrangements. Additionally, an open ended question asks respondents, "Why do you participate in agricultural organizations." The analysis here focuses on the questions about the importance of different levels of participation in public or membership organizations.

Participation Activities

The survey asks farmers to identify the importance of a range of activities in public and membership organizations based on the Arnstein (1969) and Wiedemann and Femers (1993) ladders of participation. Activities in the survey are listed in increasing levels of involvement, moving from: receiving information about issues and decisions, responding to solicitations for input, and voting on issues, to serving on a board, and serving as a voting board member.

Although these activities are listed in a rank order, the question assumes that opportunities and

structures for any participation level are in place, and seeks to interrogate the farmer's own preference. Respondents rated each type of participation as "very important", "somewhat important" or "not at all important," providing an indication of their participation preferences. This section also includes "Prefer that others make decisions" and "other" as participation activities; however, these responses were ambiguously worded , and therefore were omitted from the final analysis.

Another set of participation questions investigated farmers' involvement in agricultural organizations. The organizations were selected with input from agricultural researchers and extension officers to reflect the array of guiding missions that may culturally relate to farmers' needs and preferences. I do not use those responses in this analysis, but the survey questions are attached in Appendix A.

Survey Section II: Values and beliefs about farming practices

Questions in this section use a 5 point Likert scale to identify the degree to which respondents agree or disagree with a belief related to Midwestern farming practices. The references contained in each statement derive from ethnographic studies about farmers' attitudes towards an array of topics related to farm management: decision making, nature, community, land stewardship, and technology (Salamon 1992, 1994; Walter 1997; Urban 2005; Ahnstrom 2008). Decision making questions concern: buying new or used equipment, knowing production costs per field for making cropping decisions, conducting research as part of farming business, consulting with experts, consulting with neighbors. Statements involving "nature" are: nature is unpredictable, nature is fragile and society needs to protect it, nature is manageable, and nature is resilient. Community statements address the importance of volunteering in community, church or

farm organizations, and importance of farm benefiting the local community. Land stewardship questions concern importance of preserving soil for next generation, farmer is a key link with nature, and importance that farm looks neat and well maintained. Lastly, technology questions concern willingness to try new methods and reliance on hard work and sound judgment over technology and equipment. As discussed below, these statements are combined into 5 independent variables based on a factor analysis that reveals how beliefs group together in distinct cultural patterns and themes.

Survey Section III: Demographics and farm data

These questions ask respondents about their age, gender, years farming, full and/or part time status, total acres farmer, total acres owned that are also farmed by them, and acres owned that are farmed by someone else. This section also asks farmers to indicate their major crops and if they have livestock.

Dependent Variable: Overall Importance of Participation

The dependent variable measures the overall importance a farmer assigns to various participation activities. A high score indicates that the farmer places a great deal of importance on all types of participation activities, from receiving information to serving on boards. This variable is constructed by summing the preferred participation level questions in the survey. For each participation activity (level) the responses are: 1 = *not at all important*, 2 = *somewhat important* and 3 = *very important*. Summing these responses for all five questions creates a range of scores from 5-15 which is interpreted here as increasing levels of importance of participation. These “overall” participation scores vary among sample respondents (Chart 3.1), indicating

considerable diversity in participation preferences among farmers. However, the summed scores for overall participation are not normally distributed. Instead, the distribution appears bimodal, suggesting one group of respondents who assign high levels of importance to participation and another group who assign some or little importance to participation.

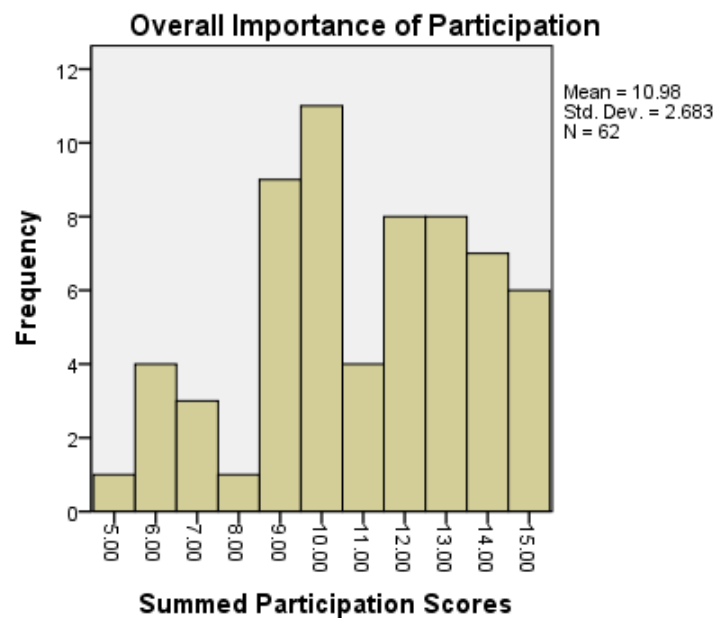


Chart 3.1: Summed totals of each participation level per respondent.

Using the median value (11) as the cut score, I recode responses and assign scores 11 and over a value of “1” to indicate high importance of participation activities, and a value of “0” to the remaining scores which means low importance.

Independent Variables—Farmer “types”

To determine how these participation preferences relate to farmers’ cultural identities, I analyze whether or not distinct farmer cultural “types” exist in the sample. Confirmatory factor analysis is used to determine if the five farmer (cultural) identities from the literature are present

among the respondents, and to ascertain variables associated with each farmer type (Walter 1997; Nassauer and Westmacott 1987). The variables that load highly along the same dimension are summed to create a new variable to represent a specific farmer identity, either the “Steward,” “Manager,” Fiscal Conservative,” “Progressive” or “Agrarian.” These new independent variables are then introduced into a logistic regression model to test if they relate to participation preferences. Logistic regressions are run for both overall importance of participation and for specific participation activities. I note that the five farmer types are not mutually exclusive: respondents may belong to more than one farmer type given the factor analysis method for creating and discriminating between farmer types. I discuss the consequences of this overlap in the discussion. Below, I list the five farmer types (cultural identities) and the survey questions that are hypothesized to describe each farmer identity.

The Steward combines the business aspects of farming with a strong sense that s/he is responsible for protecting land and nature (Walter 1997). The survey questions that indicate the Steward include serving as a key link with nature, protecting soil for the next generation, protecting and managing nature, and belief that conducting research is important part of farm business. As discussed previously, Urban (2005) finds that from the farmer’s perspective, a Steward is more concerned with soil conservation and productivity than preserving ecologically diverse habitats found in the physical environment. I add questions that conceptualize nature as a “force” due to observations and interviews in which farmers discussed the variability of their schedules due to ‘mother nature’ and the weather.

The “Manager” is identified as a hard working business person (Walter 1997). The survey questions that reflect the Manager are: knowing production costs for each field and the

value in using that data for cropping decisions, closely following commodity prices and having a marketing plan, relying on hard work and sound judgment more than the latest technology.

A few values associated with the “Fiscal Conservative” overlap with the Manager and the Steward such as knowing production costs per field and conserving soil for the next generation. However, Fiscal Conservatives are set apart by their risk averse decisions pertaining to investments and land management; they seek to pay off debts and prioritize working with his/her family in order to maintain the land and keep the farm as a family business. The survey questions that include dimensions of the Fiscal Conservative are: buying certified used equipment over new, knowing the cost of production for each field and preserving land for the next generation.

The “Agrarian” views farming as a way of life. The survey measures this farmer type by asking about the importance of hard work along with dedicating time to volunteer in the community and the importance of a farm operation benefitting the local community. The Agrarian also strongly values hard work and sound judgment over technology but less so than the Manager. To measure the “Progressive” the survey asks about the two primary traits of progressivism among Midwestern farmers: the degree to which respondents are willing to try new farming methods, and the importance that their farm looks neat and well maintained.

I use a confirmatory factor analysis to test whether indicator variables (beliefs and values about farm practices) load highly onto factors that correspond to the 5 culturally distinct “types” of Midwestern farmers. Then, for each factor representing a farmer cultural type, I identify the variables that load highly on the factor and sum the responses for those variables to generate a measure of how closely a particular farmer conforms to that farmer type. I then use logistic regressions to test whether the dominant farmer “types” are associated with participation preferences (positively or negatively), hypothesizing that farmers types such as the Steward, that

value egalitarian ways of life, are more likely to prefer more active participation levels than those from more individualistic ways of life, such as the Manager.

RESULTS AND DISCUSSION

Importance of participation activities

Results reveal some variation among farmer respondents in the importance assigned to various participation activities. All respondents view receiving information as either somewhat or very important; no one indicated that receiving information is *not* important (Table 3.1). Although this represents the least active form of participation, aside from not participating at all, staying informed is clearly of significance to the farmers in this sample. The percent of farmers stating that a participation activity is very important decreases as we move to more active forms of participation such as serving on boards.

Participation Activity	Very Important	Somewhat Important	Not at all important
Receive information	54.7% (35)	40.6% (26)	0
Vote on issues	43.8% (28)	43.8% (28)	9.4% (6)
Vote in final decisions as committee member	31.3% (20)	39.1% (25)	23.4% (15)
Serve on board/committee	26.6% (17)	39.1% (25)	31.3% (20)
Respond to request for input	21.9% (14)	67.2% (43)	6.3% (4)

Table 3.1: Participation activities ranked in order of very important (%).

From an empowerment perspective, voting and receiving information indicate top down activities, as they signify a hierarchical arrangement of stakeholder participation (Arnstein 1969; Wiedemann and Femers 1993). Voting on issues contains a form of tokenism because the slate of

options has already been determined. Such tokenism is even higher for receiving information as options are already likely in place. From a cultural theory perspective, however, farmers' preferences for these more passive forms of participation may also point to the presence of individualistic or hierarchical ways of life in which individuals seek to be informed about issues; a person might value having an array of options and creating his or her own pathway through those options. For these individuals, receiving information provides a person with information about choices available to him or her. What appears to be "passive" from an empowerment perspective may thus reflect a choice from an individualistic, culturally oriented, interpretation.

More active levels of participation such as *voting as a committee member*, *serving on a board*, and *responding to solicitations for input* are consistently deemed as somewhat important for the majority of respondents. The two most involved forms of participation, *serving as a committee member* and *voting as a committee member* each receive the highest percentage of not at all important responses, indicating that a substantial minority of farmers assign little importance to active forms of public participation.

For *responding to request for input*, the majority of responses (67%) indicated that this was only somewhat important. 21.9% indicated that responding to solicitations was very important, while 6.3% indicated it was not at all important. Although not self-initiated, this type of participation activity is also of medium importance to the farmer sample.

Respondents are evenly divided on the importance of *voting on issues*, with 43.8% indicating somewhat important and another 43.8% indicating very important. Voting conceptually fits under "tokenism" from an empowerment perspective (Arnstein 1969). It is an activity that allows for citizens voices to be heard, but in no way guarantees that their requests or needs will be acted upon (Arnstein 1969). In the farming context, however, voting may be

interpreted as a personal responsibility that reflects an individualistic way of life, responsibility to a community, and a greater good for residents. In this cultural interpretation, voting is a mechanism for farmers to contribute to the greater good without having to publicly voice their personal or farm interests.

It is also important to note that in agricultural communities, both German and Yankee farmers engage in some degree of hierarchical decision making which suggests that more passive forms of participation may be culturally shaped norms. With German farmers, some activities were collective and others were determined by the head of the farm. With Yankees, the predominant way of life was with a male head of household supplying directions, and perhaps some specific instructions, on planting or farming operations (Salamon 1992). Over time, these cultural attitudes condition a way of life that includes an acceptance of top down decision making arrangements. This is another way of understanding how voting, a moderately low level of active participation, ranks higher than active forms such as voting as a board member or serving on a committee.

Factor Analysis

Factor analysis is used to confirm that variables measuring specific farm management beliefs group together along dimensions that represent the 5 farmer types. A total of 17 variables were entered into the factor analysis using a principal component factor analysis with an orthogonal varimax rotation to maximize the separation between factors. The final solution comprises 5 factors which cumulatively explain 64.72% of the variance. The model results in a Kaiser-Meyer-Olkin MSA of .642.

Factor loadings between .65-.70 are indicative of significance for sample sizes between 60-70 respondents (Hair et al. 1998). In this case, both conceptually and in terms of measures of sampling adequacy (MSA) the loadings for three variables just under .65 (key link with nature, farm operation benefits community, nature is resilient) still contributed to the model's overall explanatory power and were therefore retained (Table 3.2). However, three variables, *values hard work and sound judgment*, *research is part of business*, and *nature is manageable* fell well below a .60 cutoff and were dropped from the rest of the analysis.

	Steward	FC	Manager	Agrarian	Progressive
Moral obligation to preserve soil	.715				
Key link with nature	.634				
Nature is unpredictable	.763				
Nature is fragile	.673				
Buy used before new		.713			
Consult with state experts		.668			
Consult with neighbors		.772			
Values a neat farm			.779		
Knows production costs per field and makes decisions with that info			.737		
Closely monitors commodity prices and has marketing plan			.764		
Put in long hours and important to volunteer in community				.762	
Important that farm operation benefits local community				.644	
Willing to try new methods					.785
Nature is resilient					.649
<i>Values hard work and sound judgment</i>	----	---	---	---	---
<i>Research is part of farm business</i>	----	---	---	---	---
<i>Nature is manageable</i>	----	---	---	---	---

Table 3.2: All variables with factor loading results for the 14 final variables summed for farmer types.

The factor loadings largely conform to the underlying dimensions of the five different farmer identities (Table 3.2). Variables with high loadings for the Steward correspond to ways that the farmer sees him/herself as a link to the natural environment and the next generation. Nature as “unpredictable” and nature as “fragile” correspond to an outlook that sees nature as a “force,” (Castree 2005) and the farmer, through his or her everyday interaction with the soil and farmland, respects the physical environment but also seeks to limit its negative impact on production. The Steward also values the business side of farming. However, this variable did not load highly on any dimension, let alone the Steward, and is dropped entirely from further analysis. The remaining variables reflect the signature identity of the Steward, a farmer who connects with their “natural” environment.

The factor loadings also conform well to the Fiscal Conservative. The Fiscal Conservative seeks to save money by purchasing used equipment under warranty. The high loading for “consultation with neighbors and/or experts” indicates someone who collects a wide array of information, albeit informally, for decision making. This might reflect the risk averse nature of the Fiscal Conservative, as someone who cautiously investigates options before making decisions.

The third factor corresponds to the Manager. As expected, variables representing “knows costs of production per fields”, and “monitors commodity prices” loaded highly. However we see two interesting results. First, the variable, *values hard work and sound judgment more than equipment* drops out. I suggest that this is due to the analysis capturing a manager’s business philosophy rather than individual fieldwork decisions. Second, “valuing a neat farm” which accords with the Progressive loaded highly for the Manager. This is an interesting finding. It could mean that the neat farm is an aesthetic value that corresponds with the Manager’s

philosophy of hard work and sound judgment instead of the Progressive's interest in new technology. For that reason, I kept *values a neat and well maintained farm* in the construction of the Manager variable.

The fourth factor corresponds to the Agrarian farmer type. Variables related to community and volunteering loaded highly on this factor, representing the predicted Agrarian traits. The fifth factor corresponds to the Progressive farmer type and is dominated by the variable *willing to try new farming methods*. This conforms to the essence of valuing and implementing technological advances in farming as described by Nassauer and Westmacott (1987) in their seminal discussion of progressivism. In addition, "nature is resilient" loaded highly on this factor. I suggest that along with a cultural willingness to adopt a new technology, the progressive believes that their land, soil or surrounding natural environment can adapt to changes brought on by innovative technologies.

Based on the factor analysis, I created 5 new dichotomous variables: Steward, Fiscal Conservative, Manager, Agrarian, and Progressive. I summed the original values of the variables that loaded highly on the factors (Table 3.3), then calculated final scores by dividing the summed score by the total number of variables used to calculate the sum. This created standardized scores for each farmer type variable.

Steward	Fiscal Conservative	Manager	Agrarian	Progressive
Moral obligation to preserve soil for next generation	Considers buying certified used equipment before buying new	Farm looks neat and well maintained	Values hard work and volunteers	Tries new methods
Views self as key link with nature		Monitors commodity prices and has a marketing plan	Farm benefits community	Nature is resilient
Nature is unpredictable	Consults with neighbors	Knows production costs per field		
Nature is fragile	Consults with experts			

Table 3.3: Variables summed to create new dichotomous variables representing farmer types.

Taking the top 25% of standardized score values I then recoded each new farmer type variable as 1 for high and 0 as low for that farmer identity. Tied scores were included in the “high” category. These final dichotomous variables were then used as independent variables representing each farmer type in the logistic regression model. I note that respondents may belong to more than one farmer category. Conceptually this makes sense because some characteristics overlap in the farmer categories, although one or two are usually dominant. I interpret results in terms of the cultural values most associated with public participation involvement, not a confirmation that a specific farmer respondent would necessarily participate.

Farmer cultural types and participation preferences

The histogram of overall participation scores (Chart 3.2) shows some variation in participation importance between the farmer types.

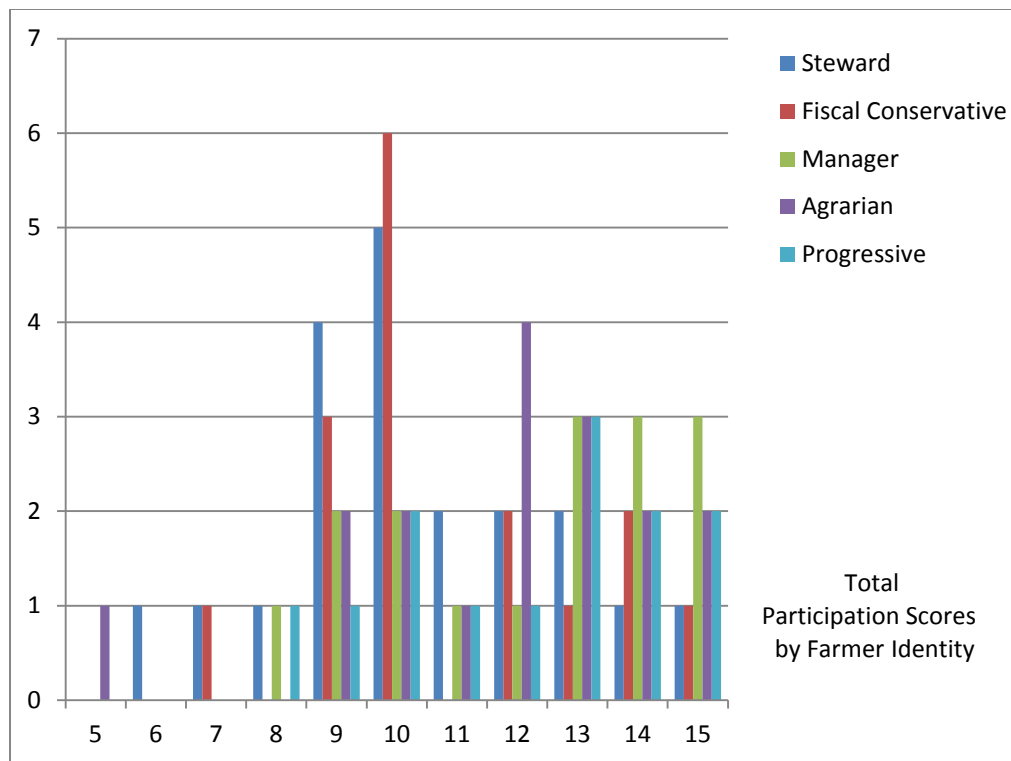


Chart 3.2: Overall importance of participation scores by farmer type.

The mode for the Agrarian is 11, while it is 10 for both the Steward and Fiscal Conservative types. For the Manager, we see a plateau in frequencies for scores between 13 and 15. The Steward has several responses with scores totaling 8 or less, while farmers in the Progressive type cluster at participation importance totals 10 and 13 respectively.

Using variables constructed from the confirmatory factor analysis, I ran a logistic regression to test for differences in overall importance of participation among the farmer types (Table 3.4). The logistic regression uses the dichotomous variable, “overall importance of participation,” as the dependent variable. As described earlier, this is created by summing responses to all participation level questions, ascertaining a cutoff value, and assigning a 1 = *high importance*, while 0 = *low importance*. Dichotomous independent variables represent each of the 5 farmer types.

Variable	Coefficient	Sig
Steward	-1.75	.021
Fiscal Conservative	-.854	.201
Manager	1.23	.098
Progressive	.967	.201
Agrarian	1.49	.045

Table 3. 4: Significance of “overall importance of participation” by farmer type.

The overall model is significant at the $p < .05$ level. The pseudo R^2 (Nagelkerke) measures .274 suggesting a moderate overall fit. The Steward and Agrarian variables are statistically significant at the $p < .05$ level, indicating that these two farmer groups differ significantly from the other groups in the levels of overall importance they assign to participation. The Steward type is negatively associated with high participation, which is a surprising finding, while the Agrarian has a positive association. The coefficient for Manager is just over the .05 significance level. In terms of overall importance of participation, there is no statistically significant relationship between participation and the Fiscal Conservative, Manager, and Progressive types – these types all express similar overall participation preferences. This might be due to the value these farmers place on seeking out new information for making decisions, which reduces the importance of other activities summed here, such as serving on boards.

Stewards are negatively associated with participation; someone who identifies as a Steward is less likely than other farmer types to place a high value on participation in public and membership organizations. Wilson (2003) notes that farmers who value nature also view themselves as the legitimate stewards of the earth. In this regard, I hypothesized a positive relationship with participation, because attitudes of environmental stewardship seemed more

group- and outward-oriented. The deeper belief in preserving the land for future generations was expected to signal a more egalitarian belief about resources which might lead to greater interest in public participation. However, the logistic regression results suggest the opposite. Wilson (2003) also finds that many farmers who view themselves as Stewards simultaneously resist government intrusion on their way of life. Such rejectionist attitudes towards regulation suggest an individualistic way of life geared to keeping the farm in the family—an inward and insulated view-- and a desire to remain independent of external authorities. Stewards may prefer to create their own opportunities and not relinquish their autonomy or needs to organizations (Douglas 1979). The negative relationship between Steward and participation seems consistent with the Individualist's values of protecting themselves from external intrusions on their way of life, implying that Stewards privilege the roles of individual farmers in protecting resources for future benefit

On the other hand, Agrarians assign a higher level of importance to participation than other farmer groups. Agrarians are understood as valuing community, and they see farming as a way of life and social good. In this sense, Agrarians are group oriented in terms of a grid/group cultural theory of participation. This makes sense as for them, farming is a way of life that is not bounded by fields or equipment, or necessarily individualist pursuits, but rather combines a drive for success through hard work with a commitment to giving back to the community. While Agrarians work hard, they are also deeply involved in external social arrangements and organizations in which their personal activities may benefit a larger group. The Agrarian perhaps straddles the individualistic and egalitarian ways of life with the importance they assign overall to participation.

In addition to investigating the overall importance of participation, it is logical to see if farmer types are associated with preferences for specific kinds of participation activities. Overall importance of participation may mask statistically significant relationships between specific forms of participation and farmer types. To examine more and less active participation activities, two logistic regressions were run, one for *votes on issues* and another for *serve on board*. Voting on issues represents a less active form of participation, while serves on board signifies a more active form of participation. Both participation variables were recoded so that *very important* = 1 and *somewhat* and *not at all important* responses = 0. The logistic regression model for voting on issues (Table 3.5) is statistically significant ($p=.013$) with a Nagelkerke R^2 of 0.277.

Variable	Coefficient	Sig
Steward	-1.856	.019
Fiscal Conservative	-.912	.191
Manager	1.970	.012
Progressive	.452	.532
Agrarian	.741	.282

Table 3.5: Logistic regression results for voting on issues.

The Steward variable remains statistically significant but is negatively related to votes on issues. However, the Manager variable is positively related to votes on issues and is statistically significant. Perhaps for the Manager, voting presents an opportunity to apply prior knowledge about production costs and markets to policy issues that are perceived to affect the business operations of the farm.

Serving on a board represents a very active form of participation. Results for the model examining preferences for serving on a board show statistically significant variation among farmer types, $p = .013$, and a Nagelkerke R^2 of .299 (Table 3.6).

Variable	B	Sig
Steward	-1.780	.044
Fiscal Conservative	-.496	.536
Manager	1.280	.083
Progressive	1.809	.019
Agrarian	1.366	.065

Table 3.6: Logistic regression results for serving on board.

The Steward again negatively relates to serving on a board while the Progressive is more likely to assign importance to serving on a board. The Agrarian is statistically significant, at the $p < .10$ level, suggesting that like the Progressive, the Agrarian assigns high importance to this active form of participation. This result accords with the general beliefs of an Agrarian type, who is oriented towards volunteering and strongly values a farm-community relationship. However, the positive relationship between the Progressive type and serving on a board is less clear. Perhaps such farmers see serving on a board as a way of gaining access to new information or being in a position of responsibility to promote new approaches in conservation or agriculture. However, specific case studies would be required to verify that hypothesis.

CONCLUSION

An examination of participation preferences among this sample of Midwestern farmers reveals that the overall importance of participation and preferences for more active forms of participation depend on cultural identities—ways of life produced by social interactions and rules guiding such interaction. This study reveals that overall, active forms of public participation are not the most important levels of engagement for this sample of Midwestern farmers. In order, receiving information, voting, and serving on a board are the three most important types of activities for the sample as a whole. More significantly, this study finds that specific farmer types vary in the importance they assign to two different participation activities, voting and serving on a board. Agrarian farmers assign greater emphasis on both overall participation and the more active form of participation, serving on boards, than do farmers belonging to other cultural types. This specific finding aligns with what we know about the cultural identity of Agrarian farmers, in that it reflects their belief in community and sustaining a certain agricultural lifestyle

The tests on *voting on issues* and *serving on board* reveal that cultural differences influence preferences towards specific participation activities. This finding is important for two reasons. The first is that it reveals that preferences diverge from the main assumption embedded in ladders of participation; that the ideal level of participation is full control (e.g. serving on a community-run board). Such variation corresponds with findings by Bailey and Grossardt (2010) in their multisite survey of stakeholder preferences in transportation planning. On average, respondents preferred partnership to full control in the decision making process. Second, the variation in preferences is related to cultural identities. In this study, direct involvement through serving on boards is more important to Progressive farmer types, for example, than to other

culturally distinct farmer types. Similarly, voting is more important among Managers than other farmer types. For both activities, the Steward is least likely to participate. While findings are not conclusive due to the small sample size, initial results demonstrate that farmers differ in terms of the relative importance they assign to specific participation activities. This variation is essential to future planning and assessment of public participation processes with farmers, as it provides a basis for understanding the types of farmers who might actively participate, and how different activities might include or exclude farmer participants.

These findings contribute to the literature on stakeholder involvement and representation in public participation for environmental management. If culture influences participation preferences, then the means of involving (potentially) affected individuals becomes even more complex. Not only are issues such as access, timing, number of participants, and policy issues of concern (Barndt 1998; Nyerges et al. 2006; Reed 2008) but so too are the types of activities intended to allow public participation. To offset this variation, and broaden participation, officials might seek to apply multiple types of activities to foster farmer participation. In the case of a conservation district serving farmers in a rural agricultural watershed, this means harnessing resources to facilitate multiple activities for perhaps the same outcome, which may not be practical.

Findings also have important implications for interpreting what constitutes “authentic” public participation. Current forms of participatory environmental management emphasize “authentic” involvement in decision making by those affected by public policy issues. King et al (1998) contends that to achieve authentic participation, three processes must occur: local officials should facilitate broad citizen involvement, policy processes need to be transparent, and affected individuals must become involved in decision making that affects them (King et al.

1998). This study reveals that certain farmer types are likelier to participate in specific types of activities over others due to unique cultural distinctions. Findings help expand the idea of “authentic” participation; that it not only refers to “broad” representation—both in terms of individuals and needs—but also to “preferred” decision making activities. This links to Davidson’s (1998) suggestion to employ a “wheel” of participation, which bases participation activities on desired preferences of local stakeholders. The “wheel” metaphor and paradigm might indeed help arrive at “authentic” participation because it aspires to both broad and preferred participation activities for affected community members.

Indeed, authenticity might qualitatively improve when the types of activities in public participation match the preferences of people who conveners are seeking to include. For example, if only a limited number of affected individuals are interested in serving on a board, but they value such service and see it as important, than that is arguably as “authentic” as encouraging individuals who may be reluctant to serve, only for the purpose of broadening inclusion. Cultural orientations towards participation add an important dimension to assessing what constitutes “authentic” participation.

Finally, the four ways of life offer a way of designing and interpreting participation preferences that account for cultural differences in general. Moving beyond farmers, Grid/Group theory, and the four ways of life, point to new ways of explaining barriers to participation and variation in participation in given settings. While external barriers to participation exist, pre-determined activities may relate to culturally embedded ways of life and thus facilitate or impede local involvement. Through interviews and informal assessments, further research could investigate participation preferences as they relate to the four ways of life in an actual public participation setting.

Although these findings have important implications, they are limited by of the shortcomings of the survey research design. The small sample size limits the conclusions one can draw about the variation in participation preferences among Midwestern farmers. Future studies can increase the sample size by sending reminders to complete the survey, mailing out second surveys, and being attentive to the seasonal timing of the survey. It would also be beneficial to analyze actual participation in public agencies and community organizations in addition to participation preferences. The links between preferences and behavior have not been addressed, despite their relevance for participatory decision-making. It is also important to address participation preferences among farmers in other agricultural contexts. Historical settlement patterns and cultural linkages to farming differ between cotton growers, dairy farmers, and other producers, and are thus very likely to influence participation patterns in other settings.

This research suggests that variation in participation activities exists among Midwestern farmers and that such variation is tied to specific cultural norms, or, local ways of life. It will be important to attend to the way culture governs participation preferences and contributes to variation in local participation, particularly among farmers who remain key stakeholders in environmental management and decision making. Exclusions due to specific culturally biased preferences may be offset by finding other activities for catalyzing farmer participation. Thinking creatively about these options, and invoking a cultural perspective, might sustain local involvement over the long term.

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CHAPTER 4

FARMER ATTITUDES TOWARD PRODUCTION OF PERENNIAL ENERGY GRASSES IN EAST CENTRAL ILLINOIS: IMPLICATIONS FOR COMMUNITY-BASED DECISION MAKING

INTRODUCTION²

Throughout the Midwestern United States, land owners and managers, mainly farmers, are increasingly considering the possibility of transforming industrial agricultural landscapes that currently are used almost strictly for food production to landscapes that integrate renewable energy production. Because most land in this region is privately owned and independently farmed, transformation of the landscape will be the product of myriad decisions by individual farmers who are influenced not only by markets, technologies and policies, but also by local social norms and networks, and by cultural factors (Atwell 2010). Currently, the rationale behind farmers' decisions whether to grow energy crops, including perennial energy grasses, and where on the landscape to grow these crops is poorly understood. Much emphasis in policy circles is placed on the utility of marginal land as an initial focal point for renewable energy production. However, the notion of what constitutes marginal land in this context remains unclear. This is problematic as conceptions of the environment can be viewed as socially constructed (Urban and Rhoads 2003; Castree 2005), and social processes strongly influence farming practices and land-use decisions (Wilson et al. 2003). The geography and conservation literatures are replete with examples of how social relations, cultural beliefs, and personal values influence decision-making

² This material was originally published by the degree candidate in a special issue of the *Annals of the Association of American Geographers* on Geographies of Energy. It is cited as: Cope, M.A., S. McLafferty, and B. L. Rhoads. 2011. Farmer attitudes toward production of perennial energy grasses in central Illinois: Implications for community-based decision making. *Annals of the Association of American Geographers*. 101: 4, 852-862. It is reprinted here with minor formatting changes.

about modifications to rural landscapes (Wilson 1997; Wilson et al. 2003; Rodriguez et al. 2008). Thus, determining how farmers view bioenergy crops and how their views are bound up with conceptions of marginal land is critically important for understanding evolving landscapes of bioenergy production in the Midwestern U.S.

Our study, based on an initial set of data from a mail survey and GIS-aided focus group, examines how farmers, who as owners and managers of private land are key stakeholders, might reconfigure extant agricultural landscapes, including land currently considered as “marginal” for production of corn and soybeans, to support energy-grass cultivation. This research is situated within the context of a community-based bioenergy initiative in Decatur, Illinois. The initiative seeks to ascertain the potential for energy-grass cultivation to yield multiple local and regional benefits such as protection of soil and water resources; enhancement of biodiversity; increased and diversified farm income; and sustainable economic development. We use survey methods and a GIS-aided focus group to elicit farmers’ perspectives on growing perennial energy grasses and to examine how such perspectives relate to farmers’ decision-making about energy grass cultivation and their conceptions of marginal land.

Our research explores fundamental questions relevant to the community based bioenergy initiative: What are farmers’ perspectives on energy grass cultivation? How do farmers conceptualize marginal land, and what associations do they make between marginal land and the potential for energy grass production? Our conceptual framework emphasizes the importance of economic and non-economic processes, including sociocultural and biophysical processes, (Zimmerer 2011) in farmers’ decisions about whether and where perennial energy grasses might be planted.

BIOENERGY POLICY AND MARGINAL LAND

Biomass energy constitutes 3% of the total energy consumed in the United States (Jensen et al. 2007; USDE 2008). The production of bioenergy crops will likely increase given recent federal and state renewable energy policies such as the 2007 Energy Independence and Security Act, which established a production target of 36 billion gallons of corn based ethanol by 2022, and 100 million gallons of cellulosic ethanol by 2010. The 2008 Farm Bill passed by Congress created a program called the Biomass Crop Assistance Program (BCAP) to subsidize the collection, harvest, storage and transportation of eligible biomass materials and provide matching payments (up to \$45 dollars per ton) for biomass sold to a certified conversion facility (USDA 2009).

Switchgrass and miscanthus are two perennial energy grasses included under BCAP that are considered to have significant environmental and economic benefits (Heaton, Dohleman, and Long 2008). They require fewer mechanical and chemical inputs than grain crops and their extensive root systems make them resilient and capable of growing on highly erodible land, thereby providing the potential to reduce soil erosion and improve water quality (Jensen et al. 2007). The high yield potential of miscanthus and switchgrass, along with their ability to grow in poor soil, have made them a central focus of bioenergy policy discussions in the Midwest (Heaton, Dohleman, and Long 2008). Perennial energy grasses have also attracted attention from local and regional conservation organizations who see potential environmental benefits in these grasses.

The issue of *where* on the landscape perennial energy grasses should be planted is critically important as policymakers attempt to evaluate energy grass potential. A frequently cited advantage of these crops is that they can be cultivated on “marginal land,” thus reducing

competition with food crops (Royal Society 2008). The governments of countries such as India, Indonesia and China are adopting policies to encourage bioenergy crop cultivation on marginal and degraded land (Plieninger and Gaertner 2011). In the U.S., the suitability of bioenergy crops for marginal land is frequently cited as an advantage (Schmer et al. 2008).

Despite the emphasis on degraded and marginal lands as sites for perennial energy crop cultivation, the concept of marginal land has been neither clearly-defined nor critically analyzed (Dale et al. 2010). Marginal land has been defined as “land that is of poor quality with regard to agricultural use and unsuitable for housing and other uses” (OECD 2001). But this definition begs the questions: how is quality defined and by whom?

Economists typically define marginal land as land with a low economic return. However, this definition ignores the social and subsistence value of land for local populations, especially in cases where land resources are shared (Biswas 1979). In contrast, ecologists and agricultural scientists typically define marginal land in biophysical terms, as land that is unproductive due to physical properties such as soil quality or slope. Such biophysical definitions have dominated assessments of bioenergy crop production in the U.S. For example, in evaluating switchgrass potential, marginal land was defined as: “limited by erosiveness, excessive wetness, soil chemistry constraints, rooting constraints, or climate issues” (Wright 2007, 3). Abandoned farmland and land designated for the Conservation Reserve Program (CRP) have also figured prominently in definitions of marginal land for bioenergy production in the U.S. (Schmer et al. 2008).

Although marginal land is relevant to geographical conceptions of landscapes, the concept has received scant attention in the geographic literature aside from a handful of studies of marginal lands’ spatial distribution (e.g. Breunig-Madsen, Reenberg, and Holst 1990). We

argue here that strict economic and biophysical definitions of marginal land are limited because they ignore important social and political-economic valuations and meanings of land in particular geographic contexts. Contemporary geographic perspectives emphasize the ways in which rural landscapes are socially constructed and the political and ecological contexts of landscape change (Halfacree 2001; Wilson 2001). In the intensively-cropped landscapes of the Midwestern U.S., land valuations are made by farmers whose views reflect a range of social, economic and ecologic considerations (Figure 4.1).

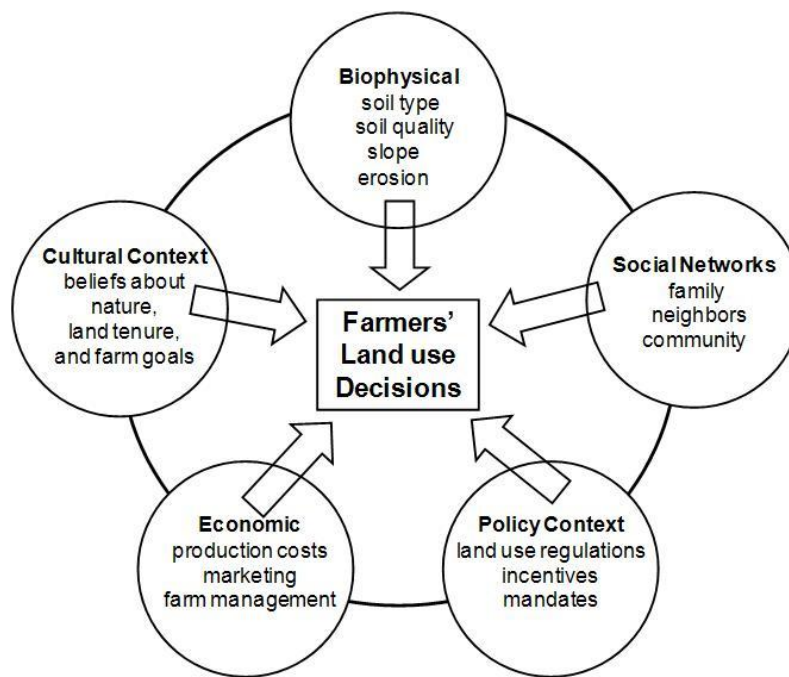


Figure 4.1: Factors that influence farmers' decisions concerning perennial energy crops³.

Decisions about land are based not only on economic imperatives, but also pragmatic concerns related to farming practices, social relations such as tenancy, aesthetic judgments about

³ Adapted from: White, S. S., Brown, J.C., Gibson, J., Hanley, E., and D. Earnhardt. 2009. Planting food or fuel: An interdisciplinary approach to understanding farmers' decision to grow second-generation biofuel feedstock crops. *Comparative Technology Transfer and Society*. 7(3):287-302.

landscape appearance, values about environmental stewardship, and attitudes towards nature, family, and community (Walter 1997; Wilson et al. 2003; Urban 2005; White et al. 2009).

COMMUNITY-BASED NATURAL RESOURCES MANAGEMENT

Transformation of landscapes of food production into landscapes that include energy production depends strongly on the active involvement of local landowners and managers, i.e. farmers, especially when decision-making occurs within a community-based resource management process, and land under consideration for transformation is privately owned. Therefore, this study is situated within a community-based approach to environmental decision making that has increasingly emphasized the value of diverse local knowledge in natural-resources management, both within the United States and internationally (Born and Sonzogni 1995; Bernard and Young 1997; Agrawal and Gibson 1999; Weber 2000; Armitage 2005; Margerum 2008; Reed 2008; Gruber 2010). Past work on community-based decision-making has drawn distinctions between specialists with various levels of technical expertise (e.g. academic scientists, policy makers) and individuals with vested interests in decision-making (e.g. local residents, grass-roots stakeholders; Rhoads et al. 1999; Lurie 2004; Larson et al. 2009; Prell et al. 2009). Previous work has also emphasized that effective collaborative decision-making depends in part on mutual understanding and trust between these two groups (Focht and Trachtenberg 2005). This interplay between lay-person knowledge and that of specialists has been critically interpreted as a complex process in which professionals ultimately benefit from the knowledge of local stakeholders (Waller 1995; Rhoads et al. 1999). Whether or not community-based decision making is the panacea originally envisioned has been questioned (Mitchell 2005; Koontz and Thomas 2006), but this new paradigm has led to an explosion of

grass-roots partnerships and non-profit organizations seeking to influence management of local resources.

In many cases, knowledges that are part of a community-based decision-making process are heavily influenced by social, political and cultural factors – a characteristic that links community-based decision-making to the idea that many landscapes are socially constructed (Greider and Gratoski 1994). In this regard, community-based natural resource management directly related to farming practices hinges not only on appropriate understandings of farmers' attitudes about economic issues, educational programs, technical assistance and assessments of risk (e.g. Napier and Tucker 2001), but also on sociocultural factors such as farmers' cultural conventions and identities, farming practices, and sense of aesthetics (Nassauer 1989; Urban 2005) (Figure 1) Yet policy makers and others engaged in community-based resource management typically focus on biophysical and economic criteria that influence farmers' land use decisions at the expense of “intrinsic” socio-cultural motivations, such as protecting land for future generations and assuring the visual quality of the landscape (Ryan, Erickson, and De Young 2003). These considerations may influence farmers' perspectives on energy grass cultivation in ways that are important for community-based bioenergy initiatives.

RESEARCH SETTING

In the past several years, a Local Bioenergy Initiative (LBI) has emerged in Decatur, Illinois, through the combined efforts of the Agricultural Watershed Institute (AWI), a local nonprofit organization concerned with watershed protection, the Soil and Water Conservation District, city governments and businesses. The LBI seeks to develop a profitable and environmentally beneficial energy grass market in and around Macon County. To do so, the LBI

will conduct community deliberations, with significant involvement of farmers, regarding the economic, social, and environmental impacts of energy grass production in Macon County and throughout east central Illinois.

The LBI is situated in Macon County, an intensely farmed area in central Illinois covering 1515.1 square kilometers. Macon County is home to a population of 105,044 and 708 farms (USDA Agricultural Census 2007; U.S. Census Bureau 2008). Almost 75 percent of the land is used for corn and soybean production (USDA Agricultural Census 2007). Soils in the area are mostly classified as “very suitable” for crop production with the addition of even minimal fertilizer (USDA Soil Survey 2009).

For reasons not well understood, farmer involvement in LBI deliberations has been limited. Given their key roles as landowners and managers, coupled with the goals of the LBI, the lack of farmer input signifies an important omission. The AWI, already engaged in research partnerships at the university, invited us to assist in conducting initial research on local farmer perspectives regarding renewable energy and energy grasses. We viewed this endeavor as an opportunity to contribute to geographic knowledge of landscapes of renewable energy in the Midwestern U.S. and to enhance geographic understandings of marginal land.

DATA AND METHODS

The research was conducted in two phases. First, we administered a mail survey to four hundred rural residents in the study region to assess farmers’ knowledge of and attitudes towards perennial energy grasses. Survey recipients were chosen randomly from a database of over one thousand rural landowners and farmers maintained by the Macon County Soil and Water Conservation District. Although the survey explicitly targeted farmers, it was impossible to

identify only farmers from the database prior to mailing. However, the respondents discussed here all self-identified as being engaged in farming operations.

The questionnaire consisted of closed- and open-ended questions about farmers' knowledge of perennial energy grasses, their attitudes about tradeoffs between food and biofuel production, their understanding of the environmental benefits or costs of energy grasses, and constraints on planting. We asked about farmers' willingness to plant perennial energy grasses and the criteria used in deciding where to plant these new crops. We also included a form for respondents to indicate their interest in attending a GIS-aided focus group to explore issues related to planting perennial energy grasses in central Illinois. Fifty-seven farmers responded to the survey, for a response rate of 14.25 percent. Many factors influence response rates among farmer populations such as length of survey and seasonal timing (Pennings, Irwin, and Good 2002; Morgaine et al. 2005). Our response rate is comparable to that achieved in similarly designed surveys in which farmers are not sent reminders to return a questionnaire (Pennings, Irwin and Good 2002). The heterogeneity of our sampling frame also may have affected the response rate.

The second phase of the project comprised a GIS-aided focus group. As in a typical focus group, the session was organized as an exploratory 'conversation' among a small group of farmer participants (Longhurst 2010). The session was GIS-aided in the sense that participants were able to view and manipulate maps of the study region and direct spatial queries. GIS provided a tool for encouraging participants to think about energy grass cultivation in relation to local land use and environmental conditions. This use of GIS is consistent with the sort of interactive geovisualization advanced in contemporary research on critical and qualitative GIS (Kwan 2002; Cope and Elwood 2009; Elwood 2010). The focus group centered on two

questions: 1) What factors are important to you in deciding whether or not to plant perennial energy grasses? 2) If a viable market for such grasses existed, where would you be willing to plant energy grasses? The first question aimed at evaluating farmers' interest in planting energy grasses and the economic, social, and environmental constraints to planting. The second question was explicitly geographical and explored farmers' perspectives about where on the landscape energy grasses should be planted.

Twelve respondents indicated an interest in attending the energy grasses workshop, although only five actually participated. A member of the AWI who provided information for the survey also attended the session. Using a method described in Nyerges et al (2005) one researcher operated the GIS while the others facilitated and observed the discussion (Nyerges et al. 2005, 712). Participants directed the GIS operations which included panning, zooming, and proposing spatial queries. The GIS contained six data layers: a 30M crop cover image of Macon County (classified by USDA-NASS), 2008 soil data, parcel data, slope, streams and watershed boundary data from the Illinois State Water Survey, and street centerline data.

RESULTS

Survey Results

The farmers who responded to our survey were similar in demographic characteristics to farmers in central Illinois (USDA 2007). Three-quarters were fifty years of age or older. Most (88%) considered themselves "family farmers". More than half the respondents had farmed for three decades or more, but a substantial minority (14.5%) farmed for less than a decade. Tenancy was common among the respondents: the average acres farmed (926 acres) was more than four times the average acres owned (171 acres). In sum, the respondents consisted primarily of experienced farmers with long histories in central Illinois.

In general, farmers saw perennial grasses as a potentially important source of renewable energy, but had limited knowledge of energy grass cultivation. Only 7 percent reported that they were “very informed” about the grasses, and almost half (40%) reported being “not informed”, results similar to those reported in the literature (Jensen et al. 2007; Villamil et al. 2008). Thus, farmers lacked detailed knowledge about the grasses themselves and how to cultivate them. Nevertheless, respondents identified many benefits to energy grasses: over 80 percent agreed that using the grasses for fuel and power supply helps to reduce dependence on foreign oil (Table 4.1). They were also generally aware of possible environmental benefits, citing improvements in water quality and wildlife habitat associated with energy grasses.

Question	Agree	Disagree	No Opinion
Biofuels are important for reducing dependence on foreign oil	85.7% (48)	8.9% (5)	5.4% (3)
Raising crops and conserving the environment are competing goals	36.4% (20)	54.5% (30)	9.1% (5)
Perennial energy grasses should not be grown in central IL	10.7% (6)	46.4% (26)	42.9% (24)
Planting perennial energy grasses can help improve water quality	66.7% (36)	0	33.3% (18)
Grasses benefit bird and wildlife habitat	67.3% (27)	0	32.7% (18)
Local market for energy grasses would interest me in replacing some row crops with grasses	35.7% (20)	21.5% (12)	42.9% (24)
Willing to plant grasses on my marginal land	47.4% (27)	7.0% (4)	45.7% (26)

Table 4.1. Responses to selected survey questions (Number of respondents in parentheses).

*Missing values excluded in calculating percentages.

Despite recognizing the benefits of perennial energy grasses as a source of renewable energy, the respondents were hesitant about replacing current crops (primarily corn and soybeans) with energy grasses. Ten percent took an extreme view, agreeing with the statement that “energy grasses should not be grown in Illinois;” 21 percent disagreed that they “would

replace some corn and soybeans with energy grasses if a local market existed.” On the other hand, 35 percent indicated a willingness to replace some row crops with energy grasses if a local market for the energy crop existed (Table 4.1). Those willing to consider planting energy grasses viewed them primarily as an “extra” crop, not a wholesale replacement for corn and soybeans. Even if market conditions were favorable, most farmers saw themselves converting less than 10 acres of corn/soy land to energy grasses. Importantly, the respondents overwhelmingly favored planting the grasses on marginal land. Responses to open-ended questions mentioned highly erodible land and land with poor soil as ideal areas for energy grass cultivation. In this sense, the survey pointed toward a biophysical definition of marginal land

Many barriers to planting perennial energy grasses emerged from the survey responses. Economic barriers were most important, particularly the lack of a market for the grasses and the lack of profitability. Farmers also mentioned the high cost of shifting from one crop to another, including the costs of purchasing new equipment and obtaining rhizomes to establish the grasses. Changing crops also requires a substantial investment of time, as noted by several respondents, one of whom described the “many years to profitability” in the context of her/his advancing age. Lack of storage and transportation infrastructure was also cited frequently. Central Illinois includes a well-developed network of grain elevators and transportation facilities that tightly link corn and soybean production areas with markets. The absence of such a network for energy grasses was mentioned by some respondents.

GIS-Aided Focus Group

The GIS-aided focus group provided an opportunity to explore farmer’s perspectives on energy grasses in detail. The first part of the session focused on knowledge and barriers, and it

echoed many of the themes identified in the survey. Initially, economic concerns dominated the conversation. Participants emphasized the need for a market and expressed concerns about profitability. Getting local agribusinesses to create a market for energy grasses was seen as critically important. Referring to a large multinational agribusiness firm headquartered in the study area, a participant looked ahead and commented: “There’s our market.” In addition to profitability concerns, participants stressed the high initial cost of cultivating a new crop, including equipment, rhizomes, transportation and other issues raised in the survey. Concern was also expressed about timing required to realize a cash crop. One participant described the “5 year wait” for perennial energy grasses to become fully established as a “risky and expensive” proposition.

Viewing maps of the study region sparked a more grounded discussion of energy grass cultivation. The land use map, a map quilted with corn and soybean patches, framed participants’ responses (Figure 4.2).

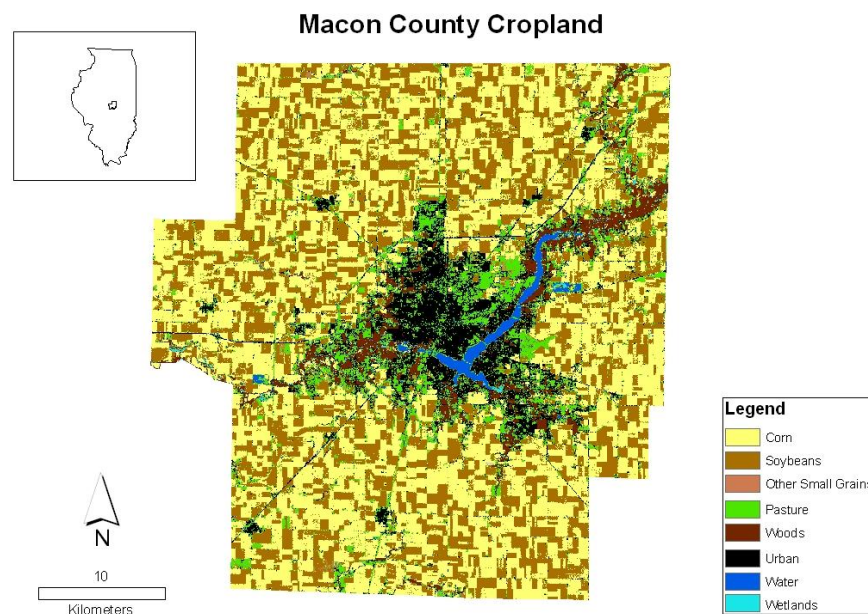


Figure 4.2: Land cover in Macon County.

While viewing this map, participants raised concerns about the fact that the grasses are perennial species and thus potentially invasive. Respondents described the need to protect their productive corn and soybean fields from invasive species. Discussions also focused on the highly productive soils in the study region and their value in producing essential “food” crops of corn and soybeans. Questions were raised about replacing food crops with fuel crops. As one farmer summarized: “I can’t take corn out for something questionable,” and another: “If it was prime [farmland] I wouldn’t.” Thus, farmers expressed concerns about ecological impacts and conveyed an attachment to well established cropping patterns.

We asked participants to describe suitable locations for energy grasses on thematic maps and to identify criteria for determining land suitability which were then implemented via spatial queries. Biophysical characteristics were important in participants’ assessments of land suitability for energy grass cultivation; they identified stream and ditch corridors and areas with poorly drained and highly erodible soils as suitable areas for grass production. All of the participants viewed energy grasses as a sort of interstitial crop, not something that would supplant corn and soybeans. As in the survey responses, they emphasized “marginal land” as an appropriate place for energy grass cultivation. One participant said that he would be willing to plant the grasses on “marginal ground” such as a persistent gully at the end of a filter strip. That land “washes away bad,” and perennial grasses might help reduce erosion.

In addition to well-recognized biophysical and economic criteria, characteristics of the built environment shaped farmers’ conceptions of marginal land in relation to energy grasses. Areas bordering railway lines and rights of way for electric power lines attracted attention because they contain lower value farmland and because these human-built features can impede cultivation of corn and soybeans using large farm equipment (tractors and combines). Perennial

energy grasses, with their low fertilizer, pesticide and planting requirements, were seen as a good option for troublesome rights-of-way areas.

To explore participants' perspectives on land suitability at a scale familiar to them, we zoomed in on a farm parcel in the study region (Figure 4.3). In viewing the parcel, participants immediately identified a “triangular area”, located north of the stream. Cut off by the stream from the remainder of the farm, participants described this as a “nuisance area” that would be good for energy grass cultivation. They also described areas along treelines where it is difficult to maneuver large farming equipment and where crop yields are typically low because of shading by trees. At the farmstead scale, marginal lands suitable for energy grass cultivation were identified not just on the basis of environmental features but in relation to everyday farming practices and operations.

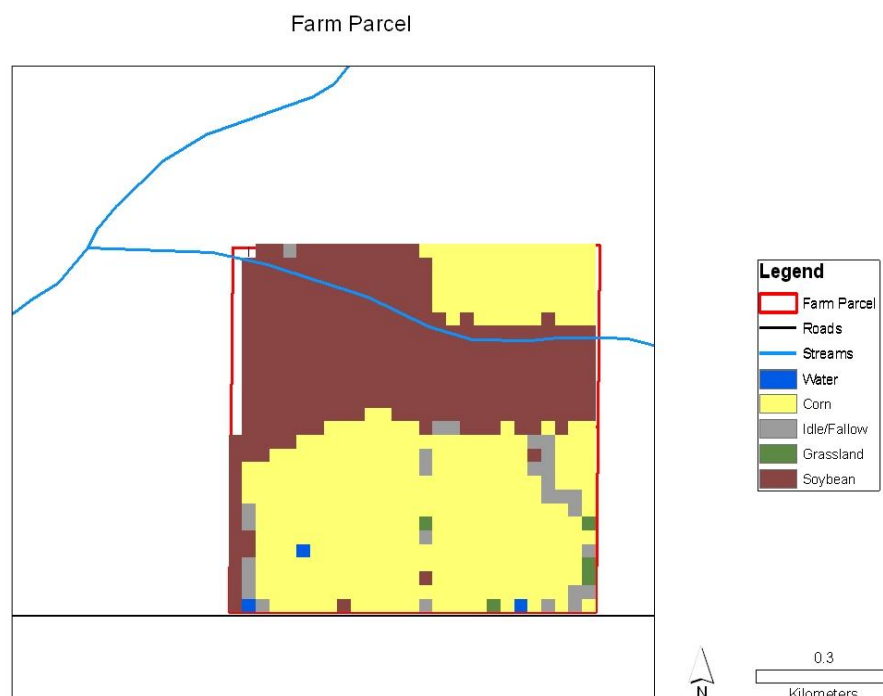


Figure 4.3: A sample farm parcel discussed by participants in the GIS-aided focus group.

Social relations of farming also emerged as important. As tenant farmers, several participants described the contingency of cropping decisions and the fact that they would need to get the landowner's approval to plant energy grasses. Although landowners may be amenable to planting grasses on uncultivated land, taking land out of corn or soybean cultivation to plant energy grasses would be much more controversial because it goes against the grain of established farming practices and might place the owner in the position of being too progressive. Moreover, in deciding which crops to plant, many landowners engage in complex profitability calculations that include not just the market value and costs of crops produced but also factors such as subsidy payments, rental agreements and conservation incentives. These play out in specific ways for particular land parcels, impacting energy grass cultivation decisions.

Throughout the discussions, participants defined lands suitable for energy grass production not purely in environmental terms, but in relation to existing cropping patterns, farming operations, land parcel characteristics, and the social relations of farming. These 'marginal' lands were defined at multiple scales from the farmstead scale to the regional and national scales. One participant commented that energy grasses are "a better option for places like Missouri" where the farmland is less productive. Although participants sometimes described specific criteria for land suitability, they also used relational reasoning, contrasting energy grasses with corn and soybeans: Land that is difficult or less productive to cultivate for the two dominant crops drew attention for energy grass planting. Research in geography and other disciplines argues that marginalization is a relational process: so-called "marginal" groups or places can only be defined in relation to a "non-marginal" other (Halfacree 2001; Collins 2010). Marginalization reflects imbalances of power. In the farm landscapes of central Illinois, power is embedded in networks of infrastructure, equipment, agro-industries, and farming

practices that support corn and soybean production. These networks served as a focal point in participants' conceptions of marginal land.

CONCLUSIONS

Federal, regional and local initiatives to promote renewable energy and environmental sustainability by encouraging planting of perennial energy grasses hinge on farmers' willingness and ability to cultivate these crops. Farmer participation in community-based biofuels initiatives and farmers' local knowledge of planting opportunities and constraints are critically important to the success of these initiatives. The findings from this initial study suggest that such local knowledge is inherently spatial: farmers' willingness to plant energy grasses is tied up with understandings of land suitability for planting at the farmstead and regional scales. The method of a GIS aided focus group provided an essential tool for drawing out and illuminating these understandings, which are critical for community-based efforts to explore the potential for generating a local biofuels market.

Findings from both the survey and GIS-aided focus group highlight the economic, social and geographical contingency of farmers' decision-making about if and where to grow energy grasses. Farmers' perspectives on land suitability were broadly consistent with the goal of local conservation organizations to encourage planting of energy grasses on highly erodible land. However, farmers also described social barriers such as tenancy arrangements and pragmatic considerations about farm operations, market constraints and transportation that are likely to limit the success of efforts to achieve environmental goals through grass cultivation. Another key component of federal and local policies is the effort to develop energy grass markets that rely on grasses cultivated by local farmers. Although limited by small sample size, our survey

findings indicate that in Macon County, an area dominated by corn and soybean production, a fraction of farmers are willing to plant energy grasses on at least a limited scale if a local market exists. How this willingness extends across Illinois and other Midwestern regions should be evaluated in future studies.

This research also demonstrates the value of an innovative method, a GIS-aided focus group, in ascertaining farmers' local knowledge of energy grass cultivation. The familiar visual language of maps and the ability to shift between the farmstead and regional scales helped to reveal farmers' knowledge and attitudes in relation to the spaces and settings of daily life. These kinds of advantages have been highlighted by GIS researchers in other contexts (Kwan 2002, St. Martin and Arber 2008). Elwood (2006) describes how community organizations use GIS to construct spatial narratives to support their objectives. Similarly, our farmer participants created narratives about the potential for energy grass cultivation in central Illinois that reflected their understandings of local farmland resources, their everyday farming practices and their rootedness in current cropping patterns. In viewing GIS data layers, participants identified marginal lands – environmentally vulnerable lands, interstitial areas and “nuisance” areas -- as prime candidates for energy grass cultivation. Farmers' diverse conceptions of marginal land indicate that assessments of local capacity for energy grass production and the viability of local markets need to consider more complex notions of land suitability than those embedded in traditional concepts of marginal land.

Several factors limit the generality of these findings. The sample sizes for the mail survey and GIS-aided focus group were each small; results of this study should be viewed as suggestive, rather than definitive, and need to be evaluated through additional studies in more diverse geographic contexts based on more extensive information. The context for this study – the

highly productive agricultural lands of central Illinois – strongly conditioned farmers’ responses and influenced their attachment to corn and soybean production. Farmers in less productive agricultural areas may be more willing to engage in energy grass cultivation on a large scale. Despite these limitations, our results reveal the situatedness of farmers’ decisions in social, economic and geographic webs, a perspective which can inform efforts to understand and influence energy grass cultivation across the United States.

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CHAPTER 5

CONCLUSION

This research examines public participation and PPGIS through the lens of culture as a way to 1) interpret stakeholder inclusions and exclusions throughout the PPGIS process; 2) ascertain actual participation preferences among a sample of potential stakeholders, in this case, farmers in a rural agricultural watershed; and 3) investigate farmers' sociocultural norms and knowledge towards perennial energy grasses, using survey methods and a GIS-aided focus group. Findings from each of these investigations contribute to the conceptualization of "authentic" participation and make an important contribution to theories and practices in adaptive management.

To understand stakeholder inclusions and exclusions, this study contends that cultural theory is necessary to uncover assumptions that influence the design and execution of public participation and PPGIS processes on one hand, and the values and beliefs guiding stakeholder involvement on the other. That is to say assumptions and expectations about participation may preclude stakeholder involvement either because stakeholders value participation as a goal very differently than conveners, or because specific activities in PPGIS do not accord with stakeholders' participation preferences. In reference to empowerment, Corbett and Keller (1998) contended that there was no link between empowerment and PGIS outcomes, and that this was due to "a paucity of discussion over the methodologies and frameworks by which empowerment due to a PGIS initiative can be measured and analysed" (Corbett and Keller 1998). Similarly, I suggest that without a cultural theory, there is little way participation can be "measured and analyzed."

Building on initial discussions by Carver (2003) and De Man (2003), I suggest that Grid/Group theory contributes to PPGIS in two important ways. First, by introducing the concept of ways of life, Grid/Group theory locates beliefs about participation within a unifying structure that provides PPGIS conveners a vocabulary and lens to interpret variation in participation, confront expectations and assumptions such as who should participate, what role they may have, and why might individuals opt out of participation in the first place. Second, Grid/Group theory helps interpret participation practices and outcomes in a way that moves beyond the idea of “failure” if full ownership is neither attained nor desired by groups and participants, as commonly expected using Arnstein’s ladder of citizen participation (Arnstein 1969).

As discussed above, individuals may prefer to not participate at all. If that is the case, then interpreting such a decision as an “exclusion” per se is misleading because it is in fact, a person’s choice; an exclusion may in fact be a culturally contingent preference. On the other hand, Bailey and Grossardt (2010) demonstrate that given a choice, participants will seek partnerships with domain experts in final decision making process. Using Grid/Group theory, we can interpret the Bailey and Grossardt example as participants’ acceptance or integration of hierarchical ways of life for the purpose of decision making. Depending on the way it is carried out, such a partnership could result in tokenism (Arnstein 1969), or perhaps a more empowering form of citizen engagement where discussions benefit the collective in terms of final material and policy outcomes. Qualitative methods and analyses can investigate such outcomes.

Grid/Group theory provides an innovative theoretical framework that links PPGIS to a broader literature on culture and participation. It accounts for the idea that the egalitarian model of empowerment, collective and equal decision making ability, may not be the preferred model

for everyone. Perhaps allowing for distinct roles to emerge can allow for more durable policy outcomes, while having only those who want to participate present can potentially further important social goals. Most critically, cultural theory expands the concept of authentic participation—that there are a combination of preferences and beliefs about participation which may not always fit the “desired” goals of representation and full citizen ownership within public participation. In accounting for and seeking to accommodate different ways of life and divergent participation practices, PPGIS becomes more than a decision making process but also a forum of cultural exchange and production.

The idea that participation preferences vary due to specific cultural identities and beliefs is empirically examined in the third chapter. Here, farmer types who highly value participation are likelier to hold strong Agrarian beliefs. This finding is statistically significant and theoretically compatible with the ideals of an Agrarian, who defines success in a way that extends beyond the farm and into community life; that hard work and volunteering are both important attributes of a good farmer, and that the farm benefits their local community. In this regard, the Agrarian expresses a more egalitarian way of life; that at the very least, the group—a community and social network—is valued by the Agrarian even if they do not subsume all needs and interests to the needs of the group (or community in this case). It is this type of farmer we are likelier to see participating on some level in organizations and decision making contexts. The progressive was found to be the likeliest to prefer sitting on a board, while the manager type was most likely to value voting on issues.

The logistic regression models revealed a statistically significant negative relationship between the Steward and all three types of participation measured: overall importance, voting on issues, and serving on a board. There are a number of important ways to interpret this finding.

First, the Steward type might be more concerned with actively managing nature and property on her/his land than engaging in policy decisions that, among other issues, affect agricultural land use and natural resources management. Second, this finding suggests that those most likely to represent issues pertaining to natural resources conservation would be the *least* likely to be involved in adaptive management projects. Focht and Trochtenberg (2005) might argue that sufficient trust exists between conservation officials and farmers that the Stewards would find little reason to participate whereas Progressives and Managers might be likelier to participate since there is less guarantee that their interests would be met. Further research would need to investigate the implications of such absences in adaptive management planning.

In general, farmers are ideally positioned to actively contribute to adaptive management activities such as development, implementation, monitoring and evaluation precisely because they are renters, landowners, and managers of the natural resources found on their farms and best positioned to know about environmental changes on the landscape as they occur. However, as the bioenergy grasses survey and GIS-aided focus group results suggest, whether farmers will become involved in direct participation on the landscape will depend on a combination of sociocultural, economic and biophysical factors. Progressives might favor strategies that improve or introduce new sustainable agriculture techniques, while Managers, who might vote on options, would do so out of concern about crop yields and future planning. Indeed, farmers in the bioenergy grass study expressed concern about maintaining existing cropping patterns, for both economic and culturally driven reasons. Spatially, there could be a disconnect between optimal locations for conducting adaptive management tests, and the farmer landowners and managers willing to provide guidance or material support. To overcome these representational and spatial discrepancies, those in charge of integrating citizen participants in adaptive

management—officials, conservationists, grassroots leaders, and other key stakeholders—will need to develop personal relationships and interactions among farmers.

The arc of this study, the cultural influences on stakeholder participation, extended into 1) cultural theory, 2) an empirical test of participation preferences, and 3) an examination of attitudes toward energy grass production. The three components of this study signify the three phases of a public participation and public participation GIS processes: convening, engaging, and outcomes. Future research on cultural theory will benefit from a comparison of Grid/Group theory to other theoretical frameworks, with the twofold aim of situating PPGIS further into the cultural theory literature, and for improved understanding of the many contradictions and assumptions embedded in PPGIS goals and activities. A fruitful area of research is theorizing end-user communities and individuals involved in Voluntary Geographic Information (VGI) and mobile spatial information production. This analysis of participation preferences was limited by a small sample size ($n = 64$). Further research on participation should not only attend to increasing the sample, but examine participation preferences related to specific organizations, policy issues, and introduce the influence of time constraints on participation. For example, a farmer might generally prefer to serve on a board, but if the time commitment makes that difficult, then the same person might prefer to vote on issues. Introducing everyday constraints into measurements of participation preferences by cultural identity will yield a result that should more closely match actual participation.

The PPGIS for perennial energy grass revealed important constraints on farmers to growing miscanthus and switchgrass. In particular, time to market, uncertainty, and age figured prominently as barriers to adopting new crops, even on land that farmers, not officials, considered as marginal. In future research, a GIS-aided focus group might be even more

productive if conservationists, farmers, and officials attended together. The possibility of that type of engagement will depend on situational factors, including timing, location, and organizational considerations, factors that this study did not investigate thoroughly, but would also be considered more robustly in future applied research settings.

Cultural theory in general, and Grid/Group theory in particular, provide a new lens for interpreting the many forms of participation in decision making. By addressing cultural influences on participation, this three part study offers practitioners, researchers, officials, and resident participants a new way of encountering diverse ideas, values, needs, and suggestions in public participation that this scholar hopes contributes to making our unique ways of life more socially and environmentally sustainable.

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APPENDIX A: MAIL SURVEY

Farmer Participation in Macon County

We ask you to take 10 minutes to describe your involvement in agricultural organizations and views on farm practices. This will help us understand existing participation in agriculture related activities and develop new workshops based on your interest, experience, and opinions.

Thank you for your input!

1. Please tell us about your current involvement with the Macon County Soil and Water Conservation District.

	Yes	No	N/A
a. Vote for Conservation District board members	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₆
b. Attend board meetings	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₆
c. Attend workshops hosted by the Conservation District	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₆
d. Enrolled in a conservation program	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₆
e. Other (<i>describe</i>):			

2. Below are examples of participation levels in public and membership organizations. How would you rate the importance (to you) of each participation level?

	Very important	Somewhat important	Not at all important
Receive information on issues or decisions	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
a. Respond to solicitations for input on issues	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
b. Vote on issues	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
c. Serve on a board or committee	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
d. Vote in final decisions as board or committee member	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
e. Prefer that others make decisions	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
f. Other(<i>describe</i>):	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁

3. For your farming operation, how important is involvement in the following organizations?

	Very important	Somewhat important	Not at all important	N/A
a. Illinois Farm Bureau	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁	<input type="checkbox"/> ₆
b. Illinois Corn Growers or other commodity organization	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁	<input type="checkbox"/> ₆
c. Co-Op or Community Supported Agriculture	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁	<input type="checkbox"/> ₆
d. Non-profit natural resources organization	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁	<input type="checkbox"/> ₆
e. Government Agency	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁	<input type="checkbox"/> ₆
f. University Extension	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁	<input type="checkbox"/> ₆
g. Other (<i>describe</i>): _____	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁	<input type="checkbox"/> ₆

4. Why do you participate in agricultural organizations?

5. The statements below represent different views related to farming practices. Please check the box under the option that best describes your views.

	Completely Agree	Agree	No Opinion	Disagree	Completely Disagree
a. I am willing to try new farming methods	<input type="checkbox"/> ₅	<input type="checkbox"/> ₄	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
b. It's important that my farm looks neat and well maintained	<input type="checkbox"/> ₅	<input type="checkbox"/> ₄	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
c. I rely on hard work and sound judgment more than equipment or technology	<input type="checkbox"/> ₅	<input type="checkbox"/> ₄	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁
d. I consider buying certified used equipment before buying new	<input type="checkbox"/> ₅	<input type="checkbox"/> ₄	<input type="checkbox"/> ₃	<input type="checkbox"/> ₂	<input type="checkbox"/> ₁

	Completely Agree	Agree	No Opinion	Disagree	Completely Disagree
	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
e. It is important that I know the cost of production in each field and use that information for cropping decisions	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
f. I closely monitor commodity prices and have a marketing plan	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
g. Conducting research is a key part of my farming business	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
h. It's important to consult with local or state experts before making a decision	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
i. It's important to consult with neighbors or other farmers about decisions	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
j. I will put in long work hours but it's also important to volunteer in community, church, or farm organizations	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
k. It's important to me that my farm operation benefits the local community	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
l. Farmers have a moral obligation to preserve soil for next generation	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
m. The farmer is a key link with nature	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
n. Nature is unpredictable	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
o. Nature is fragile and society needs to protect it	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
p. Nature is manageable with expert knowledge and technology	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
q. Nature is resilient	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

6. Please tell us about your use of computer and mapping technologies:

	Daily	Weekly	Monthly	Rarely	N/A
a. Use a computer	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 6
b. Use the internet	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 6
c. Use geographic information systems software	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 6
d. Use online mapping tools (e.g. Google Earth)	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 6
e. Use Macon County's Map Server	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 6
f. Use a Global Positioning System (GPS) in	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 6

my farm equipment

7. Would you be interested in attending a soil conservation workshop that also uses computer maps as part of the discussions? (Please see enclosed slip for further information)

____ Very Interested ____ Somewhat Interested ____ Not at all interested

8. Have you heard of a Geographic Information System (GIS) prior to this survey?

____ Yes ____ No ____ Not Sure

Please provide some background information about you and your farming operation.

9. What group best describes your age? ____ < 40 ____ 40-49 ____ 50-59 ____ 60-69
____ ≥ 70 years

of age

10. Zip Code of your farm business: _____

11. Gender: ☐₁ Male ☐₂ Female

12. Years you have been farming full time: _____ part time: _____

13. I (we) farm _____ total acres.

14. I (we) own _____ % of the acres we farm.

15. I (we) own _____ acres that are farmed by someone else.

16. What conservation practices are implemented on your farm? (*Check as many as apply.*)

☐₁ buffer strip ☐₂ filter strip ☐₃ grass ☐₄ structures ☐₅ terraces
waterway
☐₆ ponds ☐₇ no till/strip ☐₈ stream-bank stabilization
till

☐₉ nutrient management plan ☐₁₀ other _____

17. What are your major crops? (*Check as many as apply.*)

☐₁ corn ☐₂ soybeans ☐₃ wheat ☐₄ other (list) _____
☐₅ Any livestock? (list) _____

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

For more information about the results of this survey, please contact Miriam A. Cope at mcope2@illinois.edu or 217.333.1880. We will compile and share results from the questionnaires but all information will remain anonymous and confidential.