Renewable Agriculture and Food Systems: 32(6); 511–523 doi:10.1017/S1742170516000442

'Slow to change': Farmers' perceptions of place-based barriers to sustainable agriculture

Samantha Grover* and Joshua Gruver

Ball State University, Ball State University, Muncie, IN 47306, USA.
*Corresponding author: sgrover@umn.edu

Accepted 9 November 2016; First published online 12 January 2017 **Research Paper**

Abstract

Smallholder farmers are an important and growing segment of the farm population in Indiana and in the USA. Past research regarding farmer decision-making has been inconsistent and has largely focused on the larger-scale, conventional farmer, leaving smallholders poorly understood. There is a need to better understand the management decisions of smallholder farmers within their regional context to promote efforts toward environmental, social and economic sustainability. Through in-depth qualitative inquiry, this study investigated the impact of regional factors that influence farmers' decisions and the barriers and opportunities most relevant to farm viability and sustainability in the context of East Central Indiana (ECI). Semi-structured interviews with 15 key informants and 33 farmers informed our understanding of the factors most relevant to small-scale farming in the region. Several important themes emerged related to perceived barriers to sustainable farm management, including markets; structures and regulations; time and labor; environmental/ecological factors; and networking and access to educational support. The results of this study complement the findings of previous work that describe the complex framework farmers navigate when making decisions on the farm. Further, subtle regional factors emerged that significantly impact farmers' decisions, emphasizing the importance of local context in crafting agricultural policies and outreach efforts. Implications and recommendations for ECI are discussed.

Key words: farmer attitudes, qualitative methods, small farms, place-based, stewardship

Introduction

Small-scale, diversified farms are an important and growing segment of the U.S. farming population. Not only are they critical stewards of our natural resources, but small farms also compose an important part of the social fabric of rural America by contributing to culture and tradition through promoting self-empowerment and community responsibility; providing places for families to pass on values of hard work and responsibility; and providing a human connection to food and the earth (NCSF, 1998). The definition of a small farm has been somewhat ambiguous throughout the literature. Small farms have been defined by terms such as land acreages operated, number of livestock units, value of farm output, farm assets, and farm income (Lewis 1978 in Gebremedhin and Christy, 1996, p. 59). In 2013, the USDA-ARS released a more concise classification system for small farms to provide better longitudinal comparison. While the authors' synthesis of past research reflects findings across definitions, selection methods for this research align more closely with the latter, including an additional focus on local food production (see Methods section). Although practicing agriculture at a small scale does not ensure that sustainable practices are used, small farms in general are more likely to practice and promote sustainable agricultural practices than large farms (D'Souza and Ikerd, 1996; Tavernier and Tolomeo, 2004). Nonetheless, agricultural research and subsidy payments have traditionally been devoted to increasing yields and the needs of larger-scale, conventional production agriculture rather than rewarding small family farms and sustainable practices (Tilman et al., 2002; Riedl, 2007).

Agricultural practices of the last 60 years have generally resulted in significant environmental degradation, including loss of biodiversity, marginalized water quality (fresh and salt water), and loss of ecosystem services (Tilman et al., 2002). These impacts and peoples' response to them vary regionally and are very much dependent on mitigating factors such as regional economics, environmental

factors (e.g., terrain and soil type) and social factors (Sassenrath et al., 2010). Community characteristics such as links to marketing channels (and whether these are regional or more global in nature); community support and knowledge of farming systems and the commitment to local economy; and connections and accessibility to internal and external change agents (i.e., scientists, policy makers, educators, etc.) all impact how different areas of the country practice agriculture and respond to the risks and rewards that chosen practices bring (Gliessman, 2010; Sassenrath et al., 2010).

Managing agricultural lands sustainably over the next 50 years will ideally result in increased societal benefits including: higher crop yields; greater efficiencies in water, nitrogen and phosphorous use; management practices that are ecologically and sociologically mindful; the sensible use of pesticides and herbicides; and significant changes in livestock production (Tilman et al., 2002). Deficiencies in the existing literature highlight the need for more research that preserves important contextual factors and allows for direct application by regional agricultural professionals. The authors of this study believe that there is insufficient understanding of the factors that influence decision-making on small, diversified family farms, especially within specific regional contexts. Because each region holds unique characteristics that may impact the local food system, solutions must be grounded in place-based research within the community of concern.

Achieving a paradigmatic shift in the way agriculture is done will require, among other things, that farmers are appropriately rewarded for the work they do, particularly if they are using sustainable agricultural practices (Tilman et al., 2002). Recognizing there is a delicate balance of practicality, economics, social drivers and environmental factors that shape the management decisions farmers make, this research seeks to explore the question of what it means to be a smallholder farmer in East Central Indiana (ECI). Through in-depth qualitative inquiry, this study more specifically investigates the following questions in the context of ECI: What are the factors farmers consider when making decisions about sustainability on their farm? What are the barriers and opportunities in regard to sustainable management on small farms? What is the importance of regional context in farming decisions?

Past research focusing on farmers' management decisions is useful in providing guidelines for future research, but it is limited in significant ways. Several studies (Gould et al., 1989; Westra and Olson, 1997; Soule et al., 2000; Farmer and Betz, 2016) have attempted to link demographic and farm variables with conservation decisions, but there has been little, if any strong agreement in results (Knowler and Bradshaw, 2007; Prokopy et al., 2008). Although uncovering these quantitative relationships could make targeting programs more efficient, few if any variables have accurately predicted farm management behavior despite decades of research. Others have investigated the more in-depth motivational and attitudinal aspects of farmer decision-making (Salamon et al., 1997; Petrzelka et al., 1996; Sassenrath et al., 2010). While these studies provide critical insight and have built a strong framework for understanding farmers' complex decision-making processes, they do not fully address the personal and nuanced decision-making processes that inhibit or motivate farmers' actions. The authors of this study hope to gain insight into the situational and contextual details informing management behaviors by engaging in extensive on-farm interviews with small-scale farmers about the challenges or barriers in ECI that keep them from maintaining the long-term viability of their farms—and how those barriers may be more or less pronounced due to regional socio-cultural, economic and environmental factors.

Currently, there is a groundswell of interest in ECI in promoting small-scale, diversified agriculture. In 2012, a feasibility study was commissioned with a goal to expand the marketplace for Indiana-raised and Indiana-consumed food (Aubrey, 2012). Among other things, the study predicted that the market size in Central Indiana is not only large enough to accommodate more specialty crop producers, but that most of the anticipated growth in the specialty crops sector (i.e., fruits and vegetables, tree nuts, dried fruits and horticulture and nursery crops including floriculture) (USDA NASS, 2012) will come from farms of less than 200 acres. This is even more likely considering that rising costs of land, equipment and buildings have created significant barriers to entry for larger-scale conventional agriculture (Ahearn et al., 2005). Consequently, the number of small, diversified farms is expected to increase. Overall, there seems to be a desire in Indiana to 'grow more farmers,' but there is also an inclination that some of the critical infrastructure (communication and distribution networks, processing facilities, educational resources) needed to support this growth may be lacking in the state (Meter, 2012). A better understanding of producers' decision-making processes will not only allow for a more efficient allocation of support resources, but will also provide insight into the relevant drivers for sustainable management in ECI and in places with similar regional characteristics in the USA. The results of this study are not intended to generalize the views of ECI farmers, but rather, to enhance understanding of the context-specific factors that shape intention and behavior among smallholder farmers toward engaging in sustainable management practices.

What influences management decisions on the farm?

Farmer motivations, attitudes and perceptions, although complex and somewhat difficult to measure, are important drivers of farmer decision-making (Alonge and Martin, 1995). Several studies have explored farmers'

https://doi.org/10.1017/S1742170516000442 Published online by Cambridge University Press

motivations for choosing whether to adopt sustainable management practices, with varying results (Ryan et al., 2003; Chouinard et al., 2008; Sassenrath et al., 2010). Farmers describe gaining personal benefit from independence, working outside and being close to nature, acting as stewards for the environment, and interacting with the community, among other things as important motivators to farm and choose sustainable methods (Ahnström et al., 2009). In other research, family factors such as tradition of innovation (Salamon et al., 1997) and identification of an heir (Inwood and Sharp, 2012) were found relevant. Still, although farming is often described as a 'lifestyle choice' based on non-economic factors, it is also a business, and thus cannot be separated from economic motivations and the need to make a living. That is, although farmers may be motivated by a sense of stewardship, adopting conservation measures is also a business decision, so must be practical and cost-effective to the farmer's operation to be successful (Hoag et al., 2012). Overall, motivational studies stress that farmers balance a number of factors when trying to achieve 'good practice' (as defined by each individual) on their farms (Lemon and Park, 1993; Karami and Keshavarz, 2010).

Attitudinal research provides further insight into farmers' behavior. Farmers are more likely to adopt sustainable management practices if they have a positive attitude toward stewardship and the environment (Lynne et al., 1988; Sullivan et al., 1996; Prokopy et al., 2008), if they value the off-farm benefits of conservation practices (Reimer et al., 2012) and if they have favorable attitudes toward the community (Petrzelka et al., 1996). Conversely, farmers may be less likely to adopt sustainable management practices if they have favorable attitudes toward economic rationality and conventional farming methods (Petrzelka et al., 1996), and if they have stronger beliefs in technology (Lynne et al., 1988). However, attitudes by themselves do not necessarily predict behavior; attitudes are simply a predisposition to act in a given way (Karami and Keshavarz, 2010; Heberlein, 2012). Even if farmers have positive environmental attitudes, in order to actually adopt an environmental behavior they must also be aware of the practice, believe it is feasible, and find it consistent with their goals (Pannell, 1999).

There is also strong evidence that external factors such as social, economic and geographic circumstances shape the regional conditions that help to determine what type of farming systems will arise. Comparing drivers for adoption of sustainable systems in the Northeast versus Southeast USA, Sassenrath et al. (2010) showed that despite having similar motivations, key regional factors impacted farmers' ability to adopt sustainable systems. In the Northeast, farmers were more inclined to adopt more localized and diverse systems because local marketing channels were well developed, as opposed to global marketing channels which were more prominent in the Southeast. Market conditions such as price levels, consumer willingness-to-pay, transportation and supply chain transaction costs, labor markets, local agricultural policy and proximity to urban areas (Mishra et al., 2002) are all regionally specific factors that can work to induce or deter farmers from adopting more diversified systems (Bowman and Zilberman, 2013). Farmers' decisions are both limited and augmented by such political, economic, social and ecological contextual factors (Duram, 2000), supporting the notion that the broader community significantly impacts the type of agricultural systems adopted. Therefore, barriers to the adoption of sustainable systems must be understood within the specific community context (Karami and Keshavarz, 2010).

Theoretical framework

Social–psychological theory suggests that behavioral intention is not only informed by attitudes, but also by the interactions among values, beliefs and subjective norms (Fishbein and Azjen 1975; Heberlein, 2012). According to the Theory of Reasoned Action (TRA) pioneered by Fishbein and Ajzen (1975), beliefs toward an outcome, evaluation of an outcome, beliefs of what others might think, what experts think and motivations to conform—all inform attitudes and subjective norms, which in turn influence intentions and behaviors. Still, there is evidence that physical and social situational context can play a significant role in driving behavior (Heberlein, 2012). External factors have indirect bearing on attitudes and subjective norms by modifying the structure of a person's beliefs (Davis et al., 1989). Karami and Kesharvarz's (2010) framework of farmer behavior depicts attitudes as bound partly by gender norms and influenced heavily by religion and spiritual values, access to information, attitudes of nearby reference groups, quality of life and personal characteristics. Similarly, a model produced by Ahnström et al. (2009) describes farmer attitudes and perceptions as being influenced by nature, agri-environmental schemes, subjective norm attitudes and, perhaps most importantly, the 'context box' (Ahnström et al., 2009). Farmers, the authors argue, shape their perspectives and attitudes based on the way they perceive the context in which they operate. Factors such as education, economics, extension, farm history and the existence of farm heirs make up the context box and act not only upon the farmer directly, but also affect the larger norm attitudes and the way agri-environmental schemes are designed. In this way, situational and social constraints serve as thresholds for attitudes. Strong attitudes can overcome these thresholds, while weak attitudes tend not to. This may help explain that although two farmers could have nearly identical environmental attitudes, they may choose to act differently in accordance with their farm structure, management style, individual circumstances and cultural norms in the surrounding community. The fault in most studies is that they often fail to account

https://doi.org/10.1017/S1742170516000442 Published online by Cambridge University Press

for the multitude of factors that influence attitudes (Reimer et al., 2012), and do not adequately recognize the importance of location and individual farmer circumstances in shaping attitudes and behaviors (Ahnström et al., 2009). Though not empirically testing TRA, the framework guides research questions in this study to address noticeable gaps in the smallholder farming literature that fail to speak toward factors such as individual circumstances, regional culture, physical location, local economy and historical land-use context. This research seeks to understand which factors bound within the community context of ECI are most important in shaping the decisions of small farmers contributing to local food systems.

Methods

Study region

In the eight-county ECI region (see Fig. 1), most farms (71% or 3716 farms) report annual sales of less than US $100,000. Nearly 70% of all farms have fewer than 180 acres, and most farms (88%) are owned by families or individuals (USDA NASS, 2012). The top crop items produced by acreage are by far corn for grain and soybeans for beans. However, a diverse range of other commodities is also produced in the region with notable market values, such as milk and dairy products; vegetables, melons, potatoes and sweet potatoes; grains, oilseeds, dry beans and dry peas; sheep, goats and their products; and fruit, nuts and berries (USDA NASS, 2012).

This study employed qualitative research methods to gain a deeper understanding of how farmers perceive situational circumstances as influencing their motivations and management practices. The study counties were chosen based on geographic proximity to Muncie, Indiana, the center and largest urban area in ECI, as well as the center of the ECI business development unit. Fifteen key informant (KI) interviews were conducted to build an understanding of the regional context and to gain initial access to the population. KIs were selected based on their positions in communities/organizations or by their locally described reputations as knowing a lot about smallholder farming in ECI (Elmendorf and Luloff, 2001). The pool included professionals from Extension, state and county farm and natural resource agencies, market masters and identified leaders among local farmers. Discussions focused on regional cultural characteristics and farming history, challenges often discussed with farmers and availability of educational and other types of resources. KIs identified potential interviewees based on their knowledge of the farmers' eligibility and willingness to participate in an interview. This method of chain referral (Biernacki and Waldorf, 1981) was also used to draw on farmers' knowledge of additional participants in order to collect a range of perspectives to best understand and represent the study region. In order to conduct the KI and producer interviews, researchers sought and received IRB (Institutional Review Board) approval.

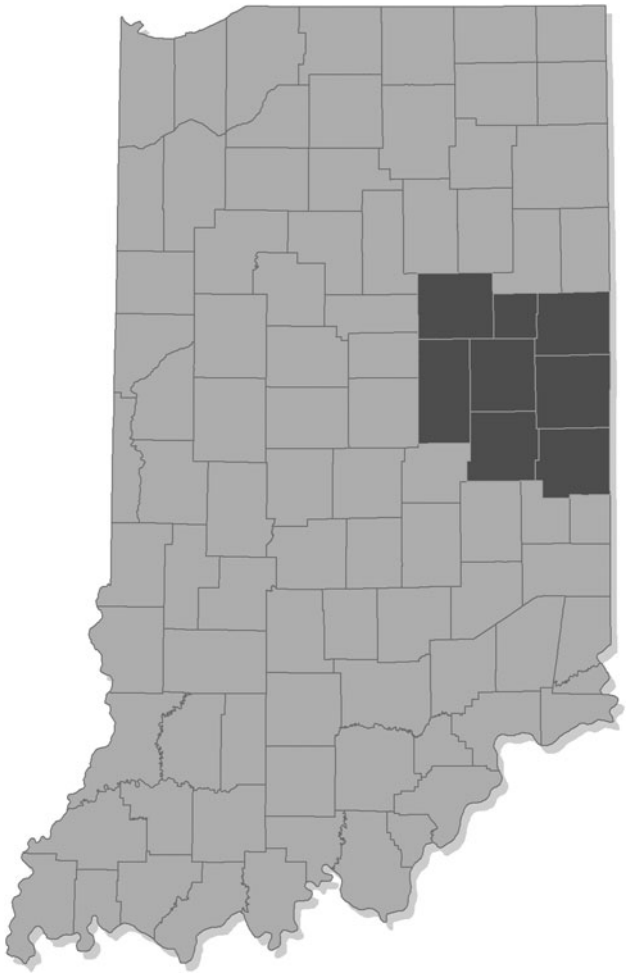

Figure 1. ECI study region included the following counties: Delaware, Blackford, Jay, Randolph, Wayne, Henry, Madison, Grant.

Farms were selected based on the following criteria, which are modified from the USDA definition for 'low-sales, small family farm:' (a) farm controls fewer than 260 acres of land; (b) a majority of farmland is operator-owned; (c) ownership structure for the farm is individual or family-owned (related by blood, marriage or adoption); (d) annual farm revenues do not exceed US $150,000; and (e) a significant portion of the farm's output is dedicated to crop or animal products, or both, destined for direct sales to consumers or local food markets (e.g., u-pick operations, farm stands, farmers markets, Community Supported Agriculture (CSA), local groceries or auctions). These criteria were meant to reflect current and predicted trends among smallholder farmers in the USA, and also include a focus on locally marketed food production.

Data were collected through in-depth, face-to-face interviews with farmers from all eight study counties in May

https://doi.org/10.1017/S1742170516000442 Published online by Cambridge University Press

through September 2012. Participant selection was purposive so as to maximize the diversity of stories and experiences represented by small-scale farmers in the ECI region. Every attempt was made to achieve a diversity of farmer experiences, farm types, farm sizes and geographic characteristics. Based on standards set by previous qualitative research in the agricultural field (Duram, 2000; Reimer et al., 2012; Zwickle et al., 2012) 33 interviews were conducted with farmers, until saturation was reached. A semi-structured format was used to maintain objectivity while allowing the researcher flexibility to explore topic areas further as they became relevant. Following the emergent nature of qualitative research, interview questions were adjusted as themes began to arise in the research identifying the most salient topics related to small-scale diversified farming in ECI. Interviews were audio-recorded and/or documented with detailed notes by the researcher and lasted between 1 and 4 hours. At the end of the interview, farmers were asked to complete a short demographic questionnaire to provide additional background and contextual information.

Content analysis was used to code transcripts according to individual units of meaning in the data. Codes were then organized into relevant themes, which identified commonalities across interviews. Prior to data collection, the researcher disclosed potential biases by drafting a list of preconceived ideas about the culture of the study region based on time spent living and working in ECI. A secondary coder confirmed themes that arose from the data and peer debriefing was used to provide a second or third perspective. Thick description and direct quotations accompany the analysis to illustrate the themes.

The results of this research are associated with a larger study examining the relationship between soil management and social characteristics of farmers. Farmers were asked to complete a questionnaire regarding their perceptions and management techniques in regard to soil, and soil samples were taken at each farm. Results from that aspect of the study are beyond the scope of this paper and will not be discussed in this text, but are available in Grover (2013).

Results

KIs provided regional context and informed questions drafted on the interview protocol. Because producer marketing challenges were a prominent theme KIs identified, specific questions in the interview protocol were directed to further explore these issues; and in fact, marketing became an exceedingly relevant topic throughout the farmer interviews. A related topic that became prominent was KIs' views of the farming culture in ECI. Several speculated that ECI's history of the tradition and dominance of conventional agriculture may have stifled the growth of the small farm/local food movement compared with other areas in the state. While informants did not say precisely why ECI has been slower to adopt a local foods model than other areas in the state, several theories arose related to geography, economics and the ubiquitous presence of conventional agriculture in ECI compared with other regions.

KIs' attention to the polarization in farm sizes that has occurred in ECI is testament to the continuing dominance conventional production has on the regional farming culture. Aspects of farming culture became significant throughout the farmer interviews, particularly as related to ecological concerns and educational needs. These issues will be further discussed in the sections that follow. A full account of the KI interviews is available in Grover (2013).

Farmer interviews: markets

Markets were by far the most prominent topic farmers discussed regarding challenges in maintaining long-term farm viability. Farmers perceived a low level of awareness about local foods among consumers in ECI, although most said awareness had grown in recent years. Several were convinced that most people 'don't know what good food is,' noting changes in consumer preferences toward convenience foods. They perceived a particularly low willingness-to-pay on the part of consumers in ECI compared with other areas in Indiana, as well as a lack of understanding of locally based agriculture and the cost and processes associated with farming and food production. Several farmers in this study traveled to markets in the greater Indianapolis area, although somewhat regretfully. Farmers noted that the market was much larger in those areas and customers in the metro seemed to have greater appreciation for local foods compared with ECI. Farmers linked this willingness-to-pay to higher levels of education and income, but in some cases, to a different mindset in more urban areas.

> 'The community here is just not—it doesn't have that mentality. I don't know if they were just broke or what, but they just wanted to get something for nothing.'

While producers felt somewhat satisfied with the prices they received for their products, many felt that the strength of the market affected what they could produce. Several farmers, for instance, had an interest in switching to more organic or 'natural' practices, but did not think enough customers would be willing to pay an extra premium. Many farmers also felt that they could not raise their prices to account for increases in production costs over the years because of competition from big box stores and consumer expectations for low prices.

Farmers often pointed to larger-scale economic forces as affecting the market for their products. Many mentioned the economic recession in the USA, although it was viewed to have both positive and negative effects on the market for local products. Farmers linked consumers' low willingness-to-pay to job losses and lowered incomes over the last several years, especially noting the decline

https://doi.org/10.1017/S1742170516000442 Published online by Cambridge University Press

of manufacturing industries in ECI. At the time data were collected, ECI's unemployment rate was higher than national and state averages (BLS, 2012; USDA ERS, 2012), at 9.7% compared with 8.3% in Indiana and 8.1% nationwide. Over the period from 2006 (prior to the Great Recession) to 2012, median income in ECI counties remained fairly stagnant, although 'real' (CPI inflation-adjusted) median income fell by about 13% (BLS, 2012). Manufacturing jobs were negatively impacted over the same period. Statewide, manufacturing jobs declined by 17.3%; in the Muncie metropolitan area (the only geographic subset available), losses in the industry were as high as 41.6% (BLS, 2012).

Farmers were also attuned to the issue of market competition. In addition to discussing price competition from big box stores, many farmers also readily described competition with other local producers; although, farmers seemed to have differing definitions of what it means to compete with one another. Some saw their consumer base as being limited to a small geographic range, or to a particular type of consumer, whereas others felt that anyone nearby growing similar products constituted competition.

> 'The biggest challenge for me farming here has been to grow something that does very well, and that everybody else doesn't grow.'
>
> 'Other farmers say, 'Well, I don't know how you can sell it at that price.' And it's like, well, I don't compete with you. I don't live on your side of town. We don't compete with other vendors, and we don't compete with the grocery stores.'

A number of producers mentioned the increasing presence of Amish populations in the small farming community over the last decade (Amish farmers were interviewed as well). Non-Amish farmers seemed to have a general respect for the Amish way of life and the quality of Amish produced products, but expressed concerns with market competition.

> 'The Amish are going to be real competitors for anyone else because they are working hard at it–they're doing all the information gathering and research. And I wish them well, but I can't compete with them in price.'

Farmers were further concerned about competition from 'non-growers' (particularly those who sold products through farmers markets). According to farmers, some market vendors purchase food at lower prices from Amish-run produce auctions (one auction opened just outside ECI in 2004, and another within ECI in 2007). Reportedly, some of these vendors resell auction-bought produce at farmers markets or roadside stands with little or no indication to consumers of where the food came from. Several farmers openly described contention with these 'non-growers.'

> 'It's not so much an open conflict as it is kind of a seething wound [laughs]. It's something that those of us that grow our own are very proud.'

Some farmers seemed to view this practice as an issue of deception. They were indignant when comparing their own labor and investment spent in bringing their products to market to their 'non-grower' counterparts.

> 'Every time they go and sell something they bought, they don't put no work into, we bring stuff home… It's a farmers market. If you aren't growing it, you're not a farmer. That's false advertisement, that's cheating.'

Still, there was a range of acceptance for this type of market competition. While some were adamantly in favor of a grower-only model, others felt it was acceptable to engage in some resale, as long as vendors primarily produced their own goods. In fact, some producers engaged in resale as a way to supplement their own products to offer more to consumers, to increase their profit margins, and/or to have a source of backup income in the event of a crop loss; they felt it was simply another outlet to diversify the sale of their product and an important way to ensure a more stable income.

Another market-based issue was farmers' indication that supply chain costs for organic production are particularly high in the area. Since there is not a well-developed organic sector in ECI, they said, it is difficult to access the inputs needed for organic production (e.g., fertilizers, feeds and approved pesticides), making the cost of organic production too high for many to justify. Producers cited that Indiana, and ECI in particular, has been slower than many other areas to embrace the local and organic food movement and believed that supply infrastructure had not developed accordingly for that reason.

Structures and regulations

Almost every farmer mentioned regulatory issues at some point during the interview. Many felt that small farmers were overburdened by excessive or inappropriate regulations at the federal and state level. For the most part, farmers felt that policies were enacted with large-scale operations in mind, feeling that many regulations were inappropriate to their scale, making the compliance process onerous—both time and cost prohibitive. Farmers also felt disadvantaged by government subsidy structures that favored large-scale production, noting that the system encourages cheap food, making it harder for small farmers to compete. Several felt that government 'got in the way' of what they needed to do to be successful in operating and growing their farm.

> 'I don't like government intervention at all…(speaking of health regulations) It's a one size fits all rule that just simply doesn't fit me, and it wouldn't fit anybody else doing what I'm doing…'

Many farmers expressed concern over predicted changes in health and safety regulations. Farmers worried that any increase in certification or regulatory costs would

https://doi.org/10.1017/S1742170516000442 Published online by Cambridge University Press

hurt their already slim profit margins. Farmers also felt impeded by disjointed regulations at the more local level. Several mentioned that health requirements varied from county to county, and even market to market, making the selling process confusing and time consuming.

Although a majority of the farmers viewed government regulations as a barrier, there were some exceptions. Several mentioned taking advantage of recent grant opportunities such as USDA high tunnel grants, or other incentive programs. Most were apathetic to regulations requiring training for pesticide and fertilizer application. A few suggested that government could sometimes be an asset.

> 'There's a lot of folks that live in this area, they don't want the government involved at all. But the government will give you money if you work within their guidelines. And they know what they're talking about.'

Time and labor

Nearly all farmers mentioned time, or lack thereof, as a constraint on their operations. Many worked full-time jobs on top of farming and struggled with expanding their operations or implementing new practices. While some aspired to leave their off-farm job to farm full-time, several farmers viewed what they do as a lifestyle choice that must be supported by an off-farm income. Yet, time was limited even for the full-time farmer. Many talked about challenges in becoming more efficient with all of their resources, but especially with their time. Those who farmed full-time often described struggling with being able to get everything done. Although general farm work was often discussed, several farmers also particularly noted struggles in finding the time to market products adequately or to learn about and set up new marketing avenues.

> 'I wish I had more time to focus on marketing, because with both of us working full-time outside of the farm, there's just not enough hours in the day. I think if I could dedicate some more time to it, we'd see the changes and progress that we want to see sooner.'

Farmers also discussed time in a more long-term sense. Many felt limited in what they could do with their operation because of their age, talking about the ways they might change their operation, 'if they were younger' (a number of farmers did not begin selling extensively from their farm until retirement age). Many noted that the work is too hard to continue doing at the same rate as the body ages. Several farmers struggled with hiring labor to help ease their time constraints. For many, the cost of labor was too high to justify at their scale. Others struggled with being able to find workers who were able to do the work to their standards and stay long enough to become skilled at the job. Many farmers felt not only that 'kids don't know how to work anymore,' but some also worried that people in general may not have as much interest in farming as they used to.

Environmental/ecological factors

Farmers identified the biggest positive aspects about farming in ECI to be the good soils and climate for growing crops (and, in fact, were hard pressed to come up with anything else that was particularly positive about the farming region). Yet, farmers also felt that much of the land in the area was 'tired' from conventional agriculture practices. Many criticized or commented on the non-use of crop rotations as an example of the lacking agricultural diversity in the region. Several discussed struggles with maintaining and/or improving soil fertility, especially producers who were farming land formerly in conventional production.

> 'The land was in really poor shape when we got it, and it's taking a long time to build the ground back up. We realize it took a long time for it to get that way and it will probably take a long time to build it back up, but we would like for it to happen faster.'

Several farmers also mentioned issues related to chemical drift as a challenge for growing organically. A few noted that even if they wanted to certify their farm organically, it would not be possible because of their proximity to other conventional farms.

Networking and access to educational support

Farmers generally felt that their educational needs were underserved. Resources such as Extension, they said, typically favored conventional farming. They especially felt that there was not enough information for growing horticultural crops in ECI soils and climate region, expressing frustration in seeking information online or from Extension, and only being able to find information catered to faraway places. Several felt that traditional educational resources were lagging in ECI.

> 'When you read and you go to conventions, you realize Indiana is really far behind in the fruit and vegetable business. Even your extension agents don't seem to be real proactive. Maybe there's not enough fruit and vegetable growers here? So you can't really fault them, but I just wish we could have a little bit more sometimes.'

Some were frustrated with the available educational resources because they were 'overly academic,' feeling that educators did not have adequate hands-on training, or did not make enough site visits to understand farmers' situations. While some farmers felt positive about the support they received from educational agencies, many preferred learning from other farmers, or at least from those with hands-on experience.

https://doi.org/10.1017/S1742170516000442 Published online by Cambridge University Press

> 'They've got the degree, but they haven't got the common sense knowledge. You can write a cookbook, but that doesn't mean you can cook.'

Farmers often described learning from and receiving support from other farmers. Many found valuable relationships at various state or regional conferences.

> 'I think organizations where the members are willing to share information… those kinds of things are vital for a small farmer, especially a person that's trying to do it as an individual. It's kind of like your little mini support group.'

At the same time, farmers seem to be disconnected from each other in the local ECI region. Few were able to describe many others in ECI who were doing similar things as them, and often farmers were only able to identify others farmers who attended their same market.

One farmer illustrated the relative rarity of his type of operation in the area by the 'abnormal' nature of his practices compared to peers.

> 'I've been known to go to the dark side—organic fruits and vegetables… I'm doing strange stuff—which, for around here, strange means I try very hard to do no sprays or chemicals.'

Some farmers perceived that there simply were not very many similar producers in the area, while others figured that there were similar farmers were around, but they just were not acquainted. One farmer mentioned her disappointment at the lack of a strong communal feeling among small farmers in the area.

> 'I feel incredibly isolated here. I know there a couple other people in our county, probably, but there aren't many small farms that are doing non-conventional farming.'

Most farmers were open to the idea of a more formalized network for small farmers in ECI, although they expressed several concerns. The biggest concern was time—farmers worried that the benefits would not be worth the cost of time that could be better spent on the farm. Still, some had reservations because they were skeptical about the expertise of other farmers in such a group.

> 'Sometimes I get information from other farmers, but that's kind of like, take it with a grain of salt because you don't always know what they're really telling you.'

On one hand, farmers found the knowledge gained from each other as an important resource. Several supported the idea of collaborating to share ideas and resources. Yet, several farmers thought there might be a limit to the degree that farmers in the area would be willing to cooperate to share resources and information.

> 'Not everyone's going to be your best bud, but the people who are reasonable and open hook up. There's people around here that are very competitive and secretive and guarding themselves all the time. I try to exercise my faith in those matters and realize that there'll be plenty for me.'

Discussion

Farmers in this study identified a number of barriers similar to those experienced by farmers nationwide. However, as predicted, some aspects were more pronounced and/or more specific to regional context of ECI, suggesting the need for more localized attention in the formation of initiatives aimed to promote local food production and consumption. In this study, as throughout the literature (Gebremedhin and Christy, 1996; Eastwood et al., 2004; Hall et al., 2006; Cantor and Strohlic, 2009), market conditions were found to be a significant limiter on farmers' ability to sustain and grow their operations. Still, the specific influencing factors farmers described in ECI merit further consideration.

For instance, farmers' struggle in receiving adequate prices for their product is consistent with other findings that describe barriers related to competition from big box stores, consumers' general lack of understanding and trends related willingness-to-pay for food on a national scale (Thilmany et al., 2008; Martinez et al., 2010). However, farmers' suggestion that ECI consumers have an especially low willingness-to-pay for local products compared with other nearby locations because of income and education may suggest a regionally pronounced barrier related to economic development consistent with county-level census data. At the time of data collection, ECI counties had some of the highest poverty levels in the state at 18.6%, compared with 15.5% in Indiana and 15.9% nationwide. Educational attainment for adults 25 and older for completion of a bachelor's degree or higher over 2010–2014 was only 17.1% in ECI, compared with 23.6% statewide and 29.4% nationally (U.S. Census Bureau, 2013; 2014). This finding may lend some support to the suggestion by Délier et al. (2003) that a vibrant rural economy may be necessary to support small-scale farms and not vice versa. Of course, it is possible that ECI consumers have a lower willingness-to-pay for other reasons. Although consumer attitudes are beyond the scope of this study, consumer education helps to drive marketing (Sassenrath et al., 2010) and thus may be an important part of the solution.

Farmers' perceptions of market competition as a challenge was not surprising given the results of past research (Lawless, 1999; Cantor and Strohlic, 2009), but subtleties that emerged from this study shed light on cultural and political issues specific to ECI that may shape regional conditions. In particular, farmers perceived demographic changes over the last decade including influxes of Amish populations settling in ECI as having influenced both the farming culture and markets in the region in unique ways. While Amish populations are challenging to quantify and track, data available suggests that Indiana has the third highest Amish population in the USA, with an estimated 45,144 adherents in 2010 (Grammich et al., 2012), over half of which are located in ECI counties. Data also suggest that major gains (50% or more) and/or new

https://doi.org/10.1017/S1742170516000442 Published online by Cambridge University Press

settlements occurred in ECI from 2000 to 2010 (Grammich et al., 2012). Produce auctions largely operated and utilized by Amish farmers launched in the decade prior to study created a new market mechanism for growers and have built linkages with farmers' markets. Yet, they have also introduced new types of competition, illustrated by the conflicts farmers described between 'growers' and 'non-growers.' These conflicts seem to be largely the result of inconsistent market rules and enforcement and the absence of state regulations governing sales at farmers markets. While a 'grower only' market structure would likely be supported by some, it is also worth considering that 'non-growers' also sell products grown in ECI, helping to support other farmers and keep food dollars in the local economy. Still, the conflict between these groups is significant and creates a social barrier to cooperation among those working toward a more localized food system. Future policy governing farmers' market sales, then, should focus on requiring more transparency in the sale of local products both to foster cooperation between producers and to provide better consumer information. While we cannot be sure whether these types of issues in regard to market competition are specific to ECI, they are likely to be more prevalent in states such as Indiana that do not have statewide regulations governing resale at farmers markets. Parallels related to the cultural mix of the region may also exist in other areas where non Euro-American populations engaging in small-scale agriculture have developed a strong market presence. Evidence from ECI suggests that because of differences in regional demographics, solutions to address market concerns should be inclusive and crafted with sensitivity to cultural dynamics and producer relationships (Koontz and Johnson, 2004).

This research also demonstrates the important role subjective norms play in how likely local food systems are to develop and succeed. Consistent with the history Meter (2012) provided, farmers in this study held the opinion that the organic and local food movement has been slower to develop in ECI than in other areas of the country and other areas in Indiana. Farmers as well as KIs linked this effect not only to demographic and economic conditions, but also to geography and land-use history. According to interviewees, high-quality soils and flat terrain in ECI promoted the use of large-scale equipment for conventional production in the region compared with other areas in the state where other models prevailed due to tradition and geographic conditions. As a result, the prolonged presence and dominance of conventional agriculture in ECI has had a strong influence on subjective norms in the region for what types of agriculture are viewed as deviant. Because the use of alternative practices is perceived to be less well developed in ECI, farmers may feel social pressure to conform to the conventional mode of production, as evidenced by statements of how 'strange' farmers felt their use of organic or alternative practices was in the area or by the irritation some expressed toward 'not being considered a farmer' because of the size and nature of their operation. In this way, the regional setting may present additional social barriers to the adoption of more sustainable practices in ECI. The increased pressure to conform to subjective norms may make it more difficult for farmers to engage in alternative methods of production in other areas throughout the Great Plains, which is also supported in previous research (Duram, 2000). Of course, practical implications of the tradition and land-use history in the region also include restrictions on farmers' ability to choose organic practices because of the proximity to conventional producers and the lack of local food systems infrastructure in the region. Indiana as a whole imports approximately 90% of its food. This 'importing behavior' has gifted the state great efficiencies for shipping food long distances, but few efficiencies for local food trade (Meter, 2012). Since this was not a comparative study, however, it is difficult to gauge the extent of this challenge compared with other areas in the state. Future research should explore the extent of support for the local food movement between ECI and more (supposedly) progressive areas of the state in terms of both farmer attitudes as well as supporting infrastructures available. The finding that this challenge seems to be more pronounced in regions where culture has favored conventional agriculture implies that a blanket solution may not be appropriate. Given farmers' perceptions of consumer attitudes in ECI, as well as the difficulties many farmers described in terms of effectively marketing their products, additional support may be needed to help farmers expand their markets and speed the development of the local food economy. One model that may be effective is the creation of a regional food hub which could offer infrastructural support to producers, increase market access for purchasers, and serve as a conduit for information flow and sharing (Hardy et al., 2006; Barham et al., 2012). Engaging local institutions (e.g., universities, hospitals and other major employers) in the regional food economy could offer a way forward.

The finding of structures and regulations as a barrier is similar to results found by other researchers (Duram, 2000); in this study and in past research, farmers consistently seemed to feel that regulations at the federal and state level were not scale-appropriate to their operations. If a more robustly developed local food system is desired, more opportunities such as small producer grants, which farmers discussed in a positive manner, should be encouraged, while policies giving favoritism to conventional production should be discouraged. Regulations could also be revised toward more of a sliding-scale approach to account for the scale and diversity of farms and the needs of small businesses. The Tester-Hagan Amendment in the recent Food Safety Modernization Act (FSMA) is one example of how this might be implemented. In an effort to provide more

https://doi.org/10.1017/S1742170516000442 Published online by Cambridge University Press

scale-appropriate oversight for food safety, the amendment exempts small producers who sell within a 275-mile radius of their farm from complying with stringent record-keeping and plan-making requirements otherwise required through FSMA but maintains practical requirements that maintain product traceability. Still, more careful work is needed to reduce regulatory barriers that are impractical for small producers while maintaining food safety and integrity.

Time and labor are related to economies of scale, so given that this study focused on small-scale farmers, it was unsurprising to find these as barriers. Time and labor are common constraints found in others studies and are recognized by the USDA as barriers for farmers involved in local food production (Martinez et al., 2010; Sassenrath et al., 2010; Zwickle et al., 2012). Several farmers specifically mentioned time constraints in regard to marketing (e.g., not having enough time to market properly or to expand their markets as they would like to), so it seems that the lack of time can have reinforcing negative effects. Potential solutions in this regard could include offering additional marketing education for farmers, and/or encouraging the formation of cooperative marketing systems that would help farmers share marketing burdens.

Some of the related issues farmers discussed with regard to labor are also worth noting in more detail. Farmers' challenges finding good labor and their views that 'people just aren't interested in agriculture anymore' must be addressed if we desire to maintain and grow the farming population. The suspected decline in skill and interest in farming is troubling. Steps should be taken to promote farming as a viable and desirable career, along with other actions to improve the markets and profitability of small-scale farming. Initiatives such as the USDA's beginning farmer program should continue to be implemented, and hopefully will help to encourage farmers to begin operations at a younger age to alleviate some of the challenges many farmers experience related to their age and health. Continued investment in programs like 4-H and FFA that encourage children to develop interests and skills in agriculture will be vital.

The main ecological factors farmers described, soil productivity and chemical drift, are challenges identified by organic farmers on a national scale (Hanson et al., 2004; Pimentel et al., 2005) and are likely to continue to be a problem in future years. Still, chemical drift is particularly detrimental to small-scale farmers because small properties do not allow for as large of a land buffer between adjacent fields where chemicals are used. The problem may be further exacerbated in areas such as ECI where organic practice is viewed as culturally deviant because neighboring farms may be less amenable to working with small farmers to adjust their practices. Although voluntary programs such as DriftWatch are beneficial, additional enforcement and legal implications for chemical drift may be necessary to alleviate barriers for small farmers.

Farmers' views that area resources disproportionately favor conventional agriculture were somewhat expected given the pervasiveness of commodity crop production in the region and the focus of previous research on larger scale farms. The finding that farmers often found local resources to be 'overly academic' and that many preferred learning from those with first-hand experience was also consistent with previous work (Franz et al., 2010). Convincing research extolls the benefits of farmer-to-farmer networks in strengthening local food markets, building community, facilitating the transfer of information and innovation, and building impetus needed to make change (Fisk et al., 2000; Kroma, 2006). Still, farmers in ECI may have reservations about engaging in a collaborative network. Aside from their general feelings of isolation or disconnection from other farmers, some viewed the market as being small and were wary of developing relationships with other farmers for fear of increased competition. It is possible that such protective attitudes may inhibit some small farmers from collaborating with one another to expand the market. The skepticism some expressed about the expertise of other farmers may also be significant. It is difficult to say whether the apprehension to collaborate is unique to ECI without further study, but the relative absence of cooperatives and farmer networks in the area compared to some other regions may offer some indication. Future research exploring the conditions that promote cooperation among small farmers may help agricultural professionals and farmers better understand how to promote collaboration in areas where cooperative attitudes may be lacking. Moving forward, ECI farmers may need to be encouraged to form more trusting relationships with other farmers. In a practical sense, educational efforts could focus on on-farm field days specifically geared toward small-scale, diversified farmers. By engaging in common, honest experiences that are locally relevant, farmers gain shared knowledge that helps to form a collective identity, which is more likely to lead to trusting relationships (Carolan, 2006; Franz et al., 2010). An example of this was highlighted in Blesh and Wolf's (2014) work in Iowa where farmers were encouraged to participate in in-field testing and trials on their farms. The practice became a key piece of change in the region because it promoted socialization among farmers and helped to develop a cultural norm of experimentation. As farmers gain and develop commonalities, they may be more amenable to trusting one another and forming a more cohesive and formalized social network. From an educational perspective, it is important to note that since trust develops in part from common interest, topics for outreach must encapsulate the unique needs of the growers/farmers.

Summary and Recommendations

This analysis provides evidence that regional contextual factors, and the physical and social realities that develop as a result, play a substantial role in the success of smallholder operations. While ECI farmers share barriers common to those found in previous research on smallholders (e.g., markets, time, labor and ecological factors), regionally specific contextual factors show an added layer of complexity to farmers' decision-making process. Confirming the assertions of social psychology theory, this research suggests that external factors (e.g., economy, demographic change, land-use context and subjective norms) have bearing on smallholder's attitudes and further, on their behavioral intentions regarding on-farm decision-making and sustainable agricultural practices. In ECI, demographic changes have introduced new market conditions and significant changes in relationships between farmers. Farmers and local professionals believe that ECI's agricultural history and social norms have encouraged the continuing domination of conventional larger-scale agriculture and the underdevelopment of small-scale diversified agriculture relative to other areas of the state and/or country. Accordingly, support and resources for small farms is also perceived to have lagged behind, making it more challenging for farmers in the area to expand and improve their operations. At the same time, macroeconomic declines have disproportionately affected the ECI region. Low income and educational attainment and high unemployment in the area have potentially contributed to lower consumer willingness-to-pay for local products. Farmers have experienced weaker and more uncertain markets, likely detracting in part from farmers' willingness to form collaborations, further stifling the growth of small-scale farms and the local food movement. All of these factors compound to underwrite the more simply put notion expressed by many KIs and farmers that ECI is just 'slow to change.'

Understanding farmers' attitudes is vital—in this study, like many others, smallholders' attitudes were highly varied, and their motivations toward sustainable agricultural practices were as well. More importantly, farmers' attitudes are an indicator of the external factors that act as delimiters to change. That is, solely attempting to change farmers' attitudes will not likely result in a large shift to the adoption of more sustainable practices; external factors act as thresholds that can dictate whether or not they act on an attitude. Instead of trying to change the attitudes themselves solely through education, this research suggests attempts be made to modify these thresholds so that existent attitudes are allowed to move in the way that befits them.

If ECI is to progress toward a future including a more sustainable food system, the approach moving forward must be multi-faceted. Structural and social solutions at a regional, state, or even national level noted in this paper's discussion could reduce barriers smallholders face. At a high level, more attention from educational agencies could be directed toward issues specific to smallholders; bureaucratic processes could be reduced to allow farmers to more easily sell at through multiple direct market outlets; aggregation, distribution and marketing hubs could be established to create economies of scale for small producers. Social norming, though tougher to implement and involving more time, can lead to significant behavior change and can address issues at regional and local levels. For instance, efforts to create spaces where common practice and socialization arise among smallholder communities can help build trust and collaborative spirit. Integrating local produce and agricultural education into schools and institutions can normalize the consumption of local foods and eventually help to drive consumer demand. In these ways, local agriculture should be approached as an integrative part of economic development so that a strong economy will not be necessary to support local agriculture, but rather, that local agriculture will be a vital component of a strong economy.

Acknowledgements. The authors would like to thank the participants of this study for their willingness to share their time and their stories as well as the Renewable Agriculture and Food Systems journal reviewers for providing feedback to create a stronger manuscript. This research was made possible by grant funding from the Ball State University ASPiRE Program.

References

Ahearn, M.C., Yee, J., and Korb, P. 2005. Effects of differing farm policies on farm structure and dynamics. American Journal of Agricultural Economics 87(5):1182–1189.

Ahnström, J., Höckert, J., Bergeå, H.L., Francis, C.A., Skelton, P., and Hallgren, L. 2009. Farmers and nature conservation: What is known about attitudes, context factors and actions affecting conservation? Renewable Agriculture and Food Systems 24(1):38–47.

Alonge, A.J. and Martin, R.A. 1995. Assessment of the adoption of sustainable agriculture practices: Implications for agricultural education. Journal of Agricultural Education 36(3):34–42.

Aubrey, S. 2012. Indiana Farms, Indiana Foods, Indiana Success: Central Indiana Food Hub Feasibility Study. Prosperity Ag & Energy Resources, Hancock County, Indiana.

Barham, J., Tropp, D., Enterline, K., Farbman, J., Fisk, J., and Kiraly, S. 2012. Regional Food Hub Resource Guide (No. 145227). Available at Web site https://doi.org/10.9752/MS046.04-2012 (verified 15 September 2014).

Biernacki, P. and Waldorf, D. 1981. Snowball sampling: Problems and techniques of chain referral sampling. Sociological Methods and Research 10(2):141–163.

Blesh, J. and Wolf, S.A. 2014. Transitions to agroecological farming systems in the Mississippi River Basin: Toward an integrated socioecological analysis. Agriculture and Human Values 31(4):621–635.

Bowman, M.S. and Zilberman, D. 2013. Economic factors affecting diversified farming systems. Ecology and Society 18(1):33.

Bureau of Labor Statistics. 2012. U.S. Department of Labor. Unemployment, Employment, Inflation and Prices. Available at Web site http://www.bls.gov/ (verified March 2016).

Cantor, A. and Strohlic, R.S. 2009. Breaking Down Market Barriers for Small and Mid-sized Organic Growers. California Institute for Rural Studies, Davis, CA.

Carolan, M.S. 2006. Social change and the adoption and adaptation of knowledge claims: Whose truth do you trust in regard to sustainable agriculture? Agriculture and Human Values 23(3):325–339.

Chouinard, H.H., Paterson, T., Wandschneider, P.R., and Ohler, A.M. 2008. Will farmers trade profits for stewardship? Heterogeneous motivations for farm practice selection. Land Economics 84(1):66–82.

Davis, F.D., Bagozzi, R.P., and Warshaw, P.R. 1989. User acceptance of computer technology: A comparison of two theoretical models. Management Science 35(8):982–1003.

Délier, S.C., Gould, B.W., and Jones, B. 2003. Agriculture and rural economic growth. Journal of Agricultural and Applied Economics 35:517–527.

D'souza, G. and Ikerd, J. 1996. Small farms and sustainable development: is small more sustainable? Journal of Agricultural and Applied Economics 28(1):73–83.

Duram, L.A. 2000. Agents' perceptions of structure: How Illinois organic farmers view political, economic, social, and ecological factors. Agriculture and Human Values 17(1):35–48.

Eastwood, D.B., Brooker, J.R., Hall, C.R., and Rhea, A. 2004. Small produce Growers' marketing behaviors: A case study of Tennessee. Journal of Food Distribution Research 35(1):57–64.

Elmendorf, W.F. and Luloff, A.E. 2001. Using qualitative data collection methods when planning for community forests. Journal of Arboriculture 27(3):139–151.

Farmer, J.R. and Betz, M.E. 2016. Rebuilding local foods in Appalachia: Variables affecting distribution methods of West Virginia farms. Journal of Rural Studies 45:34–42.

Fishbein, M. and Ajzen, I. 1975. Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Reading, MA: Addison-Wesley.

Fisk, J.W., Hesterman, O.B., and Thorburn, T.L. 2000. 12 Integrated Farming Systems: A Sustainable Agriculture Learning Community in the USA. Facilitating Sustainable Agriculture: Participatory Learning and Adaptive Management in Times of Environmental Uncertainty, p. 217. Cambridge University Press, Cambridge, UK.

Franz, N., Piercy, F., Donaldson, J., Richard, R., and Westbrook, J. 2010. How farmers learn: Implications for agricultural educators. Journal of Rural Social Sciences 25 (1):37–59.

Gebremedhin, T.G. and Christy, R.D. 1996. Structural changes in US agriculture: Implications for small farms. Journal of Agricultural and Applied Economics 28(1):57–66.

Gliessman, S.R. 2010. The Conversion to Sustainable Agriculture Principles, Processes, and Practices. CRC Press, Taylor & Francis Group, Boca Raton, FL.

Gould, B.W., Saupe, W.E. and Klemme, R.M. 1989. Conservation tillage: the role of farm and operator characteristics and the perception of soil erosion. Land economics 65(2):167–182.

Grammich, C., Hadaway, K., Houseal, R., Jones, D., Krindatch, A., Stanley, R., and Taylor, R. 2012. 2010 U.S. Religion Census: Religious Congregations & Membership Study. Association of Statisticians of American Religious Bodies. Available at Web site http://www.thearda.com/ (verified March 2016).

Grover, S., 2013. Exploring motivations and perceptions of small-scale farmers: Considerations for sustainable agriculture in east central Indiana. Doctoral dissertation, Ball State University.

Hall, C., Brooker, J., Eastwood, D., Epperson, J., Estes, E., and Woods, T., 2006. A marketing systems approach to removing distribution barriers confronting small-volume fruit and vegetable growers. Choices 21(4):259–263.

Hanson, J., Dismukes, R., Chambers, W., Greene, C., and Kremen, A. 2004. Risk and risk management in organic agriculture: Views of organic farmers. Renewable Agriculture and Food Systems 19(4):218–227.

Hardy, C.L., Holz-Clause, M., and Chase, C., 2006. Analysis and Comparison of the Technical and Business Planning Needs of Iowa Farmers Marketing Directly to Consumers and Iowa Farmers Marketing Through Supply Chains. Iowa State University, Ames, IA.

Heberlein, T.A. 2012. Navigating environmental attitudes. Conservation Biology 26(4):583–585.

Hoag, D., Luloff, A., and Osmond, D. 2012. Socioeconomic analysis: National Institute of Food and Agriculture–Conservation Effects Assessment Project. How to Build Better Agricultural Conservation Programs to Protect Water Quality: The National Institute of Food and Agriculture-Conservation Effects Assessment Project experience. Soil and Water Conservation Society, Ankeny, IA. p. 120–137.

Inwood, S.M. and Sharp, J.S. 2012. Farm persistence and adaptation at the rural–urban interface: Succession and farm adjustment. Journal of Rural Studies 28(1):107–117.

Karami, E. and Keshavarz, M. 2010. Sociology of sustainable agriculture. In Sociology, Organic Farming, Climate Change and Soil Science. Springer, Netherlands. p. 19–40.

Knowler, D. and Bradshaw, B. 2007. Farmers' adoption of conservation agriculture: A review and synthesis of recent research. Food Policy 32(1):25–48.

Koontz, T.M. and Johnson, E.M. 2004. One size does not fit all: Matching breadth of stakeholder participation to watershed group accomplishments. Policy Sciences 37(2):185–204.

Kroma, M.M. 2006. Organic farmer networks: Facilitating learning and innovation for sustainable agriculture. Journal of Sustainable Agriculture 28(4):5–28.

Lawless, G.M. 1999. The Farmer-Food Buyer Dialogue Project (No. 13). University of Wisconsin Center for Cooperatives, University of Wisconsin-Madison. Available at Web site http://www.uwcc.wisc.edu/info/ffbuyer/toc.html (verified 30 April 2013).

Lemon, M. and Park, J. 1993. Elicitation of farming agendas in a complex environment. Journal of Rural Studies 9(4): 405–410.

Lynne, G.D., Shonkwiler, J.S., and Rola, L.R. 1988. Attitudes and farmer conservation behavior. American Journal of Agricultural Economics 70(1):12–19.

Martinez, S., Hand, M., Da Pra, M., Pollack, S., Ralston, K., Smith, T., Vogel, S., Clark, S., Lohr, L., Low, S., and Newman, C. 2010. Local Food Systems: Concepts, Impacts, and Issues. USDA ERS. Economic Research Report Number 97. Available at Web site http://www.ers.usda.gov/media/122868/err97_1_.pdf (verified March 2016).

Meter, K. 2012. Hoosier Farmer? Emergent Food Systems in Indiana. Crossroads Resource Center, Minneapolis, Minnesota. Available at Web site http://www.crcworks.org/infood.pdf (verified March 2013).

Mishra, A.K., El-Osta, H.S., Morehart, M.J., Johnson, J.D., and Hopkins, J.W. 2002. Income, wealth, and the economic well-being of farm households. Agricultural Economic Report, 812.

National Commission on Small Farms (NCSF). 1998. A time to act: A report of the USDA National Commission on Small Farms. U.S. Department of Agriculture, Washington, DC. Available at Web site http://www.iatp.org/files/258_2_106175.pdf (verified May 2012).

Pannell, D.J. 1999. Social and economic challenges in the development of complex farming systems. Agroforestry Systems 45:393–409.

Petrzelka, P., Korsching, P.F., and Malia, J.E. 1996. Farmers' attitudes and behavior toward sustainable agriculture. Journal of Environmental Education 28(1):38–44.

Pimentel, D., Hepperly, P., Hanson, J., Douds, D., and Seidel, R. 2005. Environmental, energetic, and economic comparisons of organic and conventional farming systems. BioScience 55(7):573–582.

Prokopy, L.S., Floress, K., Klotthor-Weinkauf, D., and Baumgart-Getz, A. 2008. Determinants of agricultural best management practice adoption: Evidence from the literature. Journal of Soil and Water Conservation 63(5):300–311.

Reimer, A.P., Thompson, A.W., and Prokopy, L.S. 2012. The multi-dimensional nature of environmental attitudes among farmers in Indiana: Implications for conservation adoption. Agriculture and Human Values 29(1):29–40.

Riedl, B.M. 2007. How Farm Subsidies Harm Taxpayers, Consumers, and Farmers, Too. Available at Web site http://www.heritage.org/research/reports/2007/06/how-farm-subsidies-harm-taxpayers-consumers-and-farmers-too (verified March 2016).

Ryan, R.L., Erickson, D.L., and De Young, R. 2003. Farmers' motivations for adopting conservation practices along riparian zones in a mid-western agricultural watershed. Journal of Environmental Planning and Management 46(1):19–37.

Salamon, S., Farnsworth, R.L., Bullock, D.G., and Yusuf, R. 1997. Family factors affecting adoption of sustainable farming systems. Journal of Soil and Water Conservation 52(4):265–271.

Sassenrath, G.F., Halloran, J.M., Archer, D., Raper, R.L., Hendrickson, J., Vadas, P., and Hanson, J. 2010. Drivers impacting the adoption of sustainable agricultural management practices and production systems of the Northeast and Southeast United States. Journal of Sustainable Agriculture 34(6):680–702.

Soule, M.J., Tegene, A., and Wiebe, K.D. 2000. Land tenure and the adoption of conservation practices. American Journal of Agricultural Economics 82(4):993–1005.

Sullivan, S., McCann, E., De Young, R., and Erickson, D. 1996. Farmers' attitudes about farming and the environment: A survey of conventional and organic farmers. Journal of Agricultural and Environmental Ethics 9(2):123–143.

Tavernier, E.M. and Tolomeo, V. 2004. Farm typology and sustainable agriculture: Does size matter? Journal of Sustainable Agriculture 24(2):33–46.

Thilmany, D., Bond, C.A., and Bond, J.K. 2008. Going local: Exploring consumer behavior and motivations for direct food purchases. American Journal of Agricultural Economics 90(5):1303–1309.

Tilman, D., Cassman, K.G., Matson, P.A., Naylor, R., and Polasky, S. 2002. Agricultural sustainability and intensive production practices. Nature 418(6898):671–677.

U.S. Census Bureau. 2013. Small Area Income and Poverty Estimates (SAIPE) Program. 2013 Poverty and Median Household Income Estimates - Counties, States, and National. Available at Web site https://www.census.gov/did/www/saipe/data/statecounty/data/2013.html.

U.S. Census Bureau. 2014. 2010–2014 American Community Survey 5-Year Estimates on Educational Attainment. Available at Web site http://factfinder.census.gov.

United States Department of Agriculture Economic Research Service. 2012. County-level Data Sets. Available at Web site http://www.ers.usda.gov/data-products/county-level-data-sets/poverty.aspx?reportPath=/State_Fact_Sheets/PovertyReport&fips_st=18 (verified March 2016).

USDA NASS. 2012. 2012 Census of Agriculture. Available at Web site https://www.agcensus.usda.gov/ (verified March 2016).

Westra, J.V. and Olson, K.D. 1997. Farmers' Decision Processes and Adoption of Conservation Tillage (No. 13380). University of Minnesota, Department of Applied Economics, St. Paul, MN.

Zwickle, S., Wilson, R., Lillard, P., and Doohan, D. 2012. Organic Weed Management in Ohio and Indiana: A Report on the Knowledge, Perceptions, and Experiences of Farmers and Experts. Environmental Social Sciences Lab. College of Food, Agricultural, and Environmental Sciences. School of Environment and Natural Resources. Ohio State University, Columbus, OH.