

PERCEPTIONS OF A NRCS PROGRAM TO REMEDIATE DECOMMISSIONED POULTRY
HOUSES IN NORTHWESTERN ARKANSAS

A Thesis Presented to
The Faculty of the Graduate School
At The University of Missouri

In Partial Fulfillment
of the Requirements for the Degree in
Master of Science

By
JACOB WORSHAM
Dr. Charles Nilon, Thesis Supervisor

May 2023

PERCEPTIONS OF A NRCS PROGRAM TO REMEDIATE DECOMMISSIONED POULTRY
HOUSES IN NORTHWESTERN ARKANSAS

presented by Jacob Worsham, a candidate for the degree of Master of Science.

The following hereby certify that, in their opinion, this thesis is worthy of acceptance in partial fulfillment of the requirements for the degree of Master of Science at the University of Missouri.

Professor Charles H. Nilon, PhD

Professor Sonja Wilhelm Stanis, PhD

Assistant Professor Robin Rotman, JD

Acknowledgements

I would like to thank everyone who contributed their time and energy to the completion of this thesis. I could not have done it without the support and expertise of my advisor, Dr. Charles Nilon, who helped me face the obstacles that came with this challenging project. His recruitment of me for this changed the course of my life, and I am very grateful for him. I would also like to thank the project's leader, Dr. Susan Rupp of Enviroscapes Ecological Consulting, whose passion and drive for this project helped me develop my own while working on my small portion of her project. Everyone on the "Practice 360" team – including Dr. Dirk Philipp from the University of Arkansas, and Dr. Tamberly Conway from Conservation Conexions, LLC. -- helped me think through this project during our many conversations. Additionally, the contributions and teachings of my committee members, Robin Rotman, JD and Sonja Wilhelm Stanis, PhD, helped me rethink how I wanted to present my research, both within this thesis and at The Wildlife Society's annual conference in Spokane, Washington. I would also like to thank the Arkansas Natural Resource Conservation Service for awarding this project funds through a Conservation Innovation Grant (CIG), and again to Dr. Rupp for diligently applying for this grant. Lastly, I would like to thank my family and friends for supporting me and putting up with my anxiety about this project, helping me turn it into something to be proud of.

Table of Contents

List of Tables and Figures.....	v
Abstract.....	vi
Introduction.....	1
Background.....	2
o Environmental Concerns.....	2
o Practice 360.....	3
o Environmental Quality Incentives Program.....	4
o Arkansas and the Poultry Industry.....	5
o Conservation Innovation Grant.....	6
Literature Review.....	7
o Financial Costs or Financial Gain.....	9
o Complexity of Conservation Programs and Burdensome Requirements.....	10
o Concern over Environmental Issues.....	11
o Government Interference.....	13
o Conceptual Framework.....	14
o Summary of Literature Review and Research Need	16
Methods.....	18
o Research Questions.....	18
o Study Area and Participants.....	19
o Research Design and Larger Project.....	20
o Survey.....	22
o Interview.....	23
o Content Analysis.....	24
o Data Analysis.....	25
Results.....	26
o Current Uses of Decommissioned Barns.....	27
o Participation in Practice 360.....	31
o Concern over Environmental Issues.....	33
o Relationships with Poultry Integrators.....	37
Discussion.....	40
o Research Questions and Ties to Literature Review.....	40
o Ties to Conceptual Framework.....	44
o Limitations.....	47
o Future Research.....	48
o List of Recommendations to Arkansas NRCS.....	49
Conclusion.....	51
References.....	53
Appendix.....	58

List of Tables and Figures

Figure 1. The Theory of Planned Behavior.....	16
Table 1. Summary of Data Collected.....	25
Table 2. Themes and Codes.....	27
Figure 2. Simplified Model of the Theory of Planned Behavior.....	44

Abstract

Out-of-use poultry houses have accumulated in Northwestern Arkansas, home to the headquarters of many large poultry operations such as Tyson, Inc. These out-of-use structures have been recognized as environmental hazards to the surrounding soils and groundwater reserves. A Natural Resource Conservation Service (NRCS) conservation program called Practice 360 aims to aid farmers in the removal and remediation of these barns and soils, yet has never been used within the state of Arkansas. A qualitative perception study of the area's local farmers and natural resource professionals is the goal of this research, using the Theory of Planned Behavior to frame the variety of ways individuals make voluntary decisions for themselves and their poultry barns, such as whether or not to remove their poultry barn and/or to participate in a conservation program to do so. The results of this study reveal that farmers' decisions regarding their out-of-use barns are affected by a lack of practical and rational incentives for removal of the barns, a lack of knowledge of Practice 360, varying levels of environmental concern, and the historical, social, and political contexts of the barns, including the farmers' relationships with their poultry integrators.

Introduction

Arkansas consistently ranks near the top of the nation for state poultry production with a multi-billion dollar operation that produces about 1.1 billion birds annually (USDA NASS 2017). Large poultry companies headquartered in Arkansas, such as Tyson Foods, Inc. and George's Inc., often follow a vertical integration business model which contracts with local farmers in the area to raise chickens. The companies supply farmers with birds and feed but expect them to invest in their own poultry houses (Boehler, 2010). Due to increased product quantity and quality demands, poultry integrators often will require their contracted growers to make expensive and unsubsidized upgrades to their poultry equipment, causing many local growers to withdraw from the poultry business altogether (Vulkina and Leegomonchai, 2006). Due to local farmers leaving the poultry industry for various reasons, we estimate for there to be hundreds to thousands of out-of-use poultry barns in Northwestern Arkansas alone. Not only do these barns take up space that otherwise could be economically rewarding to the farmer, they also present environmental challenges in the form of soil and groundwater contamination resulting from the leftover chicken manure and litter (Boehler, 2010).

The Natural Resource Conservation Service (NRCS) has developed standards called "Practice 360 – Waste Facility Closure," which outline steps for removing out-of-use poultry barns and remediating the soil beneath (NRCS Closure of Waste Impoundments, 2011). Farmers can apply for the Environmental Quality Incentives Program (EQIP), which helps cover up to 75-90% of the costs associated with the program (USDA EQIP 2019). However, according to the Arkansas NRCS, this conservation program never has been utilized by a farmer within the state. An examination of the conditions that have led to the under-utilization of this conservation program is the subject of this thesis, using qualitative research methods to survey and interview

farmers and natural resource professionals in Northwest Arkansas. The larger goals of this research project include understanding the incentives and disincentives local farmers have for participating in a conservation program to remove their out-of-use poultry barns, as well as the conditions that led them to leave the poultry industry in the first place. Additionally, the researcher will provide a list of recommendations to the Arkansas NRCS for more effective utilization of this program moving forward.

Background

Environmental Concerns

Due to an increased demand for poultry, egg, and meat products, the poultry industry is one of the fastest-growing agricultural-based industries in the world, posing an environmental crisis in the form of the large-scale accumulation of wastes from the poultry manure and litter (Bolan et al., 2010; Alabadian and Adeoye, 2009). The poultry industry naturally has been concentrated geographically, with the hatcheries and processing plants all located within close proximity to the growers in order to minimize transportation costs; however, such geographic concentration can pose environmental concerns due to the simultaneous concentration of poultry litter (Boehler, 2010). Poultry litter typically contains the bird's bedding material, feathers, manure, and leftover feed, which also contain nutrients, trace elements, pesticide residues, microorganisms, as well as antibiotics and coccidiostats given to the live birds (Bolan et al., 2010). Additionally, poultry integrators typically shift the responsibility for waste management and dead bird disposal onto the growers themselves (Taylor and Domina, 2010). Therefore, local growers are forced to deal with the environmental ramifications of their involvement with the poultry industry, even after they have left the business.

Poultry houses accrue a substantial amount of nutrient-laden manure and litter which is typically land-spread onto agricultural lands, as poultry waste can be a valuable source of plant nutrients (Bolan et al., 2010). However, if over-applied, poultry waste can cause nitrate and phosphorus leaching into the surrounding soils and groundwater, along with numerous other nutrients and pollutants, leading to environmental issues such as the eutrophication of water bodies, phosphorus runoff, production of phytotoxic substances, spread of pathogens, air pollution, and the emission of greenhouse gases (Kelleher et al., 2002). As individually-contracted poultry barns create non-point sources of pollution with excessive chicken litter, it is much more difficult for state and federal water quality laws, such as the Clean Water Act and its National Pollutant Discharge Elimination System, to manage which pollutants end up in water bodies (Salzman and Thompson, 2019, p. 190). Even when poultry houses are out-of-use, the soils beneath and surrounding them have limited usefulness for years due to their high salt levels, compaction, and poor physical properties that limit plant growth, such as the heavy nutrient load of phosphorus, nitrogen, and potassium, a problem exacerbated by precipitation events (Alabadian and Adeoye, 2009).

Practice 360

Due in part to the numbers of out-of-use poultry houses across the nation, the Natural Resource Conservation Service (NRCS) has developed a set of standards called “Practice 360 – Waste Facility Closure,” which is designed to remediate a footprint of a 40’ x 400’ out-of-use poultry house over an estimated 5-year lifespan of practice for both the landowner and the NRCS (NRCS Closure of Waste Impoundments, 2011). The practice applies to agricultural waste storage facilities, including those that have been stored at the animal production area, such as

poultry houses, that are to be permanently closed or converted to another use, and does not apply to sites that are contaminated by hazardous wastes which would be subject by law to specific state or federal clean-up procedures (NRCS Conservation Practice Standard, 2018; Salzman and Thompson, 2019, p. 252). The process begins with the removal of the house itself and the disposal of its contents in an environmentally-sound manner, followed by the removal of the nutrient-dense, polluted soils in accordance with a nutrient management plan (NRCS Closure of Waste Impoundments, 2011). Woody materials are mixed into the remaining soil in order to sequester nitrogen, with clean soil then added and vegetation planted, improving the soil quality, controlling erosion, and enhancing the landscape (NRCS Closure of Waste Impoundments, 2011). According to the Arkansas NRCS, Practice 360 has never been used by a farmer within the state of Arkansas, despite the large presence of the poultry industry in this state.

Environmental Quality Incentives Program

As costs to remove old poultry barns can reach tens of thousands of dollars, farmers interested in Practice 360 can apply to the Environmental Quality Incentives Program (EQIP), a program which provides financial assistance to landowners when attempting to address natural resource concerns (USDA EQIP, 2019; NRCS Closure of Waste Impoundments, 2011). EQIP shares up to 75% of the costs created for the farmers, and provides both financial help and one-on-one assistance throughout the process (USDA EQIP, 2019). Additionally, increased and advanced payments are available for Historically Underserved Producers, with up to 90% of the average cost covered for these populations (USDA EQIP, 2019). If a farmer were to use Practice 360 and apply for EQIP cost-share assistance, they would be able to remove their out-of-use

poultry barn, use the land for another economically-rewarding purpose, and contribute positively to their local environment, all for a much lower cost.

Arkansas and the Poultry Industry

The Northwestern counties of Arkansas are the home to the headquarters of many large, multi-million-dollar poultry companies, such as Tyson, Inc., George's, Inc., and Simmons Foods, Inc. These corporations are integrated vertically and referred to as "integrators" when they contract local farmers in the area to raise chickens for them, providing the farmers with the chickens and the feed, but asking for the growers to invest in their own poultry houses and equipment which must meet the integrator's specifications (Vukina and Leegomonchai, 2006; Taylor and Domina, 2010). Due to the geographic concentration of the poultry industry and rigid broiler contracts, growers typically have few integrators in their area from which to choose and have a difficult time switching integrators, leaving the growers at the mercy of their integrator's regulations and requirements with little room to negotiate their own contracts (Boehler, 2010; Vukina and Leegomonchai, 2006). Integrators typically directly oversee their growers' progress, sending a service technician weekly to check on the growers' work and to monitor potential wastes; however, growers are responsible for the health and life of their own birds, only being paid for those birds that are returned at slaughter weight (Taylor and Domina, 2010).

The short term nature of the contractual relationship between the grower and the integrator, typically about seven weeks per single flock grow-outs, provides ample opportunities for the integrator to ask for modifications or upgrades to the grower's current poultry equipment in efforts to increase their profits (Roth, 2002). Examples of upgrades include the additions of blackout houses, upgraded temperature controls, concrete floors, or increased space, to be

incorporated before they renew the contract for the next flock, creating a financial headache for the grower if they wish to continue in the business, on top of their initial investment debts (Boehler, 2010; Roth, 2002). The Packers and Stockyards Act of 1921 (and its subsequent amendments in 1958, 1987, and 2002) provide some protections for poultry growers that increases contract transparency, with the U.S. Department of Agriculture enforcing that integrators provide all the information that growers need to make business decisions (Fitzgerald, 2010; Packyards and Stockyards Act Fact Sheet, 2020). However, the nature of the integrator-grower relationship retains an imbalance of power, with many contracts only guaranteeing a single flock with the grower despite their significant initial investment in their poultry house (Vukina and Leegomonchai, 2006; Roth, 2002). Additionally, poultry integrators are not required to monitor the agricultural wastes created within their independently-contracted farmer's barns, as other industries producing solid and hazardous waste are through laws such as The Resource Conservation and Recovery Act (RCRA) (Salzman and Thompson, 2019, p. 235). Rather, agricultural wastes are generally excluded from these federal regulations due to their ability to be returned to the soil as a fertilizer, and poultry integrators are not required to aid their growers in the removal or remediation (Identification and Listing of Hazardous Waste, 2023).

Conservation Innovation Grant

This thesis is funded as a smaller part of a larger project led by Dr. Susan P. Rupp, a Certified Wildlife Biologist of Enviroscapes Ecological Consulting, LLC., based in Gravette, Arkansas. The larger project led by Dr. Rupp is funded by a Conservation Innovation Grant (CIG), a competitive grant that awards both private and public sector innovation in resource conservation to inspire creative problem solving in improvements to water quality, soil health,

and wildlife habitat (USDA CIG, 2019). The larger project, led by Dr. Rupp, had goals of utilizing Practice 360 on a local farmer's poultry house and land in order to demonstrate the positive benefits of poultry house removal and soil remediation, as well as to test the effectiveness of various soil amendments on the soil's productivity post-remediation. Field days were planned on the remediation site to engage local community members and farmers in the environmental issues pertaining to the conservation practice and to introduce them to the idea and benefits of Practice 360, as it has never been used in the area before. This goal of this thesis within this larger project was to conduct a perception study gauging how local farmers and landowners think about their out-of-use poultry barns, as well as their perceptions of Practice 360 before, during, and after the planned field days.

Literature Review

Research on farmer perceptions of out-of-use poultry houses, or specific conservation programs related to them, is extremely limited. Therefore, the focus of this literature review will be on farmers' perceptions of the incentives and disincentives to participating in conservation programs in general, as this has been the subject of much research over the past few decades. The cumulative effects of agricultural practices and pollution has demonstrated the need for private land conservation and best management practices across the United States, leading to the rise in incentive-based conservation programs led by the United States Department of Agriculture (USDA) and the Natural Resources Conservation Service (NRCS); however, many of these private-land conservation programs are dependent on the intentional choices of independent landowners and farmers to implement them. An example of this is the Conservation Reserve Program (CRP), the largest private-land conservation program in the United States,

which provides payments to farmers to take land that is environmentally sensitive or highly erodible out of production for ten or more years (Stubbs, 2014). Providing numerous benefits to both the farmer and the environment, this program has seen substantial enrollment since it was enacted, with average annual rental payments reaching \$1.7 billion dollars for the years 2015 to 2019 (Pratt and Wallander, 2022). However, smaller and more specific conservation programs have a harder time gaining word-of-mouth recognition within farming networks, as well as accruing willing participants; therefore, research on landowner perceptions of conservation programs within the framework of psychological theories of choice and behavior is becoming increasingly relevant within human dimensions studies (Willcox and Giuliano, 2011; Beedell and Rehman, 2000).

New and smaller conservation programs need to be rooted in a recognition of farmer's attitudes as well as their individual circumstances for effective utilization (Ahnström et al., 2009). In this way, the results from the literature can often contain a great deal of contradictions, as the attitudes of farmers are not static and differ among individuals; therefore, generalizations about farmer preferences and perceptions need to accommodate for both the diversity of viewpoints, as well as different disciplines such as the social sciences and economics (Ahnström et al. 2009; Senger et al., 2017). This literature review will summarize the existing literature on farmer's perceptions of conservation programs, including the motivations and barriers for voluntary participation, and will end with an examination of the conceptual framework that will guide this research.

Financial Costs or Financial Gain

The first constraint or barrier to participation often is the financial cost of participating in such an endeavor; the costs involved with voluntary participation can be the first and final straw that determines a farmer's adoption of a conservation program, especially if they are financially constrained (Reimer et al., 2012). Financial risk is an inevitable vulnerability for farmers when they are entering a long-term conservation program contract, and varying levels of market uncertainty as well as future economic conditions might persuade a farmer to hold back, even if their situation is satisfactory in the present moment (Greiner and Gregg, 2011; Ramsey et al., 2019). Consideration of risk plays an important and unique role in farmers' on-farm conservation decisions, and conservation programs often hold a sizable amount of risk in their monetary costs and potential to limit production (Ramsey et al., 2019). In contrast, studies on conservation programs have found that financial benefits are most effective in alleviating constraints to the adoption of conservation practices, and can be a positive incentive for voluntary participation, shown through the success of the Conservation Reserve Program (Greiner and Gregg, 2011; Stubbs, 2014). All farmers must take economics into account, with some farmers viewing their operation solely as a business, interested only in the financial prospects of what they do with their land; however, this viewpoint is rather limited and simplistic, as many farmers take their stewardship role very seriously and can be interested simultaneously in economic gain and their environmental impact (Reimer et al., 2012; Chouinard et al., 2008). Appealing to the profit potentials, even if they are in the long-term, in addition to the environmental and stewardship motivations might be the best chance to increase voluntary participation in a conservation program (Chouinard et al., 2008).

Complexity of Conservation Programs and Burdensome Requirements

Smaller conservation programs that do not offer an outright monetary incentive often struggle to accrue voluntary participants, which limits the word-of-mouth spread through farming communities about the positive benefits of the program (Reimer and Prokopy, 2014). In many cases, farmers might not know that some programs exist (Wilcox and Giuliano, 2011). Within the current arrangement of programs, there is a complex and very full menu of options for the landowner to consider, including a plethora of programs that a farmer could enact on their land with their local natural resource agencies, and it is up to them to decide which one seems the most important or most incentivizing (Kumar Chaudhary et al., 2017). Even if a farmer is aware of the names and acronyms for all of the various conservation programs available to them, each specific program has a wide variety of practices and logistical complexities, including rigid structures and timelines, of which a farmer might not be aware or fond of (Reimer and Prokopy, 2014). A multitude of program choices might be overwhelming to the landowner, and can lend itself towards an opinion of stepping away from the idea of conservation altogether, especially if a long-term contract is involved (Olenik et al., 2005). In fact, research on barriers to farmer participation has found that a lack of time is a major disincentive that can even supersede interest in a conservation program, and short-term contracts are preferred (Reimer et al., 2012; Olenik et al., 2005). The time and energy that are required to be involved with a conservation program might not fit within their busy lives, even if the desired outcome of which is of interest to the landowner.

The minutia of the process, including lengthy application processes, extensive paperwork, phone calls, and scheduling conflicts, might dissuade farmers from participation (Reimer and Prokopy, 2014). If conservation schemes were designed to include farm and farmer-

specific solutions, rather than specific guidelines for what needs to be done, more farmers might feel empowered by a sense of stewardship to make decisions and modifications to their own conservation plans, making the laborious paperwork more goal-oriented and “worth it” (Ahnström et al., 2009). The relationship between the agency involved and the farmer is often the key to a program’s success; a relationship of mutual understanding, respect, and exchanging of expertise should be the priority of a program, which simultaneously would meet the needs of the farmer, the agency, and wildlife (Willcox and Giuliano, 2011). If an agency takes the step intentionally to open a conversation with the local farmers and clarify the complexities of conservation programs, farmers could have their concerns met and trust could form (Armstrong et al., 2011). Once a farmer participates in a conservation program, they are more likely to do so again; therefore, the initial leap to participation is what is aided by short-term contracts, flexible arrangements, and farmer-specific aid and assistance (Willcox and Giuliano, 2011; Olenik et al., 2005; Ahnström et al., 2009).

Concern over Environmental Issues

Inherently, there is a large amount of variety in the environmental concerns of farmers and landowners across the country and globe (Reimer et al., 2012). This level of concern over environmental issues, on both small and large scales, can prove to be either a motivation or a disincentive for voluntary participation in conservation programs (Conner et al., 2016). Those who have more exposure to information about environmental issues, through the news, social circles, or local natural resource agencies, are more likely to participate in a conservation program, especially if these problems are observable or potentially could cause a personal impact (Raedeke et al., 2001). This means that a farmer who has a greater sense of their own impact on

their local natural resources, as well as a sense of personal efficacy to be a part of the solution to the issues, is more likely to participate in a conservation program (Raedeke et al., 2001; Reimer et al., 2012). The opposite of this is also true, as farmers who believe that their own farms' environmental impacts are not very large, or who do not have a sense that their own personal actions matter on a large scale, are less likely to adopt a conservation program on their farms (Conner et al., 2016). However, this is not to say that environmental education and interest in conservation programs are directly correlated, as many farmers are aware and concerned about environmental issues, yet simultaneously choose to not participate in conservation practices for many other factors, including their economic situation or perceived efficacy (Ahnström et al., 2009). This is often the case with local, smaller operation farms whose environmental impacts are not as widely felt as those of larger agricultural operations (Reimer and Prokopy, 2014). Additionally, larger farming operations generally are thought to be more concerned with profits than their environmental impact (Raedeke et al., 2001).

Many farmers are driven in their lives and careers by a strong stewardship ethic for their lands as well as the planet at large, which might prove to be a motivating factor for their consideration of some conservation practices (Greiner and Gregg, 2011). Engaging in stewardship activity by implementing a conservation program might foster personal satisfaction as well as social recognition within farming communities (Chouinard et al., 2008). Farmers who feel a sense of responsibility for the preservation of the Earth's natural resources for future generations might feel compelled to do what they can, even if that means detracting from their own personal profits or productivity (Chouinard et al., 2008; Reimer et al., 2012). Farmers cannot narrowly and exclusively be defined by desires of self-interest; like many humans, they are driven by the welfare of others, such as those in their own local communities and in the

natural world (Floress et al., 2017). However, even if a farmer feels a sense of stewardship or responsibility for the Earth, this does not mean they will participate in a conservation program to do so – farmers are capable of implementing their own conservation practices and ideas and might be avoiding a government program for another reason (Armstrong et al., 2011).

Government Interference

A farmer's risk-perception for participating in a conservation program goes beyond the financial, personal or environmental impact of such a decision – for many farmers, risk is inherent in the decision to cooperate with a government entity such as the USDA or NRCS (Kraft et al., 1996; Ramsey et al., 2019). If farmers feel negatively about the involvement of the government on their land, they are less likely to participate in a conservation program (Kraft et al., 1996). Many farmers fear a loss of control over their farm, land, or production outputs when they agree to have their land be regulated over a long period of time (Ahnström et al., 2009; Olenik et al., 2005). Involvement in a conservation program can put the farmer into a vulnerable position, one in which they are uncertain about legalities and regulations. In order to increase trust levels, agencies should be up-front and involve the farmer throughout the decision-making processes and the implementation of the program (Ramsey et al., 2019; Raedeke et al., 2001). Engagement with local qualifying farmers and landowners is key to implement conservation programs, and considering the unique circumstances and concerns of each individual is the first step to lowering their resentment toward government agencies, allowing a conversation to open (Armstrong et al., 2011). Farmer feedback and the implementation of these suggestions are crucial to building trust. Allowing the program to be more farmer-specific and flexible allows for the conservation program to fit within a farmer's life and routine, which aids in the

implementation, management, and final results of the practice (Armstrong et al., 2011; Ahnström et al., 2009). However, even if an agency makes every effort to accommodate farmers' needs, there are still those who will not participate due to a general indifference to the program or a wish not to be involved with a government entity (Reimer and Prokopy, 2014).

An individual's risk assessment for participating in a conservation program might extend backwards as well as forwards, as individuals cope with their unique individual circumstances and life-situations that have accumulated in their current position (Ramsey et al., 2019; Selinske et al., 2015). The history of the land, as well as the individual's feelings about the history of their land, play into decisions they are willing to make about the land, including the political, social, and personal happenings on or around the land in question within a particular conservation program (Drescher et al., 2022). People's emotional connection with land can be positive, such as with familial ties and historical significance, or negative, such as with broken farming contracts, and could influence what they want to do with the land (Drescher et al., 2022; Vulkina and Leegomonchai, 2006).

Conceptual Framework

Participation in a conservation program is a voluntary choice for a farmer or landowner, a choice that will undoubtedly add time commitments, work, and stress to their already busy lives; therefore, in order to make a decision to participate, a level of motivation must be present within them (Reimer et al., 2012). Research studies on farmers' incentives and disincentives to participation in nature conservation programs have utilized different socio-psychological frameworks of motivation, risk, behavior, and choice (Senger et al., 2017; Borges et al., 2014; Beedell and Rehman, 2000; Ramsey et al., 2019). Among these, a popular choice for researchers

in the past three decades has been the Theory of Planned Behavior (TPB), which has been utilized in a wide variety of research disciplines to provide a better understanding of farmers' decisions and adoption behaviors, including within conservation (Beedell and Rehman, 2000), soil conservation (Wauters et al., 2010), and land use practices (Poppenborg and Koellner, 2012). This theory, derived from the Theory of Reasoned Action by Icek Ajzen in the 1980s, outlines a set of personal elements that lead to an individual's intention, and then to a specific behavior or choice, and is used to explain situations wherein people are able to make voluntary choices and exercise their own discretion or self-control, and has been applied to the adoption of a voluntary conservation practices (Ajzen, 1991; Kumar Chaudhary et al., 2017). Although TPB is typically utilized within quantitative studies, assigning numerical data to particular elements of decision-making (Beedell and Rehman, 2000; Senger et al., 2017), the theory has also been utilized within qualitative studies as a guiding framework (Hall et al., 2019).

A key concept in TPB is behavioral intent, or that an individual's intentions are influenced by the likelihood that the behavior will result in a specific outcome, and the benefits or risks of that outcome (Ajzen et al., 2018). A person's intention within TPB originates from three psychological constructs of *attitude* (one's perceived positive or negative consequences of the behavior), *subjective norms* (one's social, cultural, or group beliefs of the behavior), and *perceived behavioral control* (one's perception of how capable they are of performing the behavior) (Ajzen, 1991; Borges et al., 2014). These constructs are formed by an individual's beliefs, which are uniquely constructed from a wide variety of personal and societal background factors (see Figure 1) (Borges et al., 2014). Any methodology attempting to understand why farmers behave the way they do need to take into account the feelings, motives and goals of the

farmers themselves, as well as the structural and external factors and constraints on their actions (Beedell and Rehman, 2000).

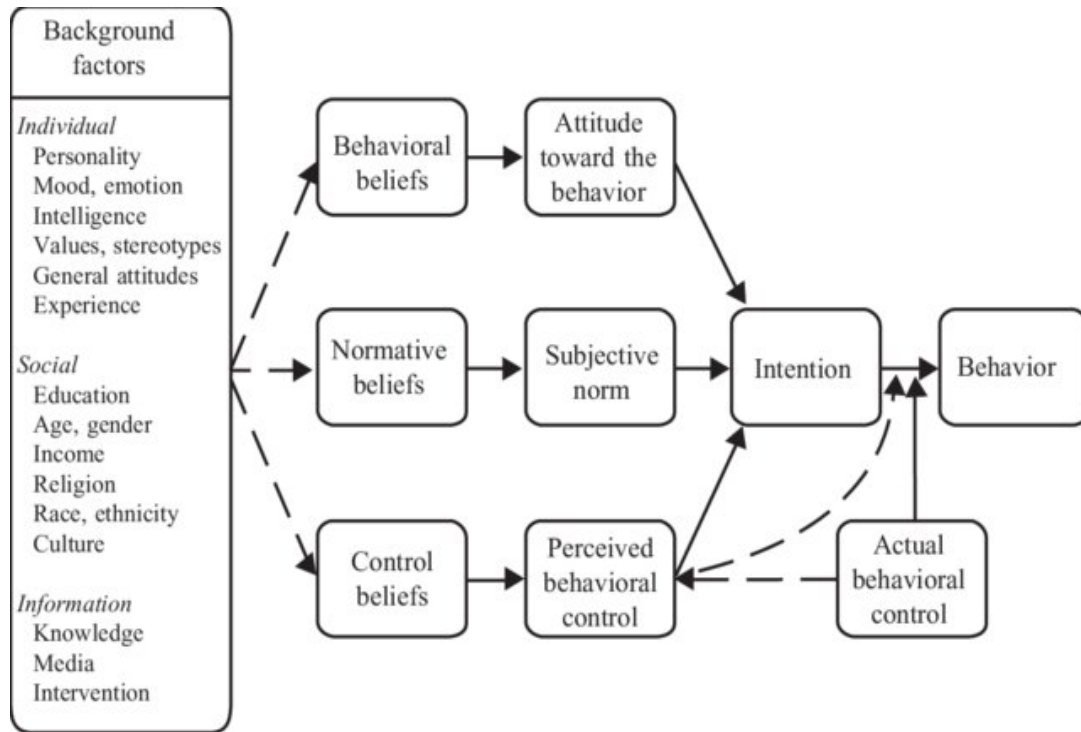


Figure 1. The Theory of Planned Behavior (Ajzen et al., 2018).

Summary and Research Need

From a review of the literature, the main barriers to adopting a conservation program include the financial strain of such an endeavor (Greiner and Gregg, 2011), the complexity of conservation programs and the burdensome requirements of participation (Ahnström et al., 2009; Reimer and Prokopy, 2014), environmental concerns (Conner et al., 2016), and a general disdain for government interference (Kraft et al., 1996). On the other hand, major motivators for participating in a conservation program include a monetary incentive (Chouinard et al., 2008), a short-term contract and simplified processes (Olenik et al., 2005), previous experience or word-

of-mouth success stories (Wilcox and Giuliano, 2011), farm-specific attention and solutions (Ahnström et al., 2009), as well as an appeal to a sense of personal stewardship and efficacy (Raedeke et al., 2001). Even if a conservation program cannot match the success of programs like the Conservation Reserve Program by providing a sizeable monetary incentive, it still can appeal to a landowner's sense of stewardship, aesthetics, environmental impact, or personal enjoyment, among many things other than profit (Stubbs, 2014; Ramsey et. al, 2019).

While many studies have used a socio-psychological framework, such as TPB, to evaluate farmer's conservation adoption preferences (Senger et al., 2017; Borges et al., 2014), research is limited on these behaviors within the poultry industry, and specifically on the incentives and disincentives to participation in a poultry-house remediation program such as NRCS Practice 360. Additionally, the voices of natural resource professionals, who work with their local farmers and are in charge of implementing these conservation programs, are often left out of these studies. For Practice 360, a program which has never been used within the state of Arkansas, word-of-mouth spread of the potential benefits has been limited, and a lack of knowledge of the program might be a major barrier to participation (Wilcox and Giuliano, 2011). An evaluation of how barriers and motivations found within the literature might play out within this specific poultry-house context makes an interesting case for new research.

Using TPB to frame this research will allow the researcher to examine how an individual's beliefs and feelings about their out-of-use poultry barns impacts their decisions to participate in Practice 360. Additionally, TPB allows for an examination of how background structural and societal factors influence farmers' beliefs about a particular decision, which could be used to address another gap within this particular niche of research; that is, how larger entities (such as poultry integrators) influence the on-farm conservation decisions of local farmers. In the

particular case of local farmers who feel forced out of the poultry industry due to demanding integrators and contract negotiations, TPB could be used to evaluate how this influence, coupled with other barriers, might create additional disincentives to voluntary participation. Also, additional research as to which motivators might outweigh these new disincentives is of particular interest after this literature review.

Methods

Research Questions

Following a review of the issues facing the Arkansas NRCS in regards to decommissioned poultry houses within the larger, CIG-funded project, as well as a review of the existing research concerning farmer perceptions of conservation programs, a list of research questions have been developed to move this project forward. The main research question being asked is: What are the perceptions of Northwest Arkansas farmers and local natural resource professionals on out-of-use poultry barns? This question is being asked within the context of 4 sub-questions:

1. What are farmers' and local natural resource professionals' perceptions of out-of-use poultry barns *within the context of current uses for the barn and other potential future uses for the land and/or barn?*
2. What are farmers' and local natural resource professionals' perceptions of out-of-use poultry barns *within the context of their willingness to participate in a NRCS conservation program to remove them?*
3. What are farmers' and local natural resource professionals' perceptions of out-of-use poultry barns *within the context of the environmental impact of the houses?*

4. What are farmers' and local natural resource professionals' perceptions of out-of-use poultry barns *within the context of their relationship to the poultry integrators in the area?*

Study Area and Participants

This study is being conducted in the Northwestern counties of Arkansas, in Benton, Carrol, Crawford, Franklin, Madison, Sebastian and Washington counties, due to the relevance of these counties as housing the headquarters of many large poultry companies including Tyson, Inc., George's, Inc., and Simmons Prepared Foods, Inc. Additionally, these areas have been designated as having conservation priority after data-layer analysis of impaired watersheds and out-of-use poultry houses by Dr. Susan Rupp, of Envirosapes Ecological Consulting, LLC. Local farmers and landowners in the area who have out-of-use poultry houses on their lands, who either were or are under contract with a poultry integrator, will be the target population for this study. Additionally, local natural resource professionals who work with local poultry farmers and who are responsible for implementing programs such as Practice 360 will be a supplemental population of research interest, due to the potential of local professionals to contribute a deeper understanding of the complexities of farmer issues (Del Rossi et al., 2021). These local professionals will include employees of the NRCS, such as district conservationists and resource/soil conservationists, as well as extension agents from the University of Arkansas who work with poultry farmers.

Research Design and Larger Project

The perception study within this thesis is a smaller part of a larger project conducted by the Arkansas NRCS and a private Arkansas environmental consulting firm named Enviroscapes Ecological Consulting, LLC. The larger CIG-funded study, led by Dr. Susan Rupp of Enviroscapes Ecological Consulting, had goals of addressing the abundance of out-of-use poultry barns in the area by creating a demonstration site for Practice 360 on a farmer's land. This demonstration site would serve to reassess NRCS Practice 360 by demonstrating the effects of standard woodchips versus novel switchgrass hay/rhizobacteria soil amendments during the soil remediation process of NRCS Practice 360. The larger project proposed would have demonstrated which additions to the soil yielded better results for the soil's chemical, physical and biological properties, as well as for switchgrass plant growth post-remediation over a course of three years. Additionally, the larger project had goals of exploring other "value-added" incentives to participation in Practice 360 by partnering with other areas of conservation need within NW Arkansas, such as using the remediated lands for quail restoration, monarch and pollinator conservation, the protection of endangered karst species, or the development of an Arkansas native seed program, among many other options. Finally, the larger project had plans to conduct multilingual field days to promote and demonstrate the practice remediation site in order to stir local interest in Practice 360, where a majority of this project's interviews and surveys were to be conducted with local farmers. However, despite a thorough and detailed itinerary for this larger project, it was met with consistent setbacks due to the inability to secure a farmer's permission to use their out-of-use barn for the demonstration site. Despite efforts on the part of those in charge of this larger project, a lack of interest in Practice 360 and this project on the part of local farmers and landowners meant many of the plans detailed above were not

implemented. Therefore, the qualitative perception study conducted with this thesis is the only product to come from this larger, CIG-funded project. As a result of the lack of local interest in the demonstration portion of this project, a major intention of this thesis was to determine reasons for the disinterest in Practice 360 and its implications for the state of the poultry industry in Arkansas.

Within hard-to-reach populations, some mixed-methods of research and data collection are required to obtain a full-picture view of the issues and viewpoints, with many studies incorporating both quantitative surveys and qualitative interviews to reach saturation (Reimer and Prokopy, 2014; Willcox and Giuliano, 2011). Although quantitative research methods are often used in studies on farmer's perceptions of conservation programs (Armstrong et al., 2011; Olenick et al., 2005; Borges et al., 2014), qualitative methods can be used to make a less-definitive, but more personal, exploration of a specific issue (Reimer et al., 2012; Creswell and Poth, 2018, p. 45). The perception study conducted within this thesis project utilized qualitative data-collection methods, including a qualitative survey, interviews, and a content analysis to grasp the complex viewpoints surrounding this topic. This qualitative mixed-methods approach was conducted in an attempt to meet the limitations of a small sample size, and as a way to empower local farmers and natural resource professionals to tell this story in their own words. A non-random, snowball sample approach was used to obtain more results for both the survey and interviews, utilizing participants as a way to contact others in their farming community (Sommer and Sommer, 2002, p. 238).

Survey

The first step in obtaining data from this project was an online, Qualtrics-generated survey targeted toward current or former poultry farmers who had an out-of-use barn on their land. The survey contained 13 questions, and was a mix of multiple-choice and open-response questions. The questions asked the farmer some basic demographic information, questions about their history in the poultry business, and a series of perception questions on their out-of-use poultry barn and Practice 360. The first round of the survey was distributed in the summer and fall of 2021 through the University of Arkansas extension agents and the Arkansas Association of Conservation District agents in each individual target county of Arkansas (Benton, Carroll, Washington, Madison, Crawford, Franklin, and Sebastian). These agents sent the survey link to their private emails lists of poultry farmers two separate times over the course of a six-month period. Additionally, the survey was posted to numerous local Facebook groups (“Contract Poultry Growers of Arkansas”, “NW Arkansas Poultry/Farm/Livestock”, “Arkansas Farm and Garden”, “Carroll County Conservation District”) by the researcher and some extension agents three separate times over the course of a one-year period. The survey link was distributed over email to the attendees of a July 2021 Arkansas Farm Bureau poultry division meeting. A flyer was distributed both in-person and over email during an April 2022 meeting of the Missouri-Arkansas Poultry Growers Association. The survey link was advertised on KUAF public radio within a news story covering this research project, airing live in July 2022 and then posted to their website afterward. Additional efforts to advertise the survey included a two-week run of a 30-second radio spot on a local channel (KURM) which aired during a poultry farmer programming segment at noon on weekdays, and flyers posted in local hotspots such as grocery stores, churches, and farm/feed stores. These efforts were non-random and were used as an

attempt to accrue as many voluntary participants as possible, and the data is limited by these data-collection methods. The survey had only 13 local farmer responses collected and fully completed. With this small response, the project shifted to a qualitative approach to focus primarily on interview data, with the survey data already collected used to inform and supplement the interview data qualitatively.

Interviews

Interviews can generate comfortable conversation between the researcher and the participants, leading to an in-depth understanding of the participant's point-of-view and allowing for the interviewee to tell their story in their own words (Sommer and Sommer, 2002, p. 113). As a result, qualitative interviews can add meaningful data to complex issues with small, hard-to-reach populations (Creswell and Poth, 2018, p. 46). Therefore, semi-structured interviews with both local farmers and local natural resource professionals were the main focus of this research project after the survey was unable to yield a large response rate. One farmer interview participant was found after they had completed the survey, while the others were found through snowball sampling methods and help from the University of Arkansas extension agents in Washington and Benton counties. Additional advertising for interviews was conducted during the various efforts to distribute the survey (listed in previous section), with a 25-dollar cash research incentive. Semi-structured telephone interviews were scheduled and arranged with interested participants between the summer of 2021 and the summer of 2022, and interview times ranged from 15 to 30 minutes depending on the interviewee's schedule. After the consent statement was read by the researcher, the interview followed a pre-determined interview guide. Supplementally, a variety of probing sub-questions under each main question were asked based

on the natural flow of the conversation. The content of the interviews included the farmer and/or natural resource professional's reflections on the state of the poultry industry, the issue of out-of-use poultry houses, and the incentives/disincentives to participation in NRCS Practice 360. The interviews were recorded confidentially, and later transcribed by the researcher. In total, four local farmers and eight local natural resource professionals were interviewed.

Content Analysis

In order to supplement the low sample-size from both the survey and interview data collection, a qualitative content analysis of secondary data from Facebook was conducted to get a gauge of the local, online conversations on relevant topics. Facebook is a social media tool utilized by many farmers to connect to their local farming communities directly (Cui, 2014). In Northwestern Arkansas, there are many online public and private groups for farmers, ranging in their topics and member-bases. For the purpose of this content analysis, five local Facebook groups were chosen due to their relevancies of topic and clientele: "NW Arkansas Poultry, Farm, and Livestock," "Northwest Arkansas Pet and Livestock," "Decatur, Gentry, Gravette Community Homepage," "NW Arkansas Farm and Garden," and "Arkansas Rabbits, Chicken, and Livestock." Each of these public Facebook groups have a discussion tab and anyone from the community is allowed to post and discuss certain topics, with some using it for conversation, questions, and advertising. Within these Facebook groups discussion tabs, a search for applicable keywords over a 12 year period was conducted (posts from 2010 to 2022), with the keywords being: poultry, chicken, house, barn, poultry house, chicken house, broiler house, poultry barn, chicken barn, broiler barn, poultry litter, chicken litter, out-of-use, integrator, Tyson, Practice 360, NRCS, and contract. Posts and comments were saved and copied to a Word document if

they had relevancy to the topic. In total, 20 posts, many with comment threads, were found compatible to this research. These posts were analyzed qualitatively and coded along with the interview transcripts and survey data. Posts were made by farmers voluntarily, and while this mode of data-collection by itself is not an all-encompassing assessment of the opinions of local farmers in this area, within this qualitative project these unique responses can be collected and analyzed with the other pieces of data as a biased, non-random data source.

Table 1. Summary of Data Collected

	Farmers	Natural Resource Professionals	
Survey (completed responses)	13	n/a	
Interviews	4	NRCS employees	6
		Extension agents	2
Content Analysis (posts)	20	n/a	

Data Analysis

While NVivo is a tool utilized by many researchers analyzing large sets of qualitative data on farmer’s perceptions (Reimer et al., 2012; Jost and Schewbel, 2019), the data sets in this study were small enough to code the data by hand, using a thematic analysis approach (Creswell and Poth, 2018, p. 181; Rademaker et al., 2012). Coding by hand allowed the researcher to do an intentional comparison between the two different groups of participant interviews (farmers and natural resource professionals), as well as a side-by-side analysis of the responses from two farmers in very different situations. The information from each individual survey, including answers to multiple-choice and written-response questions, were formatted into separate Word documents, printed out, and analyzed qualitatively along with the printed interview transcripts.

The posts found in the Facebook content analysis were printed out and analyzed along with the interview transcripts and survey results. Using analysis strategies outlined by Huberman and Miles (1994) and strategies of deductive and inductive coding, the documents from the surveys, interviews and content analysis were scoured for unique and common codes using a color-coded system on the printed materials. Each code was added to a separate codebook Word document, and these codes were then reviewed, combined, and organized into the four pre-determined themes based on the project's four research questions. The themes allowed for the researcher to make the recommendations to the Arkansas NRCS and to find connections to the larger conceptual framework of TPB within conservation perception research.

Results

After coding the interview transcripts, survey results, and content analysis posts, the codes were organized into the four unique themes established from the research questions: current uses of decommissioned barns, participation in Practice 360, concern over environmental issues, and relationships with poultry integrators. Each of these themes has individual, inductively coded pieces of data within them (see Table 2). This results section will include a review of the four themes and a discussion of the data that was coded into them. When quoting directly from sources within the data collection, labels will be present to indicate whether it is a farmer quote, a natural resource professional quote, data from the survey, or a post from the content analysis. The results section relies primarily on the interview data collected, as this was the most substantial data accrued from this project. However, the survey results and content analysis results are summarized at the end of each theme's section to supplement the interview data. The content analysis portion primarily was coded into the last theme of "relationships with

poultry integrators” and is used to supplement the interview data there. Gender-neutral pronouns will be used for all participants. Specific titles, locations, or job descriptions will not be included for the sake of complete confidentiality, but all farmers and natural resource professionals are from Northwest Arkansas and have worked within the poultry industry or with issues pertaining to poultry houses.

Table 2. Themes and codes

Theme	Codes (sub-themes)
Current Uses of Decommissioned Barns	Using barn for a current or future purpose
	Barn is not seen as a nuisance or liability
	Costly to remove
	Indifferent to removal
	Thinking of getting back into the business
	Already removed the barn
Participation in Practice 360	Lack of knowledge
	Skeptical about program
	Using the barn for another purpose
	Time and money constraints
	Issues with government interference
	Lack of incentives
	Wasteful
	Interested in Practice 360
Concern over Environmental Issues	Soil and water concerns
	Safety concerns
	Not an issue
	Removal process itself is even more of an issue
Issues with Poultry Integrators	Unfair contract negotiations
	Reason for out-of-use barn
	Nature of the poultry business
	Poultry integrator responsibilities
	Unsustainable practices

Theme 1: Current Uses of Decommissioned Barns

According to all of the interviewed farmers and natural resource professionals within the Northwestern counties of Arkansas, poultry growers often use their out-of-use poultry barns for

other helpful reasons, such as the storage of hay and equipment, and are most likely uninterested in removing them due to the beneficial uses these buildings have on their farms. One local natural resource professional made the following statement: “Some [farmers] may try to maintain the buildings for a while with some thoughts of getting back into the business... but most find them useful structures for storing hay, equipment, general farm junk; I’ve seen them converted into nice facilities for sheep. Farmers come up with a ton of uses for those old buildings, and most don’t really see them as a liability.” Many farmers who find themselves with an out-of-use poultry barn are often involved in other farming practices, and can easily find another use for an empty shed, or even for another business venture. One farmer, speaking about other farmers in the area, said in their interview, “That’s what happens to a lot of them [being used for another purpose]; they use them for their cattle operations more than anything, storing hay or equipment, or they turn one into a shop so they can work on their equipment.” Even if the houses are sitting without any profit or economic interest being accrued from such a large parcel of land, having an additional storage or a work shed is something a farmer might have interest in, so removing it might not be a beneficial option for their farming operation. In fact, many of the farmers interviewed were simply indifferent to the thought of removing their out-of-use barns, and did not see them as nuisances. For many of the farmers, their involvement in the poultry business had only been with one to three poultry houses (no one surveyed or interviewed had more than five out-of-use houses on their land), and they had supplemented their income with other farming practices. While these houses can be quite sizeable, when there are only one or two sitting out-of-use, a farmer will generally still have plenty of space left on their land to conduct their other business ventures. As one local professional stated, “Unless the building is in bad shape and

needs to be torn down, they [poultry farmers] will leave them standing. They do not see a need to remediate the soil.”

One farmer, when asked whether or not removing the out-of-use poultry barn was a possibility for them, stated: “No, not really. We use them, and the costs to replace equipment sheds, hay barns, anything like that would be... I mean, would be unreal right now, the costs of that kind of stuff.” Possibilities for remediating the soil and then using the land where the out-of-use poultry barns sits for another economically-rewarding purpose, such as for other farming practices, might seem enticing; however, these considerations also force the farmer to think about the costs of removing the house, as well as remediating the soil. One local professional made the following statement: “As far as remediation [of the soil beneath the poultry barn] goes, I haven’t seen studies on that. I am sure you could, but that is going to cost more money. But if I am a grower, then I would probably just try to use that space somehow, storing hay, farm equipment, and so on... A main parameter that makes something sustainable is whether or not it is economically sustainable. If the costs greatly exceed the benefit, then a farmer is probably not going to do it unless someone is providing help... people have raised mushrooms in old chicken houses. Possibly the best solutions for old houses would be to come up with more practices like that, which at least have the potential to be cost-effective.”

One of the farmers interviewed was a clear outlier in the group, as they had already removed their out-of-use poultry barn and had remediated the soil by themselves, without the help of Practice 360 or the NRCS. When explaining why they decided to embark on this remediation project by themselves, this farmer stated: “Most of the farmers in this area will convert [their barns] to hay storage... but with the amount of chicken litter on the ground, I was uncomfortable with storing hay on top of chicken litter, because of the biological stuff in the

soil... I was unwilling to convert it [into a hay storage barn], and I was converting the whole farm to a hay farm. I wanted to use the land for productive reasons, meaning I wanted to put it back into use for the hay. So the chicken houses had to go.” Although this farmer made the decision to remove their poultry barn due to their specific vision and purpose for their farm, they also understood why other farmers would opt to make the opposite decision by stating, “What’s the business case to do something other than just let them sit there? Most farmers, if you can convince them that they can do something more productive than just letting that piece of metal sit there, then they’ll be all for it. Because farmers are practical by nature. You have to show them what is in it for them, and you have to show them that there is something more productive they can do for the land.”

Within the survey, a majority of the respondents (10/13) use their out-of-use barns for storage purposes, while two farmers are using them for other animals besides poultry. One farmer surveyed decided to keep their out-of-use barn up in the hopes of eventually returning to the poultry business one day. Only three of the thirteen farmers surveyed had any interest in removing or selling their out-of-use barn, although they still found meaningful uses for them in the meantime. Additionally, within the content analysis, there were two posts associated with farmers either attempting to sell their out-of-use barn for its parts, or asking questions about the process of doing so. Therefore, it seems as though there are some farmers interested in removing their out-of-use barns, yet they typically will take the issue into their own hands by removing and selling it themselves.

Theme 2: Participation in Practice 360

The correspondence leading to the interviews was the first time that all of the participants, barring two of eight local professionals, had ever heard of NRCS Practice 360. This demonstrates a lack of public knowledge, farmer knowledge, and even local professional knowledge, and might play a large role in the reason why the program has not been utilized in Arkansas. These results are not necessarily unexpected, as the goals of this larger research project were to introduce farmers to the program. Despite the general lack of knowledge of the program, one of the local professionals interviewed thought Practice 360 could be of benefit to farmers if they knew about it, saying: “This practice has not been on the poultry farmers’ radar so to speak, I’m not sure if it is a lack of knowledge... it could be, or they are just not interested in tearing the old houses down. I see the role to dig deeper for the need to have poultry house remediation, the benefits are pretty unknown now... and seeing the benefits and possibilities on the farm or landscape of the farm afterwards, I think it definitely has the benefit of addressing water quality and soil health resource concerns.”

Alternatively, some farmers and local professionals interviewed were highly skeptical of the program and its purposes when they heard about it during the interview; in fact, one farmer had some ethical issues with the intention of the NRCS to use taxpayers’ dollars to clean up poultry houses. They explained their position by saying, “Now the NRCS will come in and spend government money to clean up the mess and greenwash everything, and say ‘Look what we’ve done, we’ve cleaned up this mess.’” On top of some of the farmers being skeptical about the program, some of the local professionals interviewed were unsure of the benefits of using Practice 360 for the farmers they work with. One local natural resource professional made the following statement: “I think you will have a really hard time convincing anyone to participate

[in Practice 360]. Unless the buildings could be recycled, it seems awfully wasteful and I don't see many people participating... maybe I am missing something.”

Deciding to participate in a program like Practice 360 requires the farmers to use their limited time and energy to apply, and then to see the program through for up to five years. Additionally, one interviewed farmer could not see any financial benefit to participation in Practice 360, saying, “Tearing down a house costs money, and most of the items it was constructed from are worn out and can't be sold for much, if anything.” To participate in Practice 360 is a large, costly project, one which applications to EQIP can cover most, but not all, of the costs. Despite the lack of knowledge and disincentives to participation, one farmer still would have participated in Practice 360 if they had known about it before removing the houses by themselves, saying, “I contacted my county agent and even they were not aware of any program like that. If somebody was willing to provide the technical guidance, and be here to hold my hand through it, absolutely I'd work with them.” Although this farmer would have used Practice 360 as a tool to remove their poultry barns and remediate the soil beneath, they also understand why other farmers might not do the same, saying “Farmers are gonna ask, well why would you be willing to help me? What do you want in return for that? They'll say, ‘I don't know nobody that wants to help me that doesn't want something in return.’ You have to overcome that skepticism, because farmers are skeptical by nature.”

Within the survey, none of the thirteen farmer survey respondents had heard of Practice 360 before taking the survey. After reading a short description of the program, nine farmers said they were not interested, three said they were, and one said they would need more information. Further, the potential cost associated with Practice 360 was the biggest disincentive for those surveyed, with ten out of the thirteen respondents labeling it as a major disincentive to

participation, followed by the time/effort/energy required to participate (8/13), a lack of clear incentives (5/13), and the ability for the farmers to remove or sell the house by themselves (5/13). One surveyed farmer, who identified as being able to remove their own barn and remediate their own soil without the help of Practice 360, wrote: “I think we as farmers greatly understand the nutritional needs of healthy soil.” The biggest labeled incentive to participation in Practice 360 was cost-share assistance (10/13), followed by using the land for other purposes (5/10) and reducing the environmental impact of the barns (5/10). There were no results within the Facebook content analysis for the term Practice 360, or anything related to it within the other key terms.

Theme 3: Concern over Environmental Issues

Various and contradicting opinions emerged during the interviews about the environmental concerns surrounding out-of-use poultry barns and the process of taking them down. Viewpoints from both sides of the spectrum were heard within both farmer and natural resource professional groups, with some believing the houses were environmental concerns standing as they are, while others thought that the act of taking them down was even more of an environmental concern. One farmer took issue with the environmental problems that poultry integrators create when they abandon old barns for new farms, making the following statement: “It’s not sustainable in any way I don’t think... there will be tons of tin and insulation that will go to a landfill now. Three miles down the road they’re throwing them [new poultry houses] up as fast as they can. A few years down the road, they will do the same thing again. I am sure there is an environmental impact from these old houses, and even the drainage off of them.”

Another farmer, who removed the poultry barns on their land by themselves, agreed that the houses posed an environmental risk, which was one of the reasons why they decided to remove them, saying: “The dirt is contaminated... there is a high nitrogen load with chicken litter. Guys in this area don’t agree with me... but in chicken food there are seeds that aren’t digested which can, when redistributed as chicken litter for a nitrogen source -- the seeds can regerminate in the fields bringing in unwanted weeds.” The dangers of what is contained within the chicken litter is exacerbated when there are precipitation events, especially if the soil and litter are exposed to precipitation by a leaky roof, a hole in the roof, or during the remediation process when the house is down and the soil is exposed. This same farmer made the following statement about their experience removing their own poultry barns: “I had one pond downstream from the chicken houses... I did not work fast enough and the rain came when the chicken houses were down but the concrete perimeters were still up... it acted like a swimming pool, and all that high nitrogen, high phosphate load went into the pond, and the pond turned black... [In general], when you wash off chicken houses, water goes into ponds and water sources, it gets into the dirt and forms downy fluffy muck at the bottom of the pond.” One local professional had the following to say about precipitation and out-of-use poultry barns: “When the soil is exposed to the external elements, wind, rain, that sort of thing, it will allow penetration of a lot of those high-concentrated nutrients that were in that broiler house to seep into our groundwater system. Water does not just stay on one site, it eventually gets filtered into our water table which gets filtered into our water ways, which then makes it downstream to other communities.”

One farmer was concerned about ways in which the out-of-use barn’s environmental issues also lead to some safety concerns for their farm and their families, saying, “If you look at chicken houses, because of the high ammonia load it forms, some acids that come out of the

ground that begin to start attacking the metal... there is a safety aspect to this. Are you comfortable, in a high wind situation, if that thing came down on you or your tractor?" Despite these considerations on the impacts of out-of-use poultry barns on environmental and personal safety, a majority of the farmers interviewed and surveyed did not believe their out-of-use poultry barns were much of an environmental issue, on local or larger scales. A main determinant for whether or not these farmers, as well as the local professionals, believed that the barns were environmental hazards was whether the barns had concrete or dirt floors. One local professional said, "Personally, I can't see how it is much of an issue if the manure is removed and floor is scraped back to the pad or concrete. I would think leaving the houses up would be better environmentally speaking." Although many modern poultry houses are being built with concrete floors, there are many with exposed dirt floors that are currently sitting out-of-use. One farmer made the following statement: "I would contend that out of the abandoned chicken houses that are out there, very few of them are on a concrete pad. Most of them are on straight dirt. If they're on a concrete pad, you get in there and clean it up. But then you have the environmental impact of dealing with more concrete. What's worse? Chicken houses built with perimeters and dirt floors -- which is why Tyson and George's got away from it. People couldn't keep them clean. They went to concrete floors, ones they could wash down... but washing down, you have water leaving chicken houses and entering rivers... you traded one problem for another... told farmers to switch to concrete floors and wash the floors down every day. But that water isn't going to a septic tank, it is not going to a bio-processor. Basically, it is funneling out into the ground. No matter what, same bio-load. Perhaps dirt houses were better, because it stayed within the envelope of the chicken house."

Some local professionals argued that the use of Practice 360 to remove out-of-use poultry barns could create even more of an environmental hazard than to leave them standing, citing the exposure of the poultry litter as a major issue. One local professional backed this opinion by saying, “Since there is a roof, there will basically be zero runoff or leaching of phosphorus, nitrogen, metals, etc. Once you tear it down, you have a big area of soil that is loaded with nutrients and metals that will then be exposed to rainfall, runoff and leaching. The easiest thing to do would be to dig it up and spread it over a large area of land. However, where there have been poultry houses, the soil on that farm is probably already high in phosphorus or other nutrients already because of litter fertilization over the years, so you probably would need to move it to another area, which is even more expensive.” The expenses accumulate due to the amount of trash created by taking down a poultry barn. One local professional viewed this as another negative disincentive to participation in Practice 360, saying: “The biggest disincentive for taking them down is the trash. The insulation is terrible to deal with. The trusses can easily be sold and the tin... but the equipment, the broken board, and the insulation is a challenge.” Therefore, while some farmers and local natural resource professionals agreed that poultry litter presents some form of an environmental hazard, there were conflicting opinions on whether using Practice 360 to remove the barns would help or exacerbate the issues.

Within the survey, a question asking the farmers whether or not they thought out-of-use poultry houses were harmful to the environment garnered the following results: one farmer selected “Yes,” two farmers selected “To a small degree,” six farmers selected “Probably not,” and three farmers selected “Not at all.” Only five of the thirteen respondents pinpointed “Reducing environmental impact” from a list of possible incentives to participation.

Additionally, there were no results from the content analysis connecting poultry barns or poultry litter to any environmental issues.

Theme 4: Relationships with Poultry Integrators

For two out of the four poultry farmers interviewed, “disputes” with the poultry integrators were the reason that their barn is now out-of-use. The interviews and content analysis accounts show that poultry integrators often will require their contract growers to make unsubsidized upgrades or modifications to their equipment in order to maintain their contracts, which can be unmanageable or unprofitable for farmers with older barns. Therefore, the farmers who cannot afford to remodel or pay for maintenance will find themselves with a terminated contract and an out-of-use barn. One farmer described the pattern of behavior of poultry integrators by saying, “The way these poultry companies operate... there’s an older farm and they want rid of them, so they [the farmers] have to spend lots of money to stay in it. I understand we have to do maintenance and upkeep on stuff, but in the case of our farm, where they’ll shut it down and then move down the road three or four miles and build some more instead of reusing a lot of the old houses, or remodeling them, they’re gonna go into a new farm now... and push up pads for three or four more, and start the cycle over again. Instead of using what we have. They don’t say ‘we’re shutting you down because you’re old’ but it costs so much to stay in it, it doesn’t make financial sense. So it is a cycle that does on, and it is not illegal.” While this farmer used to do poultry farming themselves before having their contract broken, another farmer interviewed had inherited a property that had been left with old poultry houses on it after the former owner had a dispute with their integrator. They elaborated by saying, “This property had five chicken houses, each 100 yards long, supplying for George’s. When George’s

decided not to renew the contract [because] it had dirt floors and not concrete floors – they terminated the contract with the former property owner, who allowed the houses to be abandoned.” The decade-spanning careers in the poultry industry for both of these farmers ended without their consent, and they were left to deal with the repercussions; namely, their out-of-use poultry houses as well as the accumulated litter and contaminated soil within. For both of these farmers, discussions about the possibility of using Practice 360 to remediate their barns began with a discussion within the context of how their barns went out of use in the first place. One farmer viewed their out-of-use poultry houses as something that the poultry integrator should be responsible for, rather than themselves or the NRCS, saying, “They [the NRCS] want to use taxpayer money to fix the poultry integrator’s responsibilities so they [the integrators] can continue shutting down older farms and building new complexes.” Although some of the farmers were willing to share their feelings about their poultry integrator contracts, all of the local professionals interviewed had little to say on the topic and how it related to out-of-use poultry barns in NW Arkansas, instead listing the many other reasons why poultry farmers might leave the business, such as older equipment and expenses unrelated to the integrators. Therefore, this experience with integrators seems to be uniquely shared by poultry farmers.

Within the content analysis portion of this project, many farmers discussed their integrator relationships and contract negotiations amongst themselves in public Facebook message boards. In regards to how they perceive their contract, one farmer commented on a Facebook thread, “No one forces you to sign a contract, but this does not cover the life of your loan. This leaves you at the mercy of the company when they decide they want upgrades... The contracts are what need further representation and negotiations on behalf of the growers.” Discussions on the legality of the integrator’s actions filled the message boards, with little-to-no

forms of legitimate legal action available due to the ways the contracts are set up by the integrators. One farmer mused on the current status of the integrator-grower relationship by posting, “There is no such thing as partners between integrators and poultry growers... there are a lot of problems in this industry and they seem to be getting worse. Most companies have gotten so big that a good grower is not worth any more than a bad grower. The pay scale has not kept up with the costs of building and operation... companies are catering to people who will build eight houses or more and have multiple farms in the area... this means smaller farms are not as important, which makes it harder for small farms to survive.” Another farmer described their version of the future of the poultry industry, commenting on a post, “I’d like to see the farmers treated equally, where they can make a living instead of the big man getting everything and the growers getting just enough to get by.”

While many of the farmers understand the nature of maintenance and upkeep, some felt stuck with the mess that is left behind after they are no longer able to make money with their barns through their contracts with these large poultry integrators. One farmer, when describing the modifications they would have had to make to their poultry barns to stay in the business, posted, “They [the integrators] control what you do, and we finally said no. At that point, the cost it would have taken to update would have been like buying the farm again.” Other farmers tended to be a bit more understanding of the poultry integrator’s actions and the forms and conditions of a shifting economy and marketplace, with one farmer posting, “Nobody holds a gun to your head and says sign the contract... there are people who make it work and people that don’t.” Despite the conflicting opinions on the morality of the nature of the relationship between the grower and the poultry integrator, it stands to reason that the complexities and dynamics of

these contract negotiations have contributed in some degree to the numbers of out-of-use poultry barns in Northwestern Arkansas.

Discussion

Research Questions and Ties to Literature Review

A general lack of knowledge and exposure to Practice 360 has contributed to a situation in which this program has never been used within the state of Arkansas. All of the farmers interviewed, and six of the eight local professionals, even some of those working within the NRCS, had no idea that the program existed. As a result, there are no “success stories” or local farmer testimonials which can diffuse through the local communities, potentially increasing further participation (Reimer and Prokopy, 2014; Wilcox and Giuliano, 2011). Additionally, if local natural resource professionals generally are unaware of a program’s existence, the program will not be pushed or mentioned as a possibility to the farmers with whom they are working. There are a plethora of programs available to farmers, and inevitably some, like Practice 360, get lost in the shuffle for both farmers and professionals (Reimer and Prokopy, 2014). The goals of this larger CIG-funded project included educating both local farmers and natural resource professionals on the benefits of Practice 360 with field days; however, a lack of interest in this project and the program itself revealed another issue. Based on the results of this study, and the inability of the larger project to come to fruition, it seems that even when farmers hear about the program, they still are disinterested due to a lack of incentives to remove their out-of-use barns. Most of the farmers and local professionals interviewed and surveyed viewed the out-of-use poultry houses as helpful for purposes of storage, and would not want to remove them in the first place.

A lack of rational, financial incentives are a large constraint in the adoption of conservation practices (Greiner and Gregg, 2011). Even though farmers could apply for EQIP to cover some of the costs of removing their barns, there are no additional or clear monetary incentives for doing so, and they would still need to cover some of the costs themselves (USDA EQIP, 2019). In April 2023, the Delaware Department of Agriculture (DDA) opened applications for their own “Poultry House Demolition Assistance Program,” which would reimburse poultry farmers for 50% of the costs of remediation, or up to a maximum of \$10,000 per house, in order to address the environmental concerns of out-of-use poultry houses in their state (Hoffman, 2023). Delaware’s new conservation program’s reimbursement is on top of the funds that a farmer could apply for through EQIP, which opens the possibility for Delaware farmers to remove their poultry barns, with the assistance of the NRCS, for free (Hoffman, 2023). If Arkansas were to follow suit by including an additional funding or reimbursement source within the already established Practice 360 guidelines, Arkansas farmers might be more financially inclined to participate. For one interviewed farmer who had already removed their out-of-use poultry barn, a clear business goal of using the land for hay production was the precedent for their decision. Therefore, appealing to other economically-rewarding land uses, even those conservation related, could be positive motivators for farmers to remove their barns (Chouinard et al., 2008).

Some of the survey respondents identified the time and energy it would take to participate in Practice 360 as a negative disincentive to participation. Short-term contracts are generally preferred for conservation programs, and participating in the soil remediation process within Practice 360 could take up to five years to complete, a difficult time investment for many farmers (Reimer et al., 2012; Olenik et al., 2005). Additionally, one farmer interviewed took

issue with the interference of a government entity (NRCS), viewing the actions of the NRCS as “greenwashing” and covering over the poultry integrator’s responsibilities with taxpayer dollars. In general, if a farmer’s perceptions of a government entity’s actions or intentions is more negative, then they are less likely to participate willingly in a conservation program (Kraft et al., 1996). While some farmers were concerned with the environmental issues stemming from their out-of-use poultry barns, this was not necessarily a deciding factor for most in terms of what to do with their out-of-use barns. Farmers can be aware and concerned about their environmental impacts, while simultaneously still not interested in conservation programs, perhaps for financial reasons or for a lack of personal efficacy (Raedeke et al., 2001; Conner et al., 2016). Some local professionals thought that Practice 360 might be more environmentally damaging than remediation due to landfill waste created, in addition to the runoff from the exposed, polluted soils during the process. One farmer who had already removed their out-of-use barn and remediated the soil did so with personal and environmental safety in mind, demonstrating that a program like Practice 360 might be successful by appealing to a landowner’s motivations of stewardship over their land and the Earth’s natural resources. A strong sense of stewardship is often a positive indicator that a farmer will be interested in participating in a conservation program (Chouinard et al., 2008).

Decisions that farmers make regarding their farms not only come from their personal decision-making skills and motivations, such as weighing the pros and cons of removing their poultry barn due to their environmental concerns or lack thereof; these decisions also stem from the political and social contexts of their complex relationships with their poultry integrators (Boehler, 2010; Vukina and Leegomonchai, 2006). Farmer responses analyzed within the interviews and content analysis of this project revealed that some farmers have experienced a

“dispute” with their poultry integrators, which impacts their feelings about their barn, their land, and their future endeavors. On the other hand, the local natural resource professionals interviewed, many of whom work with the poultry growers, had little to say on this same topic, which might further alienate the farmers in their feelings about their integrators, their contracts, and their out-of-use barns. While there is an abundance of literature focused on the various barriers and motivations to farmer participation in conservation programs, there are fewer studies focused on how these systemic poultry operations and integrator relationships can impact a farmer’s future conservation decisions within the poultry industry. For some, the barns represent a mess that, while inherently tied to the poultry integrator’s actions, is left for the farmers to clean up by themselves. In fact, Practice 360 as it is written does not address poultry integrators at all, and instead allows the responsibility for poultry barn removal to be entirely on the shoulders of the farmers, despite offering them aid to do so. Therefore, some farmers might feel less inclined to remove their barns, even if they could potentially use the land for another purpose, as it is an environmental and economic endeavor that they think should have been, or still could be, the responsibility of their poultry integrators after ending their contract, although poultry integrators are not federally required to help their growers manage their poultry litter (Identification and Listing of Hazardous Waste, 2023). Additionally, farmers’ general frustration and negative feelings towards the situation that led to their barn being out-of-use might cause them to not mess with removal at all, especially if they are using the barn for a perceived beneficial purpose.

Ties to Conceptual Framework

The data accumulated in this project leads to considerations of the impacts that the emotional connections and/or attachments to the land or barn itself, as well as the history of the barn, has to do with a farmer's decisions, and the various interconnecting and unique intricacies that lead farmers to make these decisions. The Theory of Planned Behavior (TPB) is a framework commonly used by researchers to understand farmers' perceptions of conservation programs, as it accounts for the factors that lead humans to make voluntary decisions (Ajzen, 1991). Conservation researchers have used TPB to link farmers' conservation behaviors to their personal beliefs and perceptions, such as their environmental awareness (Beedell and Rehman, 2000) their farming business models (Senger et al., 2017), or societal pressures (Rossi Borges et al., 2014). Within TPB, there are three psychological constructs formed by an individual's personal beliefs, as well as by their socially-constructed background factors, which then lead to a personal intention and then to the behavior itself.

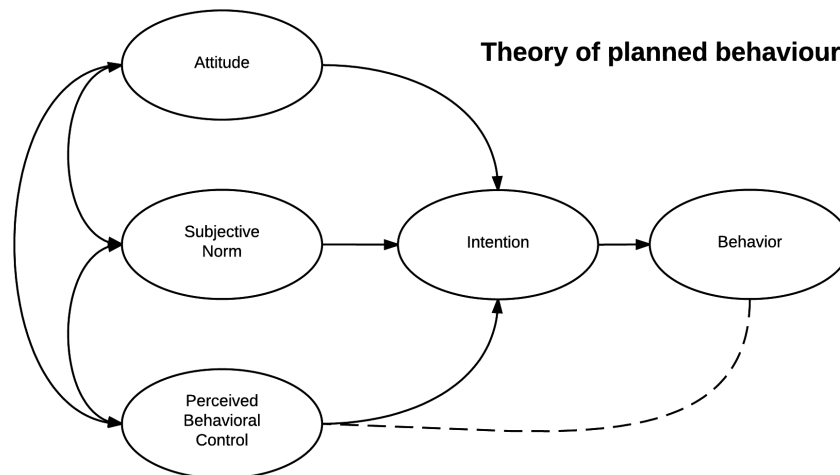


Figure 2. Simplified model of the Theory of Planned Behavior (Ajzen, 1991).

The first construct is a farmer's behavioral beliefs, or attitude toward an act or behavior. This is an individual's mental ideas about whether a certain behavior will make a positive or negative contribution to their life, or what makes the most sense for them mentally, physically, and financially (Ajzen et al., 2018). Within this study, this concept includes farmers' beliefs about the incentives or disincentives for removing their barns, their level of environmental concern, and their attitude toward the poultry integrators with whom they were contracted. These beliefs can be influenced by various background factors and life events, and can either be rigid or flexible based on the complexity of the farmer's situation (Senger et al., 2017). For example, one farmer's belief that the poultry integrators should be responsible for remediating the out-of-use barn, and their belief that the NRCS should not use taxpayer dollars to do so, resulted in an intention to not participate in Practice 360 after learning of it, which led to a behavior of inaction in regards to their poultry barn. Similarly, another farmer's behavioral belief that they are using their out-of-use poultry barn for a beneficial purpose like storage led them to the conclusion that participating in Practice 360 would not make a positive contribution to their life, leading to a similar intention and behavior of inaction. It can be noted that while the data collected in this study has led to assumptions about what beliefs have led to the intentions and behaviors of farmers, many of these beliefs and intentions are developed internally and are extremely personal to an individual, and therefore cannot always be truly known by researchers (Ajzen et al., 2018).

The next construct is a farmer's normative beliefs, or the subjective normative pressures. This includes the individual's ideas about which behaviors should or should not be performed based on their social network, cultural norms, and group beliefs (Ajzen et al., 2018). Within this study, if a farmer sees no one in their local community participating in a program like Practice 360, even if it is simply because of a lack of knowledge of the program's existence, then they

might not be inclined to be the first one to experiment and do so. To be the first within a certain group to do something new and out-of-the-ordinary is a vulnerable position for farmers to willingly put themselves in, especially when the perceived incentives are not proven and the perceived disincentives seem numerous. In fact, if the norm within the poultry farming community is to use the out-of-use barns for other purposes, such as storage, farmers might be inclined to behave similarly. These social pressures can come both from the outside groups, such as the farming community and local neighbors, as well as from those closer to the farmers, such as their immediate families and those whom they support with their farming incomes. Participating in an expensive endeavor like Practice 360 is a financial risk that could impact the livelihoods of a farmer's family, so their family's opinion on the matter is sure to play a role in their decision.

The last construct is a farmers' control beliefs, or their perceived behavioral control. This is the farmer's perception of how easy or difficult the behavior will be for them to perform (Ajzen et al., 2018). Within this particular study, this includes how a farmer perceives the financial costs, paperwork, and planning that removing the barn and participating in Practice 360 includes. For example, one farmer who had already removed their out-of-use barns by themselves to put the land into use for hay production had a perceived sense of behavioral control. They thought they could, and did, remove their barns. However, they did not participate in a conservation program to do so, as this was outside the boundaries of their perceived behavioral control. Neither they nor their local county agents knew that the program existed, and they were not aware of how to ask for help. Another example includes the financial costs of participating in Practice 360 exceeding a farmer's budget, or the timing interfering with their other projects. If a farmer believes they will not be able to successfully complete a behavior, for

a variety of pre-established and personal reasons, then they might be less likely to try it out (Ajzen et al., 2018; Beedell and Rehman, 2000). Although most of the farmers within this study might have a sense of behavioral control (i.e., they do believe that removing the barns is something they could physically do), they might not perform the behavior voluntarily due to a lack of desire and the perceived difficulties of engaging in the conservation practice, coupled with a lack of rational incentives to do so.

Overall, reviewing the concepts of the Theory of Planned Behavior within this study demonstrated how an uncountable amount of predetermined beliefs, shaped both by an individual's personal background and the community around them, leads to their complex intentions and behaviors when deciding whether or not to participate in a conservation program (Ajzen et al., 2018; Rossi Borges et al., 2014). Therefore, a solution to the lack of use of Practice 360 is complex and must account for a variety of perceived disincentives. While some perceived barriers to participation are manageable and could be easily overcome by an agency, such as a lack of knowledge or access to the program itself, other attitudes are more deeply held by farmers and might be much harder, or even impossible, for a natural resource agency to adjust to.

Limitations

A major limitation for this project includes a small sample size, and broader generalizations about the state of the poultry industry or out-of-use poultry barns cannot be made from the data collected. Instead, this research serves as a qualitative insight into the very unique and complex situation happening with a few Northwestern Arkansas farmers and local professionals in regards to NRCS Practice 360, and sought to establish credibility through a triangulation of different data sources (Creswell and Poth, 2018, p. 256). A majority of the data

presented here was collected during the COVID-19 pandemic, with online efforts proving to not be as effective as in-person data collection for this specific audience. A general lack of interest in the subject matter resulted in a noticeable shortage of responses to survey and interview requests over the phone and email. Additionally, the larger project this study was a part of eventually ended without result, which halted some of this project's plans to share and accumulate data during local field days.

Future Research

Future researchers of this same subject matter might garner a broader audience in a qualitative or quantitative fashion to make more substantial claims about the impact of the poultry industry on local soils and watersheds, as well as on individual farmers' lives. This study revealed a certain amount of tension between former contracted poultry farmers and their poultry integrators, and these themes could be expanded on in future research studies in efforts to understand the state of the poultry industry, and to create more equitable goals moving forward. Future researchers who are able to reach more diverse populations of farmers, including the communities of Hmong and Latinx poultry farmers in Northwestern Arkansas, might investigate this issue with an Environmental Justice framework in order to examine the integrator-farmer relationship through a conversation of equity. Environmental Justice is a theoretical framework which addresses the unfair exposure of poor and marginalized communities to natural resource harms, and is an ongoing process (rather than a state) of race, class and privilege within the distribution of environmental disamenities (Boone, 2008). Environmental Justice research, which came onto political and scholarly radars in the 1980s, has uncovered that ethnic minorities, people of color, Indigenous communities, and those from lower economic classes have to face a

greater proportion of environmental burdens in the forms of exposures to air, water and soil pollution resulting from industrialization and capitalistic practices (Mohai et al., 2009). These situations can create what is referred to as “sacrifice zones” or “zones of non-being” within Environmental Justice research (Martinez-Alier et al. 2014). Therefore, future researchers using an Environmental Justice lens perhaps could give voice to minority and low-income farmers with out-of-use poultry barns in Arkansas. As time progresses, and the environmental impact of the poultry industry becomes more dire to the Earth’s natural resources, such research will be crucial.

List of Recommendations to Arkansas NRCS

Based on the data accumulated from this project, a list of three recommendations are made to the Arkansas NRCS in regards to more effective implementation of Practice 360, taking into account the farmer’s perceptions and beliefs framed by TPB. These recommendations are:

(1) Create and provide educational materials, for farmers and local professionals, on the environmental impacts of out-of-use poultry houses, as well as Practice 360 itself and its cost-share opportunities with EQIP. A major obstacle to a farmer’s ability to use Practice 360 is a lack of awareness that it exists. Even the professionals in charge of implementing such programs are not aware of their existence, adding further obstacles. Additionally, the environmental hazards created by these houses and contaminated soils might not be on the farmers’ radar, and educational materials might spark their sense of environmental stewardship. Knowledge about Practice 360 and its associated benefits could impact a farmer’s attitude toward the behavior of participation, or their perceived behavioral control of the situation, as outlined in TPB.

(2) Suggest alternative uses for the land where the out-of-use poultry house currently resides as an incentive for removal, such as putting it into use for economically-rewarding purposes or for conservation-related purposes. Many farmers are using their out-of-use barns for current, practical purposes, such as storage. However, if they were to learn about other ways they could use this land post-remediation, such as using it to supplement another conservation purpose or to farm a new crop, then they might consider removal. If many farmers within a particular area were to utilize a specific and beneficial land-use alternative, this could potentially shape the local subjective norms and group beliefs as framed in TPB. As one interviewed farmer said, “Most farmers, if you can convince them that they can do something more productive than just letting that piece of metal sit there, then they’ll be all for it. Because farmers are practical by nature. You have to show them what is in it for them, and you have to show them that there is something more productive that they can do for the land.”

(3) Address, discuss and/or negotiate with large poultry integrators for their role in the remediation of out-of-use poultry houses, perhaps to source potential funding or to change/improve the contracts that configure farmer/integrator dynamics. Asking for the farmers to be solely responsible for their out-of-use barns does not address the historical, political, and social contexts of what has happened to them and their barns. Beginning a discussion with larger poultry companies about their role in the eventual environmental contamination, coupled with a potential solution such as Practice 360, could be the beginning of improved contract negotiations and a push for the program’s funding and/or widespread use by former poultry farmers. If farmers could see that the NRCS understood and addressed the larger issues at hand, their attitude toward participation might change.

Conclusion

Given ever-increasing consumer demands for poultry and egg products, the poultry industry will continue to grow (Bolan et al., 2010). Relationships between farmers and their poultry integrators often are contentious and contracts generally are short-term; therefore, numbers of out-of-use poultry barns will continue to rise, and the environmental and economic issues for the farmers regarding these out-of-use barns likely only will increase as the barns age and deteriorate (Boehler, 2010; Roth, 2002). If the Arkansas NRCS wishes for a conservation program like Practice 360 to be successful in remediating these old barns and polluted soils, then more effort needs to be allocated toward the advertisement of the program. Local, small-scale efforts to push the program would be practical to enable “success stories” that could travel by word-of-mouth through farming networks. In addition, the creation and distribution of educational materials, for both farmers and local professionals, describing why and how the program is of environmental and economic benefit is crucially needed.

Apparently, there is a large amount of skepticism and questioning about whether or not the program is necessary, warranted, or even sustainable. Alternatively, if the lack of farmer interest this study demonstrated is of enough weight, then perhaps the focus should be shifted away from this program and directed towards an individual-focused program with efforts to help farmers sustain the losses they suffer, both environmentally and economically, after their contracts are ended by poultry integrators, taking into account these farmer’s individual attitudes and backgrounds. When considering financial and moral responsibilities of removing the old poultry barns, perhaps the focus should be shifted away from programs targeting small-scale farmers and towards programs that work with billion-dollar poultry corporations. Future studies on conservation program adoption analyzed through an Environmental Justice lens might

illuminate these issues for populations of farmers lost within a system that creates messes and then asks for them to clean it up.

References

- Ahnström, J., Höckert, J., Bergeå, H. L., Francis, C. A., Skelton, P., & 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.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Ajzen, I., Fishbein, M., Lohmann, S., & Albarracín, D. (2018). The influence of attitudes on behavior. *The Handbook of Attitudes*, 197-255.
- Alabadian, B. A., & Adeoye, P. A. (2009). Effect of different poultry wastes on physical, chemical and biological properties of soil. *Caspian Journal of Environmental Sciences*, 7(1), 31-35.
- Armstrong, A., Ling, E. J., Stedman, R., & Kleinman, P. (2011). Adoption of the Conservation Reserve Enhancement Program in the New York City watershed: The role of farmer attitudes. *Journal of Soil and Water Conservation*, 66(5), 337-344.
- Beedell, J., & Rehman, T. (2000). Using social-psychology models to understand farmers' conservation behaviour. *Journal of Rural Studies*, 16(1), 117-127.
- Boehler, K. E. (2010). Poultry growers in Arkansas: Agents or independent contractors. *Ark. L. Rev.*, 63, 849.
- Bolan, N. S., Szogi, A. A., Chuasavathi, T., Seshadri, B., Rothrock, M. J., & Panneerselvam, P. (2010). Uses and management of poultry litter. *World's Poultry Science Journal*, 66(4), 673-698.
- Boone, C. G. (2008). Environmental justice as process and new avenues for research. *Environmental Justice*, 1(3), 149-154.
- Borges, J. A. R., Lansink, A. G. O., Ribeiro, C. M., & Lutke, V. (2014). Understanding farmers' intention to adopt improved natural grassland using the theory of planned behavior. *Livestock Science*, 169, 163-174.
- Chouinard, H. H., Paterson, T., Wandschneider, P. R., & Ohler, A. M. (2008). Will farmers trade profits for stewardship? Heterogeneous motivations for farm practice selection. *Land Economics*, 84(1), 66-82.
- Conner, D., Miller, J., Zia, A., Wang, Q., & Darby, H. (2016). Conjoint analysis of farmers' response to conservation incentives. *Sustainability*, 8(7), 684.
- Creswell, J.W., Poth, C.N. (2018). *Qualitative inquiry and research design: Choosing among five approaches*. 4th Ed. Sage.

- Cui, Y. (2014). Examining farmers markets' usage of social media: an investigation of a farmers market Facebook Page. *Journal of Agriculture, Food Systems, and Community Development*, 5(1), 87-103.
- Del Rossi, G., Hecht, J. S., & Zia, A. (2021). A mixed-methods analysis for improving farmer participation in agri-environmental payments for ecosystem services in Vermont, USA. *Ecosystem Services*, 47, 101223.
- Drescher, M., Kim, Y. H., & Warriner, G. K. (2022). Private landowners' childhood nature experiences affect their feelings of connectedness-to-nature and land stewardship as adults. *Biological Conservation*, 274, 109713.
- Fitzgerald, A. J. (2010). A social history of the slaughterhouse: From inception to contemporary implications. *Human Ecology Review*, 58-69.
- Floress, K., de Jalón, S. G., Church, S. P., Babin, N., Ulrich-Schad, J. D., & Prokopy, L. S. (2017). Toward a theory of farmer conservation attitudes: Dual interests and willingness to take action to protect water quality. *Journal of Environmental Psychology*, 53, 73-80.
- Graham, M. (2017). Postcolonial nature conservation in practice: the everyday challenges of on-ground urban nature conservation, Cape Town, South Africa. *GeoJournal*, 82(1), 43-62.
- Greiner, R., & Gregg, D. (2011). Farmers' intrinsic motivations, barriers to the adoption of conservation practices and effectiveness of policy instruments: Empirical evidence from northern Australia. *Land Use Policy*, 28(1), 257-265.
- Hall, A., Turner, L., & Kilpatrick, S. (2019). Using the theory of planned behaviour framework to understand Tasmanian dairy farmer engagement with extension activities to inform future delivery. *The Journal of Agricultural Education and Extension*, 25(3), 195-210.
- Hoffman, S. (2023). *Delaware announces cost-share program to remove old poultry houses*. State of Delaware News. <https://news.delaware.gov/2023/03/28/delaware-announces-cost-share-program-to-remove-old-poultry-houses/>
- Identification and Listing of Hazardous Waste, 40 § CFR 261.4(b)(2). (2023).
- Jost, F., Dale, A., & Schwebel, S. (2019). How positive is “change” in climate change? A sentiment analysis. *Environmental Science & Policy*, 96, 27-36.
- Kelleher, B. P., Leahy, J. J., Henihan, A. M., O'dwyer, T. F., Sutton, D., & Leahy, M. J. (2002). Advances in poultry litter disposal technology—a review. *Bioresource technology*, 83(1), 27-36.
- Kraft, S. E., Lant, C., & Gillman, K. (1996). WQIP: an assessment of its chances for acceptance by farmers. *Journal of Soil and Water Conservation*, 51(6), 494-498.

- Kumar Chaudhary, A., Warner, L. A., Lamm, A. J., Israel, G. D., Rumble, J. N., & Cantrell, R. A. (2017). Using the Theory of Planned Behavior to Encourage Water Conservation among Extension Clients. *Journal of Agricultural Education*, 58(3), 185-202.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. Sage.
- Mohai, P., Pellow, D., & Roberts, J. T. (2009). Environmental justice. *Annual review of environment and resources*, 34, 405-430.
- Martinez-Alier J., Anguelovski I., Bond P., Del Bene D., Demaria F., Gerber J.-F., Greyl L., Haas W., Healy H., Marín-Burgos V., Ojo G., Porto M., Rijnhout L., Rodríguez-Labajos B., Spangenberg J., Temper L., Warlenius R. and I.Yáñez. 2014. Between activism and science: grassroots concepts for sustainability coined by Environmental Justice Organizations. *Journal of Political Ecology* 21: 19-60.
- NRCS Closure of Waste Impoundments, Remediation of Abandoned Poultry Houses Conservation Practice Job Sheet (2011).
- NRCS Conservation Practice Standard, Waste Facility Closure. Code 360 (2018).
- Olenick, K. L., Kreuter, U. P., & Conner, J. R. (2005). Texas landowner perceptions regarding ecosystem services and cost-sharing land management programs. *Ecological Economics*, 53(2), 247-260.
- Packyards and Stockyards Act Fact Sheet, Agricultural Marketing Service. United States Department of Agriculture (2020).
- Poppenborg, P., & Koellner, T. (2013). Do attitudes toward ecosystem services determine agricultural land use practices? An analysis of farmers' decision-making in a South Korean watershed. *Land Use Policy*, 31, 422-429.
- Pratt, B., & Wallander, S. (2022). *Cover Practice Definitions and Incentives in the Conservation Reserve Program*.
- Raedeke, A. H., Nilon, C. H., & Sanford Rikoon, J. (2001). Factors affecting landowner participation in ecosystem management: A case study in south-central Missouri. *Wildlife Society Bulletin*, 29(1), 195-206.
- Rademaker, L. L., Grace, E. J., & Curda, S. K. (2012). Using Computer-Assisted Qualitative Data Analysis Software (CAQDAS) to Re-Examine Traditionally Analyzed Data: Expanding our Understanding of the Data and of Ourselves as Scholars. *Qualitative Report*, 17, 43.

- Ramsey, S. M., Bergtold, J. S., Canales, E., & Williams, J. R. (2019). Effects of Farmers' Yield-Risk Perceptions on Conservation Practice Adoption in Kansas. *Journal of Agricultural and Resource Economics*, 44(2), 380-403.
- Reimer, A. P., & Prokopy, L. S. (2014). Farmer participation in US Farm Bill conservation programs. *Environmental Management*, 53(2), 318-332.
- Reimer, A. P., Thompson, A. W., & 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.
- Roth, R. (2002). Contract farming breeds big problems for growers. *Famers' Legal Action Report*.
- Salzman, J., & Thompson Jr, B. H. (2019). *Environmental Law and Policy*. Fifth Edition. West Academic.
- Selinske, M. J., Coetzee, J., Purnell, K., & Knight, A. T. (2015). Understanding the motivations, satisfaction, and retention of landowners in private land conservation programs. *Conservation Letters*, 8(4), 282-289.
- Senger, I., Borges, J. A. R., & Machado, J. A. D. (2017). Using the theory of planned behavior to understand the intention of small farmers in diversifying their agricultural production. *Journal of Rural Studies*, 49, 32-40.
- Sommer, B. B., & Sommer, R. (2002). *A practical guide to behavioral research: Tools and techniques*. Oxford University Press.
- Spade, D. (2020). Solidarity not charity: Mutual aid for mobilization and survival. *Social Text*, 38(1), 131-151.
- Stubbs, M. (2014). Conservation Reserve Program (CRP): status and issues. Washington, DC, USA: Library of Congress, Congressional Research Service.
- Taylor, C. R., & Domina, D. (2010). Restoring economic health to contract poultry production. *Agricultural and Resource Policy Forum*. Auburn University.
- USDA Conservation Innovation Grants Fact Sheet, Natural Resources Conservation Service (2019).
- USDA Environmental Quality Incentives Program, Natural Resources Conservation Service (2019).
- USDA National Agricultural Statistics Service, Census of Agriculture (2017).

- Vukina, T., & Leegomonchai, P. (2006). Political economy of regulation of broiler contracts. *American Journal of Agricultural Economics*, 88(5), 1258-1265.
- Wauters, E., Bielders, C., Poesen, J., Govers, G., & Mathijs, E. (2010). Adoption of soil conservation practices in Belgium: an examination of the theory of planned behaviour in the agri-environmental domain. *Land Use Policy*, 27(1), 86-94.
- Willcox, A. S., & Giuliano, W. M. (2011). Cattle rancher and conservation agency personnel perceptions of wildlife management and assistance programs in Alabama, Florida, Georgia, and Mississippi. *Wildlife Society Bulletin*, 35(2), 59-68.

Appendix

Farmer Outreach Materials and Posts

Facebook Posts:

- Hello! I am a graduate student from the University of Missouri researching NW Arkansas poultry farmers' opinions on remediating out-of-use poultry barns. If you live in the area and have or used to have a poultry house on your land/that you've managed, would you be willing to take a few minutes to take this survey? I'd appreciate your time and would love to hear your take on this. Link to survey:
https://missouri.qualtrics.com/jfe/form/SV_6xsHzDbYyKOLa6i
- Hello, if any poultry farmers in the area are interested in participating in a short interview over the phone, we are offering a 25 dollar research incentive. I am a graduate student at Mizzou looking into farmer's perceptions of their out-of-use poultry barns. If you are interested feel free to email me at jawrcb@mail.missouri.edu. Thanks!!

Flyer:



The University of Missouri School of Natural Resources is conducting a research project on poultry houses and is requesting your help! If you are a poultry grower in the area we would like to hear your thoughts, either by taking a survey or engaging in a short phone call. We are studying the opinions of current or former poultry growers on out-of-use poultry barns, the pros/cons of removing them once they are out-of-use, their environmental impacts, and the role of poultry integrators in this process. If you would like to learn more or participate, please take the short, 5-minute survey (link is below) or scan the QR code with your smartphone camera. If you'd like to contact the researcher, or participate in a short interview over the phone for a \$25 dollar incentive, please find the researcher's contact information below. Thank you!



Link to survey: bit.ly/poultrysurvey

For further information: Jake Worsham, jawrcb@mail.missouri.edu, 573-645-7699

Copy of Survey for Farmers

Consent Statement: Hello! You are being invited to take part in a survey for a research project through the University of Missouri. If you are a farmer or landowner who manages an operating poultry house, has managed a poultry house in the past, or has an out-of-use poultry house on your property, we will greatly value your opinion on the questions in this survey! Before we begin, please read this consent statement: You must be 18 years of age or older. Your participation is voluntary, and you may stop being in this study at any time. You are being asked to complete this online survey and to share your honest opinion on this practice. The survey should only take 5 to 10 minutes. The information you provide will be kept confidential and only the research team will have access. If you have questions about this study, you can contact the University of Missouri researcher at jawrcb@mail.missouri.edu or 573-645-7699. If you have questions about your rights as a research participant, please contact the University of Missouri Institutional Review Board (IRB) at 573-882-3181 or muresearchirb@missouri.edu. We appreciate your consideration to participate in this study.

(Q1) I have read the above statement and I consent to participate in this survey.

- Yes, I consent to participate in this survey
- No, I do not consent

(Q2) How many poultry houses do you have on your land, including those in-use and out-of-use?

- Just 1
- 2-3
- 4-10
- 11-20
- More than 20
- I do not have any poultry houses
- I had poultry houses, but have already removed all or some of them (how many did you have?) [OPEN RESPONSE]

(Q3) If you have poultry houses on your land that are not being used for poultry currently, what are you using these houses for? (you can select multiple)

- I am still using them for poultry
- Storage areas (equipment, hay, etc.)
- Using it for other animals
- Nothing, the house is abandoned
- I might use it for poultry again soon
- I am hoping to sell the house eventually
- Other, please explain [OPEN RESPONSE]

(Q4) Have you ever considered removing these old poultry houses on your own to make room on your land for other uses? (you can select multiple)

- No, the poultry house is out-of-use but it is not an issue
- Maybe, but I don't need the land for anything else
- Yes, but I don't have the time or resources needed to remove it

- Yes, I want to sell the house
- I already removed some poultry houses from my land
- I am still using the house for poultry
- Other, please explain [OPEN RESPONSE]

(Q5) In your opinion, can abandoned poultry houses be harmful to the soil or the environment?

- Not at all
- Probably not
- To a small degree
- Most likely
- Yes
- Other, please explain [OPEN RESPONSE]

(Q6) If you are comfortable, please briefly state why you left the poultry business (if your poultry house is currently out-of-use):

- OPEN RESPONSE

(Q7) If you are comfortable, please mark your ethnicity/race:

- Asian or Pacific Islander
- Black or African-American
- Hispanic or Latino
- Native American or Alaskan Native
- White or Caucasian
- Multiracial or Biracial
- A race/ethnicity not listed here [OPEN RESPONSE]
- I prefer not to say

(Q8) Have you ever heard of a Natural Resource Conservation Service conservation program called “Practice 360 – Waste Facility Closure” for the removal and remediation of poultry houses and the soil beneath them?

- Yes
- No
- Maybe
- I have heard of other conservation programs involving poultry houses, but not Practice 360 (please specify) [OPEN RESPONSE]
- Other, please explain [OPEN RESPONSE]

(Q9) Practice 360 is a conservation program offered through the NRCS that aids farmers in the removal of out-of-use poultry houses and remediates the soil beneath, which could allow for some alternative land uses and reduces the environmental impacts of these houses. Cost-share assistance can be applied for in order to reduce the financial strain of such a project, with up to 75-90% of the costs covered.

Could you see yourself ever working with the NRCS to participate in such a program and remove your old poultry houses, now or in the future?

- Yes
- No
- Maybe, with cost-share assistance
- I would need more information
- Other, please explain [OPEN RESPONSE]

(Q10) Some have suggested that the following are incentives for participation in this program. For you personally, which of these do you see as positive incentives for participation? (you can select multiple)

- Cost-share assistance
- Using the land for other purposes
- Reducing environmental impact
- A simple, easy, quick process
- Aesthetics
- None of the above
- These are incentives, but I still don't think I would participate (expand if you would like) [OPEN RESPONSE]
- Other, please explain [OPEN RESPONSE]

(Q11) Some have suggested that the following might be disincentives for participation. For you personally, which of these do you see as a negative disincentive? (you can select multiple)

- Lack of personal knowledge of program
- Potential costs
- Lack of clear incentives
- Time, effort, and energy required
- I can remove or sell the house myself
- The poultry house isn't harming anyone/thing as it is
- Government interference on property
- I use the house for another purpose, or could use it again for poultry
- None of these are disincentives
- Other, please explain [OPEN RESPONSE]

(Q12) Do you have anything else you would like to add regarding the subject of out-of-use poultry houses?

- [OPEN RESPONSE]

(Q13) Would you be interested in participating in an interview about this subject? We are providing a 25 dollar cash incentive for interviews and would love to hear your opinion on this matter for our research. If so, please provide your name and your email below and we will be in touch to schedule a short phone call (This information will be kept confidential). Please click the arrow below to submit your survey! Thanks so much.

- [OPEN RESPONSE]

Interview Guide for Farmers

Read IRB Consent Statement:

Before we begin, please let me read this consent statement: Your participation is voluntary, and you may stop being in this study at any time. You are being asked to participate in this interview and to share your honest opinion. The interview should take around 30 minutes. The information you provide will be kept confidential and only the research team will have access. If you have questions about this study, you can contact the University of Missouri researcher at jawrcb@mail.missouri.edu or 573-645-7699. If you have questions about your rights as a research participant, please contact the University of Missouri Institutional Review Board (IRB) at 573-882-3181 or muresearchirb@missouri.edu. We appreciate your consideration to participate in this study.

Pre-question: Do you consent to be interviewed and for this interview to be recorded?

Q1: First of all, can you tell me a bit more about yourself and your farm, and perhaps about your history of working as a poultry farmer? Why did you leave the business?

Q2: Had you ever heard of Practice 360 – Waste Facility Closure before I mentioned it to you in my letter/email?

- *If yes...* **Can you tell me what you know about it?**
- *If not...* Basically, Practice 360 is a conservation program offered through the Natural Resource Conservation Service that aids farmers in the removal of decommissioned poultry houses and remediates the soil beneath, which could allow for some alternative land uses and reduces the environmental impacts of these houses. Cost-share assistance can be applied for in order to reduce the financial strain of such a project.

Q3: Could you see yourself participating in such a program to remove the poultry house on your land? Why or why not?

- Potential prompts, depending on the content/length of their initial answer to Q3.
 - What are you currently using your poultry house for?
 - Can you tell me how your knowledge or lack of knowledge about the program impacts your desire to participate?
 - Can you tell me about how the cost of participation might impact you? How important would it be for you to receive cost-share assistance?
 - Do you perceive there to be a lack of incentives to participate?
 - Other farmers have mentioned that the time and effort required to participate might be a disincentive. How do you feel about this?
 - Have you ever thought of removing the poultry house by yourself?
 - Practice 360 is a relatively new program and has not been used frequently in this part of the state. Would you feel differently if you knew of others who had participated successfully in this program?

Q4: As it stands, potential incentives to participation include the ability to remove the poultry house with cost-share assistance, and to remediate the soil which would increase the environmental quality of the soil. **Because participation is completely voluntary, what incentives to participation interest you the most, if any, or what additional incentives would you want included to decide to participate?**

- Potential prompts, depending on the context/length of their initial answer to Q4.
 - Some farmers are motivated primarily by the potential for cost-share assistance to aid in the project costs, and wouldn't participate in this program without this assistance. Would the potential to receive cost-share assistance change things for you?
 - What environmental impacts do you think out-of-use poultry houses might have, if any?
 - Some farmers have been incentivized by the ability to use the land for other purposes with the poultry house removed and the soil remediated. Can you think of any other potential land uses for your land if you participated?
 - Some farmers have said they wouldn't participate unless the process was simple, quick and easy. How do you feel about this?

Interview Guide for Local Professionals

Read IRB Consent Statement:

Before we begin, please let me read this consent statement: Your participation is voluntary, and you may stop being in this study at any time. You are being asked to participate in this interview and to share your honest opinion. The interview should take around 30 minutes. The information you provide will be kept confidential and only the research team will have access. If you have questions about this study, you can contact the University of Missouri researcher at jawrcb@mail.missouri.edu or 573-645-7699. If you have questions about your rights as a research participant, please contact the University of Missouri Institutional Review Board (IRB) at 573-882-3181 or muresearchirb@missouri.edu. We appreciate your consideration to participate in this study.

Pre-question: Do you consent to be interviewed and for this interview to be recorded?

Q1: Can you tell me a bit about your job and the ways in which you work with local poultry growers?

Q2: Why do you think many poultry farmers in the area have left their contracts with poultry integrators?

- If poultry growers still have their out-of-use houses up, what do you think they use them for?
- Do you think these growers have thought about removing these barns? Can you think of any benefits of doing so?

Q3: Had you ever heard of Practice 360 – Waste Facility Closure before I mentioned it to you in my letter/email?

- *If yes...* **Can you tell me what you know about it?**
- *If not...* Basically, Practice 360 is a conservation program offered through the Natural Resource Conservation Service that aids farmers in the removal of decommissioned poultry houses and remediates the soil beneath, which could allow for some alternative land uses and reduces the environmental impacts of these houses. Cost-share assistance can be applied for in order to reduce the financial strain of such a project. **What are your initial thoughts on this?**

Q4: What do you think are the pros/cons for farmers for removing out-of-use barns? For participating in a program like Practice 360?

Q5: What do you think are the environmental issues that can be associated with poultry barns?