

FACTORS ASSOCIATED WITH FARMER ADOPTION OF BEST MANAGEMENT  
PRACTICES IN THE SUWANNEE RIVER WATER MANAGEMENT DISTRICT OF  
NORTH FLORIDA

By

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To the Suwannee River Partnership and all of my participants.

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The idea of attending graduate school was never a fond one for me. However, I found myself in a decision-making time crunch as I was graduating in eight months with a degree in Wildlife Ecology and Conservation and had no idea what I wanted to do post graduation. Also known as a 'big girl job.' I randomly stumbled upon the Agricultural Education and Communication (AEC) Department website, and decided to contact the academic support services coordinator for the department. She gave me so much insight, hope and set up a meeting for me with faculty members and graduate students. Thank you Jodi!

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I gained communication confidence through my teaching assistant responsibilities. I was challenged on numerous occasions by undergraduate students. I thoroughly appreciate those brief moments of conflict and learned how to stick up for my grading decisions. Before graduate school, I avoided conflict at all costs because I never knew how to respond. Though I don't think I will ever seek out conflict I will know how to handle circumstances better in the future. I also want to thank my students for their constructive criticisms at the end of each semester during evaluations. Feedback is an important aspect of growth. I was also able to grow in my public speaking abilities. On several occasions, lead instructors gave me the opportunity to give lectures in front of large audiences. Though my technique is certainly not perfect, I now enjoy speaking.

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## LIST OF ABBREVIATIONS

BMP	Best Management Practice
CWA	Clean Water Act
EPA	Environmental Protection
FDACS	Florida Department of Agriculture and Consumer Science
FDEP	Florida Department of Environmental Protection
FWPCA	Florida Water Pollution Control Act
OAWP	Office of Agricultural Water Policy
SRP	Suwannee River Partnership
SRWMD	Suwannee River Water Management District
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
WMD	Water Management District

Abstract of Thesis Presented to the Graduate School  
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By 1998, the nitrate problem in the Suwannee River Basin was a well-documented concern. The Suwannee River Partnership (SRP) was created in 1999 as a response to a need for collaboration between multiple political and private entities to solve the nitrate issue in ground water and surface water in the region. The main goal of the Partnership is to improve water quality and reduce water usage within the Suwannee River Water Management District (SRWMD) without regulations.

The purpose of this research was to identify and describe the factors that contribute to farmer adoption or rejection of Best Management Practices (BMPs). The researcher assessed the communication channels used by farmers in the SRWMD. Participants of the study were interviewed and included SRP staff members and dairy, poultry and field crop farmers in the SRWMD.

The results show that money and trust are the most important factors contributing to farmer adoption of BMPs. The majority of farmers want to participate in a BMP program because of the economic savings BMP participation provides. Farmers generally trust the one-on-one relationships that the SRP provides, which encourages

adoption. Another key finding showed that non-adopters in the SRWMD do not exist. In some cases, signing up for SRP programs was just a formality. A major theme portrayed by the farmer participants was a feeling of stewardship toward the land. Farmers wished that the public understood their operations and knew agriculture takes good care of the land. In general, participants were concerned about the lack of agricultural education in the public and the potential political implications.

## CHAPTER 1 INTRODUCTION

### **Background**

The basic structure for the current national water quality policy and programs was developed by Congress with the Federal Water Pollution Control Act (FWPCA) of 1972. The Clean Water Act (CWA) of 1977 reorganized the FWPCA and added a major new program to control toxic water pollutants. Of the subsequent amendments to these statutes, a significant one was the Water Quality Act of 1987, which addressed "toxic hot spots" and storm water discharges (ChemAlliance, 2007). Large contributors to "toxic hot spots" are non-point source discharge from agriculture runoff. Control was provided under the 1987 amendments, which required states to submit state management programs to control pollutant discharges from non-point sources (Environmental Law Handbook, 1997).

The primary purpose of the CWA was to restore, protect and maintain the chemical, physical and biological integrity of the nation's surface waters (Environmental Law Handbook, 1997). It is unlawful to discharge pollutants into waterways except as provided by the terms of the Act. The surface waters covered by CWA are defined broadly, and include rivers, lakes, intermittent streams, and even wetlands (ChemAlliance, 2007).

In 1972, The Florida Water Resource Act was established. This Act formed an administrative water law that assembled all waters of the state under regulatory control (Olexa, D'Isernia, Minto, Miller & Corbett, 2009). Five Water Management Districts (WMDs) were formed, encompassing the entire state and still exist today. Each district covers one or more important water basins. Watersheds rather than political boundaries

define these districts (Water Encyclopedia, 2007). The WMDs are responsible for water supply, flood protection and water quality among other natural issues. WMDs play a significant role in the regulation of agriculture water control and use. Each district develops a management plan that defines the district's role in water resource management and provides comprehensive long-term direction (Florida Department of Agriculture and Consumer Services, 2004).

The Florida Department of Environmental Protection (FDEP) administers the Water Resource Act of 1972. FDEP prepares the state water use plan and works to foster interagency agreements to achieve the plan. The water plan is developed by FDEP through consultation with federal, state and local agencies and particularly the WMDs. Its main purpose is to recognize various interests competing for water-use rights and to allocate for these rights while retaining reasonable water quality and quantity control, and promoting the goals of environmental protection, proper drainage, flood control and water storage and ensuring a reliable water supply for Floridians in the future.

The Office of Agricultural Water Policy (OAWP), within the Florida Department of Agriculture and Consumer Science (FDACS), was established to facilitate communications among federal, state, local agencies, and the agricultural industry on water quantity and water quality issues involving agriculture. In this effort, the OAWP is actively involved in the development of Best Management Practices (BMPs), addressing both water quality and water conservation on a site specific, regional, and watershed basis. As a significant part of this effort, the office is directly involved with statewide programs to implement the Federal Clean Water Act's Total Maximum Daily Load

(TMDL) requirements for agriculture. The OAWP regulates agricultural producers and industry groups, the FDEP, the university system, and the Water Management Districts to develop and implement BMP Programs that are economically and technically feasible.

These different acts and agencies established the regulatory water conservation movement in Florida. The overall goals included conserving both quality and quantity of water as a resource. As state and regional agencies were collecting data on the sources and amount of nitrogen in the Suwannee River Valley, they began to research the best method for problem solving (Dedekorkut, 2003).

By 1998, the nitrate problem in the Suwannee River Basin was a well-documented concern. Nitrates in water have several sources, principal among which is agriculture. From the early 1980s, to the turn of the century, the nitrogen readings in the Suwannee River Basin doubled and have been consistently higher than comparable water bodies in the region (Ritchie, 2002). The three main commodity groups in the Suwannee River Basin are dairy, poultry and field crop farmers. The Suwannee River Water Management District (SRWMD) estimated that inorganic nitrogen (or fertilizer) was responsible for 45 % of the nitrate problem; poultry was responsible for 33 % of the nitrate problem, 10 % from dairy cows, 5 % from beef cows, 6 % from the atmosphere and 1 % from people (Hornsby & Mattson, 1998). This led to the discovery that SRWMD had the state's largest area of elevated groundwater nitrate-nitrogen concentrations (Hornsby, Ceryak & Zwanka, 2002).

After this discovery, a focus was placed on finding opportunities to assist farmers. It was recognized that the system was too complex and a coordinated effort would be

necessary to have a comprehensive perspective and authority over all aspects (Dedekorkut, 2003). These ideas became the building blocks for a partnership.

### **Suwannee River Partnership**

The Suwannee River Partnership was created in response to a need for collaborations between multiple political entities. Formed in 1999, the Suwannee River Partnership (SRP) began with 24 state, federal, and regional agencies, local governments, and private industry members along with the University of Florida Cooperative Extension Service (Dedekorkut, 2003). The Partnership's initial focus was the Middle Suwannee Watershed, where in some areas, nitrates and nitrogen in groundwater and springs were well in excess of drinking water standards (Dedekorkut, 2003). In 2003, the Partnership expanded its work to include the Santa Fe River Basin. The partnership has also grown to a stakeholder group of 63 federal, state and local agencies, state associations, private businesses, and other organizations all interested in improving water conditions within the SRWMD.

The Partnership's primary goal is to improve and protect water quality in the Suwannee River and the dozens of springs that feed it by reducing nitrate levels in the surface and groundwaters, using a watershed approach to management. The Partnership seeks a balance between protecting natural resources and sustaining the region's agricultural economy.

The components of the SRP include Best Management Practices, Cost-Share, Quality Assurance and the County Alliance for Responsible Environmental Stewardship. The Best Management Practices (BMPs) are economical and technologically feasible changes in farming practices designed to reduce polluted runoff and conserve water (Dedekorkut, 2003). These BMPs are made available to assist farmers in complying

with regulatory requirements for protecting public health and the environment. Since nitrates come from a variety of sources such as fertilizer and waste, BMPs have been developed for all possible sources and for each different farm type. The Cost Share Programs exist to help dairy, poultry and field crop farmers compensate for the cost of updating their waste management and fertilizer techniques. Quality Assurance relates specifically to the management practices and it verifies that BMPs are implemented and maintained properly over long periods of time (Dedekorkut, 2003). Technicians provide assistance to farmers who have problems sustaining the BMPs. The Partnership also uses this program to account for the public funds used for cost share programs. If BMPs are not maintained and do not serve their purpose, future cost share programs may not be available. The County Alliance for Responsible Environmental Stewardship (CARES) is a part of the Florida Farm Bureau. The Farm Bureau certifies and recognizes farmers that participate in the Partnership program. To maintain CARES status, farmers must continue to operate and maintain their practices over time (Suwannee River Partnership(b), n.d.).

The Partnership also contributes to many research and education programs. The University of Florida Institute of Food and Agriculture Science's Manure Lab provides manure analysis and application rate recommendations to growers in the Basin (Dedekorkut, 2003). A Manure Lab Committee also meets monthly and publishes The Poop Scoop for producers (Smith, 2009). This newsletter develops education related to animal waste management. A Mobile Irrigation Laboratory evaluates irrigations systems for efficiency and makes recommendations to farmers about water conservation (Dedekorkut, 2003). The Mobile Lab also demonstrates how the

recommendations benefit water quality and nutrient management. Lastly, An On-Farm Research Program contains a BMP effectiveness Demonstration Project. The Demonstration Project evaluates BMPs at different types of farms to evaluate site-specific BMPs by monitoring water quality pre- and post-BMP implementation (Suwannee River Partnership(c), n.d).

The Suwannee River Partnership has undergone many transitions and challenges since its conception. Aysin Dedekorkut did the last general assessment of the progression of the Partnership in 2003, under the Department of Urban and Regional Planning at Florida State University. It documented the amount of waste BMPs have kept from the aquifer. The assessment also showed how the level of farmer participation has changed over time. The second assessment was a farmer survey conducted by the Suwannee River Partnership and the Florida Department of Agriculture. The purpose of the survey was to establish farmers' attitudes and perceptions of the Partnership (Land, 2008). It also asked participants how they value the Partnership's work and how it should work to protect the environmental future of the SRWMD. According to the Partnership, the survey would allow them to provide a valuable service to its membership and to surrounding communities (Land, 2008).

### **Suwannee River Partnership Strategic Plan**

After two assessments, the SRP developed a Strategic Plan for 2008-2011. This plan includes a vision of being "an effective partnership for promoting excellent water quality and conservation for all citizens of the SRWMD" (Suwannee River Partnership, 2008, p.2) The plan also has a mission to provide "researched based solutions that protect and conserve the water resources within the SRWMD by emphasizing the implementation of voluntary or incentive-based programs" (Suwannee River

Partnership, 2008, p.2) The Partnership identified priority areas with key steps or activities to achieve the goals and explained how they will measure success.

Currently, the Partnership has three priority areas, one of which is BMP research, education, and implementation. The Partnership plans to continue to conduct research that verifies and improves the effectiveness of land management practices in protecting and saving water (Suwannee River Partnership, 2008). The first priority also identifies educational information that provides solutions to land users on management practices that help protect the environment and that are feasible to use, as well as, continuing to provide programs and incentives that help landowners implement management practices that help protect and save water (Suwannee River Partnership, 2008). The second priority is to expand the Partnership by seeking to form new partnerships while promoting the non-regulatory incentive based approach with local leaders and citizens within springsheds. The third and final priority is to increase awareness, marketing and accountability. The Partnership wants to continue to inform landowners, citizens, partners, elected officials, and others about Partnership programs (Suwannee River Partnership, 2008). In addition, continuing to document how Partnerships programs help protect and save water will be critical to keep programs voluntary (Suwannee River Partnership(d), n.d.).

As the Partnership evolves, the strategic plan is a way for the Partnership to propose solutions to problems addressing issues of adoption rates, Partnership expansion to new stakeholders, and increasing general public awareness.

### **Suwannee River Partnership Challenges**

An obstacle in dealing with the agricultural pollution issues stems from farmers' resistance to traditional one-size-fits-all command-and-control approaches that do not

allow flexibility for site-specific application (Dedekorkut, 2003). The CWA requires states to submit a list of “impaired water bodies” defined as surface waters that do not meet water quality standards. The CWA obligated that TMDLs be established for such impaired waters. The Florida Watershed Restoration Act (FWRA) passed in 1999 executed the TMDL program for the state (Florida Department of Agriculture and Customer Service, 2004). FDACS was designated to direct the program for addressing agriculture non-point source pollution.

Farmers view this type of administration as ineffective and inequitable (Dedekorkut, 2003 & Windham, 2009). Farmers believe that a voluntary proactive participation will achieve results more quickly and at a higher level than the traditional approach (Suwannee River Water Management District, 2003). Participants of the Partnership agree that that applying BMPs voluntarily is more efficient than TMDLs in improving water quality since farmers are doing more than they would do otherwise (Dedekorkut, 2003). Farmers think that TMDLs would not achieve better practices or water quality because “people would be intimidated” (Dedekorkut, 2003, p.96). There is also a significant amount of mistrust of the governmental agencies. Farmers have a perception that bureaucracies collaborate to “gang-up” on agriculture production that they are not out for the good of agriculture (Windham, 2009). Fortunately, FDACS, under the Florida state law, is given the option to take care of agriculture water quality issues through voluntary, incentive-based programs to avoid regulatory intervention if significant improvement of water quality can be proven (Florida Department of Agriculture and Consumer Services 2004). This is known as the Impaired Waters Rule.

While this option is an opportunity for the farmers and allows the partnership to continue, it does have some criticisms. One is in regards to long-term sustainability of BMPs by farmers due to the voluntary nature of the program. Another is whether or not BMPs are inherently effective as a solution to nitrate problems (Dedekorkut, 2003). There is also a level of mistrust by environmental groups that farmers will do the right thing in the absence of regulation. They believe that the SRP has created a loophole to allow farmers to sidestep regulatory actions, like set pollution limits, for the Suwannee River and consequently individual farms. Environmental groups would prefer that TMDLs be required, and they maintain that the state should require farmers to obtain permits in the same way as other industries that cause pollution (Dedekorkut, 2003).

Status reports from 2001 showed that portions of the basin were not meeting their designated uses (Suwannee River Partnership, 2008). This resulted in the Middle and Lower Suwannee River, the Santa Fe River and the Suwannee River Estuary being added to FDACS's list of impaired water bodies submitted to the EPA. Following this listing, the FDEP is mandated to reduce nitrate levels using regulatory measures (Dedekorkut, 2003). Therefore, FDEP and EPA must evaluate if the current or proposed pollution control mechanisms effectively address the impairment of the water as part of the Impaired Waters Rule. This would include limiting farmers in how much they fertilize or irrigate their crops and restricting how livestock producers manage the waste of their animals. However, at the time of listing no regulatory tools existed to cover all the farmers at the state level, so cost-share incentives supplemented the agency in achieving its goals (Dedekorkut, 2003).

In 2002, to prevent imposing mandatory rules and regulations on its farmers in the future, SRP developed and submitted “Reasonable Assurance” documentation to FDEP and EPA. This would try to prove that the Partnership’s management programs were dealing with water quality concerns appropriately using non-regulatory methods. Documentation was accepted by FDEP but denied by EPA. EPA stated that there was a lack of farmer commitment in the Upper Suwannee and Santa Fe watersheds. EPA asserted that attaining participation would be crucial for meeting water quality standards in the Suwannee Basin and did not approve of the decision of excluding portions of the river (Dedekorkut, 2003). However, EPA did recognize the Partnership’s efforts and assigned portions of the river with high participation a low priority, meaning that TMDLs would not be scheduled in the near future.

Though the EPA did not require that TMDLs be established immediately, the SRP needs to respond to the EPA’s denial of the SRP’s “Reasonable Assurance” documentation. In the future, if the Partnership submits another document they need to show an increase in the level of participation (or BMP adoption) to decrease the level of doubt and eliminate EPA’s possible requests. This would ensure that farmers would not be subjected to mandatory regulations.

In 2003, goals were established for 80% participation in the implementation of BMPs for field crops and 100% participation for poultry and dairy farmers in the basin by 2008 (Smith, 2009). Though field crop and poultry participation increased by 2008, it was not to the extent desired and dairy participation had decreased. The Partnership should understand the discrepancies in adoption rates before moving forward (Smith, 2009).

The Partnership needs to be able to prove, with certainty, to FDACS and EPA that it plays a significant role in reducing nitrates. There is a sense of urgency to be able to record significant water quality improvement. This is most critical regarding the possibility of regulatory actions being considered in the future, especially since parts of the SRWMD were submitted on the impaired waters list. However, even if BMPs are working well it will take a long time to observe environmental outcomes. This is especially true for groundwater due to its age. As a result, achieving water quality levels designated is not projected to be before 2028. Therefore, farmer adoption rate is the only measure of reasonable assurance for farmer compliance (Dedekorkut, 2003). FDEP expects local stakeholders (SRP) to prepare documentation to demonstrate reasonable assurance that proposed control mechanisms will restore the water body. There is some doubt that the Partnership will be able to describe the impaired water, water quality goals, propose management actions, procedures for monitoring and reporting results, and proposed corrective actions to the extent required. If they cannot establish reasonable assurance, and regulatory actions are implemented, it is unknown how the farmers' perceptions and attitudes of the Partnership will change. The level of participation could drop dramatically due to mistrust. The Partnership has always been voluntary, but if the state forces mandatory compliance it loses its appeal and becomes unnecessary.

### **Research Problem**

Nitrates in the SRWMD have been on the rise over the last two decades, with agriculture being a major contributor (Suwannee River Partnership(a), n.d.). While the Suwannee River Partnership had achieved adoption of BMPs in all three of the major commodity groups, over time, the adoption rates had reached a plateau. The

Partnership needs to reach complete farmer adoption of BMPs in the Suwannee River Valley. In addition, the Partnership was under growing pressure to demonstrate its ability to reduce nitrate levels through incentive programs for farmers. The Partnership needs to know if the structure of its programming and communication increases adoption rates.

### **Purpose**

The purpose of this research was to discover the communication channels used by the dairy, poultry and field crop farmers in the SRWMD and how the SRP uses these channels to encourage BMP adoption. The study examined the influence of SRP programs and materials in farmers' decisions to adopt BMPs. The study conducted examined the adoption of BMPs by dairy, poultry and field crop farmers located in the Suwannee River Water Management District. The researcher will be identifying and describing factors that influence individual farmer adoption of BMPs.

The following objectives were used to guide this study:

1. Determine the communication channels used by the three main farmer groups in the SRWMD.
2. Determine farmers' perception of the value of SRP programs and materials on BMP adoption.
3. Determine the factors that contribute to farmer adoption of BMPs.
4. Identify barriers that contribute to farmer non-adoption of BMPs.
5. Explain the varying adoption rates among dairy, poultry and field crop farmers in the SRWMD.

### **Significance of the Study**

As the study identifies the factors that contribute to farmers' decisions to adopt or not adopt BMPs, it will play an important role in determining how to convey the

importance of water conservation to agriculture audiences and increase participation in conservation programs. The study will allow the Partnership to see if its stated mission, vision and activities will achieve their proposed goals. The study will make the SRP aware of any gaps between their plans to increase adoption and the real life situations of the individual farmers. When independent variables are established it will improve the Partnership's knowledge of values, attitudes and beliefs regarding farmer's adoption of BMPs. The Partnership can then decide how to respond to these values, attitudes and beliefs to move towards higher adoption rates. The conclusions will show the Partnership whether it will need to refocus, reprioritize and edit the strategic plan to achieve higher adoption rates in the Suwannee River Valley. If the mission of the SRP is realized, the overall nitrate levels in the Suwannee River Basin will be reduced, thus making a healthier environment for all residents in the area and help alleviate some of the struggles arising between humans and their natural resources.

### **Definition of Terms**

1. **ADOPTION.** Maintaining and sustaining the appropriate BMPs on a farm based on the commodity produced.
2. **BEST MANAGEMENT PRACTICE (BMP).** A structural or nonstructural method of preventing or reducing the movement of sediment, nutrients, pesticides and other pollutants from the land to surface or ground water, or which otherwise protect water quality from potential adverse effects of agricultural activities.
3. **CLEAN WATER ACT (CWA).** Federal legislation that serves restore, protect and maintain the chemical, physical and biological integrity of the nation's surface waters.
4. **SUWANNEE RIVER PARTNERSHIP (SRP).** Formed in 1999 as a coalition of state, federal and regional agencies, local governments, and private industry representatives working together to reduce nitrate levels in the surfacewaters and groundwater within the basins, or watersheds of the Suwannee River Water Management District (Suwannee River Partnership(a), n.d.).

5. SUWANNEE RIVER WATER MANAGEMENT DISTRICT (SRWMD). One of five regional water management districts in Florida created by the Water Resources Act of 1972. SRWMD is the smallest of the water management districts in terms of geographic area and population served and manages water and related natural resources in north-central Florida by providing water quality and quantity monitoring, research, regulation, land acquisition and management, and flood protection (Suwannee River Water Management District, 2006).
6. TOTAL MAXIMUM DAILY LOAD (TMDL). The maximum amount of a given pollutant that a water body can absorb and still maintain its designated uses (Suwannee River Partnership(e), n.d.).

### **Limitations**

As with all research, there are limitations, which will affect the transferability of the specific results of the study. Since a purposive sample will be used, the findings can only be used with accuracy within the Partnership. Though findings might be relevant to other similar organizations promoting the adoption of BMPs or similar conservation tools, it will not directly parallel other farmers. Another possible limitation is the dynamics between the interviewer and the participant during interview sessions. Individuals may not be as willing to share all experiences and the data would be swayed in the direction of the most verbal participants.

### **Assumptions**

There are several assumptions of the study as well. First, it was assumed that all respondents answered the questions honestly and accurately. It is also assumed that all of the participants have had some form of contact with the SRP. Whether they have adopted the BMPs or not, the SRP assumes that all farmers in the Suwannee area have attended a Partnership sponsored program or had personal contact with SRP personnel. It will also be assumed that the BMPs recommended and applied by the Partnership are the most effective available tools for conserving water quality and quantity. Another assumption is that the Partnership is the only thing contributing to

farmer adoption. There could be multiple confounding factors, such as community norms and outside educational effort, which could be enhancing or masking the effect of the Partnership.

### **Summary of Chapter 1**

Regulatory laws and agencies established in the 1970s and 1980s began a water conservation movement to protect the resources quality and quantity. The Suwannee River Partnership was formed to allow all the political entities to communicate effectively to the agriculture audience in the SRWMD. As nitrates continued to rise in the Suwannee River Valley the Partnership reached a plateau of BMP adoption. The Partnership needs to understand why there is incomplete farmer adoption of BMPs in the Suwannee River Valley. The purpose of the study is to examine the influence of SRP programs and materials in farmers' decisions to adopt BMPs. This study will identify and describe factors that influence individual farmer adoption of BMPs and farmers' perceptions of the SRP. These factors will let the SRP review the structure of their programming and communication to increase adoption rates. The findings of the study will determine how to convey the importance of water conservation and increase participation in conservation programs to make a healthier environment for all residents in the area.

## CHAPTER 2 REVIEW OF LITERATURE

### **Introduction**

The water conservation movement in the United States began in the 1970s and 1980s through the establishment of several laws and enhancements of governmental agencies. The creation of the Suwannee River Partnership (SRP) in 1999 allowed these entities to consolidate into an effective communication tool in the Suwannee River Water Management District (SRWMD). The SRP also needed to respond to the high level of nitrates in the Suwannee River Valleys water resources. Therefore, a primary goal of the Partnership was to employ a BMP adoption program in the area. Eventually, adoption reached a plateau. The purpose of this study was to understand why there is incomplete adoption and examine the influence of SRP programs and materials in farmers' decisions to adopt BMPs. The findings will allow the Partnership to review its structure and communication, discover the most effective ways to convey recommended conservation practices and improve water quality and quantity in the SRWMD.

### **Theoretical Framework- Rogers' Diffusion**

The guiding theory for this research was Diffusion of Innovations by E.M. Rogers (2003). According to Rogers, diffusion is a process that begins with an innovation, which is then passed through certain communication channels over time between members of a social system. The four main elements of the process are the innovation, communication channels, time and the social system. For this research, diffusion will be the process by which BMPs are communicated through communication channels

among the three main farmer groups of the SRWMD. BMPs are the innovation and farmers within the SRWMD constitute the social system.

## **Innovation**

An innovation is a concept or object that is perceived as new by an individual. Newness of an innovation does not just involve new knowledge. In some cases, an individual may have known about the innovation for some time but never developed a favorable or unfavorable attitude toward it. Therefore, “if an idea seems new to an individual, it is an innovation” (Rogers pg 12).

Best Management Practices (BMPs), such as the one encouraged by the SRP, are a type of technology. According to Rogers, technologies have two components: a hardware aspect and a software aspect. The hardware consists of the physical representation or the tool of the innovation, and the software aspect consists of the information behind the tool. Technological innovations are typically beneficially for potential adopters. However, potential adopters are usually wary of new innovations and do not consider the new idea a superior alternative to a previous practice (Rogers, 2003). Potential adopters are also uncertain because of an innovations unknown effect.

Rogers (2003) states that there are five important characteristics of innovations that help explain the rate of adoption. These characteristics include: relative advantage, compatibility, complexity, trialability and observability. The relative advantage of an innovation is the extent to which an innovation is improved from the one before it. Relative advantage can be measured economically, in terms of social prestige, convenience or satisfaction. Therefore, the greater the perceived level of relative advantage, the faster the rate of adoption. Compatibility is measured by how consistent the innovation is with previously existing values, norms, experiences and needs of

potential adopters. A compatible innovation will be adopted more quickly. Complexity refers to how difficult an innovation is to use and understand. Ideas that are simpler to understand are easier to adopt. Innovations that require an adopter to attain a new skill are less frequently adopted. Trialability refers to the ability to experiment with an innovation. Ideas tried on a limited basis are generally adopted more quickly. Finally, observability is how visible results of an innovation are to other potential adopters. High observability encourages faster diffusion of the innovation (Rogers, 2003).

### **Communication Channels**

Communication channels allow messages about an innovation to pass from one individual to another (Rogers, 2003). Typically, mass media channels, such as radio, television and newspapers, tend to be a more rapid and efficient method to inform potential adopters. Interpersonal channels involving face-to-face exchanges tend to be more effective in persuading individuals to accept new ideas. These exchanges are especially effective if the individuals are similar in socioeconomic status, education or other important demographic characteristics. Diffusion investigations show that most people depend on the experiences of peers to evaluate an innovation, suggesting that diffusion consists of modeling and imitation by potential adopters of those who have previously adopted, emphasizing the importance of interpersonal communication relationships (Rogers, 2003).

An obvious step in communication is the transfer of ideas between individuals. This transfer usually occurs between two individuals that are homophilous. Homophily is the degree to which individuals who interact are similar in their attributes. Heterophily is the degree to which individuals differ in their attributes. The nature of diffusion requires some heterophily between two participants in the communication process so

there is new information to exchange. However, ideally, the individuals would be homophilous on all attributes, other than the innovation, to make the diffusion process smoother.

## **Time**

Time has three dimensions involved in diffusion: the innovation-decision process, the innovativeness of an individual compared with other members of the system and an innovation's rate of adoption in a system.

The innovation-decision process is how an individual passes from first knowledge of an innovation to the forming an attitude toward the innovation to decide to adopt or reject the new idea (Rogers, 2003). There are five main steps to in this process: knowledge, persuasion, decision, implementation and confirmation. This process and its steps are discussed in detail later with regard to farmers in the SRWMD.

The innovativeness of an individual is the degree to which they are relatively earlier in adopting new ideas compared to other individuals in the system. The more innovative the individual, the more likely they are to adopt (Rogers, 2003). There are four adopter categories based on innovativeness: innovators, early adopters, early majority, late majority and laggards.

The rate of adoption is the speed with which an innovation is adopted in a social system. The rate of adoption is measured by the length of time it takes a certain percentage of the system to adopt the innovation (Rogers, 2003). The system is the structure under which the diffusion is taking place such as an organization or community. The rate of adoption for the same innovation may differ among social systems (Rogers, 2003).

## **Social System**

A social system has a direct effect on diffusion through its unified parts that are engaged together to accomplish a common goal (Rogers, 2003). A social system can offer containment or boundaries for the diffusion of an innovation. A social system affects diffusion through its structure, norms, roles of opinion leaders and change agents (Rogers, 2003).

The structure is how the system is arranged and gives regularity and stability to human behavior so that it can be predicted with some accuracy (Rogers, 2003). There are formal and informal types of structures. A well-developed formal structure involves hierarchies and bureaucracies, while informal structures involve interpersonal networks linking a system's members (Rogers, 2003). The social structure amongst the farmers in the SRWMD is informal.

Norms can also affect a social system. Norms establish patterns of behavior for individuals within the system and define a range of behaviors that are tolerable, set a standard for the system and help the members understand what is expected (Rogers, 2003). A system's norms may provide resistance to change, and therefore, innovations.

Opinion leaders and change agents add to a social systems complexity. Opinion leaders provide information and advice to the members of the system. Their leadership is determined by frequently influencing individuals' attitudes and behavior in a desired direction. Opinion leadership is earned when the leader has technical competence of the innovation, social accessibility and conformity to norms. Opinion leaders are generally more exposed to communication channels, have higher socioeconomic status and are more innovative. They are a central piece of interpersonal communication networks and serve as a social model whose behavior is imitated by others. Opinion

leaders influence the system from the inside while change agents represent a change influence that is external to the system. Opinion leaders are generally more homophilous to the system while change agents are heterophilous. Change agents influence clients' innovation decision in a direction desired by a change agency. Change agent may even use opinion leaders to encourage the diffusion of an innovation (Rogers, 2003).

### **Innovation-Decision Process**

An individual's decision to adopt a new innovation is not an instantaneous action, but a process. The innovation-decision process is a process where an individual passes through several stages, that require choices and actions, which ultimately allow the individual to decide if the innovation will be incorporated into ongoing practices (Rogers, 2003). Prior conditions that affect an individual's innovation-decision process include his or her previous practices, needs, innovativeness and norms. A key distinction in the innovation-decision process compared to other decision is the perceived newness of the idea and the uncertainty connected to the newness. Figure 2-1 is a model representation of the process.

The first stage in the innovation-decision process is the knowledge stage. In this stage an individual gains initial knowledge and information regarding the innovation. An individual can play an active or passive role becoming aware of an innovation (Rogers, 2003). For instance, a farmer in the SRWMD may be exposed to BMPs through an SRP commercial on a mass media channels or from a peer through interpersonal communication. In both scenarios, the farmer did not pursue information or awareness. A farmer could also contact their local extension agent to learn about BMPs because they are concerned about water quality and the quantity of water used on the farm. In

this case, the farmer was influenced by their predisposition to conserve a resource and actively sought information and awareness.

Passive and active pursuit of knowledge depends on selective exposure and perception of the farmer. Selective exposure would be when a farmer unconsciously avoids communication of BMP ideas because of a conflict with existing predispositions (Rogers, 2003). Selective perception would be a tendency for a farmer to interpret communication in terms of the particular farmer's existing attitudes and beliefs. Selective exposure and perceptions can act as a mental barrier to innovation communications because the idea is new (Rogers, 2003). These two attributes of the farmer fall under the personality variables in the characteristics of the decision-making unit of the knowledge stage in Figure 2-1. Other characteristics in the decision-making unit are the socioeconomic characteristics of the farmer and the farmer's communication behavior.

The second stage of the innovation-decision processes is persuasion. The meaning of persuasion in this process does not include an assumed direction of persuasion, but an attitude formed by the individual. Figure 2-1 shows that the perceived characteristics of the innovation include its relative advantage, compatibility, complexity, trialability and observability all of which were discussed earlier in the innovation section. During this stage the farmer forms a favorable or unfavorable attitude about the innovation. In the knowledge stage, the farmer's focus was on cognitive activity, while the persuasion stage involves the psychology of the farmer (Rogers, 2003).

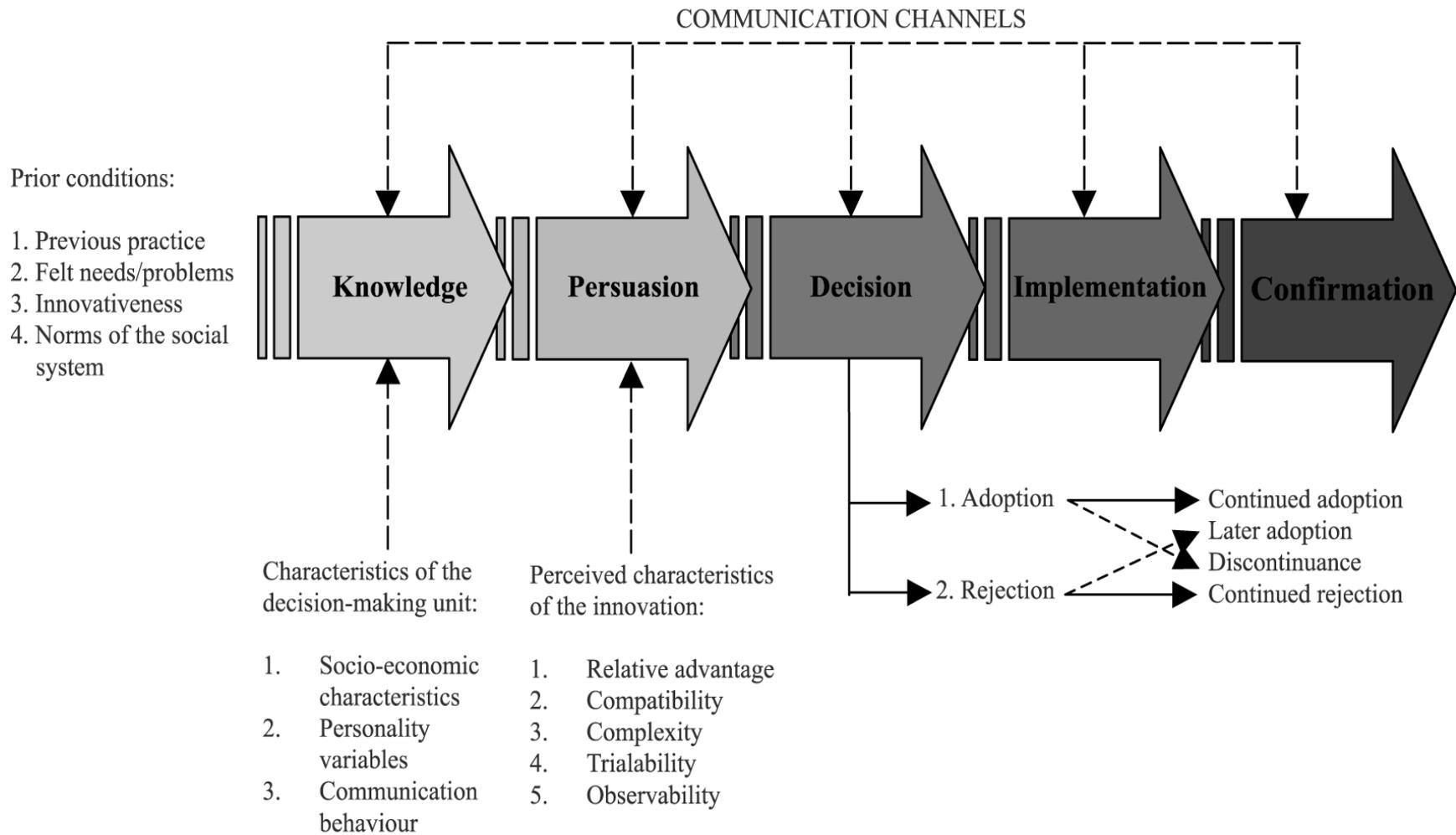


Figure 2-1. Innovation-decision process

Persuasion involves forward thinking by the potentially adopting farmer. However, all innovations carry some uncertainty because of the hesitance in the innovations ability to function. Individuals seek reinforcement to align themselves with their peers and to reduce uncertainty. Typically, this type of near peer information will be sought more frequently than scientific sources. Peers offer subjective opinions that are easily attained and more convincing to farmers than scientific evaluations (Rogers, 2003).

A type of innovation relevant to farmers in the SRWMD is a preventative innovation. A preventative innovation is an innovation that an individual adopts to avoid an unwanted event that might be possible in the future (Rogers, 2003). For farmers in the SRWMD, the event might be a multitude of regulations enforced by the state government if the SRP cannot prove its effectiveness. Under these circumstances, the undesired event is not certain, so the individual's motivation to adopt is weak (Rogers, 2003).

In the third stage, an individual engages in activities that lead to the individual's choice to adopt or reject the innovation (see Figure 2-1). According to Rogers (2003), farmers will be less likely to adopt an innovation without first being able to try it on a limited basis (trialability). The trial period proves the level of relative advantage the innovation provides to the farmer. Trial of an innovation by a peer may be substituted for an individual's personal trial. In some cases, demonstrations, like those that occur at the SRP's Crop Management Workshops, can speed up an individual's innovation-decision process (Rogers, 2003).

During the implementation stage, the innovation will be put into practice. The first three stages of the innovation-decision process were strictly mental, but the fourth

involves behavior change. Implementation usually quickly follows the decision stage. However, uncertainty typically still exists regarding the consequences of the innovation. The implementation stage may continue for a long period of time until the innovation becomes institutionalized into the adopter's operations (Rogers, 2003).

Evidence shows that the decision to adopt or reject an innovation will not always be the final step in the process (Rogers, 2003). Therefore, the final stage of the innovation-decision process is confirmation. During confirmation, a farmer will seek additional reinforcement of the innovation-decision already made, and could potentially reverse the decision. A reversal may be especially likely if the farmer is exposed to conflicting messages regarding the innovation. Discontinuance is a decision to reject a previously adopted innovation (Rogers, 2003). Discontinuance can occur if a replacement innovation exists that is better than the original or if the adopter is dissatisfied with the performance of an innovation (see Figure 2-1).

An assumption exists that there is a linear progression of the stages. However, the actual sequence of stages may be in a different order than represented in Figure 2-1. Also, a decision to reject an innovation could be made during any of the innovation-decision stages (Rogers, 2003).

### **Overview of Best Management Practices**

Within the SRWMD there are three major agricultural commodity groups: dairy, poultry and field crop. Each commodity group has a different set of BMPs recommended to it by the Partnership. However, detailed record keeping of the timing and quantity of nutrient collection and distribution is a requirement for all BMPs. The following sections describe the common recommended BMPs for each group.

## **Dairy Best Management Practices**

BMPs for dairy farms maintain or improve the level of productivity of farm land while reducing the amount of nutrients, pesticides and microbial contaminants entering the ground or surfacewater (Sanders, 2000a). Most updates to dairy management practices involve adding a physical structure. The following practices are also a part of the Natural Resource Conservation Service (NRCS) production codes.

Soil and water management is provided through a couple methods. The first BMP is providing livestock with water through the installation of a trough or tank reduces or eliminates the need for livestock to be in lakes or streams. Troughs or tanks diminish livestock health risks as well as livestock waste in bodies of water. Waste management systems are another soil and water management BMP. These are planned systems where the discharge of solid and liquid waste pollutants is reduced by recycling it through soil and plants (Sanders, 2000a). The goal of a waste management system is to manage waste so public health is protected and pollution to air, soil and water resources is minimized. A third BMP, waste utilization, is designed to safely use waste for providing fertility to crop production and to improve or maintain soil structure (Sanders, 2000a). Prevention of erosion and safeguarding water resources are other results of waste utilization.

Sediment management in surfacewater is commonly provided through waste storage facilities and waste treatment lagoons. A waste storage facility is a BMP constructed through excavating a pit or creating an embankment. Waste like manure and contaminated runoff is temporarily stored within the pit. A waste treatment lagoon is an impoundment also made by excavation for the temporary storage of animal or other agricultural waste (Sanders, 2000a). However, a lagoon allows for the biological

treatment of the waste. There are limits on the when a waste treatment lagoon is applicable. Lagoons may be used when an overall waste management plan system has been created, a lagoon can be created near the waste source, soils can be sealed or are suitable for retaining waste and when an adequate water supply is available to fill the lagoon with three feet of water prior to use (Sanders, 2000a).

In general, the Environmental Protection Agency and United States Department of Agriculture encourage voluntary approaches to issues related to nonpoint sources of pollution such as animal agriculture. Implementing comprehensive nutrient management plans ensure and environmental friendly method of manure management through transferring manure to an alternative use or using manure on the land (Sanders, 2000a).

### **Poultry Best Management Practices**

BMPs used in poultry farming fall into two categories: litter management and mortality management. Both are categories can be fulfilled with the addition of physical structures. Poultry litter is mainly poultry manure with a mix of the bedding (typically, dry, absorbent, low-cost organic materials like wood savings ect.) that is scooped up when the houses are cleaned. The average nutrient percentage of poultry litter is 3-3-2 or, on average, litter contains 60 pounds of nitrogen, 60 pounds of phosphate (P<sub>2</sub>O<sub>5</sub>) and 40 pounds of potash (K<sub>2</sub>O) per ton (Funderberg, 2009). The nutrient content of litter makes it a good source of fertilizer (Zhang Hamilton & Britton, n.d.). However, managing litter waste is important to protect the surface or groundwater from seepage.

Keeping litter to distribute on their crops or to sell is common for poultry farmers. Therefore proper storage of the litter is the convenient and practical method for eliminating nutrient loss to surface and groundwater. Most farmers in the SRWMD use

permanent litter barn structures as the BMP to store litter. The barn must be built to certain specifications to meet standards for environmental protection. For example, the barn must have a thick concrete floor to ensure an impermeable barrier, must be at least 100 feet from any wet area or water body and have a roof to protect the litter from moisture (Sanders, 2000b).

Poultry mortality can also lead to groundwater contamination (Burns, n.d.) In the past, on-site burial was the most common method of managing mortality. However, this is the least favorable method because it is the most likely to lead to water contamination compared to other mortality management methods (Burns, n.d.). The BMP encouraged within the SRWMD is on-site composting.

Recently, composting techniques have been modified to provide for sanitary degradation of poultry mortality. In the composting process, poultry carcasses are decomposed by the combination of a nitrogen source (birds and litter), a carbon source (straw, pine shavings ect.), and aerobic microorganisms. The composting process subjects the carcasses to temperatures high enough to destroy pathogenic bacteria which are normally associated with poultry disease. The high temperatures make the composting system biosecure. In fact, whole turkeys and chickens, with exception of some bone fragments and feathers, can be degraded within a few weeks. The resulting compost has chemical and physical characteristics similar to poultry litter and can be used as crop fertilizer (Carter, Anderson, Arends, Barker, Bunton, Hawkins, et. al, 2007).

The composting occurs within bins or storage facilities. Composting bins and storage areas can take many forms, and construction methods can vary. Composting

works well in an existing building if the ceiling is high enough to allow mechanical turning of the compost. Composters can also be built as stand-alone units or attached to an existing building (Carter, Anderson, Arends, Barker, Bunton, Hawkins, et. al, 2007). General guidelines for composters include using pressure treated lumber to prevent rotting, as well as roof and impervious floor to eliminate rainwater from reaching the compost and to prevent compost material from entering surface and groundwater (Carter, Anderson, Arends, Barker, Bunton, Hawkins, et. al, 2007).

### **Field Crop Best Management Practices**

In the SRWMD, the Partnership encourages the adoption of several BMPs for field crop farmers. However, the field crop farmer category includes a wide variety of products and each product has slightly different BMPs, some of which do not involve adding physical structures. Therefore, only the most common are described.

One form of water quantity control is the use of center pivots. There are several types of center pivots but in general pivots are the system of choice for agricultural irrigation because of its low labor and maintenance requirements, convenience, flexibility, performance and easy operation. When properly designed and operated, and equipped with high efficiency water applicators, a center pivot system conserves three precious resources: water, energy and time (New & Fipps, n.d.).

GPS systems allow for assistance in steering farm equipment. GPS assisted steering eliminates skips and overlaps of fertilizer, lowers fuel consumption and can easily be transferred across multiple brands and types of equipment (California Farmer, 2009). The most important characteristic of the GPS steering units is the elimination of fertilizer overlaps. This elimination reduces the amount of fertilizer waste. Fertilizer

accidentally over applied can reduce yield or cause contamination because fertilizer not used by the crop stays in the soil and leeches into the groundwater.

In general, the management practices for row crop farmers are much more cognitive than dairy and poultry practices. Dairy and poultry BMPs involve a one-time construction of physical structure which they then must use properly in storage. Row crop farmers have to learn how to use new equipment (like center pivots and GPS steering units) and keep meticulous records. The records help farm operator analyze information and make necessary adjustments to operate more efficiently, and increase profitability (Arzeno, 2004).

Diffusion of Innovation (Rogers, 2003), distinguished three types of knowledge about an innovation (or BMP). The first is awareness knowledge, which is information that an BMP exists. The second type of knowledge is how-to. How-to knowledge is information needed to use the BMP correctly (Rogers, 2003). This is the level of knowledge used for most dairy and poultry BMPs. Principles knowledge is the third type of knowledge. Principles knowledge consists of information regarding the functional principles underlying how the BMP works. For example, principle knowledge for a farmer would be the biology of plant growth which underlies the distribution of fertilizer. Usually, it is possible to adopt an innovation without the third type of knowledge, but there is an increased risk of innovation misuse or discontinuance (Rogers, 2003). Therefore, updating practices on a field crop farm is more time intensive and requires more training.

### **Previous Research**

The purpose of this research is three fold. The study will explain the varying adoption rates among the three main commodities, identify and describe the variables

that contribute to farmers' decision to adopt or reject BMP innovations, and assess the influence of the Partnership's tools on adoption. Therefore, this section will discuss the research literature related to adoption.

There are six types of BMPs recognized frequently in literature: landscape, soil, nutrient, pest, water, and livestock. These BMP types are fairly congruent with major commodities in the SRWMD. Adoption of each type of BMP has been influenced by a multitude of variables (Prokopy et al, 2008). Some of these variables are not controllable by the farmer but still influence farmer behavior and decisions (Kaiser, Wolfing & Fuhrer, 1999). For this research, the different variables were divided into four categories: farmer attitudes, farmer information or awareness, farm and farmer characteristics and economics.

### **Farmer Attitudes**

Psychologists look at individual behavior rather than societal trends to discover what determines ecological behavior. Environmental attitude has been considered a promising concept in determining an individual's ecological behavior (Newhouse, 1990). However, across different studies of BMP adoption, the relationship between attitude and behavior was moderate at best (Prokopy, 2008; Gill, Crosby & Taylor, 1986), resulting in a pessimistic view of environmental behavior as a useful tool in predicting behavior (Kaiser, Wolfing & Fuhrer, 1999), or as an important explanatory variable of adoption.

Nevertheless, Kaiser, Wolfing and Fuhrer (1999) found that environmental attitudes explain 40 percent of the variance in ecological behavior intent, such as intention to adopt BMPs. Therefore, environmental attitudes were a significant precondition of ecological behavior intention. Smathers (1982) concluded that a farmer's

attitude and perception would likely be the most influential factor for successful adoption of conservation practices.

Intention to perform an ecological behavior is not the action or prediction of adopting the actual behavior. However, the level of responsibility toward the environment directly effects intentions and predicts ecological behavior (Kaiser, Wolfing and Fuhrer, 1999). By incorporating intervening variables with behavior intention and attitudes the strength of relationship between attitudes and behavior adoption increases (Gill, Crosby & Taylor, 1986).

A gap between a value of the environment and intent to adopt conservation practices may arise from a difference between an individual's perception of the environmental condition and the actual condition (Seitz & Swanson, 1980). A study in Utah showed that when agencies reported significant areas of degraded riparian land, 84 percent of the respondents believed that the riparian areas on their land were in good or excellent condition. The farmers in this study had a positive attitude toward natural resources but did not recognize that they were a part of the problem (Corbett, 2002).

Overall, attitudes are frequently positively associated with adoption, though the association has usually been moderate. In addition, attitudes towards the environment and quality of the environment have never been found to have a negative relationship with adoption (Prokopy, 2008). Perceptions and attitudes about new conservation practices are also influenced by information disseminated and the information's source (McBride and Daberkow, 2003).

## **Information and Awareness**

One cause of farmer rejection of BMPs might be that clear and trustworthy information disseminated to the farmer is either lacking or nonexistent (Cooper & Kiem, 1996; Board of Agriculture, 1989). If farmers are not aware BMPs exist, from their perspective, they have nothing to adopt. In most cases, the vast majority of those unaware of conservation technologies are smaller farm operations (Daberkow & McBride 2003).

Potential adopters of new practices prefer and rely on several different sources of information during the stages of adoption. These sources of information may change based on the farmers current adoption stage (Korsching Hoban, 1990; Rollins, 1993). Some research reports that private-sector agents have been more influential than media sources (McBride & Daberkow, 2003), others report mass media was more important than interpersonal communication (Longo, 1990) and still other conclusions have been made that information from personal contact was most likely to influence adoption (Thomas, Ladewig & McIntosh, 1990).

In circumstances where private sector agents, such as input suppliers and crop consultants, were heavily relied upon by farmers for BMP information, the private agents had an incentive to support services for their products and developing long term relationships with customers. Consultants can also offer specialized technical expertise on an individual level. It was clear that the personalized information advice from supplier and consultants contributed to higher adoption rates of conservation practices. Extension may deal with a wide variety of issues affecting producers. The lack of specialization of specific BMPs for specific producer groups may lead to a lower level of support and a lower impact on adoption (McBride & Daberkow, 2003).

Habron (2004) found landowners who were information-seeking were the mostly likely to adopt conservation practices. It has been assumed that a precondition to an individual's environmental attitude is factual knowledge, or information, regarding the environment (Arcury, 1990). It is likely that seeking information is a way for farmers to reduce the amount of uncertainty and risk related to adopting new practices (Nowak, 1987). However, factual knowledge is not directly related to performing new conservation behaviors. Knowledge about the new behaviors and how the behavior is performed is more correlated to adoption of the behavior (Kaiser, Wolfing & Fuhrer, 1999).

Increased knowledge through information dissemination paired with increased information dissemination through Extension was highly associated with BMP adoption for dairy producers. An increased emphasis on information dissemination and technical training of BMPs will probably be effective to increase adoption rates (Rahelizatovo & Gillespie, 2004).

In contrast, findings from Gamon, Harrold and Creswell (1994) showed that farmer education by an Extension program did not significantly increase the farmer's level of knowledge or adoption of BMPs compared to farmers who did not attend the program. The findings suggest that new delivery methods and communication channels need to be sought out to convey information. The authors also recommended using more field demonstrations to assist farmers in the trial stage of adoption.

Farmers who did not participate in the Extension program may be receiving their information and increasing their knowledge through the use of other sources (Gamon, Harrold & Creswell, 1994). Extension may be competing with private industries to

convey information about BMPs to farm operators. Research shows that access to information from trade journals or private industry professional, such as commercial crop consultants, has had a significant positive impact on adoption (McBride & Daberkow, 2003; Saltiel, Bauder & Palakovich 1994). Conveying more information about BMPs through these widely used channels could be helpful in improving adoption rates. Therefore, more intentional education efforts and BMP promotion could increase adoption. Observations indicate that BMPs with higher adoption rates have been more highly promoted (Rahelizatovo & Gillespie, 2004)

In a 1995 study many farmers reported being in an information gathering stage of adoption. If these farmers progress within the innovation-decision process they would need to be provided with sufficient information to be persuaded to have a favorable perception of sustainable practices (Alonge & Martin, 1995).

Beedell and Rehman (2000) discovered that farmers were more affected by conservation-related concerns when they had greater environmental awareness and possessed information. While farmers seem to seeking information and have more awareness of the potential negative impacts of agricultural pollution to the environment, it has not translated into higher adoption of BMPs (Green & Heffernan, 1987).

Generally, increasing farmer exposure to information has influenced adoption through several channels and sources may play an influential role during the adoption decision process (McBride & Daberkow, 2003).

### **Farm and Farmer Characteristics**

Historic explanations for differences in adoption identify factors such as farm size, farmer education, farmer age, farm type, farm tenure, farmer gender and land quality or productivity (Prokopy, 2008). These factors have continued to be studied in more

recent literature, but there are no consistent conclusions being made to measure farms against for future prediction of adoption. A lot of heterogeneity exists amongst farms and farm operators, often explaining differing adoption rates (Khanna & Zilberman, 1997). For instance, farm size had been found to influence the adoption decisions (Feder & Slade, 1984) and it has been a poor predictor of conservation practice adoption (Alonge & Martin, 1995).

Generally, acreage, education and diversity are more positively correlated with BMP adoption than negatively correlated (Prokopy, 2008). However, some research has found education to be a poor predictor of conservation practice adoption (Alonge & Martin, 1995). Capital and income are usually positive or insignificant determinants of adoption except with water management BMPs, where income is never significant. There is also mixed evidence for farmer experience and tenure. Both typically have a more negative influence on adoption, but when selecting for a specific BMP type there is no discernable trend. Age has mostly a negative relationship with BMP adoption but is never significant in water management practices (Prokopy, 2008). Studies have found that age was inversely related to support for conservation practices. Older farmers were less likely to adopt due to higher uncertainty levels when exposed to a change in technology, and a smaller planning horizon to devote to knowledge and monetary investments (Rahelizatovo & Gillespie, 2004). The more labor available to the farm, the more likely the farm adopted BMPs, except in water management, where the evidence is unclear. The ownership type of a farm has equally positive and negative influences on adoption. Animal farms and other types of farms are more likely to have a negative relationship with adoption while grain farms are more likely to have a positive

relationship with adoption (Prokopy, 2008). Female gender has also been related to positive environmental attitudes and higher probability of adopting conservation practices (Christianson & Arcury 1992). Fuglie and Kasack (2001) found large regional differences in the rate of adoption of conservation practices.

## **Economics**

BMPs are relatively new technologies that usually require a significant up front investment with a perceived uncertain payoff (McBride & Daberkow, 2003). Perceived profitability has been found to be the most important factor affecting the adoption of conservation practices (Saltiel, Bauder & Palakovich, 1994). The USDA believes that the management strategies to protect groundwater are generally profitable for farmers. In spite of this, not all farmers who could adopt the practices have done so, even though the practices should boost profitability (Cooper & Keim, 1996).

One reason for the discovered trend may be that the farmers were risk adverse. Even though the practices appear profitable, a certain level of uncertainty still existed too large to overcome, unless demonstrated satisfactorily by a peer (Cooper & Keim, 1996). Farmers with smaller, less specialized operations have been more tentative in adopting new practices because of financial risks associated with start up costs (Saltiel, Bauder & Palakovich, 1994). Gamon, Harrold and Creswell (1994) found that farmers were more interested in long-term profitability of BMPs than short-term.

One method to alleviate uncertainty and promote voluntary adoption of BMPs would be through the use of incentive payments (Cooper & Keim, 1996). Typically, this has been a fixed “take it or leave it,” offer to farmers not using BMPs. In most cases, no follow-ups have been used to observe farmer adoption of BMPs as a function of the

payment offer. Therefore, the level at which incentive payments should be set to achieve desired adoption is unknown (Cooper and Keim, 1996).

Incentive payments and cost-share programs for crop and livestock could generate significant opposition from ranchers. If the government subsidized a particular segment of agriculture it could cause a land use shift and place ranchers at a competitive disadvantage (Saltiel, Bauder & Palakovich, 1994).

Alonge and Martin (1995) showed that farmers wanted educational efforts and research to be directed toward improving the profitability and compatibility of sustainable practices to improve the ease of farmers' transitions from conventional to sustainable practices. Observation also indicates that BMPs deemed more economically viable are adopted at the greatest level (Rahelizatovo & Gillespie, 2004)

Throughout studies of BMP adoption a focus needs to be placed on access to quality information (Lovejoy & Napier, 1986) and the perceptions of the conservation practice and economic factors related to adoption (Alonge & Martin, 1995). Especially since no consistency or predictability has been offered in how positively or negatively correlated the variables have been in conjunction with BMP adoption, across the broad variable categories (Prokopy, 2008). One would predict that a better understanding of these areas would be related to a better ability to predict adoption (Wejnert, 2002). However, despite the quantity of studies, few strong, consistent conclusions exist regarding the variables affecting adoption of BMPs (Arcury, 1990; Lockeretz, 1990; Napier & Bridges, 2002; Prokopy, 2008). These different factors will play a different role depending on the conservation practice being adopted (Habron, 2004); therefore, strong

emphasis should be placed on the type of practice being implemented (Nowak, 1987; Lockeretz, 1990) before considering the variables contributing to adoption.

## **Summary of Chapter 2**

Rogers' (2003) Diffusion of Innovation was used as the guiding theory for research on farmer adoption of BMPs. Diffusion of Innovation examines the process of how an innovation is communicated through channels over time between members of a social system. For this research, BMPs were the innovations and farmers within the SRWMD constitute the social system. A key aspect of Diffusion is the innovation-decision process. This process follows an individual's decision process to adopt a new innovation. The stages of this process include: knowledge, persuasion, decision, implementation and confirmation.

Previous research conducted showed that variables contributing to farmer adoption of BMPs could be separated into four categories. The first category, farmer attitude, was frequently but moderately positively associated with adoption. Information and awareness, the second category, showed that farmers want to receive information regarding a BMP from a reliable and trustworthy source. Farm and farmer characteristics had also been studied. However, no consistent conclusions have been made to predict future BMP adoption. The last category, economics, showed that perceived profitability of BMPs was the best predictor of BMP adoption.

## CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY

### **Introduction**

Over the last two decades, nitrate levels in the Suwannee and Santa Fe River basins have been on the rise. By 1998, the nitrate problem in the Suwannee River basin was a well-documented concern. Nitrates can come from several sources, principal among which is agriculture. The Suwannee River Partnership (SRP) has implemented several voluntary programs, such as Best Management Practices (BMPs), to help reduce nitrate pollution. These programs help alleviate some of the struggles arising between humans and their natural resources and are available to the farmer groups within the Suwannee River Water Management District (SRWMD).

The Partnership needs know if the structure of its programming and communication is designed in such a way that it will allow them to increase adoption rates and prove its value to state and federal governmental agencies. A qualitative research approach was selected to make the Partnership aware of any gaps between how the Partnership views its achievements and the real-life situations and to understand farmers' perceptions and experiences with SRP programs.

### **Research Design**

Qualitative research relies on text and image data with a wide variety of procedures (Creswell, 2006). The need for this approach was to view the social phenomenon holistically and give a broad panoramic view rather than a microanalysis. Since this research project is the first evaluation of adoption within the Partnership, an emphasis was placed on generating in-depth and well-rounded information. Given this, a qualitative research design was the most appropriate and offered the best starting

point for the Partnership to attain the details it needed to provide an opportunity for quantitative research in the future.

Qualitative research is specific in its characteristics. Qualitative research takes place in a natural setting where the researcher goes to the site of the participant. Research is conducted in a place of comfort for the participant, enabling the researcher to develop a level of detail about the individual or place and to be highly involved in the actual experiences of the participant.

Qualitative research uses a growing number of methods, and the qualitative researcher attempts to disturb the site of research as little as possible. The researcher also looks for involvement of the participants in data collection to build rapport and credibility with the participants. Qualitative research is emergent rather than predetermined. Aspects of the research study may unfold during the course of the study. The researcher may refine the study as he or she learns what should be asked and to whom. Qualitative research evolves as the research progresses; it is fundamentally interpretive. The researcher makes interpretations when analyzing data, settings and participants. The researcher filters all of the research data through their individual lens. Personal interpretation brought to qualitative data analysis cannot be escaped. However, the researcher reflects on his or her background and acknowledges how it may affect the study. The reasoning method used in qualitative research is mostly inductive but can also be cyclical. The researcher cycles back and forth from data collection and data analysis to reformulate the research making sure it follows the set objectives. Therefore, collecting and analyzing data happen simultaneously in qualitative research.

## **Phenomenological Approach**

For this study, interviews were the qualitative approach used to obtain information regarding the phenomenon of BMP adoption (Creswell, 2003). Interviews capture attitudes and feelings of participants and create awareness of issues that were unobservable to the researcher (Patton, 2002). Interviews gather data on participant opinions, beliefs and feelings about a situation in their own words and provide information that could not be obtained from observation. Interviews have an advantage because one interview can supply a large volume of in-depth data rather quickly. An interview can also provide information unanticipated by the researcher. However, participants may not always be willing to share information or may even offer false information. In addition, interviews require a lot of time to transcribe (Ary, Jacobs, Razavieh & Sorensen, 2006).

Key informant interviews and farmer interview sessions were used to gather information. Key informants are knowledgeable individuals that often offer invaluable insights and often provide detailed information about a group's past in addition to the contemporary happenings and relationships within the group (Fraenkel & Wallen, 2006). These key informant interviews, as well as interviews with farmers, were semi-structured in format.

Semi-structured interviews allow for discussion to be guided but not controlled by questions. While a structured interview has a formalized, limited set of questions, a semi-structured interview is flexible, allowing new questions to be formulated during the interview as a result of what the interviewee says. The interviewer in a semi-structured interview generally has a framework of themes to be explored. This interview style allows participants to discuss freely and as much or as little as they desire. The goal of

this research procedure was to give participants a chance to express their opinions, while allowing the researcher to gain insight into how they understand and feel about the topics or issues.

### **Research Subjectivity**

Researcher subjectivity is the extent to which a researcher allows his or her personal history or agenda to influence any aspect of data collection, analysis and interpretation. For this study, the researcher had limited subjectivity. The researcher has a background in wildlife ecology, natural resources and conservation. The background of the researcher led to an interest in a lifelong goal of connecting agriculture and natural resource to make a sustainable food producing culture future for Americans. These goals lead to an opportunity to study the Partnership and farmer adoption of BMPs in the SRWMD.

Prior to the study the researcher had never worked with the SRP, Florida Department of Agriculture and Consumer Service (FDACS), SRWMD or any of SRP's 63 partners. Therefore, the researcher had no political or personal ties to any of the agencies or private businesses involved in the study. The researcher is also from the urban city of Orlando, Florida and moved to Gainesville for college in 2004. As a result, there are no connections between the researcher and any of the participants who live in the more rural counties of the SRWMD.

However, throughout the research process the researcher tried not to impose a personal agenda or bias and was open to participant responses. The researcher also made sure not to over-cue an interviewee and used reflexivity to control for bias. Reflexivity allowed the researcher to self-reflect in order to actively seek out biases.

## **Methodology**

### **Key Informants**

The key informants for the study were chosen from the staff contact list on the SRP website. Four contacts are listed on the site, and all four were interviewed. A fifth key informant, the Partnership's administrative assistant and Extension agent, was added to give an outside perspective to make the information gathered during key informant interviews well rounded.

The five Partnership staff members, or key informants, interviewed included: the Partnership Coordinator, Partnership co-Coordinator, Environmental Specialist, Technical Program Manager and an Extension agent. The Partnership's coordinator is the original from the Partnerships conception in 1999. The coordinator made all of the initial contacts with farmers in the SRWMD. The coordinator was the first staff member of the Partnership to approach SRWMD farmers about adoption of BMPs. As the Partnership grew over time the position changed. Currently, it serves as the figurehead of the Partnership and oversees the programs as a whole. The Santa Fe Basin Coordinator has been a part of the Partnership since 2002. When the geographical area covered by the Partnership expanded to the Santa Fe Basin, an additional coordinator was needed. This position also serves as a contact for famers, establishing relationships in the Santa Fe Basin and encouraging BMP adoption. The co-coordinator was employed by the FDACS but the office was held within the SRWMD. The environmental specialist assists in BMP implementation with farmers in the SRWMD for the Partnership. The technical program manager works for the SRWMD. This informant was a part of the initial conception of the SRP in the early 1990s and assisted in writing the proposal for its establishment. As staff of the SRWMD, the technical

program manager is involved in outreach education to farmers regarding water quality and provided programming at workshops. The Extension agent has been an education coordinator and horticulture agent for Cooperative Extension Service in the Suwannee County Extension office since 2006. Recently, the agent began to develop a new branch of the Partnership to reach out to SRWMD homeowners. The agent also serves as an assistant to the Partnership, keeping track of events occurring in the SRWMD and keeping communication open between SRP, FDACS, SRWMD and Extension. The agent has little to no contact with farmers and does not contribute to BMP implementation process. Therefore, the agent held a needed outside, but relevant perspective that made key informant interviews well rounded.

### **Farmer Participants**

The farmer participants in this study were dairy, poultry and row crop farmers in the SRWMD. Two dairy farmers, two poultry farmers and six field crop farmers were interviewed. The crops grown by field crop farmers included: hay, iron clay peas, peanuts, corn, lettuce, and herbs. The sample size of qualitative research is usually small, averaging between one and 20 participants (Creswell, 2003) to provide a richer glimpse into each participant's perceptions and experiences. The farmer participants for this study were selected based on background information to achieve a representative sample of the three main commodities produced, as well as farmers who had adopted or rejected BMPs. Criterion-based sampling involved determining participants based on the objectives of the study (Creswell, 2003). Therefore, the purposive sampling method worked for this study. The purposive technique provided the maximum amount of insight and understanding in the area of research (Ary, Jacobs, Razavieh & Sorenson, 2006).

Farmer participants were recruited by the key informants. The key informants developed a list of farmer names and characteristics that met the needs of the researcher. These characteristics included: commodity produced, farm characteristics, and if they have adopted or rejected BMPs. The Partnership Coordinator called each farmer on the list to make them aware of their potential to be interviewed by the researcher. The researcher made a follow up call to be certain the participant was comfortable being interviewed and to determine a convenient time and location for the interview.

### **Data Collection**

Seidman (2006) stressed the importance of establishing a structure prior to beginning the interview process. Interview questions were developed in accordance with the study's purpose and theoretical perspective. Separate interview guides were developed for key informant (Appendix A) and farmer interviews (Appendix B). A panel of experts from the researcher's masters committee reviewed both interview guides.

The purpose of the interview guide was to provide a framework for each interview to ensure interviewer maintained a level of consistency among participants. Specific follow-up questions were posed to individual participants as they presented themselves and were relevant and appropriate to the discussion (Patton, 2002). Maintaining an open rapport allowed for each participant to discuss his or her unique perspectives regarding their experience with the phenomenon of BMP adoption. The interview guide and informed consent were submitted and approved by the Institutional Review Board (IRB).

The interview method served as the primary data collection method with key informant and farmer interviews conducted from August 2009 to November 2009. All

key informant and farmer interviews were audio recorded so that the full dialog, including all major points offered by participants, was captured. The researcher took notes on the dialog, recorded non-verbal behaviors in field notes as they occurred, and made reflective notes regarding her views and feelings immediately following each interview (Ary, Jacobs, Razavieh & Sorensen, 2006).

The interviews were held at the farmer's site of operation in order to inconvenience the farmer as little as possible. The semi-structured format allowed for the interview to have a loose structure, but the main goal of the researcher was to let the questions flow naturally. The researcher did not insist upon asking specific questions in a specific order. The flow of the conversation dictated the questions asked and those omitted, as well as the order of the questions. The researcher also sought clarity and a deeper understanding from the respondent throughout the interview.

### **Data Analysis**

Before any data could be analyzed they needed to be transferred from verbal to written form. This process, called transcribing, involved writing out each question and response verbatim from the interview using the recorded audiotape. Transcribing verbatim is important in preventing over-simplification of the data through summarization and accounted for the disconnection between oral communication and written notes (Wengraf, 2001). According to Kvale (1996), transcripts are translations of the interview experience into the text format and are interpreted differently as a result. At completion, the transcripts were crosschecked with interview recordings and field notes to clarify misinterpretations (Patton, 2002).

Analysis or coding of the transcripts was done through Glaser's (1965) constant comparative method. This method combined the analytical procedure of comparison for

quantifiable data with analysis for theory development. Therefore, theories generated through use of this method can be more systematical.

The constant comparative method has four stages. The first stage is comparing incidents applicable to categories. At first, the analyst codes each incident in as many categories of analysis as possible. An incident is the occurrence of a noteworthy event in the transcript. While coding an incident for a category, the incident must be compared to previous incidents coded in the same category (Glaser, 1969). Constant comparison begins the generation of theory because the analyst being to think of the category on a broader scale, its dimensions, its consequences and relation to other categories. The second stage integrates categories and their properties. Stage two begins when constant comparative units change from comparing incident with incident to incident with categorical properties (Glaser, 1969). Stage three delimits theory. Theory begins to solidify when major modifications become fewer and fewer as the analyst compares each incidents of a category to the category itself. This achievement begins to form the requirements of a theory: parsimony of variables and applicability of the theory to a wide variety of situations (Glaser, 1969). Delimiting theory also established the boundaries of the categories. As coding continues and a category has boundaries it can become theoretically saturated (Glaser, 1969). The fourth and final aspect of the constant comparative method is writing the theory. As the process of analyzing transcripts ends, that coded data supports the content of the categories and the categories have developed into the major themes of the research.

The researcher elected to use Weft QDA for assistance in data analysis. Weft QDA is an open source software package for analyzing textual data. The program

works through coding the data. Transcripts are downloaded into Weft QDA as text files and coding begins by reading through the transcripts to get comfortable with material, and re-reading looking for themes (Abrams, 2009). When a theme has been discovered, a category can be created in Weft QDA and named accordingly. To add data to a theme, text is highlighted that represents that theme and marked. Marking a quote applies it to the category selected. Categories can also be made to be nested. Therefore, if a subtheme is discovered, it can fit within a major theme (Abrams, 2009). The Weft QDA categories store the evidence (quotes) of each theme in blue text within the transcript or evidence can be displayed separately outside of transcript context.

After finding links and connections among categories, interpretations were made. These interpretations were generalizations based on the connections and common aspects among the categories and patterns. Interpretations went beyond the descriptive data to extract meaning and insights that show what could be learned from the research (Ary Jacobs, Razavieh & Sorensen, 2006).

### **Measures of Validation**

Quantitative research addresses the validity and reliability of a study to ensure its rigor and generalizability. Qualitative researchers uphold the rigor in studies through measures of validation formed by credibility, transferability, dependability and confirmability (Ary Jacobs, Razavieh & Sorensen, 2006). Qualitative studies mostly dismiss the measures of generalizability because of the extensive degree the phenomenon was analyzed for a specific site.

Credibility in qualitative research involves how well the researcher establishes confidence in the findings based on the research design, participants and context (Ary, Jacobs, Razavieh & Sorensen, 2006). Low-inference descriptors, like direct quotations,

were used to enhance the credibility of this study as well as thick, rich description to help convey an understanding of the study's context.

The extent to which variation can be tracked or explained in a study is the study's dependability. Confirmability is the extent to which the researcher is free of bias in the procedures and interpretation of the results (Ary, Jacobs, Razavieh & Sorensen, 2006). Both the dependability and confirmability of the study were established through an audit trail. The audit trail shows how decisions were made and how, when and why the study was conducted. By providing an audit trail the researcher enables others to arrive or not arrive at the same conclusions given the same data and context (Ary, Jacobs, Razavieh & Sorensen, 2006). Confirmability was enhanced by allowing both interview guides to be reviewed by a panel of experts.

Transferability addresses how well the findings from the study sample relate to other groups (Ary, Jacobs, Razavieh & Sorensen, 2006). Transferability can potentially occur between groups that are highly similar to those described in the study. Rich descriptions of the participants and the setting made transferability possible for this study.

### **Summary of Chapter 3**

A qualitative method was used in this study to generate a broad view of the Partnership and provide a deep understanding of adoption of BMPs. Interviews were the best way to reach farmers and key informants. Interviews also obtained a lot of information in a short amount of time. These interviews were semi-structured to guide the discussion but give participants an opportunity to talk openly. The participants were SRP staff member and farmers in the SRWMD. Data was collect in person and audio recorded to preserve detail. Data was then transcribed, coded and categorized. Links

and themes between categories were discovered through the use of Weft QDA. Credibility was established through low-inference descriptors while trustworthiness and confirmability were established through an audit trail. In general, support and transferability of qualitative studies requires well-documented research and rich description.

## CHAPTER 4 FINDINGS

### **Introduction**

The SRWMD has a history of nitrate levels. BMP adoption by farmers is the only measure of assurance that, overtime, nitrate levels will be reduced. The SRP was established to encourage adoption and facilitate collaboration between multiple political entities. The Partnership needs to understand the influence of its communication, as well as its programs and materials in farmers' decisions to adopt BMPs. This chapter is divided into five sections based on the objectives introduced in Chapter 1:

1. Determine the communication channels used by the three main farmer groups in the SRWMD.
2. Determine farmers' perception of the value of SRP programs and materials on BMP adoption.
3. Determine the factors that contribute to farmer adoption of BMPs.
4. Identify barriers that contribute to farmer non-adoption of BMPs.
5. Explain the varying adoption rates among dairy, poultry and field crop farmers in the SRWMD.

Each section contains themes developed from the interviews. However, the structure of each section varies. The first and fifth section has one theme which was found in both key informant and farmer participant interviews. Therefore, the theme is divided into two segments based on findings from key informants and findings from farmer participants. All other sections are divided into themes and subthemes with qualifiers for the group the findings were developed from. Themes were developed based on Glaser's constant comparative method (Glaser, 1969), using Weft QDA for assistance in data analysis.

## **Objective 1: Communication Channels Used by the Three Main Farmer Groups in the SRWMD**

Communication channels were not explicitly discussed during key informant or participant interviews. However, both sets of interviews consistently articulated the importance of interpersonal relationships or a trust bond between SRP staff members and farmers. Therefore, both key informants and participants favored interpersonal channels of communication, or face-to-face conversations for exchanging messages regarding BMPs.

### **Theme 1: The Importance of Trust Relationships**

#### **Key Informants:**

All five of the key informants recognized establishing interpersonal relationships with farmers as a vital aspect of encouraging adoption. The Partnership built trust by showing it understood farmers' issues and cared about helping them improve and succeed. In order for farmers to turn to the Partnership, it had to show that there was "a truly valiant effort being made to do the right thing" said one informant. SRP leadership knew showing concern was important and tried to set a tone of trust from the beginning. An informant commented on reviews from a previous FDACS survey.

Farmers' perceptions were very positive for the Partnership, and why? I think it has to do with -- if you just had to say in one sentence what it is, it has to do with trust. And that came from, I believe, the leadership early on. We had several key people who were in management ... and those key people just kind of portrayed that trust is important, we're here to try to work with people and so that's kind of conveyed all the way through and the people we've hired to make sure that they -- people that can relate to farmers and we try to understand farmers and where they're coming from.

Informants discovered farmers in the SRWMD were skeptical of government entities and trust was hard to earn. One informant stated,

[Farmers are] little more skeptical about governmental programs and, although the Partnership has a considerable amount of private industry groups involved in it, it's still perceived as a government program. So, you know, people, farmers are a little bit apprehensive about it being a government program.

According to informants, it's easier to earn trust with a skeptical farmer by spending time with them and being able to solve problems. One reflected about their experience with a farmer, "probably a lot of [it's] his trust and that doesn't happen overnight. I've been working with these -- some of these guys since 1997. So it's more building a relationship with them." When discussing one farmer's situation another informant said, "the guy's happy [be]cause you just solved one of his problems. I mean, if you can solve someone's problem, they're going to be your pal. So, you know, being a problem-solver is key."

Two informants stressed another aspect of earning farmers' trust rested in the ability to prove the Partnership's ability to care and help. One informant expressed, "People really don't care what you know until they know that you care." Another informant said, "showing that they care and fighting for the farmer" and "being their voice" was critical. Yet another important aspect provided was showing that the Partnership was "not just there to regulate ... we're from the government; we're here to help you."

Three of the five informants used the phrase "one-on-one" when discussing relationship building with farmers. Some of those involved working with farmers or showing or explaining concepts. Other informant comments regarding building "one-on-one" relationships referred to them as "critical" or "crucial" in building trust. One informant stated one-on-one conversations with farmers were a daily occurrence to "get

that connection.” Another said, “our number one priority now is, especially with less budget to provide for incentives, is one-on-one work with farmers.” Another commented “one-on-one contact we have to continue that, that’s our goal.”

### **Farmer Participants:**

The majority of the participants agreed that the Partnership exhibited relationships worthy of trust. One participant explained, “The Partnership has been good for this area, the local area. The Partnership has been good for it. I think, now that most of the farmers have a good, trusting, working relationship with the Partnership.” Another farmer mentioned how his operation interacts with the Partnership.

We’ve built a pretty good relationship with the people that’s there and in it and I kind of rely on them to help, bring me information and to help me and then in return, I help them and we’ve kind of -- over the years we’ve kind of built a trust together and, you know, not only the Partnership, but also a partnership with the people.

However, participants reported difficulty in trusting the Partnership initially. At first, when Partnership staff approached potential adopters, those farmers would take Partnership advice with “a grain of salt.” SRP overcame mistrust by spreading awareness of its purposes. One participant said, “I think once we figured out what they were doing, [we] kind of eased up and everybody started using [the programs].” Another participant stated, “When the [Partnership] first came out... it had a few kinks to get worked out. But in the last five, seven years, everybody has worked together to make the program benefit and do what it was intended to do.”

The Partnership gained trust by visiting the farmers in the SRWMD and having knowledge of how the agriculture industry worked in the area. One participant said,

“[The Partnership] understand[s] how your life works... having people that [have] been in the industry and that try to help the industry, that helps a lot.”

As Partnership staff improved the SRP’s image with some SRWMD farmers, those farmers began to spread the word that the Partnership was a safe group to work with. One participant said, “Being in a farming community- you hear.” Another discussed how they discovered the Partnership at meeting from farmers who were already participating, “We’ve talked to them at meetings and things like that, and I guess that’s basically kind of how, you know, we heard about [the Partnership] and we kind of said, you know, we’d like to look into it.” A third participant explained the “word of mouth” process.

I think initially, once they started getting a couple of farmers, then it was word of mouth. Things traveled- ‘hey, it ain’t what you think it is, it’s different, they are here to help.’ The guys they were sending out were people we trusted.

Finally, the Partnership was able to overcome trust barriers by showing an active interest in preserving agriculture, making the community atmosphere more positive and allowing farmer voices to be heard. One participant said, “The Suwannee River Partnership takes a proactive approach in trying to preserve our agricultural basis.” Two other participants stated,

And that’s one thing I like about the Partnership. Its focus is about trying to make it better for the farmer, not about just trying to, you know, how many -- it’s not about a regulation. It’s not about a -- although the Partnership is about coming up with a plan that’ll meet a regulation and make something -- but it’s all about trying to make something better. And that’s what I really like about it.

We’ve had some interactions, been to some meetings over there and voiced some opinions and they seemed to take our opinions... from what they’re saying and what we’re seeing, they’re working with us and not against us and that makes a big difference.

## **Objective 2: Farmers' Perception of the Value of SRP Programs and Materials on BMP Adoption**

Key informants believed farmers perceived the Partnership favorably. The favorable perception was developed through the SRP's leadership from the past and present as well as its strategy. The key informants believed its use of opinion leaders and change agents also influenced farmers' positive perception. Farmers, on the other hand, had a lot of concerns they hoped the Partnership could address.

### **Theme 1: SRP's Leadership and Strategy Development- Key Informants**

Each key informant made at least one comment regarding the leadership and/or strategy building of the Partnership staff. Before and during the Partnership's formation, the leaders were purposeful in establishing the foundation for success. One informant said "the early leader that, I think, was one of the reasons we've had success, he just kind of helped set up the approach."

The participants stated a key aspect of the approach was the staff and partners believed in it. Since the Partnership combined multiple stakeholder groups, it was critical for everyone to have the same goals. "The leadership part of it is that you have agency heads and organization heads that have come together. They believe in this approach and they convey that to their staff which helps make everything work," said one informant. The specific components of the foundation or approach which led the SRP to success were unclear.

The leadership of the Partnership also involved influential personalities and decision-makers. These leaders were specifically targeted to influence opinions. One participant contributed SRP's current success to the fact that "we've been out there

we've provided the leadership." Another informant commented on how organizations depend on leaders for decisions and progress.

Any organization is dependent on its leaders. Early on we had some very, very good leaders, as well as strong leaders, that were able to move opinions that were able to move groups; they were able to bring groups together. And so, you know, that was number one when we started we had some really good leaders that would help us make decisions and move from point A to point B.

Though the informants were confident in the Partnership's abilities and potential to make an impact in the future, the key informants were humble. They recognized that the organization has struggles, but has made considerable strides in reducing nitrates in the SRWMD by pursuing farmers to adopt BMPs. For example, one participant said, "without admitting there's some things we still need to continue to work on and strengthen, we've made a lot of progress."

The leadership that initiated the Partnership and the current leadership within the Partnership clearly established a firm foundation in their approach to success. An informant commented, "[The leaders] definitely spend a lot of time planning and thinking about how they can best reach the people." The leaders developed a "plan of action" but also "seize[d] those other opportunities as they come along" to enhance success.

The Partnership has also pursued leaders in the community to encourage adoption. One key informant said the Partnership, "identified those leaders, went to them and asked them if they would work with us to implement BMPs." Another informant explained the Partnership's initial strategy.

Early on we were trying to educate more of the masses and bring them along. And so, we would try to find the early takers and have them help us ... to get it going and to get people [to adopt]. You know, there's always those that are willing to take it on first and always those that drag their feet... The Partnership has some that are early takers, that are progressive

and they help set opinion and they make lots of noise and we have those that still don't like us.

The Partnership also relied on a progressive farmers group to spread information and persuade additional farmers to favor BMP innovations. The cost-share program allows progressive farmers to have BMPs on their property and "they in turn [told] their neighbors." Since a common perception viewed the Partnership as a government program, the leaders understood how information from peers was more heavily weighed than information from SRP staff. One informant explained, "[information is] a lot more believable if it comes out of somebody else's mouth that you see at a restaurant or see at the equipment dealership or something like that. It gives a lot more credibility to [the program]." Another informant stated, "word of mouth has been the best advertisement."

The Partnership has also been a strategically collaborative organization, "sharing" data and combining resources. With 63 partners, informants believed, "each agency has its strengths" and the partners learned "how [they] can support each other." One informant said, "We're going to work together, we're going to solve the problem, we're going to help these [farmers] change their behavior so they can accomplish this."

The last strategy the leaders of the Partnership employed was a big picture viewpoint. Informants understood the problems they were trying to overcome could not be solved overnight. Informants knew the Partnership needed a long-term perspective. A key informant concluded that SRP leaders and the community need to "realize it takes some time to see improvements." Another noted,

Agriculture is not a perfect industry... There's a lot of issues with it one way or another and so our efforts are spent in trying to work through those issues on a voluntary basis and something that will help the farmer be successful.

## **Theme 2: Concerns Driven by Governmental Agencies and Regulations- Farmer Participants**

Several farmers mentioned that they will avoid being told what to do on their operation saying, “Nobody likes to be told what to do” and “I didn’t want anybody telling me how to manage.” Most also believe the farmer on the operation is the only one who can appropriately determine how to manage the land. In addition, officials from outside the area, generally, do not have the ability to influence farmer decision-making. One participant said, “you don’t want them in your business [be]cause it’s not their business, [and] you don’t want people that aren’t here, to control what you’re doing.” Another participant described the first interaction with potential regulators at his operation:

We were knocking heads right from the get-go with those folks and them wanting to, what we felt like, force a total management scheme on our farm that we had, you know, we thought it was interesting and we said, hey, could this work? What kind of possibilities does it have? But we don’t go from 100 cows to 2600 cows milking without thinking about lots of possibilities. Far be it for anybody to come in here and start, you know, wanting to force me to manage our herd in a particular way. So this was -- we were off to a rocky road.

Others expressed that government had “too many rules” and “some of the things they’ve mentioned to [farmers] are just, it’s really not worth the time and trouble.” In addition, when a farmer signs up for assistance in updating management practices they are expected to fulfill contracts which require additional management techniques in order to receive help. One participant described the process, “you’re tied to these contracts, you got to do some other stuff to be able to get this money to help you do this, you got to do this this this... [it’s] just not worth the hassle.”

Participants didn’t just view government and regulations as a nuisance but believed it could eliminate many agricultural operations. Some regulations could be

beneficial, protect the environment and keep all of the operations on the same page.

However, too many regulations can become overbearing. Two participants expanded on overbearing regulations.

They harp on us so much about regulating all this stuff and everything, which is good, but sometimes too much of a good thing can hurt, and if you're squeezing me by the neck so much that I got to do all these things, you're eventually going to kill me and I'm not going to be able to live.

[Regulations] would be devastating to our industry to try and meet -- agriculture has not the capabilities of meeting the same kind of regulations that they would put on an industrial segment of our economy. We just can't do it. And it's not measurable. So they start by making huge assumptions and when their assumption's wrong, somebody gets hurt.

Even though regulations and dealing with the government was difficult, some participants thought more regulations were inevitable for the future. One dairy farmer mentioned, "DEP eventually will get around to making everybody have a best management practice or plan... they haven't done it yet, but I think [regulation is] coming." Another expressed additional concern,

There's no question, right in the top of my scale is my concern is over-regulation of the environmental bureaucracy. I've attended enough meetings on the national scale to understand that, given the opportunity, they would regulate a half a dozen to a dozen different elements in our air quality.

Three subthemes were presented for the first major theme: the lack of government trust, excessive government paperwork and fairness between different types of farmers.

### **Subtheme 2A: Lack of government trust**

A large proportion of farmer concerns directed toward the government and regulation stems from distrust. Distrust was formed by a lack of follow-through on the part of state agencies in previous decades. "They did some things that they shouldn't have done. They said they had money and a lot of people tried to work with them.

They didn't follow through on their end of the deal," explained one farmer. Speaking in regards to a particular agency, another participant said, "You did me wrong once, shame on you; do me wrong twice, shame on me."

Participants also discussed the lack of follow through on the funding that was promised. According to a participant, "they said, 'oh, we got money, we got money.' [Un]til it [was] time to collect." Another participant explained a situation on their operation where the farm was trying to build facilities to manage nitrogen waste.

If you tell somebody you're going to do it, you better do it. I mean, they made an announcement up here, we had a meeting at Suwannee River Water Management one night, and the Department of Agriculture says, we got money and we're going to bring this level... they were using 2004 cost figures, we were in 2006 building, and big difference, I mean, as far as what it cost to do it and what they were paying on. Plus, they were only paying on a percentage of the cost. And, you know, they did come through with the money, but it wasn't like it should have been. I mean, if you're building today, the cost/share should be at today's price. You can't build on last year's prices. I mean, I can't buy a tractor on last year's prices or a loaf of bread. You got to pay what today's market is, and that was what part of their problem was.

Another aspect of participants' trust was determined by which specific agencies were involved with the program. Participants wanted to be able to trust all of the partners. In most circumstances, participants named governmental entities and the level of trust they held with those entities. The governmental body mentioned with the most negative reputation among participants was the FDACS. One participant said, "I've dealt well with all the people, but when the agriculture department or state got involved in it, it kind of, I don't know, to me it lost its integrity." Another said, "The Department of Agriculture, they've got a lot to be desired." A third participant expanded on government trust issues.

I trust the parts I need to trust. I don't necessarily trust the government whole-heartedly. Just because it's a governmental entity, it doesn't necessarily make it a good thing. This program I believe in. Some of the other, FSA NRCS, Department of Agriculture, Water Management -- some of their stuff I'm, like -- I'm a lot more conservative than maybe they are and I distrust some of what they do. But not all of it.

That last reason the participants lacked trust in the government and regulation was the farmers' impression that both government and regulations were deceptive and purposely tried to complicate farm management.

Somebody told me a long time ago, that [a] man [will] do just what he says he's going to do, but you better be paying attention when he says what he's going to do .... I'm a firm believer in, 'The Man That Writes the Contract Will Always Win.' So it was a one-sided contract every time. You just had to figure out how.

Since government was viewed as underhandedly deceiving agriculture operations, most farmers approached government officials with suspicion and caution. One participant told his story of prudence.

If you're DEP sitting here, all right, you'd better ask me the right questions, [be]cause I'm not going to offer any extra information, okay?... I'm not anti DEP. Don't get me wrong. You can be from any government agency. You can be from any government agency, and I'll have a defensive posture. I'll have a defensive posture, a very defensive posture, in that I'm not offering anything extra.

### **Subtheme 2B: Excessive paperwork**

The main reasons farm operators disliked government paperwork was because it took away time from operating. One participant noted, "[Paperwork] cost[s] me a lot of time, it cost me money, time is money." Most would prefer an easier and more efficient system saying, "We need to go on the computer so you can just go there and type it in instead of having to fill out these papers." In addition, a participant wanted, "paperwork that had a focus on profitability so it made some sense, I wish somehow my DEP

paperwork could just be a reflection of my practical paperwork, and not some bureaucratic message.

Not only was paperwork viewed as inefficient, but was also irrelevant for protecting the environment. One farmer said, "We're spending an enormous amount of time trying to meet the government regulations in the way of paperwork. It has nothing to do with making the environment any better."

### **Subtheme 2C: Fairness between different types of farmers**

Participants had two concerns about the fairness of regulations and cost share programs for operators. The first concern was that certain commodities received more money and an advantage over other commodities. One farmer noted, "I think everybody came to realize that, you know, there's abuse and if the program helps one group of farmers and it hurts another group of farmers, it's not a good program." Another participant observed, "Takes a lot more money to help a dairy than it does a poultry farmer." Another explained,

The dairies, it requires more money... The dairies get a half a million dollars. Well, that's what it takes. Then you got the guy that gets \$2,000 to help him build some fences or put down some pipe or something. There's no way that everybody can get the same piece of pie. It all depends on your operation.

A hay farmer discussed how the BMP program initially hurt his business, but how the Partnership may have recovered from its oversight.

It was really a disadvantage to the farmers- the non-dairy farmers. A case, with our hay business, when [the equipment] first came out to pump the sludge and dairy waste water onto the coastal [hay] fields- that was a good thing to do for them. But it put them in the hay business, and they had a distinct advantage over me in the hay business where I did not have pivot systems. And so, the people that we used to sell hay to were now -- were not our customers any longer. And [the dairy farmers] overproduced more than what they needed, and so, now they're in the marketplace with us.

And we don't qualify, or didn't qualify for pivot systems or anything of that nature. Back then a long time ago when it first started.

But then they made adjustments and a lot of that's been corrected now to where, if we needed a pivot system there [is] now assistance to get one. But in the beginning, there wasn't.

The second concern participants had was that not all of the farmers were using the program correctly. One said, "Somebody's going to figure out how to use [the program] to their advantage... some people might get something that they didn't really need to still do the job that they were doing."

Some farmers also used the program incorrectly by purchasing equipment for a cheaper price but claiming it cost the full amount the program was offering. One participant gave an example, "if the Partnership was going to pay \$10 for this gate, they were looking out here for an \$8 gate and put it there for that \$10."

The final aspect of unfair use of the program was ineffective use of BMPs. Participants believed that if an individual received a benefit from the Partnership they should use it the way the way it was intended as long as it was useful as a benefit. An example of ineffective usage of the program was presented.

They're not doing it like it was meant to be. They just keep applying the manure water in one spot. They don't take the -- they don't put in an effort to move the system to somewhere else and let it apply there for three months or whatever, and then move it back.

### **Theme 3: Perceptions of the Public- Farmer Participants**

A majority of the participants stated that an increase in the number of agriculturally illiterate individuals in the public was a chief concern. Participants believed the public has misconceptions about agriculture and are misinformed because of a "lack of knowledge." One farmer mentioned a, "gap between the way [farmers] perceive [agriculture] and the way the public perceives it." Another participant commented, "A

huge thing that we're going to have to do is educate the public on what we're doing." A third stated, "People need to... realize what it takes to farm, and the issues that we have to face." Generally, the public does not understand what agriculture brings to the community. A participant explained,

[The public doesn't] realize how much the ag[riculture] industry brings into these surrounding counties dollar-wise and how much it provides for, not only their kids or, you know, for everybody, the schools and everything. And if the ag[riculture] wasn't here, Wal-Mart can't hire 2,500-3,000 people to benefit the economy. And there's no big industry in Suwannee County other than the poultry industry or the dairy industry.

Participants believed the public's lack of knowledge created two results. The first was a sense of fear toward agriculture practices, mainly the use of chemicals. One participant compared individuals' fear of flying in airplanes to agriculture's use of chemical.

I mean, it's just fear. They don't understand. It's like, people have fear of flying [be]cause they don't understand safety, and all, how flying [is] safer than driving an automobile down the road. But the one [plane] crash spreads fear where you can drive by an automobile crash, just don't faze them... And they don't understand what we do and how we do it, so it makes them fearful. We're putting out poisons... We live in it, you know, our children are here, we drink the water. We eat what we spray. We don't want to hurt ourselves.

Another participant explained why he believed the public has begun to choose products labeled 'organic.'

It's a misconception, [organic] thinking. It's a mindset that this is cleaner, this is better. It's not. I mean, you can take both products to any lab and have them analyze it, and there [have] been cases to where the conventional products are actually better than the organic products... And so, you know, it's just that lack of knowledge thing that all chemicals are bad. No, they're not. And used properly, they're beneficial.

A second result of the uninformed public, identified by the participants, was the public's feeling of indifference toward agriculture or false sense of knowledge. One

participant said, "The biggest worry is people that don't know [any]thing about farming want to step in and say, look, you can't do this, you can't do that." Another participant explained why agriculture hasn't been a public concern.

I mean, what was it, the year before last, or two years ago, the president of UF made a statement that farming was over in Florida. It's lack of education. They don't know how big the industry actually is and how much we actually do...Until the public gets interested in something -- as long as they can go and buy food at the grocery store at a reasonable price, farming and agriculture is not a concern of theirs. Things that affect their lives more on a daily basis, like the gas prices, price of automobiles and housing and stuff like that, something that they, you know, that's what they're more concerned about. Food is always there, it's always reasonable, so it doesn't concern them.

According to the participants, the largest concern was that the misinformed public has power. One participant clarified, "[The public] can get legislation passed that would harm us when we're not really harming the environment or anything, because they think, or they don't have enough knowledge of how we do and why we do." Another participant mentioned a specific case where his colleague lost a hog business because an agricultural issue, hog gestation crates, was voted on by the public.

He don't have a hog on his place anymore because of something that people voted on, and most of them never seen a gestation crate, didn't know what it was. But they voted, "oh, that sounds terrible"... How can you all even talk about something you don't know -- that you've never even seen?"

### **Subtheme 3A: Effects of urban development**

Two of the participants cited development as the "number one problem" for the SRWMD and four others identified development as a serious issue facing the agricultural community. One commented, "I think [development] is our number one problem because rural communities are becoming urban."

One reason urban encroachment was viewed as a problem was because new neighbors transplanting near agriculture were not local and were not familiar with agricultural practices. Two participants mentioned experiences they encountered with their neighbors, “The neighbors complain... and all the neighbors are move-ins, they’re not local people” and, “Urban encroachment continues to be a problem. I’ve had my own little battles out here with a neighbor that moved in from Fort Lauderdale and start[ed] complaining about 2,000-cow dairies- whatever, lady.”

Participants’ recognized, as urban development appears in rural settings, urban neighbors want their surroundings to appear aesthetically pleasing. Agriculture will not always appear aesthetically pleasing and dissatisfied urban neighbors could influence the future of agriculture in the SRWMD. One participant expanded the concerns.

[Neighbors] want things to look nice and, like I said, be pretty...And so, it’s not only I got to take care of my operation, but we got to take care of them, too, kind of in the sense that we got to keep them happy so we can stay here. Because if we don’t, they’re going to fuss and if you get enough people together, they could eventually run us out.

Another participant explained how urban neighbors do not sympathize with farmers and their operations.

Row crop farms are dusty. You know, in the spring of the year it is some kind of dusty around here, you know. Cows die and we can’t run out there as soon as it falls over dead and hook to it and get rid of it. You know, it may take us a day to get to it. We hope not, because, you know, if it takes us too long, we send the help to go do it. We don’t want to have to go do it. But they’re going to have to understand, you know. You’re living in a working and farming community and it’s not like living up on the corner of downtown that you can, you know, when you cut your limbs down you take them out to the edge of the road and the county comes by and picks -- or the city comes by and picks them up. It’s a different world out here.

Participants were also frustrated by urban neighbors’ inability to recognize their impacts on the environment. One said, “[Homeowners] out here, to fertilize their lawn,

they're using way more [than] they need to... they're a contributor to the [nitrate] problems, too." Another participant expressed frustration that urbanites did not understand the impacts of converting agriculture into development, "In Florida [agriculture] is replaced with another housing development and the septic tanks and asphalt and concrete don't have the same kind of green, provide the same kind of green space that a dairy does."

### **Subtheme 3B: Need for public relations**

A majority of the participants expressed a need for increased public relations with multiple groups outside of agriculture. One said, "There needs to be some more PR work done [with] the general public and explain to them what we're doing." Several participants noted that the media gives agriculture a "bad rap." One participant recognized the media's ability to spread and skew public perception of raising chickens, "media goes and, whether it gets twisted or not, it gets spread and everybody says, oh, well, people that grow chickens beat their chickens." Another mentioned how the media spreads bad news more efficiently than good news, "tell[ing] a good messages, it's really tough [be]cause it's always -- it's not sensational news about farmers doing good."

Some participants thought the Partnership could be a good source for promoting agriculture or has already been a strong promoter. One participant stated, "the Partnership has every opportunity to make a very -- promote a very positive industry." Another participant found that the Partnership was successfully communicating with legislators, "They've been proactive in trying to communicate with the legislative body, farmers telling the legislators about the need to maintain and it's going to be a big deal. Getting folks in the know." Generally, participants believed,

The Partnership's got a pretty good song to sing, and the more publicity we can get out and let more people know about it, the easier it is for other areas to adapt, and the easier government is going to have to accept this as a form of meeting the environmental challenges rather than trying to overly regulate it.

One participant alluded to using leaders in the community as an effective way of promotion.

There's other folks out there that says, I really understand but I'm concerned and you get them convinced that this Partnership's a really good thing, how this thing works. At least those folks can be very vocal and if they're pointed to the good things that [are] going on, well, they're probably going to carry a lot of weight.

Other participants mentioned ways the Partnership could improve its public relation techniques. One participant thought the Partnership had done some "PR work" but could do more and "make it more known." This participant listed the radio, newspapers and a "PR person" as resources the Partnership could add to its repertoire of promotion techniques. Another participant recommended, "look[ing] for some alliances out there with some folks outside of our industry" to increase the level of understanding between agriculture and the public.

However, regardless of a public relations strategy, improving the image of agriculture as an industry will be a group effort. One participant stated, "[PR] takes everybody doing something to try to keep the information out there."

### **Subtheme 3C: Impacts of environmental groups**

Half of the participants mentioned potential impacts "environmentalists" could have on the agricultural industry. One participant stated their fear, "The environmental enthusiasts are going to have a -- they can have a real heyday in trying to achieve their left-wing agendas by regulating farms out of business."

Participants also believed environmental groups have unrealistic goals that cannot be attained.

[Environmentalists] want [the land] to remain like it was when the Indians walked across it. And that's about as unrealistic as you can be, but if they got enough money behind them, they'll do it. Those are the people that worry me, that really don't have a grasp on how things work

Another participant cited concern about environmental groups as a reason for participating in Partnership programs.

The reason we got involved with [the program] is because there's a lot of people out there that don't understand, kind of like what we was talking about with the natural resource group, they don't understand what we're doing out here.

#### **Theme 4: Concerns for the Future- Farmer Participants**

Participants spent time addressing their concerns for the future. The concerns included wanting the ability to pass their farming business to a younger generation, their ability to keep up with the changing community, future availability of money, a need for tighter communication and long-range planning.

First, participants expressed a desire to be able to keep their operations within the family and also suggested it could be difficult. One said, "our family owns about 80 acres and I've -- and of all the grandkids, I've been the only one that's been interested in doing anything with the place." Another commented,

I hope to be able to pass this along to my girls. My dad's dream was to pass it on to me and I hope, you know, that one day I could pass it along to my girls. And I hope that it'll still be here to do that.

Participants also recognized keeping up with technology and improving will be a necessary aspect of the future. One said, "[Farming] will be changing, and 10 years from now it will be a lot different than it is now." Another said,

I think you always have to be looking outside the box, too. You can't be looking for conventional ways of, or conventional crops. You've got to be looking for what's out there that may be a new variety or a new crop...there's always improvements.

One participant thought having the Partnership follow up more frequently with the farmers involved with its programs would be beneficial.

I think [the Partnership has] pretty much run their course as getting new people, but they need to -- I guess is look at, okay, how can these farmers that are doing this, where can we improve now. And I know that there [are] some places we can improve here...I think there could be some educational areas there and involvements at where we can improve.

However, participants noted that a continuous barrier of keeping up with farming trends and conservation will be the level of available funding. One said, "It's particularly difficult because they don't know what funding is available. Without some direction of what funding is available, any long-term planning is, like, impractical." Another participant specifically mentioned how money cut from land grant universities will affect farming.

As they cut back funding at my place, it makes it more difficult to have the necessary research to help us make good decisions on growing crops, fertilizer application, different methods, having to make those decisions without us becoming an experiment. And I see that as a real big challenge. If you don't have IFAS or the land grant universities setting the path and doing good fundamental research out there, then you wind up with the environmental regulators making decisions about how to make best management practices. And that's extremely vulnerable to our industry. So, I see it as high risk as to what's going on with the research and funding with IFAS or for any of the land grant universities.

Several participants also wanted communication to the public and governmental agencies to continue and become stronger.

We got to try and do a better job of communicating this whole message out here so we have an opportunity to try and educate farmers better about a more uniform set of records that we can do a better job of communicating with DEP.

One mentioned that forming more organizations like the Partnership could be helpful in improving communication by saying, “As we’re moving forward, it would sure be nice to have more proactive functions or organizations like the Partnership across our industry because it has a different image.”

Though long range planning would be difficult without funding, participants felt a long-range plan for SRWMD agriculture would be helpful managing all of the farmers, keeping consistency and offering a sense of security.

Long-range planning would allow a more efficient use of everyone’s time in trying to achieve the same goal. We don’t know where the government’s headed with their new regulations. This makes it difficult to plan for at best. We’ll just play it one leg at a time. But, if you could see, if everybody understood what we ultimately had to achieve, we’d start working towards that goal a lot sooner.

### **Objective 3: Factors that Contribute to Farmer Adoption of BMPs**

When discussing reasons for adoption every farmer cited a resource as a major contributing factor. However, the definition of resource took several forms as explained by the following theme.

#### **Theme 1: SRP Provides Resources to Farmers- Farmer Participants**

To encourage adoption of BMPs the Partnership offered multiple resources farmers could use like relationships, help, education, accountability and equipment. The Partnership provided interpersonal relationships between them and the farmers. These relationships helped SRP encourage trust. The Partnership also provided educational opportunities and offered additional help. Third, SRP offered accountability. Accountability allowed farmers in the SRWMD to focus on the same set of recommended guidelines and gave farmers a sense of protection from regulations.

Lastly, the Partnership was able to provide farmers with needed equipment to entice program participation.

### **Subtheme 1A: SRP provides help and education**

Participants recognized that the Partnership “makes [farming] easier and things work better,” and that “[the Partnership] can just be useful for a lot of stuff.” Another said, “The main thing was with the BMPs and the Partnership was to help with learning the use of the water more correctly, in a timely manner, and fertilizing the same way.”

The participants received help and education through site visits and demonstrations by SRP staff. One stated, “[The Partnership] just kept coming out and helping us with stuff. Some things you can just plain out show us- that worked for us.” Another participant explained how a site visit occurred, “You know, he come[s] out and not only did he show us how it all worked by leaching and all, but just assured us.”

Demonstrations made participants more comfortable with changing or updating management practices by giving information. One participant explained,

I go to some of their demonstrations out there and just sit through some of their classes where they talk about fertilizer and pesticide use and different -- the different practices you can do with your operation. And that's been some pretty good information.

While farmers enjoyed receiving help and education from the Partnership, for some, they were secondary reasons for participating. One farmer stated, once you get into the program, it's a learning experience... but learning was secondary.”

### **Subtheme 1B: SRP provides accountability**

The farmers interviewed believed that participating in SRP programs helped the SRWMD farmers get on the “same page.” Participants thought that working with the

Partnership held all of the farmers to the same standard. One stated, "We're all supposed to be in this deal together, trying to save -- keep the water quality up."

The Partnership also provided a reference for record keeping. Documentation of resource usage was important for farmers to prove to regulators that a certain amount of water was required for the area's agriculture and to show that regulations are not necessary. Two participants explained why documentation and accountability were important.

We need to [a] have reference [for] how much water it requires for us to produce food and fiber so that when Tampa/St. Pete, these other places come in here, no, we got to have this much for agriculture in this area and for the people in this area.

It's going to be hard for somebody to come in, and when you do have somebody come in, and say, "well, they're killing the environment. They're doing this, doing that." Well, you can go again and say, "I've got the Partnership. I'm in that -- I'm doing what needs to be done," and it's kind of a shield out there saying, you know, okay, we're doing this together, all these farmers doing this, we're taking care of the environment, we're doing what needs to be done and that helps a lot.

Not only did the Partnership provide an accountability system, it also gave support to the farmers. One participant stated, "The Partnership, that kind of gives you a extra backbone to stand up with and say, hey, look, we're doing what needs to be done and what people recommend and it's a win-win situation for everybody." The Partnership provided support by offering to claim responsibility for potential problems with regulations or the public. One participant explained how the Partnership would claim responsibility.

If we signed up under this program and we went by the guidelines they gave us in that booklet, and if there's a problem later, then it falls on -- it's [SRP's] responsibility, not mine. Because as long as I do what their guidelines say, that I should be all right, but if there's a problem, it falls on them.

The participants also believed that the Partnership allowed them to stay ahead of regulators and SRP programs would make transitions to possible government-mandated regulations easier. One farmer stated, “You see stuff coming down the line, you see, you know, the environmentalists, the PETAs. If you can stay ahead of those people, you’re way ahead of the game.” Another said, “I think the [farmers] that are involved [in programs] will [have] a lot easier transition.”

Though the participants appreciated the Partnership’s efforts in producing accountability and protection from regulations, not all believed the protection could last forever. One participant explained how the Partnership’s guidelines may not be relevant in the judicial system if the public experiences issues with water quality.

I think the courts could change anything they want to change. Not that I’m overly pessimistic, I’m just realistic...Whether [SRP will] stand up against the court, you know, a court challenge, I don’t know. There’s only one way to find that out. We’ll find it out soon enough.

### **Subtheme 1C: SRP provides equipment**

The equipment the Partnership was able to provide farmers also encouraged a lot of participation in Partnership programs. When participants were asked why they wanted to get involved with the Partnership, new equipment was a popular response. One said, “The \$10,000 in cost/share equipment had a lot to do with it.” Another said, “We needed to update our spray equipment, and use the GPS equipment that they were offering through the Partnership to put our chemicals and stuff out. That’s how we got started and got involved with them.”

New equipment added additional draws by allowing farmers to be more accurate and therefore more cost efficient with inputs. One participant mentioned how equipment allowed him to be more autonomous.

New equipment, better equipment, has really helped us financially. To go back and do it ourselves, and have good accurate equipment, precise, I mean, the way we've got the newer rig set up, it's so accurate. It makes it a lot safer and more efficient.

Another mentioned how the Partnership equipment help re-start a business efficient and effectively.

We really didn't have good spray equipment because we hadn't grown crops in several -- long time, 15 years, basically. So, we didn't have spray equipment that was any good. It would have been cheaper to have bought equipment than to rebuild it, basically. And so, the program was there and so we worked with the program to get the equipment which was really, you know, a big help to us financially, to get back into the row crop business

#### **Objective 4: Barriers that Contribute to Farmer Non-Adoption of BMPs**

When asked to speculate about the barriers contributing to non-adoption of BMPs very few barriers were listed. However, the perceived profitability of a BMP was discussed by both key informants and farmer participants as being a key barrier to overcome before adoption. Farmer participants also stated farmer or farm operation age as a barrier for BMP adoption.

#### **Theme 1: Perceived Profitability of Participation**

##### **Key Informants:**

Through their knowledge of the agricultural industry, informants were able to define farmers as "resource driven" and determine "profitability is one of the high-ranking decision makers." Another informant said that "one of the biggest things you need is money and if you don't have money you don't have much of a program, it's very difficult to move people without money and incentives." One key informant suggested that a farmer implementing BMPs was similar to buying auto insurance.

If you buy auto insurance, probably one of the first considerations that you would have is cost of the auto insurance. Secondly, was probably the amount of coverage, or the types of coverages that you got, or the benefits

that you get out of it. And ag[riculture] producers are no different. They look at, “what’s it going to cost me,” or “is it going to make me money. Is it going to help me continue in my business?”

Informants agreed, the ability to save money or make more money creates buy-in for the Partnership. When individuals discover an opportunity to increase savings, they want to be included for an equal opportunity to increase profits. One informant was reflecting on BMPs saying, “Yes, it’s a water quality BMP, but it’s helping their bottom line be better.” Another, discussing the BMP program said, “Everybody wanted to [participate] and part of [the Partnership] was we were providing additional money.” Yet another informant said,

When [farmers] see [BMPs] work, and they see things working for their neighbor and they see, you know, it goes back to economics, then they want to buy into it... I think seeing your neighbor next door using [the program] and not seeing that pivot running as often and realizing he’s saving a bundle of money and I’m not. That would certainly, I think, has brought a lot of them on board.

Another topic of concern for the informants was the agricultural community’s ability to achieve long-term sustainability. One informant stated, “All of agriculture’s having a serious time, you know, economically, just surviving.” Another participant said,

If we don’t make agriculture sustainable, profitable for farmers to be able to stay in the business, whether it’s reducing the cost of inputs or increasing the price of the products or both, it’s going to be a moot point. The farmers, as much as they would like to, they’re not going to be able to stay in agriculture.

A third informant commented specifically on the plight of dairy and poultry producers in the SRWMD,

Even though there’s been cost-share incentives provided, they’ve still got to provide some of their own money. When the industry’s hurting, they’re doing good to make the feed bill payment and the light bill payment and all the things that go on a dairy. And the poultry industry’s in the same boat

because they're just barely hanging on there because they've been cutting production.

Farmers cannot afford to waste inputs for their operation. BMPs are beneficial for reducing waste of inputs. However, if money does not exist to help implement BMPs, it will not be economically beneficial for farmers. Therefore, informants determined, farmers will not participate in a program that isn't profitable. With the cost-share program, the Partnership has generally made BMP implementation more profitable. One informant said, "There's really an economic incentive for them to manage these BMP properly because, you know, they don't want to waste fertilizer, they don't want to waste water [be]cause it costs them money." Another said, "Money is something that is really important to invest for BMPs for farmers [be]cause they are not one to waste anything."

#### **Farmer Participants:**

Participants articulated, "economics drives most of what [farmers] do" and that "money is a big object." Another participant expressed a need to "have opportunities to think about what's profitable, we got to have time to think about what's efficiency, a proficiency, and all those different things." One participant's story offered a description of a specific economic worry for families.

You worry about making the bottom line, I mean, making money to support your family. Used to, the mother stayed home. Today, the mother goes and works. My wife works. And my mother worked, but she didn't work until all of us were way up in school and then she went and got a teaching degree and taught school. But back then, I mean, they made enough money that the parents -- one of the parents could stay home, the mother usually, the father worked the farm. It takes more to live today. I think that's your main problem. You got to spend more money.

Generally, a main reason farmers adopted was for cost efficiency. One participant stated,

It's cost effective. You can't afford to overuse chemicals, fertilizers, whatever. You put enough out there to do the job but, you know, if you start wasting it, it gets into your pocket so quick that it's just not even -- it's just -- it's not cost effective.

However, some of the participants think that money could be the number one reason why a farmer did not participate in Partnership programs. In most cases, programs do not pay 100% of the costs to update management practices. If the farm cannot afford the percentage unpaid by programs, the farm cannot update its practices.

A participant gave an example,

The cash is tight... I need the system, but I need that money elsewhere worse. And so, you use -- your priorities of what's going to keep your operation afloat. And, I mean, it would do no good to take the money and put in a system and then lose your place. And so you had to prioritize and look at your business and decide what you could afford and what you couldn't afford. And if I didn't have this system, so to speak, I've been getting along without it, yes, I'm running a drought risk and all that, but if I put it in, and I can't survive until the crop cycle comes back around, what good does it do me

Currently, the downturn in the economy is slowing the distribution of money and therefore BMP adoption. A participant said, "[the economy] will make it more challenging moving forward because they continue to cut back funding that I can see."

Another said,

They don't have the funding they need. They are like two years out on cost share money. And while it's a good thing to go and sign somebody up for the program, it's really hard to sign somebody up with, you know, dangle this little carrot in front of them, saying, 'you know, we got cost share money. If you sign up, do things right, we can help you with some equipment in two years.'"

When no money is available to assist farmers in updating their practices, operators may choose to stop farming. Updates cost too much money and if regulators make updates required, leaving the industry would be easier for farmers. One participant offered an explanation about updates.

That's a cost [farmers] can't pass on. [Farmers] have to absorb that, and that's where a lot of them, if they were forced to, they'll just say, okay, I just won't do any of it. We'll just close them down, or we'll just, you know, sell out.

One item making participation and adoption more difficult in hard economic times was the cost of chemicals. While BMPs make the use of chemicals more efficient, the necessity and cost of chemicals takes money away from investing in BMPs. A participant stated, "in the last year it's been the price of fertilizer has skyrocketed. We've been hammered with that, fuel prices." Another mentioned, "That is my biggest fear, is that the cost of chemicals keeps going up"

## **Theme 2: Older farmers resist change-Farmer Participants**

When asked what barriers may exist for BMP adoption several participants mentioned the difficulty older farmers have with operational changes. A participant stated some older farmers believe they have "made it this far with no help, I don't want none from [the Partnership]," one participant said. Another stated,

Some of your older managers aren't going to sign up for nothing-don't want to. They don't want to be involved or give out information about their operation. Some people are just that way.

Another participant thought that older farmers "Don't like change. They don't like someone to come in, helping them, or telling them, 'maybe do it this way instead of the way you used to do it.'" Another observation made by participants about older farmers, was their inability to foresee the purpose of the investment for their operation in the future. One participant explained a hypothetical circumstance where he was the older farmer, "I'm, say, 70 years old and, you know, I can't see spending this money when I'm going to have to sell this in five or 10 years because I'm going to be too old to do it."

## **Objective 5: Explain the Varying Adoption Rates Among Dairy, Poultry and Field Crop Farmers in the SRWMD**

As farmer participants tried to respond to questions regarding the barriers to BMP adoption, they were frequently perplexed. Most could not imagine why a farmer would not adopt BMPs if they had the financial ability and the support of the Partnership. The researcher attempted to find a non-adopting farmer in the SRWMD. However, when interviewing farmers targeted as non-adopter, the farm operation used some type of conservation practice. Therefore, a clear boundary could not be drawn to categorize any farmer as a non-adopter so it was removed from the study. Farmer participants also frequently discussed their love of the land, or stewardship, and why conservation is important to them. The removal of the non-adopter category and stewardship were paired together in this section because the two represent why there is no clear reason why adoption rates differ among the three farmer groups.

### **Theme 1: Non-Adopters Are Rare- Farmer Participants**

Several participants said that after signing up for the BMP program, nothing really changed for the operation. Officially signing up was merely a formality. A participant mentioned, "We were doing these BMPs anyway. And you will find most of the farmers that you talk to are doing them anyway."

When asked, most of the participants did not know any farmers that had not adopted BMPs or "couldn't imagine why they wouldn't." One said, "I don't see where anyone would not want to do it because, in the long run, it's going to benefit you, benefit the environment and the people around you." Another said, "As far as the buildings for the poultry and the dairy BMPs and all, I've not heard of anybody say that they didn't

want to participate.” Lastly a participant believed, “[SRP has] pretty much run their course as getting new people.”

## **Theme 2: Farmers as Stewards of the Land- Farmer Participants**

Half of the participants involved in the study mentioned taking care of the land or environment. One commented, “for the most part, we’re environmentalists” and another said, “Most farmers are trying to be the best stewards they can to start with.” Yet another stated, “we care as much about the environment as anybody.” A fourth said, “I don’t see where anyone would not want to [conserve] because, in the long run, it’s going to benefit you, benefit the environment and the people around you.”

A main reason farmers practiced conservation was because their living “comes from the dirt.” A participant stated “that’s one thing with farming, is you’re always looking for something to better. You’re always trying to better everything.” Several participants said that if they spoiled the environment, agriculture businesses could not exist. One participant believed if farmers didn’t take care of the land, the abuse of the resource would eventually lead to negative impacts.

If you stop and think about it, the environment and the land is what produces the farmer. The farmer’s got to have it to make a living, so why wouldn’t we want to take care of it. And if something -- if I go out there and I’m doing something that kills my crop, common sense says, no, that’s bad, that’s bad for the environment ‘cause they can’t live. Okay, I’m not going to do that no more. So why wouldn’t, you know, why wouldn’t a farmer want to take care of the environment and take care of the land because that’s what takes care of him.

A second reason stewardship of the land was important was for the value of wildlife. The participants understood that a farm operation is not the same as a wildlife preservations in management techniques. However, farms intentionally used techniques to encourage wildlife.

I mean, we can ride around the farm here and, you know, wildlife is important to us. It doesn't make our living but it's part of our lives, our living. It doesn't derive us any money but it's the way we live. You can, on this little farm here you can see deer and you can see turkey and you can see quail and dove and whatever, you know, it's here. And we do things to make sure they stay here. We plant food plots. We don't tear some trees down or we don't clear-cut the place. We like that kind of stuff. It's what we are also.

#### **Summary of Chapter 4**

Key informants and farmer participants agreed upon two things: perceived profitability and interpersonal relationships are important factors contributing to farmer adoption of BMPs. The majority of farmers want to participate in a BMP program because of the economic savings BMP participation provides. Farmers generally trust the one-on-one relationships that the SRP provides, which encourages adoption. Another key finding showed that non-adopters in the SRWMD were rare. A major theme portrayed by the farmer participants was a feeling of stewardship toward the land. Farmers wished that the public understood their operations and knew agriculture takes good care of the land. In general, participants were concerned about the lack of agricultural education in the public and the potential political implications.

## CHAPTER 5 DISCUSSION

### **Introduction**

This study helped fill a the research priority area for Agriculture Leadership in the National Research Agenda (Osborne, n.d.) for engaging citizens in community action through leadership education and development and determining the effects of enhanced citizen engagement in building sustainable agriculture enterprises. The Partnership engaged farmers through its programs by educating the community. Through its efforts a vast majority of farmers in the SRWMD have adopted BMPs.

### **Conclusions**

The keys to a successful organization, for the Partnership, were found in the leadership of the Partnership staff. The important aspects of the leadership within SRP were its strategies and integrity in establishing and keeping trustworthy relationships. The Partnership's strategies included creating a foundation for the stakeholder groups and understanding that good leaders were critical for decision making and achieving goals.

The Partnership also matched its goals with an appropriate strategy and perspective for accomplishment. Reducing nitrate pollution in groundwater will take decades to accomplish, therefore the Partnership used a long-range perspective. On the other hand, increasing adoption of BMPs in the SRWMD was a goal that could be achieved much more quickly so the Partnership developed a five-year strategic plan.

The Partnership unknowingly used aspects of Rogers' Diffusion of Innovation (2003) to achieve farmer adoption of BMPs. The Partnership needed to communicate the message of BMPs to farmers. Rogers (2003), states that interpersonal channels of

communication are more effective than mass media channels. Communication between homophilous individuals is even more effective because the individuals share common meanings, beliefs and mutual understanding, and the participants agreed. Participants appreciated that SRP staff had an agricultural history which included their educational background and presence in the community prior to working with SRP. Therefore, the SRP's homophilous, "one-on-one" relationship with farmers built trust and allowed the SRP to disseminate information about BMPs more easily.

Within the time element of Diffusion, the Partnership leaders and staff focused on the first two stages of the innovation-decision process, knowledge and persuasion, as they reached out to farmers in the community. The Partnership understood that a farmer's previous experiences, perceived needs and the norms of the area would impact farmers' level of appreciation for SRP programming and they would have to adjust and provide accordingly.

In general, farmers in the SRWMD previously had negative experiences with other agencies and the norm was to be skeptical and cautious when approached by officials of programs. Therefore, during the knowledge stage of the innovation-decision process, SRP staff focused on developing enduring interpersonal relationships with farmers and meeting equipment needs for productivity. In the knowledge stage, farmers were exposed to a BMP and gained understanding of how it functions (Rogers, 2003). The Partnership fought farmers' selective exposure and selective perception of BMPs through relationship building. In these relationships, the Partnership concentrated on how-to knowledge and principles knowledge of BMPs to avoid misuse or discontinuance of the BMP.

Relationship building was also important during the persuasion stage of farmers' innovation-decision process. Cognitive thinking is mainly used during the knowledge stage, but persuasion uses affective thinking. As a farmer became more physiologically invested with the innovation, they wanted to confirm their perception of the BMP through the opinions of near peers (Rogers, 2003). SRP tried to fill the need for near peers by consistently and purposefully involving change agents. These individuals were specifically targeted to influence perceptions and included staff from SRP, SRWMD, and IFAS. Staff members from these organizations were chosen because of their high level of interaction with farmers.

During the persuasion stage, the SRP also used opinion leaders to pursue a positive image in the community. The key informants recognized a difference between early adopters and laggards (Rogers, 2003). "Early on we were trying to educate more of the masses and bring them along. And so, we would try to find the early takers and have them help us ... to get it going and to get people [to adopt]." The staff pursued those "early takers" as opinion leaders to persuade the laggards. As farmers were identified as early adopters, the Partnership encouraged them to participate in a progressive farmers group. The progressive farmers group implemented BMPs on their property and spread information and persuaded additional farmers to favor and adopt BMP innovations. One informant explained, "[information is] a lot more believable if it comes out of somebody else's mouth that you see at a restaurant or see at the equipment dealership or something like that. It gives a lot more credibility to [the program]."

The change agents and opinion leaders answered questions that farmers had regarding the characteristics of the BMP innovations. The agents and leaders were prepared to answer questions on the BMPs' relative advantage, compatibility with previous management techniques, and complexity compared to previous management techniques. The trialability of BMPs was limited due to cost and practicality. However, the SRP provided opportunities for farmers to view BMP demonstrations. Demonstration events also gave SRP staff an opportunity to share the BMP's relative advantage and other characteristics. Observability of BMPs occurred through the progressive farmers group. Non-adopting farmers could view the results of BMP adoption by inspecting the farms of neighbors who had already adopted.

Farmers stated that an additional aspect of their persuasion stage included forward planning. The participants mentally applied the BMPS to their current or future farm conditions before deciding to adopt. Since BMP adoption carried some degree of uncertainty a vicarious trial is necessary to project into the future to see if BMP adoption would be possible or practical. Farmers also adopted BMPs as a preventative innovation. According to key informants and participants, adopting BMPs may prevent mandatory agricultural regulations from being issued in the future. Typically, motivation to adopt a preventative innovation is weak and therefore adoption rates are slow (Rogers, 2003). However, the desire for farmers to avoid regulations was a powerful motivator. This cue-to-action compelled farmers to form a favorable attitude toward adoption and turned it into a behavioral change.

Farmers in the SRWMD were not necessarily aware of the Partnership's deliberate strategy or use of Diffusion of Innovations. However, the strategic foundation

established a basis to fight farmer skepticism toward governmental agencies. Farmer participants confirmed the Partnership's "word of mouth" method was effective for increasing farmer participation in SRP programs. Farmers heard about programs from attending meetings, site visits and through their peer network or social system- reaffirming the importance of homophilous relationships and communication channels.

Both the key informants and the farmer participants valued relationships and trust. Initially, farmer operators wanted to prohibit SRP staff from building relationships within the community. The farmers' perception was that the Partnership's duty was to prove its ability to help. Relationships were formed through the Partnership's ability to provide resources. However, participants defined 'resource' differently. Some considered help and educational opportunities a primary need and resource. Others preferred money and equipment provisions or the ability to remove responsibility from the farm operator if mandatory regulations were enforced.

When the Partnership gave these resources, it earned trust and respect, which in turn eased farmers' minds in developing relationships with SRP staff members. The built relationships were the fourth resource provided by the Partnership. Relationships were made easier by the SRP's humble attitude and ability to recognize imperfections within the organization.

Participants not only wanted resources, they wanted to be comforted in their fears. Farmers were concerned about the public's lack of agricultural knowledge. The majority of their concern developed from the perceived level of impact the uninformed public and environmentalists or natural resource groups could have on the agricultural industry. The farmers believed the combination of urban encroachment and the public

voting on agricultural issues could eliminate segments from the industry. Farmers agreed a public relations campaign would help improve agriculture's image and a campaign will be necessary for agriculture to remain in Florida.

Farmers wanted to specifically inform the public about its impacts on the environment because the public blames a majority of water quality and quantity issues on agriculture. Participants also wanted to make the public aware of their conservation efforts. Farmers perceived themselves as stewards of the land. Participants valued the land as a resource because their livelihood is cultivated from the land and they appreciate the wildlife viewing.

In fact, participants proved their love of the land to the extent that the "non adopting farmer" category was removed from the study. During the course of the interviews, each farmer spoke about updated management techniques they were using. Though not all of the participants were officially involved in the Partnership's programs, they were all using BMPs unofficially, at a minimum. Therefore, according to participants interviewed, non-BMP-adopting farmers in the SRWMD were absent.

Though non-adopters were absent, participants speculated as to why a farmer may choose not to adopt BMPs. Key informants and farmers agreed that money, economics, or perceived BMP profitability were large factors in decision-making. A farmer may understand how BMPs would save money and create a more economically efficient business, but if start-up costs produce a financial burden the operator cannot bear, the operator will not participate. Cost-share money was crucial, but if not enough could be provided; the money was irrelevant for the farmer.

A second speculation, made by farmer participants, for non-adoption was the age of the farmer and/or the operation. Older farmers have a higher resistance to change and are more skeptical of governmentally-influence programs. Lastly, if the farmer will not be in operation long enough to be able to foresee the benefits of the investment, persuasion would be hard to accomplish.

The availability of money was also an important concern for the future. Money will be continuous barrier due to the cost of keeping up with farming trends and conservation practices. Participants though more and updated practices were important for being able to pass the businesses down to other family members, though they worried younger generations are losing interest in farming.

Since non adopting farmers were irrelevant for the SRWMD, the farmer participants thought more frequent follow up from SRP staff would be helpful for adopters. Participants wanted the follow up to include different levels of Partnership involvement and additional education to improve efficiency for operations.

The key informants and farmer participants' ability to agree upon multiple themes emphasizes the lack of a leadership gap. The recognition of informants that one-on-one relationships were crucial and a daily occurrence says farmers in the SRWMD are receiving their information from the source. The lack of a leadership gap increases the Partnership's credibility and trustworthiness amongst farmers.

Though many conclusions have been made, the analysis was subjective and used a limited sample size. Therefore, projectability is not possible. The qualitative research conducted produced clear findings but does not necessarily produce definitive conclusions for other organizations. One weakness of the study is an unclear

perspective of the Partnership's leadership styles and strategy development. However, conclusions do provide enough information to establish a firm basis for decision-making in other collaborative organizations.

### **Implications**

The conceptual framework discussed the importance of farmers' attitudes, information and awareness, farm and farmer characteristics as well as economics in relation to BMP adoption. The interviews of key informants and farmer participants established that economics and perceived profitability of BMPs are the most important determining factors for adoption. Lack of a monetary resource is the number one barrier to adoption. If money is available, either from the farmer or an organization, management practices can be updated. Money is the bottom line for farmers. Even if a farmer has a favorable attitude toward conservation, and has information or awareness of BMPs, without money that farmer can do nothing. Two criteria must be met for BMP adoption: sufficient resources to update practices and specific economic benefits that would result.

Money will clearly always be an important factor for organizational survival. However, money cannot, by itself, solve problems. For the Partnership, a combination of a collaborative atmosphere, volunteer approach and strength from interpersonal relationships was just as valuable. In the future, when money may become a drained resource, offering other amenities will be increasingly important.

The success of a voluntary program demonstrates that the future of agriculture conservation does not need to be completely government regulated. Though establishing the Partnership did not give immediate results, in the long term, the results might be more enduring. Farmers in the SRWMD have a more positive attitude than

farmers who were required to make immediate and comprehensive changes to their operations by officials. Farmers with a more positive outlook toward political entities could prove be beneficial in the future. Cooperation may be needed to monitor usage of resources for record or other management updates for conservation may be necessary.

The Partnership also shows collaboration between multiple political entities is not only possible but can be successful. Generally, large collaborations are avoided because of the overwhelming hassle associated with achieving agreements between a wide spectrum of objectives and values. Combining the input made the Partnership's approach stronger and gave the organization authority over the process, making the process more streamline. This is an important concept for other states with water quality or quantity issues. Devoting a separate organization dedicated to determining and solving problems may be the best method.

The lack of agricultural awareness and knowledge in the public realm, as discussed by participants, has a couple implications for the industry. If the majority of the American public is uninformed or holds misconceptions, they are likely to be misguided in their perception of issues. Media and natural resource groups have the ability to negatively skew the needs of farm operators. Without having a well-rounded perspective of the background, the public votes on issues presented. These issues have the ability to have damaging economic effects on the breadth of the industry. Media needs to receive an increased number of positive accounts of how agriculture is improving the community or economy to help eliminate harmful judgments passed on agriculture.

Therefore, agriculture needs to be its own proponent. There is a need for more outreach to expand knowledge and awareness of agriculture throughout all segments of the population. The current focus of education may be too focused on the legislative body. While they are an important audience to reach, legislators represent a small proportion of the population. Individuals with expertise in public relations should be involved in agricultural organizations. These individuals are needed to become the advocates of agriculture throughout the American public.

In order for the agricultural industry to establish a long-term endurance in the future, education toward agriculture awareness should start at a young age. The young generations have yet to develop attitudes and are therefore a more impressionable audience. Agricultural education should be incorporated into state education standards (like Florida FCAT) to be more relevant for educators in urban and rural settings.

The discovery that the SRWMD lacked non-adopting farmers has implications for regulators. There may be a prevalence of farmer stewards outside the SRWMD, throughout the many community groups of agriculture. Farmers that view themselves as stewards of the land, should be treated as such. Regulators should consider the idea that all farmers have adopted some form of BMP voluntarily and recognize a volunteer approach is just as effective for improving environmental conditions.

Lastly, Rogers' Diffusion of Innovation (2003) can be effective in agricultural communities for encouraging the use of conservation practices. The participants responded well in the knowledge and persuasion stages of the innovation-decision process, which led them to decide to adopt and implement BMPs. The innovation-

decision process could be effective in other agriculture settings and homeowner for conservation.

### **Recommendations**

In the current economic struggle, it will be important for organizations to look outside themselves for collaboration potential. Organizations will be able to accomplish more together than apart by combining and sharing resources.

Extension specifically could benefit from becoming a more collaborative organization. Extension is stretched for multiple resources including finances and staff. By merging resources together with organizations that have a similar mission, goals and values, Extension can focus on succeeding and growing rather than maintaining.

This research is also applicable to organizations trying to increase adoption of conservation practices. These organizations could have a variety of targets including farmers or homeowners. Regardless, the findings of this study show organizations should strategize and have an action plan and incorporate Diffusion of Innovation (Rogers, 2003) so the path of the organization is clear.

Organizations need to break down their outreach programs into smaller units. More one-on-one contact is needed between leaders and their members to create trust and loyalty while eliminating a leadership gap. The study will play an important role in determining how leaders in conservation organizations can emphasize the importance of conservation to agriculture audiences and increase participation in conservation programs

The SRP should be a model for other water management districts in Florida, or other similar entities in other states. Though the SRP is its own entity, with its own structure, it works within the district. The Partnership has discovered a way to make

voluntary BMP programs widely accepted and adopted by overcoming monetary and trust barriers. If the SRP is used as a model more frequently mandatory regulations may be avoidable.

Though the Partnership is a strong example for how to encourage BMP adoption, the SRP should focus more attention on the confirmation stage of the innovation-decision process. Many farmers have passed through the decision and implementation stages, but there is still a certain degree of uncertainty about the consequences of adoption. Therefore, the farmer is still seeking reinforcement for the decision already made. Follow-up is needed to ensure farmers maintain BMP adoption so that dissonance does not occur.

In the future, the Partnership should be evaluated again to give an expanded historical perspective. A second evaluation could study the confirmation stage of the innovation-decision process and show the long-term sustained level of BMP adoption. An evaluation performed later could also view how Partnership staff led the organization through challenges. A future study could also clarify the details of the strategy and leadership of the SRP which they confidently believed in for their success. The identified strategy could be used as the foundation for the start of other collaborative groups encouraging the adoption of conservation practices.

Further research should be conducted on the role of opinion leaders and change agents within agricultural settings. The findings of this study suggest that using Diffusion's influential players in the casual social system of agriculture is effective. Further research is needed to confirm or undermine those findings.

Additional research should also be performed on other collaborative organizations that include public and private stakeholders and are specifically geared toward agriculture. The Partnership's collaboration has been successful in reaching farmers but further research would define if this organization was a common or unusual example.

One-one-one relationships were important in collaboration and research should also focus on the use of these relationships in organizational leadership. It could be argued that a key factor involved in farmer BMP adoption was the Partnership's deep relationships with their consumers, the farmers. Positive personal relationships increased adoption. Though the Partnership's programs are voluntary, other organizations could use this model to increase trust and therefore productive output.

Finally, as collaborative organizations are studied, researchers should examine them, not just under the lens of Diffusion of Innovations (Rogers, 2003) but Transformational and Transactional Leadership (Bass & Avolio, 1999) as well as Community Based Social Marketing (Mckenzie-Mohr & Smith, 1999). The addition of these concepts into collaborative organizations will emphasize different key organizational aspects that are not recognized here and expand the knowledge base for an evolving organization type.

### **Summary of Chapter 5**

The Partnership increased BMP adoption through the use of a collaborative strategy which included aspects of Rogers' Diffusion of Innovation (2003) and developing deep interpersonal relationships with farmers.

Barriers to adoption included economic factors and age of the farm operation or operator. However, farmers in the SRWMD view themselves as stewards of the land

and have therefore adopted official or unofficial BMPs. Consequently, BMP non-adopters are rare in the SRWMD.

Regulators should recognize the impact of the voluntary nature of the SRP when considering management requirements. In the future, more collaborative organizations will be helpful for achieving conservation in different realms. The Partnership should focus on increasing public awareness of agriculture and maintaining one-on-one relationships.

APPENDIX A  
KEY INFORMANT INTERVIEW GUIDE

1. When and why did you or your organization become involved with the Partnership?
2. What is your role in the Suwannee River Partnership?  
*Follow-up question:* Has your role changed in the Partnership?
3. What do you think farmer perceptions are of the Partnership? Why?
4. How does the Partnership interact with dairy, poultry and row crop farmers?  
*Follow-up question:* Do you think these methods are positive or negative?
5. What do you think are the Partnership's strengths in regards to BMPs? (getting farmers to adopt)
6. What do you think are the Partnership's weaknesses in regards to BMPs?  
*Follow-up question:* How is the Partnership working to alleviate these weaknesses?
7. How does the Partnership encourage BMP adoption?
8. What do you think are some of the variables that contribute to a farmer's adoption of BMPs?
9. What do you think are the major barriers to BMP adoption with dairy, poultry and row crop farmers?  
*Follow-up question:* How do you think the Partnership is trying to overcome these barriers?
10. Why do you think there are different adoption rates between dairy, poultry and row crop farmers?
11. What do you see as future issues for BMP adoption for dairy, poultry and row crop farmers?
12. Do you have anything else that you would like to add about BMP adoption for dairy, poultry and row crop farmers?

APPENDIX B  
ADOPTING FARMER INTERVIEW GUIDE

1. Tell me a little bit about your operation.  
*Follow-up question:* What do you grow?  
*Follow-up question:* How long have you lived in the area?  
*Follow-up question:* How long have you been in the industry?
2. How did you become aware of the Partnership?
3. How long have you been participating in Partnership programs or activities?  
*Follow-up question:* When and why did you or your operation become involved with the Partnership?
4. What are your perceptions are of the Partnership? Why?
5. How does the Partnership interact with you?  
*Follow-up question:* Do you think these methods or positive or negative?
6. What do you think are the Partnership's strengths?
7. What do you think are the Partnership's weaknesses?  
*Follow-up question:* How is the Partnership working to alleviate these weaknesses?
8. How did the Partnership encourage you to adopt BMP?
9. To what extent have you used the SRP to adopt BMPs?  
*Follow-up question:* Have you or anyone you know used other practices or gone above and beyond BMPs?
10. What are the factors that contributed to your adoption of BMPs?  
*Follow-up question:* Do you think these are common factors for farmers in the area?
11. What do you think are the major barriers to BMP adoption for other farmers?  
*Follow-up question:* How do you think the Partnership is trying to overcome these barriers?
12. Why do you think there are different adoption rates between dairy, poultry and field crop farmers?
13. What do you see as future issues for BMP adoption for dairy, poultry and field crop farmers?
14. Do you have anything else that you would like to add about your experience with the Partnership or BMP adoption?

APPENDIX C  
NON-ADOPTING FARMER INTERVIEW GUIDE

1. Tell me a little bit about your operation.  
*Follow-up question:* What do you grow?  
*Follow-up question:* How long have you lived in the area?  
*Follow-up question:* How long have you been in the industry?
2. Are you aware of the Suwannee River Partnership?  
*Follow-up question:* If so, what programs, activities have you participated in?
3. What are your perceptions are of the Partnership? Why?
4. How does the Partnership interact with you?  
*Follow-up question:* Do you think these methods or positive or negative?
5. What do you think are the Partnership's strengths?
6. What do you think are the Partnership's weaknesses?  
*Follow-up question:* How is the Partnership working to alleviate these weaknesses?
7. Did the Partnership encourage you to adopt BMPs?
8. To what extent did you use Partnership materials to make your decision?
9. What are the factors that contributed to your decision to decline to adopt BMPs?  
*Follow-up question:* Do you think these are common factors for farmers in the area?  
*Follow-up question:* Are there other practices besides BMPs that you use?
10. What do you think are other barriers to BMP adoption for farmers?  
*Follow-up question:* How do you think the Partnership is trying to overcome these barriers?  
*Follow-up question:* Do you think these are common barriers?
11. Why do you think there are different adoption rates between dairy, poultry and field crop farmers?
12. What do you see as future issues for BMP adoption for dairy, poultry and row field farmers?
13. Do you have anything else that you would like to add about your experience with the Partnership or BMPs?

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## BIOGRAPHICAL SKETCH

Rachel Divine was born and raised in Orlando, Florida. She grew up in the city, but always found her true joy exploring the rural areas of the state. As a second-generation University of Florida graduate she finds pride in contributing to the Gator Nation. Rachel received her Bachelor of Science degree in 2008 from the University of Florida's College of Agricultural and Life Sciences in Wildlife Ecology and Conservation. This degree gave her an understanding of how the natural world works and a desire to become a sustainable steward of the land and other natural resources.

Rachel completed a Master of Science degree in 2010 also from the University of Florida's College of Agricultural and Life Sciences in Agricultural Education and Communication with a specialization in Leadership. She chose this particular program because she noticed an unnecessary divide between conservationists and agriculture. Her desire became to unite the two sides to achieve one stronger voice.

She hopes that her research will give a well-rounded perspective of agriculture and water conservation in North Florida. Rachel's personal and professional goal is to encourage healthy relationships between people and the environment.