Attitudinal Variability Among Southern High Plains Cotton Producers Toward Integrated Crop/Livestock Systems

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Abstract

Sustainable agriculture is important for farmers everywhere, and especially important for farmers in the Southern High Plains where Ogallala aquifer water levels are rapidly declining. Several studies conducted in the Sustainable Agriculture Research and Education Program (SARE) stress the need for a more sustainable agriculture, however, if agriculture is to move towards sustainability farmers must first adopt sustainable practices. In the context of this study, interest in the adoption of an integrated crop/livestock system was used as an indicator of sustainable behavior. Q methodology was utilized to discover the expected, unexpected, and diverse orientations towards sustainable behavior. Fourteen cotton producers in the Southern High Plains were interviewed to gain Q concourse statements. These statements were then put on Q cards and given to 23 cotton producers who were considered to be non-adopters of integrated crop/livestock systems. Varimax rotation yielded three factors or groups of farmers. The Forward-Thinking Pragmatists realized the need for sustainable agriculture systems, yet were hesitant to adopt due to a healthy skepticism of the economic implications of integrated crop/livestock systems. The second group of producers, the Optimistic Integrators, realized the immediate need for sustainable agriculture systems, yet had not adopted because of a lack of education of integrated systems management. The third group of producers, the Traditionalists, had little interest beyond their current cotton monoculture systems. Furthermore, they felt that by transitioning their operations from water-intensive use crops such as corn, that they had made the switch to sustainable farming practices. Overall, the research revealed a certain degree of optimism towards the future that was held by all producer groups.
Introduction

Farmers around the United States, as well as around the globe, are becoming more and more interested in the concept of sustainable agriculture and are beginning to realize that agriculture’s future is at-risk as natural resources diminish. The Southern High Plains region with its immense scale of agricultural production is definitely a region where adoption of sustainable practices could produce solutions to diminishing natural resources. The 2002 Annual Bulletin produced by Texas Agricultural Statistics indicated that the Southern High Plains produced approximately 3,253,000 bales of Upland cotton. Gross receipts for this cotton production totaled approximately $974,367,000, which is 7.7% of the total agricultural gross receipts for the state. With the Southern High Plains producing “over 20% of the U.S. cotton,” and with these census figures, it is easily seen how important agriculture is to the Southern High Plain’s economy (Allen, 2002, p. 4).

Sustainable agriculture is a very popular concept, however, sustainability is not an easily definable term. Horne and McDermott (2001) stated that “we are really just beginning to identify what might make sustainable agriculture” (p. 55). Sustainability in agriculture is especially difficult to define as agriculture is extremely broad and complex as a concept. Since agriculture encompasses such a broad area, thousands of different definitions can be applied to sustainability in agriculture. Roling and Wagemakers (1998) contend that “precise and absolute definitions of sustainability, and therefore of sustainable agriculture are impossible” (p. 25). However elusive it’s definition, sustainable agriculture could quite possibly be the leading concept in the future of agriculture as “a cadre of agricultural researchers, educators, and farmers believe that the agricultural systems advocated by sustainable agriculture have great potential for addressing the . . . negative impacts of conventional agriculture” (Agbaje, Martin, & Williams, 2001, p. 38). With sustainable agriculture’s growing popularity and necessity, several researchers have answered the call and have begun the development of sustainable technologies. Among these endeavors is a multi-disciplinary, multi-institutional sustainable agriculture integrated crop/livestock system lead by a team of researchers at Texas Tech University.

This system is a possible alternative for Southern High Plains producers who operate predominately cotton monoculture systems. The alternative system utilizes a paddock system with one paddock consisting of a perennial grass (W.W. B.Dahl Old World Bluestem), while the other paddock contains a rotation of rye/wheat/cotton one year with alternative years a rotation of wheat/cotton/fallow. Steers graze the bluestem grass as a primary source of forage, but are allowed to graze the small grain crops when available. The alternative system is compared to a monoculture cotton system. The alternative system began in 1997 and uses 21% less water, 41% less nitrogen fertilizer, and is more profitable than the monoculture cotton comparison. An added advantage of the alternative system is it allows for multiple income streams (beef cattle, bluestem seed, and cotton). This diversity is much like an insurance policy, one that insures economic security over time.

To date, the outreach component has included a public relations campaign, an annual on-farm field day, and a youth educational component. The public relations campaign has primarily targeted rural newspapers in the region by providing regular press releases on the project. A web
site has also been developed to publicize the project. An annual field day is conducted in June, complete with educational tours of the system, speakers, testimonials by farmers who have adopted similar systems, and a chuck-wagon-cooked meal. A sustainable agriculture curriculum is almost completed that utilizes the project as a centerpiece. Workshops have been conducted at annual agricultural science teachers’ conferences in New Mexico and Texas.

**Theoretical Framework**

Although the university system is providing new and innovative research discoveries, with an awesome potential for application in current production settings, commonly there is a breakdown in the transfer of this knowledge from the researcher to the producer. Even with a plethora of knowledge with potential to benefit agriculture, research personnel have not had the focus of making this new knowledge practical to farmers’ current problems. Without adoption of sustainable practices supported or verified by research, in essence the research has little value and the producer, as well as the region, may miss out on an opportunity for possible sustainable alternatives. Gamon, et al., (1994) summarized this concern very succinctly by stating that “the link between research and reality is still a tenuous one” (p. 38).

In understanding the current status of the integrated crop/livestock system, the Targeting Outcomes of Programs (TOP) model is used. The TOP model “focuses on outcomes in planning, implementing, and evaluating programs [and] is based on a hierarchy that integrates program evaluation within the program development process” (Rockwell, n.d., p. 1). Concentrating on the program development side of the model, this research sought to understand the reactions of Southern High Plains farmers toward these integrated systems. It was anticipated that attitudes of producers towards the integrated crop/livestock system would be revealed so that reactions might be known and program development could proceed along the TOP hierarchy.

In terms of program development, participation is one of the steps in the TOP model. Through the gathering of qualitative interview data and quantitative Q data, the researchers sought to have a deeper understanding of the diversity of attitudes of farmers in the region that would affect program participation. It was anticipated that this knowledge would allow the researchers to target specific client groups and better understand their reactions toward the alternative system.

With the transference of the integrated crop/livestock system still in the early adoption stages, it is important that researchers know how producers perceive the integrated crop/livestock system. With the attitudes and perceptions of producers known, program planners can more efficiently diffuse information in the future by targeting producer groups who may be more open to the adoption of sustainable practices.

**Purpose and Objectives**

The primary purpose of this research was to describe diverse, expected, and unexpected orientations of cotton producers in the Southern High Plains toward the integrated crop/livestock system. As a means of accomplishing the purpose of the study, an answer to the following
question was sought: What are the points of consensus and differences of non-adopting cotton producers?

**Methods/Procedures**

Q Methodology is fairly new in the realm of social science methodologies and, furthermore, Q Methodology is also fairly new to the agriculture scene, but regardless, serves as an effective methodology for achieving desired research objectives. “Q Methodology has rich, if little known, history” (Kramer, Hegedus, & Gravina, 2003, p. 42). In 1934, British psychologist and physicist William Stephenson penned a letter to the editor of *Nature* magazine (Stevenson, 1935). In it, he wrote that he had re-conceptualized correlation analysis such that in place of correlating test vis-à-vis random variables believed to be expressions of traits, he had developed a method to correlate whole persons. This would later grow into what is known today as Q Methodology, a methodology where persons, not traits are correlated. People become variables, not traits, correlating persons instead of tests (Stevenson, 1935). Literature on Q Methodology can be found in more than 1,500 bibliographic entries (Brown, 1986).

Q Methodology (hereafter simply referred to as Q) involves the study of human subjectivity. “From the standpoint of Q, subjectivity is regarded simply as a person’s point of view on any matter of personal and/or social importance” (McKeown & Thomas, 1988, p. 7). Kramer et al. (2003) adds to the definition of subjectivity as “the self-referential frame through which human beings define and express their world” (p. 42). In a way, Q serves as a measure of how a person sees their personal world. This is very useful in determining how a person will react to stimuli present in their reality. Some might argue that a person’s subjectivity is impossible to measure and any attempts are useless, however, “subjectivity— an individual’s point of view— is sometimes thought to be impossible to study systematically or with any degree of precision” (McKeown & Thomas, 1988, p. 5). However, many agree that Q is a valid instrument in measuring subjectivity. “Q encompasses a distinctive set of psychometric and operational principles that, when combined with specialized statistical applications or correlational and factor analytical techniques, provide researchers with a systematic and rigorously quantitative means for examining human subjectivity” (McKeown & Thomas, 1988, p. 5).

Central to Q is concourse theory (Stevenson, 1978). “In Q, the flow of a communicability surrounding any topic is referred to as a concourse” (Brown, 1993, p. 4). Thus a concourse is drawn from any relevant discussion surrounding a certain issue or phenomenon. “Concourse is the very stuff of life, from the playful banter of lovers or chums to the heady discussions of philosophers and scientists to the private thoughts found in dreams and diaries” (Brown, 1993, p. 5). These thoughts surrounding an issue “...can be captured and recorded using either qualitative data gathering techniques (i.e., interviews), document review, or survey techniques” (Kramer et al., 2003, p. 42). Following the gathering of the concourse, a Q sample is taken from the concourse.

After a Q sample is drawn, a person is presented with the sample statements and asked to rank them in a order of most like them or least like them (Q sorting), and it is from this sorting of statements that a number of perceptions occurring in reality appear (Brown, 1993). With the fact
that the Q sorter is ranking the statements in terms of their point of view, subjectivity is being brought into the picture (Brown, 1993). Since there is “...no right or wrong way to provide my point of view about anything” subjectivity is present and can be measured to some extent (Brown, 1993, p. 4). “When people say I think that, or in my opinion, they are relaying something meaningful about personal experiences” (McKeown & Thomas, 1988, p. 12). The Q sample statements may be of opinion, but that opinion in the context of reality is what is seeking to be captured by the investigator.

Some debate may arise in the use of small samples in a Q study. “Q, in fact, is a method of and for the single case” (McKeown & Thomas, 1988, p. 36). Q is almost an opposite of methodological approaches in the social sciences “this, we recognize, runs counter to conventional wisdom insofar as social scientists tend to regard the single case with suspicion” (McKeown & Thomas, 1988, p. 36). “The major concern of Q Methodology is not with how many people believe such and such, but with why and how they believe what they do” (McKeown & Thomas, 1988, p. 45). Q may not give an accurate representation of the population, but it does provide an explanation for phenomenon that is currently occurring in reality. Q tells you something about what is actually happening out in the field. “Q-method is biased toward small person-samples and single case studies, a preference in keeping with the behaviorist dictum that it is more informative to study one subject for 1,000 hours than 1,000 subjects for one hour” (Skinner, 1969, p. 112).

In deriving a Q sample from the concourse, procedures implemented by Kramer (2003) were followed. The theoretical structure developed for use in this study consisted of two main dimensions (also referred to as “main effects”) with two “levels” within each of these, thereby resulting in the 2x2 matrix...” (Kramer, 2003, p. 43). The two main effects deal with the pressures of adoption of sustainable systems (that of economic and bio-physical/social) and philosophical orientation of the person (that of sustainable or individualistic). Through cross-multiplying, four cells determined which statements were extracted from the concourse to be used in the Q sample, thus structuring the Q sample (Kramer, 2003). No assumption was made that the statements placed within respective cells measured or defined, by any means, that cell. The development of the 2x2 matrix and placement of statements into those cells only served as a structure for developing the Q sample. The meaning that the researchers were seeking to find did not reside in the statements themselves, but rather in how the statements were patterned in the Q sort.

The Q sample was balanced in terms of each Q sorter having an equal opportunity to respond either positively or negatively to statements contained in each cell (Kramer, 2003). For example, within one cell, four statements were chosen that reflected a positive assertion while four statements were chosen that reflected disagreement with the positive assertion (Stevenson, 1975). The 32 Q sample statements were printed on laminated cards (with respective numbering on the back). Respondents were asked to place the statements in an array that resembled a quasi-normal distribution. The array, seen in Figure 1 was flatter than a normal distribution, but maintained properties of symmetry (Kramer, 2003). After the Q cards were sorted, the placement of the cards was recorded using the numbers that were randomly placed on each card.
Population and Sample

Q is not concerned with a large sample and is often utilized in single-case studies (McKeown & Thomas, 1988). This current study was a part of a larger study that included both producers and key program planners. It was not the attempt of Q to create a sample that was statistically representative of the greater population, therefore, random selection of producers that performed the Q sort was not a high priority. However, some structure was used in selecting participants for the Q sort. Attempts were made to perform sorts in varying geographical regions of the Southern High Plains. Attempts were also made to perform sorts with a varying age group of producers, and attempts were made to perform sorts with both medium-scale and large-scale farmers.

Ten producers who were considered adopters of integrated crop/livestock systems were interviewed to gain Q sample statements as well as four producers who were considered non-adopters of integrated systems. Twenty-three producers who were considered to be non-adopters of integrated crop/livestock systems were chosen as a sample for the Q card sorting.

Data Collection

The design for data collection occurred in two parts. The first part of data collection consisted of obtaining qualitative interview data. The second part of data collection involved the collection of Q sort data. Interviews of producers in the Southern High Plains were conducted in the spring and summer of 2003. A process of snowballing was used to obtain names for those interviewed, whereas, at the completion of each interview, each interview participant was asked for names of producers that they knew who were either adopters or non-adopters of the system.

Interviews were not rigorously structured by the interview schedule. Rather, the schedule served as a guide for interviews. Interview data were recorded in the form of field notes then transcribed to a word processor program.
After a concourse was developed and Q sample statements were placed on cards, Q sort data were gathered beginning in July 2003. Sorting data were collected from 23 producers in the Southern High Plains who are considered to be non-adopters of the sustainable crop/livestock system. The producers sorted the cards according to their current situations and farming systems.

**Data Analysis**

Primary data analysis was performed on a desktop computer with the assistance of PCQ For Windows, version 1.4 (Stricklin & Almeida, 2000). Centroids were extracted based on the number of factors designated by the researcher. PCQ allowed the extraction of factors from one factor to nine factors. Nine different factor extraction options were attempted by the primary researcher and it was determined that a three factor extraction yielded the most appropriate response in relation to the research question.

Following factor extraction, a rotation of those factors was performed through PCQ. Several rotational schemes were attempted. Each rotational scheme was undertaken with the number of iterations set at 200, and the significant level set at .46 (as set by the standard error times 2.5, with n=the number of statements). This scheme was undertaken with several different factor extraction values (Brown, 1993). It was determined that a three factor Varimax rotation provided for the best statistical analysis of the data.

A correlation matrix for the 34 different sorts was generated with associated factor loadings based on the three factor extraction scheme. Following Varimax rotation, factor loadings for each of the 34 individuals was reported. Eigenvalues for each of the three factors were reported along with the percent variance accounted for by each factor. Totals for eigenvalues and percent variance were also reported.

**Findings/Results**

Following the Varimax rotation, 28 of the 34 sorts (both producers and program planners) were accounted for in one of the three factors that were extracted. This loading of 28 of 34 total sorts gave a loading percentage of 82. Reliabilities for Factors A, B, and C were .98, .97, and .94, respectively. One sort was confounded in that it loaded in more than one factor and five sorts were not significant in that they did not load in any of the three factors.

Factor A and Factor B had a correlation of -.28, Factor A and Factor C had a correlation of -.46, and Factor B and Factor C had a correlation of -.11. Factors A and C had a significant correlation between each other, thus meaning there was some overlap in the mind-sets and thinking of those loading on Factor A and those loading on Factor C. Other correlations between factors were deemed insignificant.

**Factor A: The Forward-Thinking Pragmatists**
The *Forward-Thinking Pragmatists* were characteristic of producers with a strong desire for alternatives that were economically and environmentally sustainable. Economic concerns were the primary drivers related to decisions about modifications to their farming systems. Producers in this group were concerned with environmental and conservation issues. While they were concerned for the environment, it was economics that would be the predominate motivator for them to adopt sustainable practices. This economic concern was grounded in a healthy skepticism. A skepticism that is essential for the long-term viability of any operation. The skepticism shows that decisions concerning the adoption of alternatives must be substantiated by solid economic support.

The *Forward-Thinking Pragmatists* did not place statements containing concepts of the Texas Tech sustainable crop/livestock very high in the sort array. It seems as if these producers were concerned about conservation and sustainability issues, yet felt that the sustainable crop/livestock system was not the answer to their concerns. Producers in this group felt that the sustainable crop/livestock system was a good system, yet were not convinced that such systems were economically viable.

The *Forward-Thinking Pragmatists* felt somewhat trapped by current farm policies. As a group, they were discouraged that governmental programs and not strong commodity markets had to be factored into their management decisions. Possibly their optimism and strong desire to pursue alternatives stemmed from their frustration by feeling trapped by current farm policies which protected them from volatile international commodity markets.

In discussing the inclusion of cattle on their operation, the *Forward-Thinking Pragmatists* were not adamantly opposed to raising cattle on their farms. Although they felt that their farms were best suited for the cultivation of irrigated crops, they were open to learning how they might integrate beef cattle production into their farming systems. Finally, the *Forward-Thinking Pragmatists* could easily envision a future with further constraints on natural resources. These producers were well aware that they be forced to modify their existing practices as water supplies diminish. They perceived that increased costs of irrigation combined with increased costs of other farm inputs would eventually make farming cotton through conventional methods impractical.

The following are Q-sample statements that the *Forward-Thinking Pragmatists* placed highest in the array. Statement placements for Factors A, B, and C are shown respectively, with Factor A’s placements in bold: (1) Higher costs will force us to concentrate water on smaller areas and force us to do something with the existing area, (4, 1, 4); (2) It would be nice to irrigate a smaller number of acres and still make a living for my family instead of having to mass produce to make a living, (4, 3, 3); (3) I don’t know if my children can take over because of the water situation, (3, -1, -4); (4) The key is trying to find something that uses less water and still makes money, (3, 4, 0); (5) Cotton needs a rotation and with our cover crop we get more organic matter in the soil and thus are able to get better yields with our cotton, (3, 3, 3); (6) I would adopt more of a sustainable system if I could make money, it has to cash flow or it would be a waste of time, (2, 2, 0); (7) My farm is not designed to be a cotton farm, the topography does not lend itself to cotton so I would rather have a more sustainable, low input system, (-4, -1, -3); (8) I know the
Ogallala is lowering, but I’m not concerned for my sake, I’ll have enough to make a living, (-3, -4, -2); (9) The integrated system is a good system, but if requires more knowledge and is not really a farmer’s farming, (-3, -1, 0); and (10) It’s gonna take younger guys to do this sustainable project, I’m too old to do this kind of thing, (-2, -3, 1).

It should be noted that the five Q sample statements that pertain to the integrated system were not included in the ten statements above. It is interesting that the statements pertaining to the integrated system were all placed in either the -2, -1, or 0 positions on the Q sort array, an indication that the Forward-Thinking Pragmatists did not feel that the sustainable crop/livestock system was a valid alternative.

Factor B: The Optimistic Integrators

The Optimistic Integrators were interested in integration and very concerned with water and conservation issues. They were very open to diversification and they valued the added flexibility that would come with diversification. These producers had a very open mind when it came to the sustainable integrated crop/livestock system as an alternative for their farming systems and were willing to invest the energy required to learn about new alternatives. These producers also desired to farm less and place more emphasis on soil health, rather than mass production.

The Optimistic Integrators are significant to the future of the integrated crop/livestock system project as it shows that there is a group of producers in the Southern High Plains that are very interested in sustainable alternatives. There are some producers that are very open to including a cattle production enterprise into their farming systems.

The following are Q sample statements that the Optimistic Integrators felt strongly about.

Statement placements for Factors A, B, and C are shown respectively, with Factor B’s placements (Optimistic Integrators) are in bold: (1) I don’t like to put all of my eggs in the same basket, (0, 4, -1); (2) The key is trying to find something that uses less water and still makes money, (3, 4, 0); (3) With an integrated system you can save water you can graze the grass, hay it, or harvest it for seed and have more cash flow opportunities, (-2, 3, -1); (4) It would be nice to irrigate a smaller number of acres and still make a living for my family instead of having to mass produce to make a living, (4, 3, 3); (5) Cotton needs a rotation and with our cover crop we get more organic matter in the soil and thus are able to get better yields with our cotton, (3, 3, 3); (6) I’d like to grow more cattle than try to grow $.50 cotton, (-2, 3, -3); (7) I would adopt more of a sustainable system if I could make money, it has to cash flow or it would be a waste of time, (2, 2, 0); (8) I know the Ogallala is lowering, but I’m not concerned for my sake, I’ll have enough to make a living, (-3, -4, -2); (9) If we saw a big lake, we would look at each other and say “man we could suck that thing dry in a hurry”, (1, -4, 0); (10) I’m just not set up for livestock, you need to be set up for either livestock or crops, (-1, -3, 3); (11) It’s gonna take younger guys to do this sustainable project, I’m too old to do this kind of thing, (-2, -3, 1); (12) We had the chance to put some sub-surface drip irrigation in some of our fields, but we elected to buy more land instead, (0, -3, 2); and (13) Planting cotton is a state of mind; some will do it to the bitter end to make a living,(1, -2, 2).
Factor C: *The Traditionalists*

The *Traditionalists* clearly identified themselves as cotton farmers. They valued technology that has allowed them to continue growing cotton on a larger scale. They saw no need for alternatives, consequently, they were not as concerned with water and environmental issues were the *Forward-Thinking Pragmatists* and the *Optimistic Integrators*. They did not feel constrained by the biophysical constraints of diminishing water resources and were optimistic that they would be able to pass their operations on to future generations. This group of producers thought that the water situation was not as bad as it was hyped up to be. Also interesting, is the fact that these producers do not feel victimized by the current agricultural situation, they are optimistic about the future of agriculture and are very proud to be farmers.

The *Traditionalists* placed Q-sample statements related to the integrated crop/livestock system around the middle of the array. This placement of integrated related cards indicates that this group may not have much education about the project, thus they have no strong opinion of the project. Producers in this loading placed a few Q-sample statement items containing sentiments of economic concerns high in the array. This placement of economic concerns is in congruence with the mind-sets of the *Traditionalists*. They felt that the economic bottom line is important in making decisions about their farming systems. As expected of a traditional cotton farmer, this group did not express much interest in producing cattle and felt that cattle and crops would not integrate well within their current operations. Possibly this feeling is partially derived from the idea that they believe their farms are designed to be cotton farms and cattle just do not fit into that design. Overall, this group felt that they were cotton farmers and saw little immediate need for alternatives. However, they realized that adoption might become a necessity in the future as farm policies and commodity prices change. Also, producers loading on this group felt that cotton needs a rotation and thus they were interested in cover crops. Caution should be used in describing this group as completely unconcerned with sustainable issues. Furthermore, through follow-up interviews, this group felt that they had already adopted sustainable systems in the fact that they no longer grow irrigated corn, which requires more water than irrigated cotton.

The following are Q-sample statements that the *Traditionalists* placed highest in the array. Statement placements for Factors A, B, and C are shown respectively, with Factor C’s placements in bold: (1) The changes in technology over time has allowed us to stretch out our water and keep growing wall to wall cotton’ (1, -2, 4); (2) Higher costs will force us to concentrate water on smaller areas and force us to do something with the existing area, (4, 1, 4); (3) I’m just not set up for livestock, you need to be set up for either livestock or crops, (-1, -3, 3); (4) It would be nice to irrigate a smaller number of acres and still make a living for my family instead of having to mass produce to make a living, (4, 3, 3); (5) Cotton needs a rotation and with our cover crop we get more organic matter in the soil and thus are able to get better yields with our cotton, (3, 3, 3); (6) Planting cotton is a state of mind; some will do it to the bitter end to make a living, (1, -2, 2); (7) I don’t think the landlords will go for cattle and a sustainable system, they are used to having a rent check off of the cotton, and that rent check will go down if you plant anything else, (1, -1, 2); (8) We had the chance to put some sub-surface drip irrigation in some of our fields, but we elected to buy more land instead, (0, -3, 2); (9) I don’t know if my children can take over because of the water situation, (3, 0, -4); (10) I’ve sacrificed everything
except my morals for the farm, (0, 0, -4); (k) I’d like to grow more cattle than try to grow $.50 cotton, (-2, 2, -3); (11) My farm is not designed to be a cotton farm, the topography does not lend itself to cotton so I would rather have a more sustainable, low input system, (-4, 1, -3); and (12) I know the Ogallala is lowering, but I’m not concerned for my sake, I’ll have enough to make a living, (-3, -4, -2).

Summary of Findings

In terms of consensus among producers, all are optimistic about the future of the Southern High Plains. However, they are all optimistic in different ways. The Forward-Thinking Pragmatists felt that the integrated crop/livestock system was a good system and could envision adoption if economics surrounding the project were substantiated. This group would likely need to observe implementation in a ‘real world’ setting prior to adoption. The Optimistic Integrators were very optimistic about the integrated crop/livestock system and seemed ready for adoption as they realized that the trend of lowering water will continue. The Traditionalists were optimistic predominately with monoculture cotton and holding the hope that rapid advances in technology would allow them to sustain their livelihood systems.

In terms of consensus, both the Forward-Thinking Pragmatists and the Traditionalists seemed to receive a part of their identity and self-worth from being cotton farmers. This phenomena is deeply rooted in their culture. Both the Forward-Thinking Pragmatists and Optimistic Integrators were open to including cattle production into their farming systems. A final point of consensus was that all groups could envision the future of the region with increasing constraints on natural resources. At some level, all groups realized that the adoption of an integrated crop/livestock system or other major modification to their current farming system may be a necessity in the future rather than an option.

In terms of points of difference in perceptions toward the integrated crop/livestock system, each group had a different perception and attitude toward the system. The Forward Thinking Pragmatists exhibited a healthy skepticism towards the economic viability of the integrated crop/livestock system. The Optimistic Integrators valued the added diversity of the system and seemed ready to adopt. The Traditionalists were most likely to continue to operate their farming system as a predominate cotton monoculture system until economics, lack of water, or governmental policies dictate a change.

Also, differences in the degree of concern emerged regarding the lowering of the aquifer. The Optimistic Integrators possessed the greatest degree of concern for the conservation of natural resources, followed by the Forward-Thinking Pragmatists. The Traditionalists were least concerned with the depletion of the aquifer. However, in the long-run they still envision being forced to change their practices due to lowering water levels.

Recommendations

The researchers recommend the following: (1) a deeper understanding and appreciation for the diversity of livelihood systems and differing typologies of farmers in the Southern High Plains is
the first step in planning for the diffusion process; (2) the integrated systems of early adopting Optimistic Integrators should be used as on-farm demonstrations for Traditionalists and Forward-Thinking Pragmatists to observe, with economics and water use closely monitored and reported; (3) Cooperative Extension professionals should use a diagnostic/prescription approach in assisting individual farmers with an interest in adopting an integrated crop/livestock system; (4) A simulated ethnographic/economic decision-making tool should be developed to assist farmers in making informed decisions as per how modifications would affect their economic bottom line; (5) cotton production is a driver to the economic viability of the Southern High Plains and future integrated systems should include a cotton component; (6) outreach efforts should include cattle management and infrastructure components in a farmer field school setting; (7) state and federal farm policy incentives should be developed that encourages the adoption of integrated crop/livestock systems; (8) program planners should closely examine the impact that integrated crop/livestock systems have upon the landowner/renter scenario; (9) outreach programs must be farmer-centered; and (10) the project should be expanded to include different types of beef cattle operations and different types of livestock species.

References


