

# **Agricultural Risk Management in the Northern Coastal Plains of South Carolina**

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## **ABSTRACT**

*The agribusiness industry continues to have a significant economic impact on the state of South Carolina. Given the current condition of the national and state economies, a need arises for those involved with agribusiness operations to hedge against avoidable risks to maximize financial returns. This research analyzes the awareness and knowledge of agriculture risk management techniques employed throughout the Northern Coastal Plains of South Carolina, as well as, the willingness of market participants to become more versed in the practice of risk management. Specific focus in this research is placed on individuals that impact various phases of agriculture production. Results from this research indicate that levels of significance exist between the awareness of risk management techniques and education levels. A level of significance also exists between the willingness of market participants to attend risk management seminars and age levels.*

## **INTRODUCTION**

What is the overall awareness and knowledge of risk management instruments in the agribusiness industry within the Northern Coastal Plains of South Carolina? While risk management instruments are readily available to market participants, a lack of understanding or familiarity may prevent some participants from utilizing these measures to an optimal level. Others may be hesitant to engage in these activities due to prior experiences or negative word-of-mouth from their colleagues.

Business professionals within the agriculture community have indicated that the apparent lack of understanding of these risk management instruments impact the ability of farming operations and agribusinesses to operate effectively and their ability to sustain long-term profitability. A lack of deploying risk management measures could leave these entities vulnerable to market volatility and avoidable risks.

The purpose of this research assessment is to evaluate the awareness and knowledge of risk management techniques currently employed in Horry County, hereafter referred to as the Northern Coastal Plains of

South Carolina, in an attempt to increase the economic vitality of the agribusiness sector within the region. Furthermore, this study will examine the prior and current use of agriculture risk management methods, as well as, the level of importance at which entities value risk management measures and their success rates. Recommendations for outreach programs and service providers will be outlined in this assessment.

The following sections of the analysis will identify relevant background information, the survey instrument used to collect industry data, and conclusions and recommendations drawn from the results.

## **BACKGROUND**

While numerous studies of agriculture risk management have been performed, limited information addressing the awareness and use of agriculture risk management techniques in the Northern Coastal Plains of South Carolina is available. Clemson University prepares cost analyses of crop production estimates as a resource for those in the agribusiness industry of South Carolina, commonly known as enterprise budgets. These enterprise budgets identify the approximate costs and returns farmers, lenders, and agribusiness operators could expect to recognize from the production of a particular crop. Enterprise budgets encourage farmers to evaluate risk management techniques in an effort to maximize their profits. “Seven steps to control market risks are outlined in these enterprise budgets:

1. Know what you need from the market to be successful
2. Know where the market is right now
3. Know what the available marketing alternatives are right now
4. Assess the risks and returns from marketing strategies
5. Seek the unbiased opinions of others
6. Make the decision and follow through
7. Review the plan and adjust as needed” (Bellinger et al, 2009)

Often, farmers may elect to disregard the fixed costs listed in these budgets as they may already own the equipment or facilities necessary to produce a particular crop. However, these costs must be recovered over time to provide the necessary resources for farmers to upgrade their assets while sustaining profitability. (Bellinger et al, 2009)

A prominent risk management instrument employed by farmers and agribusinesses in the Northern Coastal Plains of South Carolina is the use of crop insurance. The USDA Risk Management Agency suggests that “producers should carefully consider how a crop insurance policy will work in conjunction with their other risk management strategies to insure the best possible outcome each crop year” (Crop Policies, 2009). Crop insurance allows farmers to reduce the risk of unknown factors like natural disasters, infestations, and market downturns. Like other policies, crop insurance premiums are based on coverage level and type of insurance. The most common types of crop insurance are encompassed in yield based and revenue insurance plans. (Crop Policies, 2009)

Futures and options are also a viable source of managing risks that can be utilized by agribusinesses. Common derivatives or derivative contracts traded on agriculture commodities like corn, wheat, soy beans, and cotton do not necessarily bind the parties involved in the physical exchange of the good. Financial, production, and marketing decisions made within the agriculture communities are often driven by these commodities markets (Flaskerud, 1994).

There are several types of participants in agricultural derivative trading. A majority of participants are users of the commodity that they are trading, thus hoping to reduce the risk associated with fluctuating prices. These asset holders hope to hedge their risk and limit any loss in value. A second classification of

participants are speculators, and these individuals hope to capitalize on fluctuating prices and turn a profit. Hedgers are protected from losses, but restricted from gains. Speculation can be extremely risky as traders are exposed to market volatility (“What You Should No Before You Trade”, 2004). If exercised properly, the use of futures and options paired with the right type of crop insurance, farmers can greatly reduce the risk associated with the unknown factors in the agriculture industry each production year.

### **REASERCH METHODS: SURVEY INSTRUMENT**

A survey instrument was designed to assess the awareness and use of agriculture risk management techniques, historical and recent usage of risk management methods, and perceived importance of agriculture risk management. This instrument was developed through discussions with members of academics, agriculture business professionals, and area farmers. The survey instrument was administered during the spring of 2009 to farmers and agribusinesses in the Northern Coastal Plains of South Carolina. All participants completed the survey at-will and surveys were completed anonymously.

The survey instrument entailed over twenty questions designed to assist in addressing the overall research objective. The first section included questions regarding the respondent’s knowledge of, perceived importance, expected future role of, willingness to attend seminars, and monitoring of agriculture risk management techniques. Specific demographic questions focusing on gender, age, education, and years of experience were incorporated into the second section of the survey instrument. The third section was focused towards the farming profession. Questions in this portion of the survey concentrated on the use of, consultation with accounting professionals, and success of prior experiences with risk management instruments. The fourth and final section of the survey was designed to obtain farm production statistics.

### **SURVEY RESULTS**

The demographics section of the survey instrument aimed at gathering specific information regarding the demographics of survey respondents. If the individual indicated their profession as any other than farmer, this section would conclude their responses to the survey. An overwhelming percentage (93%) was male participants. Of these 93 males, 29 percent ranged from age 18-30, while 23 percent were age 51-60. Although a majority of respondents had an education level of K-12<sup>th</sup> grade, 32 respondents acknowledged a 2 or 4 year degree. Degree specialization was labeled as an optional item on the survey, but of those who answered, indicated their area of study as Civil Engineering, HVAC, Marketing, and Finance.

By far, the most prevalent profession indicated in the surveys collected was farming (76 of 99). Other than farmers, 16 replied that they were agribusiness operators or other support. Credit lenders and crop insurance agents were the least amount of participants, with 5 and 2 responses respectively. The final question used in obtaining demographic information was the years of active experience in the respondent’s current profession. A fairly equal distribution of experience was realized in between the ranges of 11-20, 21-20, and 31+ years. The average among these age ranges fluctuated between 21 and 29 percent. If an individual indicated their profession as “Farmer”, they were then instructed to refer to the next page of the survey to complete more detailed information, specific to their farming habits.

The perceptions section of the survey instrument requested the participants to rate their overall agriculture risk management awareness. The questions were presented in the form of a Likert scale, with possible responses ranging from “1” (Strongly Disagree) to “5” (Strongly Agree). There were 99 surveys completed that included individuals from the farming, agribusiness, credit lending, crop insurance, and other agriculture support business sectors. Nearly 40% of the respondents strongly agreed that their self perceived knowledge of crop insurance was exceptional. Roughly 35 percent of participants concur they have exceptional knowledge of future and options. In regards to the importance of risk management in today’s agricultural industry, over half (56%) strongly agreed that is it vital to overall operations. A very

similar result was derived when asked if risk management techniques would be a major player in the future agribusinesses and farmers.

Though participants perceived that they had outstanding knowledge of techniques to reduce risk, some 49 percent agreed that they would consider attending seminars and tutorials aimed at increasing their knowledge of risk management. It was also gathered through the survey that slightly over 40% of individuals that completed the survey actively monitor news related to agriculture risk management.

As an introductory question to third section of the survey, farmers were asked to designate if they had used any form of risk management to limit their crop risks since 2006. Of the 76 respondents, 67 (88%) had indeed used at least some form of risk management. It became obvious that there is an extreme partiality to crop insurance (85%) over the use of future and options. However, 9 of 67 that used risk management measures were involved in both crop insurance and some form of futures and options use. Over 60% of the participants in the farming profession indicated that they did not consult an accounting professional to assist in tax preparation associated with risk management activities. The Likert scale was again used in this section of the survey to collect data regarding the prior success of, as well as, the intended future use of agriculture risk management instruments. The scale ranged from "1" (Strongly Disagree) to "5" (Strongly Agree). An overwhelming majority (76%) of farmers either agreed or strongly agreed that their prior experiences with risk management instruments were successful, with another 21% undecided. Comparable results were found with the next question that asked if farmers felt detailed record keeping aided in their risk management experience. Only 4.50% disagreed or strongly disagreed that keeping detailed records did not enhance their prior endeavors with these instruments. When asked if they would consider using risk management instruments in the future, 52% strongly agreed, 46% agreed, and the remaining 2% of farmers were undecided.

The final section of the survey was designed to collect production statistics from farmers. Again, information obtained in this section was based on the 76 participants that indicated their profession was farming. There was a fairly equal distribution of acreage farmed in 2008 or within the past three years: 20% farmed between 0 – 100 acres, 26% farmed between 101 – 250 acres, 22% farmed between 251 – 400 acres, 8% farmed between 400 and 600 acres, and 22% farmed greater than 600 acres. Nearly 60% of the farmers surveyed owned less than 40% of the acreage they farmed with only 8% owning 100% of their total farmed acreage. Results collected regarding crops produced by farmers yielded a wide variety of results with a majority of farmers producing both corn (89%) and soybeans (89%). There were two write-in responses for rye grass and oats in this section that were grouped with other categories for analytical reasons; rye grass was included with hay and oats with other grain.

### **TESTING OF SPECIFIC HYPOTHESES**

Statistical tests in the form of ANOVA analyses were used to evaluate several hypotheses surrounding the awareness of agriculture risk management techniques in the Northern Coastal Plains of South Carolina to determine if any significant differences existed. It was determined through discussions with members of local academics that any hypotheses that yielded p-values with a confidence interval of 10% or less would be noted.

#### *Hypothesis 1: Awareness by Acreage Farmed*

The first hypothesis tested that larger acreage (600+) farmers have greater risk management knowledge than those that plant fewer acres. It is inferred that the size of operation is a proxy for farm management sophistication. A statistical test designed to measure the exceptional knowledge of crop insurance by farmers with farmed acreage as independent groups was performed. This test found an F ratio of 0.64, an F-critical of 1.93, and p-value of 67.10% on the data, thus indicating that a significant difference does not exist. The second test evaluated the same group of participants by exceptional knowledge of futures &

options. The results of this test were slightly different than the initial test as the ANOVA test found this data set to have an F ratio of 0.58, an F-critical of 1.93, and a p-value of 72.89%. Again, a significant difference was not found via the statistical test on this hypothesis.

*Hypothesis 2: Awareness by Education Level*

A second hypothesis tested was that survey respondents with higher education have a superior knowledge of agriculture risk management than those with less education. The ANOVA test, which used education levels as the independent groups, found an F ratio of 3.32, an F-critical of 2.14, and p-value of 2.32% when crop insurance knowledge was measured. Thus, indicating that a level of significance does exist. A measurement of futures & option knowledge resulted in an F ratio of 2.56, an F-critical of 2.14, and p-value of 5.97%. This series of ANOVA testing also yielded a p-value of less than 10% indicating that a significant difference exists based on the collected results.

*Hypothesis 3: Awareness by Number of Crops Produced*

The third hypothesis tested during the analysis assumed that the number of crops produced by a farmer and their knowledge of agriculture risk management were positively correlated. The independent groups included in this statistical test were the number of crops produced. Results from the ANOVA test found that a significant difference did not exist between the number of crops produced and crop insurance awareness, as the F ratio was 1.13, an F-critical of 1.86, and p-value of 35.51%. A significant difference was not found when the awareness of futures & options against the number of crops produced was measured.

*Table 1: Results from Hypotheses Testing: Group I*

Hypothesis Testing: Group I		p-Value	Significant at 90% Confidence Interval
Hypothesis 1A	Crop Awareness by Acreage Farmed	0.6710	No
Hypothesis 1B	Futures & Options Awareness by Acreage Farmed	0.7189	No
Hypothesis 2A	Crop Insurance Awareness by Education Level	0.0232	Yes
Hypothesis 2B	Futures & Options Awareness by Education Level	0.0597	Yes
Hypothesis 3A	Crop Insurance Awareness by Number of Crops Produced	0.3551	No
Hypothesis 3B	Futures & Options Awareness by Number of Crops Produced	0.6639	No

*Hypothesis 4: Willingness to Attend Seminars by Age Level*

The next hypothesis tested was designed to measure the measure the willingness of the survey respondents to attend seminars on risk management by age level. This test assumed that age level was a proxy for the willingness of individuals to participant in seminars. The ANOVA test revealed this data set to have an F ratio of 2.01, an F-critical of 2.01, and a p-value of 9.95%. Thus, indicating that a level of significance does exist.

*Hypothesis 5: Willingness to Attend Seminars by Education Level*

The fifth hypothesis assessed during this research explored the use of education levels as a proxy for the willingness of survey respondents to attend risk management seminars. The results from the ANOVA test associated with this hypothesis found that a level of significance did not exist as the data set returned an F ratio of 2.07, an F-critical of 2.14, and a p-value of 10.87%.

*Hypothesis 6: Willingness to Attend Seminars by Farm Acreage*

The next hypothesis test assumed that farm acreage was a proxy for the willingness of survey participants to attend risk management seminars. The statistical test of choice for this assessment was again a single factor ANOVA. This assessment found that a level of significance did not exist as the F ratio was 0.87, F-critical was 1.93, and the P-value was 50.43%.

*Hypothesis 7: Willingness to Attend Seminars by Number of Crops Produced*

The final hypothesis tested in this research used the number of crops produced as independent groups to assess the willingness of farmers to attend risk management seminars. An F ratio of 0.90, F-critical of 1.86, and p-value of 49.93% were disclosed through the ANOVA test. Based on the statistics from this test, it was determined that a level of significance did not exist.

*Table 2: Results from Hypotheses Testing: Group II*

Hypothesis Testing: Group II			
		<b>p-Value</b>	<b>Significant at 90% Confidence Interval</b>
Hypothesis 4	Willingness to Attend Seminar by Age Level	0.0995	Yes
Hypothesis 5	Willingness to Attend Seminars by Education Level	0.1087	No
Hypothesis 6	Willingness to Attend Seminars by Farm Acreage	0.5043	No
Hypothesis 7	Willingness to Attend Seminars by Number of Crops Produced	0.4993	No

**CONCLUSION**

Identifying the current awareness and knowledge of agriculture risk management in the Northern Coastal Plains of South Carolina is necessary prior to the development of recommendations to enhance future awareness and knowledge. A key result found from survey respondents was their overwhelming willingness to attend seminars associated with agriculture risk management. However, discussions with many of the participants found that an intangible trust factor plays a significant role in their eagerness to employ risk management measures suggested by an unfamiliar advisor. Thus, outreach programs need to be focused at a community level.

The results generated from this research indicate that there is a relationship between education level and the apparent knowledge of agriculture risk management. However, this perceived self-knowledge of agriculture risk management may not be correlated with the use of risk management techniques, specifically futures & option contracts as only 1.5% of farmers indicated their usage of these instruments. A relationship was also found between the willingness of participants to attend risk management seminars and their age. Results indicate that farmers between the ages of 18 – 40 and greater than 60 were most willing to attend risk management seminars. While support for the remaining hypotheses were not confirmed during this analysis, it is unclear whether or not further research of agriculture risk management in the Northern Coastal Plains of South Carolina will generate results that assist in supporting the aforementioned hypotheses or alternative hypotheses. Focused research on the specific futures & options contracts employed by a sample sect of farmers and agribusiness in the Northern Coastal Plains of South Carolina could prove beneficial in identifying avoidable risks associated with market pricing of crops.

The following recommendations to the agriculture community were derived from the findings of this research assessment, while they are limited to the responses and biases of the surveyed participants.

- Provide additional seminar opportunities to farmers and agribusinesses
  - Targeted towards farmers between the ages of 18 – 40 and greater than 60

- Promote increased awareness of futures & options to farmers of all age groups and educational backgrounds
- Work with local financial advisors to offer incentives for individuals willing to participate in hedging risks through the usage of futures & options.
- Perform a pilot study with local farmers and agribusiness operators where futures & options are employed under the close advisement of a certified financial advisor. Make the results of this study available to the local agriculture industry in hopes to increase the usage of futures & options, if results are favorable.

Overall, there is awareness and knowledge of agriculture risk management instruments in the Northern Coastal Plains of South Carolina. However, there is an opportunity to improve the overall risk management experience of farmers and agribusinesses; thus impacting the economic well-being of the region.

**APPENDICES**

Appendices are available from the authors by request and include:

Exhibit A	Agricultural Risk Management Survey Instrument Cover Letter
Exhibit B	Agricultural Risk Management Survey Instrument
Exhibit C	2009 Irrigated Corn Estimated Costs and Returns (\$/Acre) From 2009 SC Corn Production Guide by Clemson Extension
Table 3	Demographics of Survey Respondents
Table 4	Risk Management Awareness of Survey Respondents
Table 5	Farmer-Specific Risk Management Awareness
Table 6	Farm Production by Survey Respondents
Table 7	ANOVA: Crop Insurance Awareness by Acreage Farmed
Table 8	ANOVA: Futures & Options Awareness by Acreage Farmed
Table 9	ANOVA: Crop Insurance Awareness by Education Level
Table 10	ANOVA: Futures & Options Awareness by Education Level
Table 11	ANOVA: Crop Insurance Awareness by Number of Crops Produced
Table 12	ANOVA: Futures & Options Awareness by Number of Crops Produced
Table 13	ANOVA: Willingness to Attend Seminars by Age
Table 14	ANOVA: Willingness to Attend Seminars by Education Level
Table 15	ANOVA: Willingness to Attend Seminars by Acreage Farmed
Table 16	ANOVA: Willingness to Attend Seminars by Number of Crops Produced

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