

# EFFECTS OF HURRICANES FRANCES, IVAN AND JEANNE ON GEORGIA IRRIGATORS

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**Abstract.** In September 2004, a series of hurricanes hit the coast of Florida. Although the hurricanes were down-graded by the time they reached Georgia, they caused significant damage to agricultural fields in the state. A survey of 73 Georgia irrigators was conducted in October 2004 to assess damages from each of the storms. Information from the survey included the type of crops damaged, amount of damage due to reduced yields, amount of damage due to reduced quality, the source of the damages, coping strategies employed by the farmers, insurance coverage, and the impact on fall harvest and planting dates.

## INTRODUCTION

Hurricanes Frances, Ivan, and Jeanne directly and indirectly affected Georgia irrigators. Many farmers lost huge portions of their crop yields, and thus, large percentages of their expected incomes. Furthermore, because of this fall's damages irrigation practices were affected, as some watered less due to the increased rain and severe weather, while others may have chosen not to grow or irrigate any crops next season. It is extremely important to study how events like these can change so many things for both irrigators and Georgia's water supply.

## DATA

To study the impacts of the storms on Georgia irrigators, a random sample of 195 irrigators was drawn from participants in the Agricultural Water PUMPING project at UGA. Seventy-nine (79) irrigators were contacted (or 40.5%). Out of the 79 contacted, 6 refused to participate. The irrigators were reached by telephone, and asked several questions regarding the effects that the hurricanes had on their respective operations. The results of these phone surveys were recorded and later entered into a spreadsheet to be analyzed.

## RESULTS

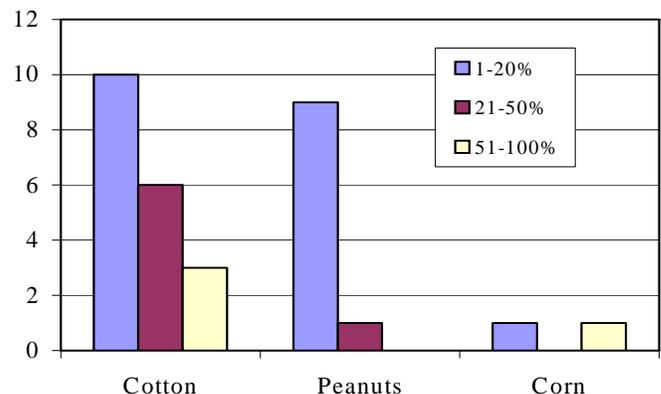
### Hurricane Frances

This first hurricane hit in the second week of September, 2004. Out of the 73 irrigators contacted, 49 of them experienced damage to one or more of their crops. Cotton was damaged more than any other crop, as 31 of the irrigators reported damage due to a combination of wind and water from Frances. The strong winds first blew the cotton out, and then heavy rains destroyed it. Peanuts, the second most damaged crop, were also damaged by the severe winds and rain.

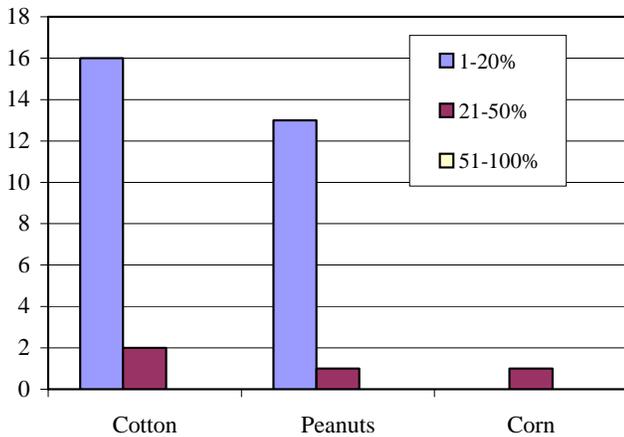
On average, the 49 irrigators lost approximately 30% of their yield of each damaged crop. Still, this number can be somewhat misleading, since some irrigators lost all of their corn, for example, while others may have only lost a tenth of their yield.

Regarding quality loss, only 21 out of the 49 irrigators who received damage experienced a loss in quality. The quality losses were primarily between 10 and 30 percent, with just two irrigators reporting quality losses greater than 50 percent.

Figure 1 shows the frequency of yield losses from Hurricane Frances, based on the percentage of yield lost of cotton, peanuts, and corn.



**Figure 1. Frequency of yield losses from Hurricane Frances.**



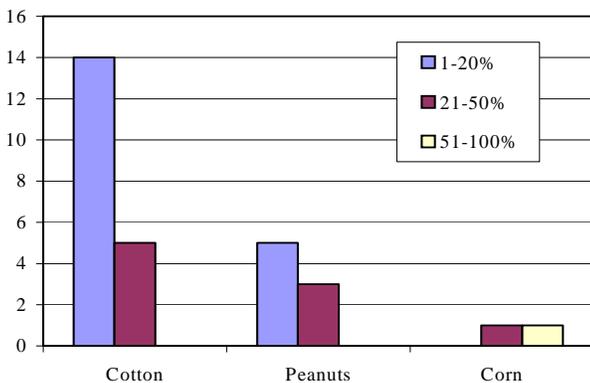
**Figure 2. Frequency of yield losses from Hurricane Ivan.**

### Hurricane Ivan

The second of the hurricanes, Ivan, caused the most damage for those Georgia irrigators that were surveyed, as 54 of them reported crop losses. Again, cotton was the crop that was most reported to have suffered damage, with 22 of the 54 experiencing cotton losses; while 20 of them stated they the hurricane affected their peanuts. Approximately 35.4 percent of all crop losses were reportedly due to water damage, with 21.5 percent caused by strong winds, and 43.1 percent due to both wind and water damage.

Figure 2 shows the frequency of yield losses from Hurricane Ivan, based on the percentage of yield lost of cotton, peanuts, and corn.

Only 10 of these 54 irrigators reported quality losses. One explanation for this smaller number might be that some of these farmers already experienced losses in quality from Hurricane Frances. Thus, any further losses may have been difficult to determine.



**Figure 3. Frequency of yield losses from Hurricane Jeanne.**

### Hurricane Jeanne

Of the 73 surveyed irrigators, 49 stated that they experienced crop losses from Hurricane Jeanne. Nearly 42.6 percent of the damages from Jeanne were reportedly due to a combination of wind and water, with 31.5 percent due solely to water damage and 25.9 percent from severe winds alone.

Out of these 49, 26 reported damage to their cotton, and 16 had losses in their peanut yields. Interestingly, there were still 4 irrigators who stated that their corn yields were affected. It is important to note that these losses were most likely caused by the two earlier hurricanes as well. The majority of the surveyed farmers had wanted to harvest their corn earlier, but the continuous storms prevented them from doing so. As a result, some of their corn remained in the fields and was damaged by Jeanne.

The frequency of yield losses from Hurricane Jeanne is shown in figure 3, based on the percentages of yield lost of cotton, peanuts, and corn.

Just seven irrigators stated that they experienced losses in quality from the final hurricane. Again, these damages may have been difficult to decipher because of the previous hurricane destruction.

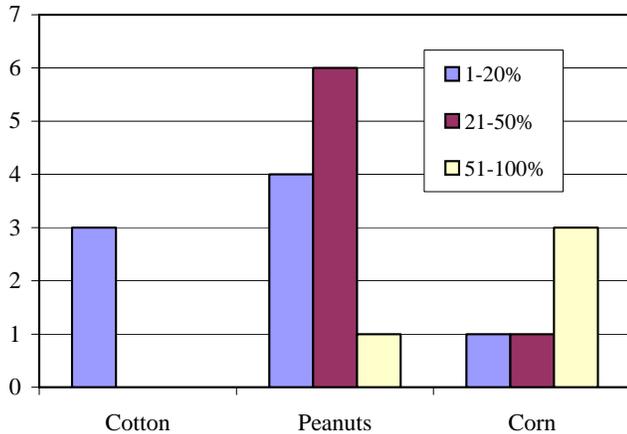
## DISCUSSION

Overall, we observe significant impacts upon Georgia irrigators, as 86.3 percent of those surveyed reported some type of damage from one or more of the hurricanes. That is, only ten irrigators replied that they were not affected by any of the three hurricanes. Only 21 of the 63 that experienced damage stated that their yield losses would be covered by insurance.

In addition to the widespread yield and quality losses, eighteen (18) irrigators had to delay harvesting by an average of eight days because of the hurricanes. Many of those surveyed said that they also had to spend extra time cleaning up, and some even hired more labor to help ease the effects of their various setbacks.

It should be noted, however, that the hurricanes were advantageous for a small portion of our sample. Two irrigators, who both grow sod, reported that the storms were beneficial for their operations in that the heavy rains caused increased output.

The hurricanes occurred within weeks of each other. This made it difficult for some of the irrigators to separate the damages incurred by each of the hurricanes. Twenty-one irrigators, or 38.7 percent of those affected by the hurricanes, were unable to distinguish the individual damage caused by each of the three hurricanes. An average of 68.3 percent of their yield was lost. The range of loss was from 2 to 100 percent. Quality loss ranged between 0



**Figure 4. Frequency of yield losses from those who could not distinguish between individual hurricane losses.**

and 100 percent and had a mean of 14.7 percent. Approximately 32.3 percent of the damage was caused by wind damage, 32.3 percent was caused by water damage, and the remaining 35.3 percent was caused by both wind and water damage.

Figure 4 shows the frequency of yield losses from those who could not distinguish between individual hurricane losses. Again, these numbers are based on the percentages of yield loss of cotton, peanuts, and corn.

### CONCLUSION

Across the results, we observe that cotton, peanuts, and corn were the most damaged crops, partly because these are also the most commonly grown crops within the sample. Still, this does not discount the severity of the destruction for those irrigators.

The effects of the storms on Georgia irrigators can be reflected in yield and quality losses. Those losses lead to a decrease in income as well as other negative consequences.

### ACKNOWLEDGEMENTS

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