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An Analysis of the Socioeconomic Impact of Hurricane Floyd and Related Flooding on Students at East Carolina University

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An Analysis of the Socioeconomic Impact of Hurricane Floyd and Related Flooding on Students at East Carolina University

ABSTRACT

The research reported here undertakes a preliminary socioeconomic assessment of the effects of Hurricane Floyd and related flooding on the students of East Carolina University (ECU) in Greenville, North Carolina. A second purpose of the study was to identify the sources from which students received needed assistance and the ways students provided assistance and contributed to local relief efforts. Greenville is located in Pitt County on the banks of the Tar River and was the site of some of the most severe flooding caused by Hurricane Floyd. The research is based on survey data collected from a scientific sampling of ECU students in the month following the flooding. In all, 826 students completed the survey, which has a margin of error of +/- 3.5%. The report is divided into the following sections: 1) data collection and sample characteristics, 2) impacts on students, 3) sources of assistance, and 4) participation in relief efforts.

DATA COLLECTION AND SAMPLE CHARACTERISTICS

East Carolina University closed on September 15, 1999, just prior to the arrival of Hurricane Floyd and remained closed until September 29. Shortly after classes resumed a survey was administered to assess the social, physical, and economic impact of the flood on ECU students. Another purpose of the survey was to explore patterns in giving and receiving assistance among students in the immediate aftermath of the flooding. A stratified cluster sampling design was used to insure that the sample adequately represented the broad range of ECU students. This involved several steps. First, a listing of all courses offered during the fall 1999 semester was consulted so that lower-division, upper-division, and graduate courses could be randomly selected from every department in the university. Courses from each of the three strata were identified by their course number with 1000- and 2000-level courses considered lower-division, 3000- and 4000-level courses upper-division, and 5000- to 6000-level courses graduate level. Selected courses were divided into separate groups according to the three strata, and each of those three lists were then randomized. Instructors were then contacted in the order their course appeared on the randomized lists. Members of the research group then visited classes and administered the survey until approximately 400 lower-division undergraduates, 400 upper-division undergraduates, and 100 graduate students had completed the paper and pen survey.

The sample accurately represents the broader student university population, though women and African Americans were slightly over-represented, comprising 64% and 15% in the sample compared to 59% and 12% respectively. Table 1 presents characteristics of the sample. Because the survey was administered through classes during the period immediately following the flood, the sample does not include students who were so severely affected by the storm they did not return to school when the university reopened.

Table 1: Sample Characteristics

Variables	Mean or % Yes	S.D.	Valid N.
Age	23.5%	6.1	523
Female	64%	-	823
Male	35%	-	823
White	78%	-	792
Black	15%	-	792
Other	7%	-	792
Graduate Student	13%	-	825
Undergraduate Student	87%	-	825
Years at ECU	2.6%	1.6	817

IMPACT ON STUDENTS

This section presents descriptive results on different types of impacts on student, including evacuations, property damage to student residences, forced relocation/change of living situations, personal property damage, and physical and psychological impacts.

Evacuation

Six out of ten students (59%) evacuated prior to the arrival of hurricane Floyd. This includes 17% of students who live in dormitories who were required to evacuate when the university closed and 42% who evacuated on their own initiative. Among those who did evacuate, friends (47%) and family (15%) were the most common sources of assistance. Only 8% received help from coworkers, landlords, or university staff, and 38% of evacuees reported receiving no assistance at all. Students who did evacuate were out of their homes for an average of 10 days. Most students at East Carolina University come from within the region affected by Hurricane Floyd, and 18% of students reported that their families evacuated their homes. One in ten ECU students (10%) were doubly affected by evacuation, because while they were evacuating their school residence near ECU, their families were also evacuating at home.

Evacuating students most frequently stayed with their parents (78%) or friends (29%), with notable but markedly smaller proportions staying with other relatives (8%), in shelters (1%), or in motels (2%). These total to more than 100% because many students evacuated to multiple destinations. The situation of an undergraduate student with a physical disability illustrates this situation. When the university closed, students who could not leave were consolidated into a single dormitory, yet that dormitory was not wheelchair accessible, leaving this student sitting in his car in the parking lot with nowhere to go. He then contacted a faculty member with whom he could stay until his parents could get through from out of town to take him home. After returning to Greenville, he then stayed with friends for several days until the dormitories reopened. Table 2 summarizes these results.

Table 2: Student Evacuation

Variables	Mean or % Yes	S.D.	Valid N.
Did you evacuate for Floyd?	59%	-	724
Of those who evacuated:			
received no help evacuating	38%	-	411
received help from family	15%	-	407
received help from friends	47%	-	407
Number of days out of home or dorm	10.2%	4.6	449
Where did you evacuate to?			
Parents	71%	-	425
Other family member of relative	8%	-	425
Shelter	1%	-	425
Motel/hotel	2%	-	425
Friends	29%	-	425
Did someone stay with you because of the storm?	30%	-	716
If yes, how many days did they stay?	5.8%	5.6	213

Damage and Relocation

In this section we consider the extent to which students experienced property damage to their residence, damage to personal property, and whether or not they had to relocate as a result of the storm or the flooding that followed. Two-thirds (66%) of ECU students reported that they suffered no property damage to their residence from Hurricane Floyd.

One quarter of all students reported that their residence was damaged but that the damage could be repaired while they still occupied the property. Given the size of the university, this represents about 4,500 students. One student in twenty, or about 900 students overall, had to move out of their residences in order for damage to be repaired, and another 720 (4%) saw their residences condemned because of flood damage. Overall, 26% of students reported some kind of property damage that cost them money. Families were the main source of monetary relief for students in Floyd's immediate aftermath, yet about one-third (32.7%) of students' families also incurred property damage, making it more difficult for the students to secure needed assistance. Moreover, about half (46%) of students who had property damage or losses also had families with property damage or losses. In other words about 2,200 students and their families suffered some kind of property damage or loss from Floyd.

About 1,260 students (7%) reported that they had to move as a result of Floyd. The vast majority of students who had to move (91%) reported experiencing difficulty in finding a new place to live. Of those who moved, nearly half (43%) found a residence that was more expensive than their preflood home. Average additional costs were \$93 per month. By contrast 23% of students forced to relocate found cheaper living arrangements; yet in most of these cases, the costs were cheaper because these students had more postflood roommates to share costs with than they did before the flood. In many cases these cost savings were the result of overcrowding in rental houses or apartments. About one-third (35%) of students forced to move saw their rents change by less than \$20 per month one way or the other.

Table 3: Damage to Residence*

Variables	Mean or % Yes	Valid N.
No damage	66%	688
Of those with damage, repairs...		
were done while still living there	25%	688
done before they could move back	5%	688
could not be done, property condemned	4%	688
Did you have to move?	21%	537
If you had to move:		
new residence was cheaper	23%	-
new residence was more expensive	42%	-
Average rent increase per month	\$93	-

* Excludes on-campus students

Obviously, the number of students relocating to new residences because of the flood has transportation and parking implications for the university community. Prior to the flooding most ECU students (57%) who lived off campus reported that they drove cars to school, with walkers (28%) making up the next largest category. As mentioned above, about 1,260 students were forced to move because of the flooding, and 61% of those students had to change their means of commuting to school as a result. Consequently 37% percent of preflood walkers and bikers now drive, and another 8% of them now ride the ECU bus service. Similarly, 55% of relocated students who used the ECU bus service before the flood now drive. In contrast 10% of preflood drivers now walk or ride bicycles to school. In general, the relocation of students from the flood has increased the number of students who drive to school, thereby putting greater stress on current parking facilities. More students are relying on the ECU bus service, but many who relocated moved to areas not traditionally considered student areas and not serviced by the ECU bus service. Expanding bus routes to include such areas may eliminate much of the increased frequency of individuals driving to school that resulted from the flooding.

Table 4: Impact on Transportation

Transportation	Mean or % Yes	Valid N.
How did you get to school before Floyd?*		684
Walk	28%	

Bicycle	4%	
ECU bus	9%	
Drive car	57%	
Get ride	2%	
Drive time	23 min.	469
Of those who had to move because of the flood:**		97
Percent of preflood walkers/bikers who now drive	19%	
Percent of preflood EDU Bus riders who now drive	12%	
Percent of preflood drivers who now walk/bike	8%	
Average postflood drive time	20 min.	41

* Does not include on-campus students

**Only students living off campus pre-Floyd who had to move

Property Damage Costs

In this next section we examine student losses of personal property and the cost of all property (both personal property and owned residences) lost by students. Personal property loss disrupted the lives of 16% of ECU university students (about 3,000 individuals). Items lost to flooding included clothing (7.8%), furniture and stereo equipment (7.2%), textbooks (5.4%), and computers (1.6%). About 1,000 students (4.5%) lost their cars to the flood waters. Overall about 4,500 of ECU students (26%) experienced some form of loss to either personal property or damage to their residence for which they were financially responsible. Among those who incurred some sort of loss, the average loss was \$5,906 - though half those surveyed incurred costs of less than \$1000. A surprising proportion of ECU students own their own homes (or live with family in owner-occupied housing). About 23% of students who reside off-campus own homes, and these students suffered greater losses than did students who rent. Average repair or replacement costs among student homeowners was \$15,960, while among renters the average costs were \$2,464. Only one in three students reported that they carried any insurance that would cover their costs, and even fewer (10%) reported that their losses were fully covered.

We undertook a preliminary bivariate analysis of group differences regarding property damage and other flood impacts. Overall we found very few significant differences. Students who lived off-campus were more affected than those who lived on-campus. Students who were homeowners were more negatively affected than renters. Compared to on-campus students those who lived off-campus were more likely to report that their lives were still "very disrupted" ($p < .01$) by the flood. Similarly North Carolina residents and African-American students were more likely to report that their lives were still "very disrupted" than were either students from out of state or white students respectively. Students were also asked whether or not their experiences of the hurricane and flooding had caused them to reconsider their life priorities, and 15% indicated that it had caused them to reconsider their priorities "a great deal" and 48% said it had "somewhat." We found that female students were more likely than males to indicate this influence. Similarly, students living off-campus and those who had suffered damage from the storm were more likely to indicate a change in priorities as a result of their experiences.

SOURCE OF ASSISTANCE

In this next section we examine patterns of receiving and giving assistance among ECU students in the immediate aftermath of Hurricane Floyd and the flooding that followed. Table 5 below summarizes responses to a set of questions about assistance received in clean up or repair of damaged property and assistance received in finding a new place to live. One-third (33%) of students who experienced some kind of property damage indicated that they did not need any help with clean up or repair. Of those needing help, family (31%), friends (29%), and landlords (22%) were the most frequent sources of assistance with clean up and repair. When it came to finding a new place to live, displaced students relied most often on friends (52%) as a source of assistance followed by family (35%). About one in five displaced

students (21%) reported that they received no assistance in locating new housing, and only 3% received this type of assistance from the university relief center.

Table 5: Sources of Assistance

Variables	Mean or % Yes	N = 270
No need for help cleaning/repair	33%	
Family helped	31%	
Friends helped	29%	
Neighbors helped	16%	
No help received	6%	
Coworkers helped	2%	
Landlord helped	22%	
Church members helped	4%	
Others helped	6%	
Of those needing help finding a new place to live:		N=61
No help finding new place to live	21%	
Family helped	35%	
Friends helped	52%	
Neighbors helped	5%	
Coworkers helped	0%	
Landlord helped	7%	
Church members helped	2%	
ECU relief center helped	3%	
Others helped	7%	

As noted above, about one in four ECU students, or about 4,500 individuals, reported incurring costs due to damage to their residence or loss of personal property. These students faced two types of needs. First, they needed to find out where they might be able to obtain financial or material assistance to help recover their losses. Second, they needed to actually obtain financial and material aid. We asked them about the sources of assistance, other than insurance, that they accessed to help them meet both of these needs. Tables 6 and 7 present these results. Results in Tables 6 and 7 do not total 100% because students could indicate multiple sources from which they received assistance.

It is important to note that 45% of students who needed information and referrals to potential sources of financial or material assistance reported that they received no such help. The same is true regarding actually obtaining needed financial and material assistance, with 49% of affected students indicating they received no such assistance. Those that did receive information and referral assistance obtained it from family (30%), friends (27%), and the ECU relief center (26%). Family was the most frequently cited source of financial or material assistance (30%) followed by FEMA and the ECU relief center (19%), and friends (15%).

Table 6: Sources of Information about Financial Assistance

Source of Information	Percent Yes (N = 173)
Of those needing information and referral assistance:	
Received no assistance	45%
Family helped locate	30%
Friends helped locate	27%
Boss helped locate	5%

Coworkers helped locate	5%
Neighbors helped locate	8%
Church members helped locate	5%
Faculty helped locate	8%
ECU relief center helped locate	26%

Table 7: Sources of Financial and Material Assistance

Source of assistance	Percent Yes (N=165)
Of those needing financial or material assistance:	
Received no assistance	49%
Family	30%
FEMA	19%
ECU relief center	19%
Friends	15%
Red Cross	8%
Church members	6%
Employer or coworkers	6%
Faculty	2%
Neighbors	2%

STUDENT PARTICIPATION IN LOCAL RELIEF EFFORTS

ECU students also participated actively in local relief efforts - both formally through channels such as the Red Cross, Salvation Army, or the Emergency Animal Rescue Service (EARS), and informally by helping friends and neighbors. Table 8 presents results describing the kinds of individuals to whom ECU students provided several types of assistance in the period immediately following the flood. It is noteworthy that 47% of the sample representing about 8,460 students reported providing some form of relief assistance through informal channels. Friends were the most frequent beneficiaries, followed by family members and then neighbors.

A preliminary analysis of group differences regarding this type of informal helping behavior revealed several statistically significant results. Men and off-campus residents were more likely than women and on-campus residents to provide assistance through informal channels. Similarly, students who had volunteered with service organizations before the flood were more likely to provide informal assistance than those who had not previously volunteered.

Table 8: Informal Relief Assistance Provided by Students

Type of Assistance	Evacuation Percent Yes (N = 801)	Financial Percent Yes (N=789)	Clean-up/Repair Percent Yes (N=764)
Provided assistance to:			
Family	7%	7%	18%
Friends	38%	36%	33%
Neighbors	8%	7%	8%
Church members	2%	4%	2%

Coworkers	6%	6%	2%
Provided no assistance	53%	54%	53%

A significant number of students also volunteered through various community organizations to help with local relief efforts. Overall, 37% of those surveyed, representing over 7,000 students, reported that they did volunteer work through organized relief efforts. The Pitt County Red Cross was the most frequent organization with which students volunteered (15%), followed by local churches (12%). Nine per cent of students volunteered with the Salvation Army, 8% in emergency shelters, 5% with the Emergency Animal Rescue Service, and about 2% with city clean-up programs.

A preliminary analysis of student volunteering with local organizations revealed the following differences. While men were more likely to provide informal assistance than women, women were more likely than men to work in organized volunteer efforts through community organizations. North Carolina residents and graduate students were more likely to work through organized volunteer efforts than were students from out of state or undergraduates respectively. Students living off-campus were more likely to volunteer than those living on-campus, as were students who had already volunteered prior to the flooding. Lastly, those who suffered property damage themselves were significantly more likely to volunteer in organized local relief efforts than were students who did not suffer any damage.

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