ATTACHMENT 7E

AGRICULTURAL NONCROP FLOOD DAMAGE
MISSISSIPPI DELTA, MISSISSIPPI

AGRICULTURAL NONCROP FLOOD DAMAGE MISSISSIPPI DELTA, MISSISSIPPI

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UPDATED JUNE 2006

AGRICULTURAL NONCROP FLOOD DAMAGE
MISSISSIPPI DELTA, MISSISSIPPI

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INTRODUCTION

1. Flooding in the Yazoo-Mississippi Delta has historically been a major problem with damages to agricultural crops accounting for the majority of damages that occur during a flood event. Agricultural firms engaged in crop production must maintain a physical plant consisting of farmland, drainage and irrigation systems, farm roads and turn rows, equipment, and maintenance and storage buildings. Flood events have the potential to damage this physical plant requiring corrective measures, and hence costs, to return it to a productive state. Losses to the noncrop components of agricultural enterprises are an important part of damage assessment and, therefore, are key elements in a flood impact assessment.

STUDY OBJECTIVES AND STUDY AREA

2. The objectives of this study were to provide up-to-date crop budgets for the Delta area, design and conduct a survey to obtain noncrop flood damage information, and estimate the noncrop damages to agricultural firms in the event of three levels of flooding--limited, moderate, and severe. The study area included the 11 counties of the lower Yazoo-Mississippi Delta--Warren, Tunica, Issaquena, Humphreys, Washington, Leflore, Tallahatchie, Coahoma, Sunflower, Bolivar, and Sharkey.

METHODS AND PROCEDURES

3. The investigators utilized published Mississippi Agricultural and Forestry Agricultural Experiment Station (MAFES) reports, along with a comprehensive survey technique, to obtain data on noncrop agricultural damages. Key personnel in each county, including the United States Department of Agriculture offices of the Agricultural Stabilization and Conservation Service and the Soil Conservation Service (currently known as the Natural Resources Conservation Service (NRCS)), Mississippi Cooperative Extension Service County Agents, and members of the County Boards of Supervisors, were interviewed to develop percentage damage estimates to various categories of damages for each county in the study.

4. Questioning of county participants was directed to the assimilation of data needed to determine flood damages. The researchers developed a table format of desired information to guide discussion and followup data requests in each county (Appendix A). Supporting data and analyses fulfilling these requirements are discussed throughout the text.

5. Aerial photographs for three randomly selected sites in each county were obtained from the U. S. Army Corps of Engineers and used as a focal point of discussion in each interview session. Elements of the agricultural physical plant that were represented in each photographs were discussed, and estimates of damage to these elements were elicited. Further, interview participants were asked to identify other sources of damage due to flooding in their counties not necessarily represented in the aerial photos. Transcripts of all interview sessions were subsequently examined, and an economic engineering approach was developed to specify the damage estimates for each county in the study.

RESULTS AND DISCUSSION

6. Representative crop budgets are provided in Appendix A for cotton, rice, soybeans, wheat, corn, and grain sorghum. Ten budget tables are provided for each crop reflecting the timing and nature of cultural practices as well as economic information. The project's Scope of Work identified categories of noncrop damages for which damage estimate values might be estimated. These included farm equipment, supplies, farm roads, fences, drainage improvements, landforming, and farm buildings. Interview sessions in the 11-county study area consistently indicated that little or no damage would result from flooding to supplies and farm buildings. Interview participants indicated that farmers, in response to earlier major floods, had adjusted their farming operations by building levees around or raising the ground level for shop and storage buildings beyond any known or expected flood levels. County personnel interviewed repeatedly indicated that experiences with flooding in the 1973 and 1981 floods had induced these adjustments, and a sufficient time has elapsed so that virtually all farmers had adjusted and little damage would be expected to these items due to flooding.

7. Remaining items of farm equipment, farm roads, drainage improvements, and landforming were further separated and developed into seven categories. Discussion of damage estimates for each of these categories follows.

a. Equipment.

(1) Equipment damages are estimated using an average investment for equipment in each county multiplied by a percentage damage factor. Enterprise budgets included in Appendix B are the basis for determining the average equipment investment per acre for each county. Crop budgets were examined, and the required equipment components necessary to produce each crop were listed. To determine investment per acre, a total equipment complement was developed and a corresponding number of acres that could be worked with that complement was estimated. Development of the equipment complement was initiated by estimating the number of acres that one harvester could handle if fully employed during a harvest season. A complement of remaining machinery was economically engineered around that number of acres utilizing

performance rates of the various implements and the required operations for each crop. New cost of the equipment complement was determined by using MAFES published machinery prices. Average investment was calculated:

(Average Investment = New Investment Cost/2)

Average investment was used to reflect the fact that equipment on farms is a mix of old and new equipment. Hence, Table 1 provides the estimates of new cost and average machinery investment per acre for each crop in the study. Appendix B (Tables 1-6) provide a detailed listing of equipment needs and costs that form the basis for Table 1.

TABLE 1
ESTIMATED EQUIPMENT INVESTMENT
COSTS BY CROP, MISSISSIPPI DELTA, 2005

Crop	New Cost ($/acre)	Average Investment ($/acre)
Cotton	1,181	590
Rice	688	344
Soybeans	426	213
Wheat	352	176
Corn	713	357
Grain Sorghum	448	224

SOURCE: The equipment complements and associated costs were obtained from budget data presented in Appendix B.

(2) Average equipment investment per acre for each county was estimated by weighting the average investment per acre for each crop by the percentage of acres of each crop in the county. Table 2 provides average planted acres by crop and county for the 2002-2004 crop years. Table 3 provides the weighting factors, i.e., the percentage of total planted acres for each crop and the weighted average investment in machinery by county. Table 4 is the average equipment investment by county.

Table 2
Average planted acres by county, by crop, Mississippi Delta, 2002-2004

County/Years	Cotton	Rice	Soybeans	Wheat	Corn	Grain Sorghum	3 yr avg. totals
Bolivar							
2002	80,900	79,500	181,900	33,500	13,600	6,200	
2003	82,500	75,400	186,800	16,000	13,500	5,700	
2004	77,600	71,000	211,600	28,500	9,600	0	
3 year avg.	80,333	75,300	193,433	26,000	12,233	3,967	391,267
Coahoma							
2002	124,900	19,500	92,600	15,500	19,100	11,800	
2003	128,800	11,500	103,200	18,900	18,900	3,400	
2004	121,600	13,000	115,300	10,600	15,800	0	
3 year avg.	125,100	14,667	103,700	15,000	17,933	5,067	281,467
Issaquena							
2002	15,400	0	36,600	6,400	34,200	0	
2003	17,500	0	37,500	2,500	31,500	0	
2004	17,800	0	45,000	2,300	20,900	0	
3 year avg.	16,900	0	39,700	3,733	28,867	0	89,200
Humphreys							
2002	66,800	3,500	39,900	8,400	16,500	4,300	
2003	59,300	4,000	50,900	3,500	21,000	5,400	
2004	61,600	4,200	63,200	6,100	12,500	0	
3 year avg.	62,567	3,900	51,333	6,000	16,667	3,233	143,700
Leflore							
2002	77,500	20,800	90,700	11,200	26,700	7,800	
2003	82,900	18,200	86,900	8,700	28,300	7,900	
2004	80,400	18,000	101,800	7,200	18,300	0	
3 year avg.	80,267	19,000	93,133	9,033	24,433	5,233	231,100
Sharkey							
2002	43,200	5,000	50,800	4,300	30,700	0	
2003	38,200	3,800	52,400	3,000	32,700	0	
2004	37,700	4,100	56,900	2,300	28,200	0	
3 year avg.	39,700	4,300	53,367	3,200	30,533	0	131,100
Sunflower							
2002	67,400	37,300	131,200	30,400	28,900	10,600	
2003	60,700	33,100	139,600	14,900	32,200	11,000	
2004	55,900	33,500	169,400	13,000	27,400	5,600	
3 year avg.	61,333	34,633	146,733	19,433	29,500	9,067	300,700

Table 2 (Cont)

County/Years	Cotton	Rice	Soybeans	Wheat	Corn	Grain Sorghum	3 yr avg. totals
Tallahatchie							
2002	45,800	15,700	96,700	13,100	30,000	2,300	
2003	38,700	16,400	95,700	12,800	31,400	6,300	
2004	45,700	16,600	101,600	5,700	27,900	1,600	
3 year avg.	43,400	16,233	98,000	10,533	29,767	3,400	201,333
Tunica							
2002	70,800	20,100	74,500	7,100	5,900	8,300	
2003	67,900	23,000	64,200	0	6,100	12,900	
2004	69,500	21,800	88,900	4,800	1,900	0	
3 year avg.	69,400	21,633	75,867	3,967	4,633	7,067	182,567
Warren							
2002	8,600	0	17,000	0	11,600	0	
2003	9,200	0	18,000	0	9,900	0	
2004	9,300	0	16,800	0	9,000	0	
3 year avg.	9,033	0	17,267	0	10,167	0	36,467
Washington							
2002	93,900	30,000	123,400	20,400	47,200	10,700	
2003	89,500	28,800	140,300	11,300	42,300	6,700	
2004	89,400	28,100	163,000	12,000	27,200	2,300	
3 year avg.	90,933	28,967	142,233	14,567	38,900	6,567	322,167

Source: USDA, National Agricultural Statistics Service

Table 3
Average Percentage of Total Crop Acreage by Crop, 2002-2004

County	Cotton	Rice	Soybeans	Wheat	Corn	Grain Sorghum
	Percent					
Bolivar	0.21	0.19	0.49	0.07	0.03	0.01
Coahoma	0.44	0.05	0.37	0.05	0.06	0.02
Issaquena	0.19	0.00	0.45	0.04	0.32	0.00
Humphreys	0.44	0.03	0.36	0.04	0.12	0.02
Leflore	0.35	0.08	0.40	0.04	0.11	0.02
Sharkey	0.30	0.03	0.41	0.02	0.23	0.00
Sunflower	0.20	0.12	0.49	0.06	0.10	0.03
Tallahatchie	0.22	0.08	0.49	0.05	0.15	0.02
Tunica	0.38	0.12	0.42	0.02	0.03	0.04
Warren	0.25	0.00	0.47	0.00	0.28	0.00
Washington	0.28	0.09	0.44	0.05	0.12	0.02

Source: Computed from information in Tables 1 and 2.

Table 4

Average Equipment Investment Per County, 2002-2004

County	Cotton	Rice	Soybeans	Wheat	Corn	Grain Sorghum	Weighted Average Investment ($/Acre)
	Percent						
Bolivar	121.23	66.22	105.23	11.71	11.15	2.27	317.81
Coahoma	262.43	17.93	78.42	9.39	22.72	4.04	394.94
Issaquena	111.87	0.00	94.74	7.38	115.41	0.00	329.40
Humphreys	257.08	9.34	76.04	7.36	41.36	5.04	396.23
Leflore	205.08	28.29	85.78	6.89	37.71	5.08	368.82
Sharkey	178.80	11.29	86.65	4.30	83.06	0.00	364.10
Sunflower	120.44	39.63	103.87	11.39	34.99	6.76	317.07
Tallahatchie	127.28	27.74	103.61	9.22	52.73	3.79	324.37
Tunica	224.45	40.77	88.46	3.83	9.05	8.68	375.24
Warren	146.27	0.00	100.79	0.00	99.43	0.00	346.48
Washington	166.66	30.94	93.98	7.97	43.06	4.57	347.17

Source: Computed from information in Tables 1 and 2.

b. Roads/turn rows. Characteristically, farm roads and/or turn rows are slightly elevated and 10 to 12 feet wide. Typically, these are constructed with the use of existing farm equipment. Equipment needed includes a tractor and box blade. The blade was estimated to cost $0.36 per linear foot. In consultation with NRCS technicians, the number of feet of major roads and turn rows was calculated for each of the three sections from aerial photographs. Based upon the total feet of roads/turn rows for the three sections, the number of feet per acre of major roads and turn rows in the county was estimated (Table 5). The cost per acre was the product of the feet per acre and the cost per foot.

TABLE 5
ESTIMATED ROADS AND TURN ROWS, MAJOR DITCHES, AND MINOR DITCHES PER ACRE BY COUNTY, 1994
(feet/acre)

County	Roads and Turn Rows	Major Ditches	Minor Ditches
Bolivar	10	14	24
Coahoma	7	10	17
Issaquena	6	10	17
Humphrey's	5	6	11
Leflore	11	16	27
Sharkey	9	13	22
Sunflower	6	10	17
Tallahatchie	2	4	6
Tunica	5	7	13
Warren	3	4	6
Washington	6	9	15

SOURCE: Compiled from survey data collected, Department of Agricultural Economics, Mississippi State University, June-August 1994.

c. Major ditches. A major ditch was estimated to be 4 feet deep and 6 to 8 feet wide. The cost to construct this size ditch with a backhoe is estimated to be $0.58 per linear foot, 2005 Mississippi State Budget Generator, per foot using a going rate of $70 per hour for the backhoe and a performance rate of 120 feet per hour. In consultation with NRCS technicians, the number of feet of major ditches was calculated for each of the three sections from aerial photographs. Based upon the total feet of each for the three sections, the average number of feet per acre of major ditches in the county was estimated (Table 5). The cost per acre was the product of feet per acre and cost per foot.

d. Minor ditches. A minor ditch is estimated to be 1 to 2 feet deep and 3 to 4 feet wide. The cost to construct this size ditch with a tractor and blade was calculated from the Mississippi State Budget Generator to be $0.36 per foot. In consultation with NRCS technicians, the number of feet of minor ditches was calculated for each of the three sections from aerial photographs.

Based upon the total feet of each for the three sections, the number of feet per acre of minor ditches in the county was estimated (Table 5). The cost per acre was the product of feet per acre and cost per foot.

e. Landforming. Estimated costs for forming land of $240 per acre for moving 300 cubic yards of soil at $0.80 per cubic yard were derived from the Mississippi State University 2005 Budget Generator. Counties were surveyed regarding the percentage of land-flow acres. The estimated average cost per acre for each county was determined by weighting the total cost per acre of landforming by the percent of landformed acres in each county. The number of acres of formed land in each county was obtained through interviews with knowledgeable technical agricultural experts in each county. Table 6 provides the estimates of landformed crop land by county. Table 7 gives total planted acre estimates, estimates of irrigated acres, and cost calculations for each county.

TABLE 6
ESTIMATED IRRIGATED ACRES BY COUNTY,
MISSISSIPPI DELTA, 2005

County	Acres
Bolivar	386,487
Coahoma	160,572
Humphreys	76,360
Issaquena	34,021
Leflore	175,994
Sharkey	55,049
Sunflower	261,815
Tallahatchie	114,639
Tunica	126,075
Warren	2,361
Washington	229,026

SOURCE: YMD Joint Water Management District, 2005 irrigation acres.

Table 7
Planted Acres, Estimated Landformed Acres, and Cost Per Acre by County, Mississippi Delta, 2005

County	Planted Acres	Irrigated Acres	Percent Formed	Form Cost ($/acre)	Cost/Acre ($/acre)
Bolivar	391,267	386,487	98.78	$240.00	$237.07
Coahoma	281,467	160,572	57.05	$240.00	$136.92
Issaquena	89,200	34,021	38.14	$240.00	$91.54
Humphreys	143,700	76,360	53.14	$240.00	$127.53
Leflore	231,100	175,994	76.15	$240.00	$182.77
Sharkey	131,100	55,049	41.99	$240.00	$100.78
Sunflower	300,700	261,815	87.07	$240.00	$208.96
Tallahatchie	201,333	114,639	56.94	$240.00	$136.66
Tunica	182,567	126,075	69.06	$240.00	$165.74
Warren	36,467	2,361	6.47	$240.00	$15.54
Washington	322,167	229,026	71.09	$240.00	$170.61

Source: USDA, National Agricultural Statistics Service, 2005.

f. Debris removal. Interview participants indicated that a complement of equipment and men was the most common method of debris removal after a flood. The most common combination cited was a crew of two men on foot loading debris, one tractor, a front-end loader with driver to handle heavy debris, and one tractor pulling a trailer with a driver. An hourly cost of operation is presented in Table 8. It was estimated that this combination could cover approximately 5 acres per hour. Hence, a per acre cost of $17.41 is estimated for debris removal and would apply to all counties.

g. Pond levees. The Mississippi State Extension Office estimated the cost of levee construction in their 2004 Catfish Budgets to be approximately $1,293 per land acre. Average cost per acre for each county was determined by weighting the total construction cost per acre by the percent that catfish pond acreage is of planted acres plus catfish pond acres. Table 9 gives the catfish pond acreage by county for 2005. Table 10 gives the county totals for planted acres and catfish ponds and shows the calculations of the average cost per acre of catfish levees.

h. Percent Damages.

(1) Damage estimates for each county were calculated as a percent damage for each category, multiplied by the total value of each item per acre. Damage percentages were developed from the interviews performed in this study and were estimated for limited, moderate, and severe flood conditions.

(2) The Scope of Work proposed the three levels of flooding, but did not identify flood events in terms of a conventionally defined measure such as a 100- or 50-year flood, etc. Because flood events and their subsequent damages differ significantly, depending upon the time of year in which they occur and other factors, interpretation of these three flood levels reflects some degree of subjectivity. To address this issue, the researchers established the following benchmarks in discussions with the resident county experts. The interviewees were asked to base responses on the following scenarios. A severe flood would be the worst flooding that the county had encountered, which for the most part was the 1973 flood. Severe flooding can be characterized as having long duration, significant depth, and/or high velocity flows and requires extensive repairs. Moderate flooding is defined as having a duration of several days and a combination of depths and other factors to cause significant damage, but not to the extent experienced under the severe flood scenario. Limited flooding is defined as having short duration, shallow depths, and requires only relatively minor repairs.

Table 8
Estimated Debris Removal Costs Per Hour, 2005

Item	Direct Cost Per Hour	Fixed Cost Per Hour	Total Cost Per Hour
Tractor (60-89 horsepower)	18.88	4.37	23.25
Tractor (90-119 horsepower)	22.32	6.75	29.07
Front-end Loader	2.41	5.74	8.15
Trailer	0.75	0.07	0.82
Labor (four men)	25.76	0	25.76
Total	70.12	16.93	87.05

Source: 2004 Planning Budgets, Department of Agricultural Economics, Mississippi State University.

TABLE 9
NUMBER OF CATFISH POND ACRES
2005

County	Acres
Bolivar	3,367
Coahoma	1,784
Issaquena	7,825
Humphreys	34,944
Leflore	18,791
Sharkey	5,226
Sunflower	31,387
Tallahatchie	1,020
Tunica	3,081
Warren	0
Washington	11,960

SOURCE: YMD Joint Water Management District, 2005 irrigation acres.

Table 10
Estimated Cost Per Acre for Catfish, 2005

County	Planted Acres	Catfish Acres	Total Acres	% Catfish Acres	Cost ($)	Cost/Acre ($)
Bolivar	391,267	3,367	394,634	0.01	1,293	11.03
Coahoma	281,467	1,784	283,251	0.01	1,293	8.14
Issaquena	89,200	7,825	97,025	0.08	1,293	104.28
Humphreys	143,700	34,944	178,644	0.20	1,293	252.92
Leflore	231,100	18,791	249,891	0.08	1,293	97.23
Sharkey	131,100	5,226	136,326	0.04	1,293	49.57
Sunflower	300,700	31,387	332,087	0.09	1,293	122.21
Tallahatchie	201,333	1,020	202,353	0.01	1,293	6.52
Tunica	182,567	3,081	185,648	0.02	1,293	21.46
Warren	36,467	0	36,467	0.00	1,293	0.00
Washington	322,167	11,960	334,127	0.04	1,293	46.28

Source: 2004 Mississippi State University Planning Budgets; YMD Joint Water Management District, 2005 irrigation acres.

(3) Individual damage coefficients represent that proportion of the "total per acre" costs associated with a specific category that would be incurred under limited, moderate, and severe flood scenarios. For example, consider the roads/turn rows category. A 5 percent damage factor under the limited flood scenario would result in a damage loss of $0.18 per acre ($3.60 x .05). Tables 11 through 21 provide these estimated damage percentages and the resulting Bolivar County damage calculations.

SUMMARY

8. Per acre damage estimates for the 11 Delta counties are presented in Table 22 for limited, moderate, and severe flood events. Zero damages were recorded for the limited and moderate flood events in Coahoma County and the limited flood in Tunica County. Humphreys County registered the largest per acre flood damages, $142.84 per acre, with the severe flood scenario. This value was larger than the next largest figure of $120.90 for Sunflower County with a severe flood.

Table 11

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Bolivar County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	317.81	1.00	317.81	0.00	0.00	0.00	0.00	0.01	3.18
Roads/Turnrows	ft	10.00	0.36	3.60	0.05	0.18	0.10	0.36	0.30	1.08
Major Ditches	ft	14.00	0.58	8.12	0.05	0.41	0.10	0.81	0.30	2.44
Minor Ditches	ft	24.00	0.36	8.64	0.05	0.43	0.10	0.86	0.30	2.59
Land Forming	dol	237.07	1.00	237.07	0.05	11.85	0.10	23.71	0.30	71.12
Debris Removal	acre	1.00	17.41	17.41	0.00	0.00	0.00	0.00	0.50	8.71
Pond Levees	dol	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total						12.87		25.74		89.11

Table 12

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Coahoma County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	394.94	1.00	394.94	0.00	0.00	0.00	0.00	0.01	3.95
Roads/Turnrows	ft	7.00	0.36	2.52	0.00	0.00	0.00	0.00	0.05	0.13
Major Ditches	ft	10.00	0.58	5.80	0.00	0.00	0.00	0.00	0.05	0.29
Minor Ditches	ft	17.00	0.36	6.12	0.00	0.00	0.00	0.00	0.05	0.31
Land Forming	dol	136.92	1.00	136.92	0.00	0.00	0.00	0.00	0.05	6.85
Debris Removal	acre	1.00	17.41	17.41	0.00	0.00	0.00	0.00	0.00	0.00
Pond Levees	dol	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total						0.00		0.00		11.52

Table 13

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Issaquena County, 2005

Category	Unit	Quantity /Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	329.40	1.00	329.40	0.00	0.00	0.00	0.00	0.01	3.29
Roads/Turnrows	ft	6.00	0.36	2.16	0.20	0.43	0.30	0.65	0.45	0.97
Major Ditches	ft	10.00	0.58	5.80	0.20	1.16	0.30	1.74	0.45	2.61
Minor Ditches	ft	17.00	0.36	6.12	0.20	1.22	0.30	1.84	0.45	2.75
Land Forming	dol	91.54	1.00	91.54	0.20	18.31	0.30	27.46	0.45	41.19
Debris Removal	acre	1.00	17.41	17.41	0.50	8.71	0.75	13.06	1.00	17.41
Pond Levees	dol	40.71	1.00	40.71	0.00	0.00	0.00	0.00	0.30	12.21
Total						29.83		44.74		80.45

Table 14

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Humphreys County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	396.23	1.00	396.23	0.00	0.00	0.00	0.00	0.01	3.96
Roads/Turnrows	ft	5.00	0.36	1.80	0.05	0.09	0.10	0.18	0.40	0.72
Major Ditches	ft	6.00	0.58	3.48	0.05	0.17	0.10	0.35	0.40	1.39
Minor Ditches	ft	11.00	0.36	3.96	0.05	0.20	0.10	0.40	0.40	1.58
Land Forming	dol	127.53	1.00	127.53	0.05	6.38	0.10	12.75	0.40	51.01
Debris Removal	acre	1.00	17.41	17.41	0.25	4.35	0.50	8.71	1.00	17.41
Pond Levees	dol	166.91	1.00	166.91	0.00	0.00	0.00	0.00	0.40	66.76
Total						11.19		22.38		142.84

Table 15

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Leflore County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	368.82	1.00	368.82	0.00	0.00	0.00	0.00	0.01	3.69
Roads/Turnrows	ft	11.00	0.36	3.96	0.05	0.20	0.10	0.40	0.25	0.99
Major Ditches	ft	16.00	0.58	9.28	0.05	0.46	0.10	0.93	0.25	2.32
Minor Ditches	ft	27.00	0.36	9.72	0.05	0.49	0.10	0.97	0.25	2.43
Land Forming	dol	182.77	1.00	182.77	0.05	9.14	0.10	18.28	0.25	45.69
Debris Removal	acre	1.00	17.41	17.41	0.10	1.74	0.50	8.71	1.00	17.41
Pond Levees	dol	85.68	1.00	85.68	0.00	0.00	0.00	0.00	0.10	8.57
Total						12.03		29.28		81.10

Table 16

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Sharkey County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	364.10	1.00	364.10	0.00	0.00	0.00	0.00	0.01	3.64
Roads/Turnrows	ft	9.00	0.36	3.24	0.20	0.65	0.30	0.97	0.45	1.46
Major Ditches	ft	13.00	0.58	7.54	0.23	1.73	0.30	2.26	0.45	3.39
Minor Ditches	ft	22.00	0.36	7.92	0.20	1.58	0.30	2.38	0.45	3.56
Land Forming	dol	100.78	1.00	100.78	0.20	20.16	0.30	30.23	0.45	45.35
Debris Removal	acre	1.00	17.41	17.41	0.50	8.71	0.75	13.06	1.00	17.41
Pond Levees	dol	40.14	1.00	40.14	0.00	0.00	0.00	0.00	0.40	16.06
Total						32.83		48.90		90.87

Table 17

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Sunflower County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	317.07	1.00	317.07	0.00	0.00	0.00	0.00	0.01	3.17
Roads/Turnrows	ft	6.00	0.36	2.16	0.10	0.22	0.15	0.32	0.35	0.76
Major Ditches	ft	10.00	0.58	5.80	0.10	0.58	0.15	0.87	0.35	2.03
Minor Ditches	ft	17.00	0.36	6.12	0.10	0.61	0.15	0.92	0.35	2.14
Land Forming	dol	208.96	1.00	208.96	0.10	20.90	0.15	31.34	0.35	73.14
Debris Removal	acre	1.00	17.41	17.41	0.10	1.74	0.30	5.22	0.60	10.45
Pond Levees	dol	97.41	1.00	97.41	0.00	0.00	0.00	0.00	0.30	29.22
Total						24.05		38.68		120.90

Table 18

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Tallahatchie County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	324.37	1.00	324.37	0.00	0.00	0.00	0.00	0.01	3.24
Roads/Turnrows	ft	2.00	0.36	0.72	0.05	0.04	0.20	0.14	0.45	0.32
Major Ditches	ft	4.00	0.58	2.32	0.05	0.12	0.20	0.46	0.45	1.04
Minor Ditches	ft	6.00	0.36	2.16	0.05	0.11	0.20	0.43	0.45	0.97
Land Forming	dol	136.66	1.00	136.66	0.05	7.24	0.20	27.33	0.45	61.50
Debris Removal	acre	1.00	17.41	17.41	0.25	4.35	0.50	8.71	1.00	17.41
Pond Levees	dol	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Total						11.86		37.08		84.49

Table 19

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Tunica County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	375.24	1.00	375.24	0.00	0.00	0.00	0.00	0.01	3.75
Roads/Turnrows	ft	5.00	0.36	1.80	0.00	0.00	0.05	0.09	0.10	0.18
Major Ditches	ft	7.00	0.58	4.06	0.00	0.00	0.05	0.20	0.10	0.41
Minor Ditches	ft	13.00	0.36	4.68	0.00	0.00	0.05	0.23	0.10	0.47
Land Forming	dol	165.74	1.00	165.74	0.00	0.00	0.05	8.29	0.10	16.57
Debris Removal	acre	1.00	17.41	17.41	0.00	0.00	0.00	0.00	0.25	4.35
Pond Levees	dol	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total						0.00		8.81		25.73

Table 20

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Warren County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	346.48	1.00	346.48	0.00	0.00	0.00	0.00	0.01	3.46
Roads/Turnrows	ft	3.00	0.36	1.08	0.10	0.11	0.20	0.22	0.40	0.43
Major Ditches	ft	4.00	0.58	2.32	0.10	0.23	0.20	0.46	0.40	0.93
Minor Ditches	ft	6.00	0.36	2.16	0.10	0.22	0.00	0.00	0.40	0.86
Land Forming	dol	15.54	1.00	15.54	0.10	1.55	0.20	3.11	0.40	6.22
Debris Removal	acre	1.00	17.41	17.41	0.25	4.35	0.50	8.71	1.00	17.41
Pond Levees	dol	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total						6.46		12.49		29.31

Table 21

Estimated Damage and cost per acre due to a limited, moderate and severe flood event, Washington County, 2005

Category	Unit	Quantity/ Acre	Price/Unit ($)	Total/Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dol	347.17	1.00	347.17	0.00	0.00	0.00	0.00	0.01	3.47
Roads/Turnrows	ft	6.00	0.36	2.16	0.05	0.11	0.15	0.32	0.01	0.02
Major Ditches	ft	9.00	0.58	5.22	0.05	0.26	0.15	0.78	0.30	1.57
Minor Ditches	ft	15.00	0.36	5.40	0.05	0.27	0.15	0.81	0.30	1.62
Land Forming	dol	170.61	1.00	170.61	0.05	8.53	0.15	25.59	0.30	51.18
Debris Removal	acre	1.00	17.41	17.41	0.25	4.35	0.50	8.71	0.75	13.06
Pond Levees	dol	26.73	1.00	26.73	0.00	0.00	0.00	0.00	0.10	2.67
Total						13.52		36.21		73.59

TABLE 22
SUMMARY, TOTAL PER ACRE DAMAGE ESTIMATES FOR
LIMITED, MODERATE, AND SEVERE FLOOD EVENTS BY COUNTY

County	Flood Event		
	Limited ($/acre)	Moderate ($/acre)	Severe ($/acre)
Bolivar	12.87	25.74	89.11
Coahoma	0.00	0.00	11.52
Issaquena	29.83	44.74	80.45
Humphreys	11.19	22.38	142.84
Leflore	12.03	29.28	81.10
Sharkey	32.83	48.90	90.87
Sunflower	24.05	38.68	120.90
Tallahatchie	11.86	37.08	84.49
Tunica	0.00	8.81	25.73
Warren	6.46	12.49	29.31
Washington	13.52	36.21	73.59

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Hanson, T., J. Steeby, and J. Avery
"Delta Catfish Production." Mississippi State University Extension Service, 2004.

Cotton 2004 Mississippi State University Planning Budgets.

Soybeans 2004 Mississippi State University Planning Budgets.

Rice 2004 Mississippi State University Planning Budgets.

Corn and Grain Sorghum 2004 Mississippi State University Planning Budgets.

Wheat 2004 Mississippi State University Planning Budgets.

U.S. Department Agriculture
2004 National Agricultural Statistics Service.

APPENDIX A

SURVEY GUIDE

APPENDIX A

ESTIMATED DAMAGE AND COST PER ACRE DUE TO A LIMITED, MODERATE AND SEVERE FLOOD EVENT

Category	Unit	Quantity/ Acre	Price/ Unit ($)	Total/ Acre ($)	Limited		Moderate		Severe	
					% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)	% Damage	Damage/ Acre ($)
Equipment	dollars									
Roads/Turn rows	feet									
Major Ditches	feet									
Minor Ditches	feet									
Land Forming	dollar									
Debris Removal	acre									
Pond Levees	dollars									
Total										

APPENDIX B

EQUIPMENT COSTS BY CROP

TABLE 1
COTTON
ESTIMATED EQUIPMENT NEEDED FOR 700 ACRES

Item Name	Size	No. Needed	New Cost ($)	Total Investment ($)
Tractors:				
Tractor	180-199 hp	2	114,782	229,564
Self Propelled:				
Cotton Picker	4R-38	1	311,490	311,490
Implements:				
Stalk Shreader	14 ft	1	10,219	10,219
Paratill & bed fold	8R-38	1	30,552	30,552
Spin Spreader	5 ton	1	10,633	10,633
Sprayer	600-750 gal	1	133,530	133,530
Row Cond (plant)	27 ft	1	9,086	9,086
Plant & pre rigid	8R-38	1	26,310	26,310
Spray Direct LB	8R-38	1	6,672	6,672
Boll Buggy	4R-38	1	25,320	25,320
Module Builder	4R-38	1	33,265	33,265
TOTAL				**826,641**
COST/ACRE				**1,181**

TABLE 2
RICE
ESTIMATED EQUIPMENT NEEDED FOR 625 ACRES

Item Name	Size	No. Needed	New Cost ($)	Total Investment ($)
Tractors:				
Tractor	180-199 hp	1	114,782	114,782
Self Propelled:				
Combine-Rice	275 hp	1	186,781	186,781
Implements:				
Field Cultivate	32 ft	1	23,211	23,211
Grain Drill	24 ft	1	27,705	27,705
Roller	32 ft	1	11,420	11,420
Header	25 ft	1	19,975	19,975
Grain Cart	700 Bu	1	18,680	18,680
Heavy Disk	21 ft	1	27,526	27,526
TOTAL				**430,080**
COST/ACRE				**688**

TABLE 3
SOYBEANS
ESTIMATED EQUIPMENT NEEDED FOR 1,250 ACRES

Item Name	Size	No. Needed	New Cost ($)	Total Investment ($)
Tractors:				
Tractor	180-199 hp	2	114,782	229,564
Self Propelled:				
Combine	275 hp	1	186,781	186,781
Implements:				
Subsoiler	3 shank	1	3,714	3,714
Disk Harrow	24 ft	1	25,883	25,883
Field Cultivate	24 ft	1	17,863	17,863
Plant & Folding	12R-20	1	39,185	39,185
Spray Broadcast	60 ft	1	7,101	7,101
Header	25 ft	1	22,061	22,061
TOTAL:				**532,152**
COST/ACRE				**426**

TABLE 4
WHEAT
ESTIMATED EQUIPMENT NEEDED FOR 1,400 ACRES

Item Name	Size	No. Needed	New Cost ($)	Total Investment ($)
Tractors:				
Tractor	160-179 hp	2	104,216	208,432
Self Propelled:				
Combine-Wheat	275 hp	1	186,781	186,781
Implements:				
Disk Harrow	24 ft	2	25,883	51,766
Field Cultivate	32 ft	2	23,211	46,422
Grain Drill	20 ft	2	26,494	52,988
Header	25 ft	1	18,045	18,045
TOTAL:				**493,401**
COST/ACRE				**352**

TABLE 5
CORN
ESTIMATED EQUIPMENT NEEDED FOR 750 ACRES

Item Name	Size	No. Needed	New Cost ($)	Total Investment ($)
Tractors:				
Tractor	180-199 hp	2	114,782	229,564
Self Propelled:				
Combine	275 hp	1	186,781	186,781
Implements:				
Dish Bed Hipper	8R-38	1	20,873	20,873
Roller	32 ft	1	11,420	11,420
Plant & Folding	8R-38	1	28,426	28,426
Header	8R-38	1	39,218	39,218
Grain Cart	700 Bu	1	18,680	18,680
TOTAL:				**534,962**
COST/ACRE				**713**

TABLE 6

GRAIN SORGHUM

ESTIMATED EQUIPMENT NEEDED FOR 1,250 ACRES

Item Name	Size	No. Needed	New Cost ($)	Total Investment ($)
Tractors:				
Tractor	180-199 hp	2	104,216	208,432
Self Propelled:				
Combine-Grain Sorghum	275 hp	1	186,781	186,781
Implements:				
Disk Harrow	28 ft	2	25,883	51,766
Field Cultivate	32 ft	2	23,211	46,422
Plant Rigid	8R-38	1	38,361	38,361
Header	25 ft	1	18,045	18,045
Spin Spreader	5 ton	1	10,633	10,633
TOTAL:				**560,440**
COST/ACRE				**448**