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[Return to Current Issue](#)

Developing Economic Assessments in Response to Natural Disasters: A Strategic Plan for Executing Extension's Mission

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Abstract: Extension is uniquely situated given its geographic dispersion and technical expertise to assess economic damage caused by natural disasters. Given the short time frame generally associated with these requests, however, many assessments are often conducted on an ad hoc basis. However, when natural disasters of the size and scope of the hurricanes experienced in Louisiana in 2008, a more strategic approach is warranted. Effective coordination of Extension resources along with the appropriate use of published data are often critical for a focused effort that is conducted in a timely fashion.

Introduction

Natural disasters such as tornados, floods, and hurricanes typically require assessment of the size and scope of impact in order for a systematic and timely response to occur beyond initial emergency services. Extension is uniquely situated to assess the situation and develop strategies for issues that arise. Unfortunately, Louisiana has had its share of addressing these hardships with the 2005 and 2008 hurricane seasons. One of the first roles of Extension during these events was estimating damage caused by the storms to the state's food and fiber sector.

We present a best practice methodology of multi-commodity damage assessment based on experiential knowledge gained from past tropical disasters. This methodology adds to the growing Extension literature on pre- and post- tropical storm preparedness including community resiliency (Wiens, Evans, Tsao, & Liss, 2004; Boteler, 2007), Extension faculty resiliency (Telg et al 2008), and single commodity damage assessment (Monks, Delaney, Pegues, Patterson, & Norwood, 2002).

History

The LSU AgCenter's Department of Agricultural Economics and Agribusiness developed crop damage estimates from adverse weather conditions in 7 of the 9 years between 2000 and 2008 to provide needed information for policymakers on damage the agricultural industry faced from natural disasters. Particularly when a hurricane occurs, past experience suggests requests for the disaster's economic impact come from a variety of sources, including the governor's office, state Farm Service Agency officials, and the state's Congressional delegation. Assessments provided form the basis of policymakers' decisions regarding the type and amount of assistance to provide. Given the LSU AgCenter's Extension Service's presence in each of the state's 64 parishes, it is uniquely positioned to lead in developing damage assessments. The reputation of Extension to generate unbiased, research-based information positions it to serve as a reliable generator of damage assessment free from political interests of elected officials and industry stakeholders.

Before 2005, the majority of natural disaster assessments in Louisiana were associated with periods of drought or excessive rainfall and performed on an ad hoc basis with no strategic plan for assessments. However, given the magnitude of damage associated with the 2005 hurricanes, it was determined the ad hoc process was insufficient for future storms. Hence, when the two hurricanes made landfall in 2008, the department developed a strategy for addressing the economic impacts of these storms (Guidry, Caffey, & Fannin, 2009).

Methodology for Developing Damage Estimates

Typically, two time frames are associated with stakeholder requests. The first is a short-term assessment requested within 2 weeks after the storm. Given the assessment's short time frame, it has a narrow scope. The second time frame is generally 1 to several months after the storm and provides additional time to address more issues related to the storms as well a more detailed version of the assessment provided in the short term.

We generated both initial short-term and long-term projections for the 2008 hurricanes (Gustav and Ike). Major elements of each approach are presented in Table 1.

Table 1.

Elements of Short-Term and Long-Term Food and Fiber Economic Damage Assessment Methods

Short-Term Estimate	Long-Term Estimate
<p><i>Scope</i> Initial producer revenue impacts - state level only</p>	<p><i>Scope</i> Detailed producer revenue impacts, increased production costs, infrastructure damage assessments â state and parish level</p>
<p><i>Extension Partners:</i> Ag. Economics extension faculty - combine, veracity check, and publish estimates Extension commodity specialists â Estimate specific commodity quantity and quality losses County agents â Assist specialists in</p>	<p><i>Extension Partners:</i> Ag. Economics extension faculty - tabulate and calculate revised impacts from e-mail survey of agents Extension commodity specialists â review e-mail survey results County agents - complete e-mail survey of production and infrastructure losses</p>

local commodity quantity and quality losses Extension administrators â Motivate and coordinate cooperation between field-level and university-based extension faculty	Extension administrators - distribute e-mail survey
Timeline: One week from initial landfall of hurricane	Timeline: Three months after short-term estimates
Data Sources: National Ag. Statistics Service -historical production and acreage Farm Service Agency - current year production and acreage for program crops USDA World Ag. Supply/Demand Estimates - marketing year prices for major commodities LSU AgCenter Ag Summary â minor commodity historical production	Data Sources: National Ag. Statistics Service - historical production and acreage Farm Service Agency - current year production and acreage â program crops USDA World Ag. Supply/Demand Estimates - marketing year prices for major commodities LSU AgCenter Ag Summary â minor commodity historical production Commodity Enterprise Budgets - measure increase production costs US Census of Agriculture - infrastructure losses

For the 2008 hurricanes, much of the state's agriculture was close to harvest when the hurricanes made landfall, and post-storm weather conditions were nearly ideal for a quick return to normal production and harvest activities. Hence, long-term assessment was completed in slightly over 1 month after Hurricane Ike made landfall. A timeline of short-term and long-term damage estimates is presented in Figure 1.

Figure 1.
 Timeline of 2008 Hurricane Season Economic Damage Assessment

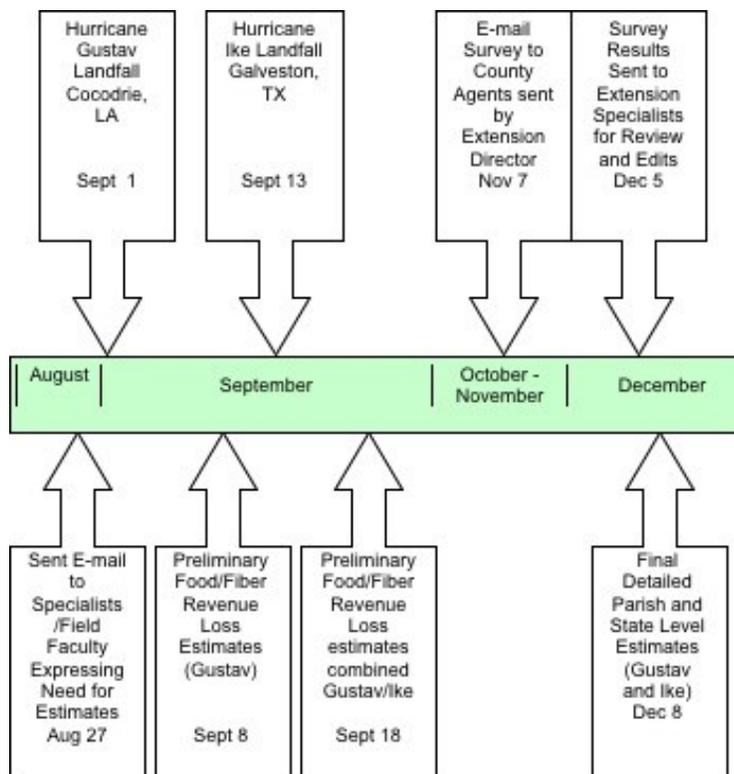


Table 2 provides estimated economic damages. The two short-term estimates were confined to projected reductions in producer revenue. The final long-term estimate incorporated updated information on revenue impacts and associated increased production and marketing costs.

Table 2.
Estimated Economic Damages Caused by Hurricanes Gustav and Ike

	Preliminary	Preliminary	Final	Percent Change	Percent Change
	Gustav Estimate	Gustav/Ike Estimate	Gustav/Ike Estimate	Sept 8 to Dec 8	Sept 18 to Dec 8
	8-Sep-2009	18-Sep-2009	8-Dec-2009	Estimate	Estimate
Revenue Losses					
Row Crops	\$323,554,560	\$481,024,405	\$444,325,283	37.33%	-7.63%
Nursery & Horticulture	\$5,000,000	\$6,500,000	\$3,123,267	-37.53%	-51.95%
Fruits and Vegetables	\$29,811,072	\$46,677,352	\$65,250,094	118.88%	39.79%
	\$5,776,904	\$10,231,582	\$31,157,520	439.35%	204.52%

Livestock & Forage					
Forestry & Wildlife	\$8,152,324	\$91,737,294	\$101,782,345	1148.51%	10.95%
Total Revenue Losses	\$372,294,860	\$636,170,633	\$645,638,509	73.42%	1.49%
Other Impacts					
Increased Costs	\$0	\$0	\$129,180,776	N/A	N/A
Marketing /Storage Loss	\$0	\$0	\$8,871,770	N/A	N/A
Total Other Impacts	\$0	\$0	\$138,052,546	N/A	N/A
Total Economic Impact	\$372,294,860	\$636,170,633	\$783,691,055	110.50%	23.19%

Issues to Recognize when Developing Damage Estimates

- Must be coordinated effort** Involving everyone from Extension administration to the county agent is critical in ensuring a focused effort is done in a timely fashion. It also provides multiple sources of damage assessments to ensure as much accuracy as possible.
- Who is asking for the estimate?** Is the estimate generated primarily for information purposes/planning or for formulating disaster payments?
- Will revised estimates be requested?** Experience in Katrina/Rita showed initial estimates created a base expectation for revised estimates. Constituencies typically expect the level of damages to rise as more time passes after the storm event.
- Are production or revenue losses requested?** Production losses are easier to measure for agricultural commodities with standing agricultural biomass but more difficult to measure for fisheries. Revenue losses are more difficult to estimate given changing quantity, quality and price conditions after the storm.

Suggestions/Best Practices

- **Use as much published data (particularly federal sources) as possible when making assumptions for damage estimates.** The federal government's interest is often appropriating compensation for losses sustained; assumptions based on federal data are typically perceived by them to have greater accuracy.
- **Develop and maintain a state database for non-program commodities.** The LSU AgCenter's database (Louisiana Summary Agriculture and Natural Resources, 2007) published for over two decades was helpful to quickly quantify hurricane losses for minor commodities (e.g., aquaculture).
- **Collaborate with colleagues in other states when the storm is a multi-state agricultural disaster.** This approach helps make multi-state disaster estimates more comparable and increases perceived accuracy by federal stakeholders.
- **Avoid the use of economic multipliers when generating total agricultural damage impacts.** Depending on the severity of the storm, historical economic linkages used in the creation of an industry multiplier for a region may no longer exist making the multiplier invalid.

Careful planning ahead of the next natural disaster, including an expectation of the timing of impacts and how data will be used, will better help scholars asked to provide damage assessments. While other organizations may also attempt to generate such estimates, Extension has the opportunity to apply its knowledge and geographic presence to measuring impacts and help its constituents be more resilient in the face of future natural disasters.

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