MONITORING HURRICANE THREATS TO U.S. AGRICULTURE

Integrating Agricultural and Meteorological Data for USDA Decision Makers

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NOAA/USDA Joint Agricultural Weather Facility

- Mission – collect global weather and agricultural information to determine weather impacts on crops and livestock
- NOAA Climate Prediction Center meteorologists quality control, map, and analyze global meteorological data
- USDA World Agricultural Outlook Board meteorologists prepare agricultural weather assessments for USDA decision makers
- Products disseminated via the WWCB

World Agricultural Outlook Board
NOAA/USDA Joint Agricultural Weather Facility

- When hurricanes threaten, special crop weather assessments prepared for Secretary of Agriculture and top staff
  - **Before a storm** – products warn of potential threats to U.S. agriculture
  - **After a storm** – products help identify impacted areas, estimate losses, develop assistance programs

- GIS used to overlay NOAA data and analyses on USDA agricultural maps
  - NHC storm track forecasts/uncertainty
  - NWS wind/rainfall measurements
  - NASS crop acreage/livestock data
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Vulnerable Agricultural Areas
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Forecast Maps

Hurricane Rita
September 21, 2005 - 11:00 AM EDT Advisory
Maximum Sustained Winds = 140 mph
Movement = W at 13 mph

8 AM Mon - 30 mph
8 AM Sun - 45 mph
8 AM Sat - 115 mph
8 AM Fri - 140 mph
8 PM Thu - 145 mph
8 AM Thu - 150 mph
8 PM Wed - 155 mph
11 AM Wed 140 mph

Legend
- Major Cotton Areas
- Minor Cotton Areas
- Major Citrus Areas
- Minor Citrus Areas
- Major Sugarcane Areas
- Minor Sugarcane Areas
- Potential Day 1-5 Track Area
- Tropical Depression
- Tropical Storm
- Hurricane

Data Sources:
- Agricultural areas are delineated using NASS county-level crop data.
- Satellite imagery obtained from the NOAA Satellite and Information Service.
- Wind information obtained from the NOAA National Hurricane Center.
- Forecast tropical cyclone positions and intensities provided by the NOAA National Hurricane Center.

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8 AM Thu - 150 mph
8 PM Wed - 155 mph
11 AM Wed - 140 mph

Legend:
- Major Cattle Areas
- Minor Cattle Areas
- Potential Cat 1-5 Track Area
- Tropical Depression
- Tropical Storm
- Hurricane

Data Sources:
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Rainfall Analyses

Hurricane Ophelia

Cotton Areas Affected by Heavy Rain and Strong Winds Sep 12-16, 2005

White numbers represent storm total rainfall (in inches) at stations that measured greater than one inch of rainfall.

Legend
- Major Cotton Areas
- Minor Cotton Areas
- Tropical Storm
- Hurricane
- Max. Extent Hurricane Force Winds (greater than 75 mph)
- Max. Extent Tropical Storm Force Winds (39-73 mph)

Data Sources:
- Agricultural areas are delineated using NAIS county-level crop data
- Rainfall data obtained from the NOAA National Weather Service
- Wind information obtained from the NOAA National Hurricane Center
- Tropical cyclone positions and intensities provided by the NOAA National Hurricane Center
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**Wind Analyses**

**Hurricane Wilma**
October 24, 2005 - 2:30 PM EDT Advisory
Maximum Sustained Winds = 115 mph
Movement = NE at 29 mph

**USUAL HARVEST PERIOD**
- Oranges / Grapefruit: mid-Sep. - Dec.

**WHITE NUMBERS REPRESENT PRELIMINARY ESTIMATES OF THE MAXIMUM WIND SPEED MEASURED AT SELECTED NOAA NATIONAL WEATHER SERVICE (NWS) WEATHER STATIONS AND BUOYS AND FLORIDA AUTOMATED WEATHER NETWORK (FAWN) SITES.**

Note: Areas potentially affected by sustained winds of tropical storm force and hurricane force are based upon NOAA National Hurricane Center estimates. These areas represent the maximum possible extent of a given wind speed. Some locations falling within the wind swaths may not have experienced sustained tropical storm or hurricane force winds, respectively.

Data Sources:
- Agricultural areas are delineated using NASS county-level crop data
- Satellite imagery obtained from the Naval Research Laboratory
- Hurricane positions and intensities obtained from the NOAA National Hurricane Center

**Legend**
- Major Citrus Areas
- Minor Citrus Areas
- Major Sugarcane Areas
- Minor Sugarcane Areas
- Max. Extent Hurricane Winds
- Max. Extent Trop. Storm Winds
- Hurricane

USDA
Joint Agricultural Weather Facility
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USDA Feedback

- Special crop weather assessments well received by USDA decision makers
- Success of these products credited to the high quality data and analyses provided by NHC, NWS, and NASS
- Expanded suite of operational hurricane-related products in a GIS-compatible format would be welcomed
- NHC/NWS products in GIS format help maintain accuracy of crop weather products that incorporate these data
Summary

1. Thank you NHC/NWS!
   Products help USDA:
   - assess potential threats to agriculture
   - identify impacted areas
   - estimate losses
   - disburse aid

2. Consider GIS-compatible formats.
   Facilitate agricultural weather assessments and help maintain consistency among products
Thank You!
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Hurricane Impacts on Agriculture in 2005

- Significant damage
  - Citrus (Wilma)
  - Sugarcane (Rita, Wilma)
  - Vegetables/Nursery crops (Wilma)
  - Timber (Katrina)
  - Infrastructure

- Other agricultural concerns
  - Cotton
  - Corn
  - Soybeans
  - Livestock

- USDA response
  - Financial aid