



## Tropical Cyclone Emergency Management for Farmers

Hurricane season runs from June 1 through November 30 in Hawai'i and the Central Pacific. Tropical cyclones (hurricanes, tropical depressions, and tropical storms) can bring heavy rains and strong winds that can cause catastrophic damage to crop fields, structures, and equipment.

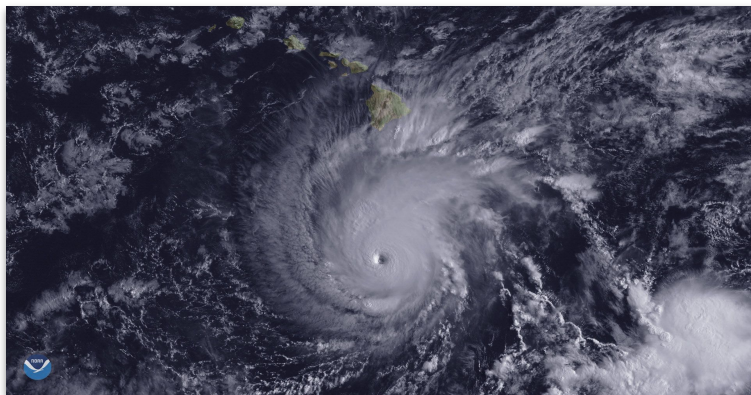
### The 4 Phases of Emergency Management

**Mitigation:** Preventing future emergencies or minimizing damage and loss through long-term planning

**Preparedness:** Preparing to handle an emergency to save lives and help response

**Response:** Responding safely to an emergency to prevent further damage or loss

**Recovery:** Recovering from an emergency



Hurricane Lane approaching Hawaii in 2018. Photo credit: NOAA

### MITIGATE damage and loss before hurricane season:

- Develop a farm emergency plan
- Invest in your plan (time, money, resources)
- Regularly review and update the plan

#### *Production-Related Considerations*

- Develop and update inventories of equipment and machinery, farm chemicals (i.e. pesticides, fertilizers, sanitizers, fuel, detergents)
- Map out water, electric, and gas lines; shut-off valves
- Install conservation practices to reduce and manage soil erosion, runoff, and stormwater
- Prune trees in fields and in areas surrounding the farm and buildings
- Incorporate alternative energy sources on the farm (i.e. solar)
- Keep drainage ways, gutters, and drains clear and free of blockage
- Keep buildings and other structures maintained

#### *Business-Related Considerations*

- Review insurance policies and take photos of property for any potential claims
- Obtain enough flashlights, lanterns, and/or headlamps for each employee, as well as appropriate batteries
- Ensure generators are working properly
- Gather important documents and information including hard copies of deeds, leases, insurance policies, banking information, and emergency contact lists in water-proof containers

### PREPARE your farm as a storm approaches:

- Minimize land prep and avoid exposing any bare soil, especially on slopes, as a storm approaches
- Purchase fuel and fill the tanks of vehicles and equipment
- Secure loose items (i.e. tools, drip tape, irrigation pipe, lumber, bins and baskets) that could become projectiles
- Shut off water, gas, and electricity where not needed on the farm
- Relocate and secure all farm chemicals (i.e. pesticides, fertilizers, fuel, sanitizers, detergents)
- Move equipment to highest ground
- Harvest as much as practical to minimize losses from flood and wind damage
- Ready backup power and light sources (i.e. generators, flashlights). Keep phones and equipment fully charged
- Close and secure doors and windows to prepare for high winds and flooding



A taro field protected by pinetree/ironwood windbreaks. Photo credit: Nancy Ooki



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### RESPOND safely during a storm:

- Put emergency plan into action
- Remain calm and keep yourself safe
- Follow local emergency management agency instructions including shelter and evacuation orders
- Stay off roads and highways for emergency response vehicle traffic
- Do not go outside in dangerous storm conditions

### RECOVER after the storm has passed:

- Do not enter an evacuated area until authorized by local authorities
- Be aware of dangerous situations left by the storm
  - Downed power lines and electrical hazards (i.e. circuits have gotten wet or are in or near water)
  - Unstable buildings and structures
  - Flood water contaminated with pathogens, chemicals, debris, and waste. Flood water may also be electrified from power lines
  - Sewage overflow, damaged or leaking portable toilets
  - Farm chemical spills or leaks
  - Gas leaks and fire hazards
- Wear PPE during clean up to protect yourself from contamination, hazardous materials, and physical injury
  - Eye protection
  - Long sleeves and long pants
  - Closed shoes
  - Respirator or mask
  - Gloves
- Follow all labels and directions for any cleaners, detergents, disinfectants, sanitizers, fungicides, or any other product used during clean up efforts
- Continue to protect yourself and employees from infectious diseases, including COVID-19

### RECOVER after the storm has passed (continued):

#### Immediate

- Do not touch electrical equipment if it has gotten wet or if you must stand in water; call an electrician instead. If it is safe to do so, turn off power at the main breaker. Check the procedures for turning power back on.
- Document all damage using photo and video. Contact insurance carriers to file claims
- Begin farm building clean up and drying within 24-48 hours to prevent mold growth
  - Open windows and doors and use fans
  - Discard anything that cannot be cleaned or dried quickly (i.e. upholstered furniture, carpet and rugs)
  - Remove and discard drywall and insulation that has been contaminated with flood water or sewage
  - Repair structural leaks and plumbing
- Dispose of any crops that were affected by flooding or other storm contamination due to food safety risks
  - Crops impacted by floodwaters are not safe for consumption and **cannot** enter the food system
  - Document any damage, actual and likely contamination, and corrective actions in your farm food safety plan
- Properly clean then sanitize equipment and tools before using them on harvestable crops
  - Discard contaminated food contact items that cannot be cleaned, sanitized (i.e. produce boxes)

#### Medium-term

- Contact the fire department to inspect or remove hazardous materials that are unfamiliar
- Clear drains, gutters, ditches, drainageways, fields and other farm areas of debris
- Apply for grants, loans, and recovery assistance programs
- Test farm water sources and soil to determine quality and safety

#### Long-term

- A 60-day waiting period is recommended before replanting in fields after flooding to allow pathogen populations to decline
- Review the emergency plan and make any necessary changes to strengthen mitigation, preparedness and response



Orchard crop and farm structure wind damage. Photo credit: Scot Nelson, Jari Sugano

#### References

- Centers for Disease Control and Prevention. (n.d.). *Fact Sheet: Clean Up After a Disaster*. <https://www.cdc.gov/disasters/cleanup/facts.html#:~:text=Clean%20up%20and%20dry%20our,air%20out%20doors%20or%20windows>.
- Mayo, D. (2018, October 8). *Hurricane Preparation for Your Farm*. University of Florida IFAS Extension. <http://nwdistrict.ifas.ufl.edu/phag/2018/10/08/hurricane-preparation-for-your-farm/>
- National Oceanic and Atmospheric Administration (2021). *The Saffir-Simpson Hurricane Wind Scale*. <https://www.nhc.noaa.gov/pdf/sshs.pdf>
- Ready.gov (n.d.). *Hurricanes*. <https://www.ready.gov/hurricanes#>
- Smith, D. (n.d.). *Farmers and Ranchers, Get Ready!* Texas A&M Agrilife Extension. <https://agrilifeextension.tamu.edu/wp-content/uploads/2016/05/E-617-farmers-and-ranchers-get-ready-agricultural-disaster-preparedness.pdf>



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Updated 06/2021