

A New Hazard Vulnerability Assessment (HVA) for Agricultural Communities: AgriSafe's Tool for Identifying and Prioritizing Natural Disaster Risks for Agriculture

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INTRODUCTION

AgriSafe Network is a national 501(c)3 nonprofit dedicated to *Protecting the People Who Feed the World*. AgriSafe responds to emerging issues in agriculture with a focus on public health. Thanks to grant funding from USDA NIFA and support from the Center for Disaster Philanthropy, AgriSafe has been able to grow their natural disaster resources.

In order to help strengthen natural disaster preparedness, response, and recovery in ag communities, and to enhance collaboration between farmers, extension, and local officials, AgriSafe created an agriculture-specific **Hazard Vulnerability Assessment (HVA)**.

Cooperative extension agents and local disaster management officials are encouraged to fill out the AgriSafe HVA for their state or region, and to use the resulting data to make evidence-based decisions on disaster preparedness, education, and outreach.

THE PROBLEM

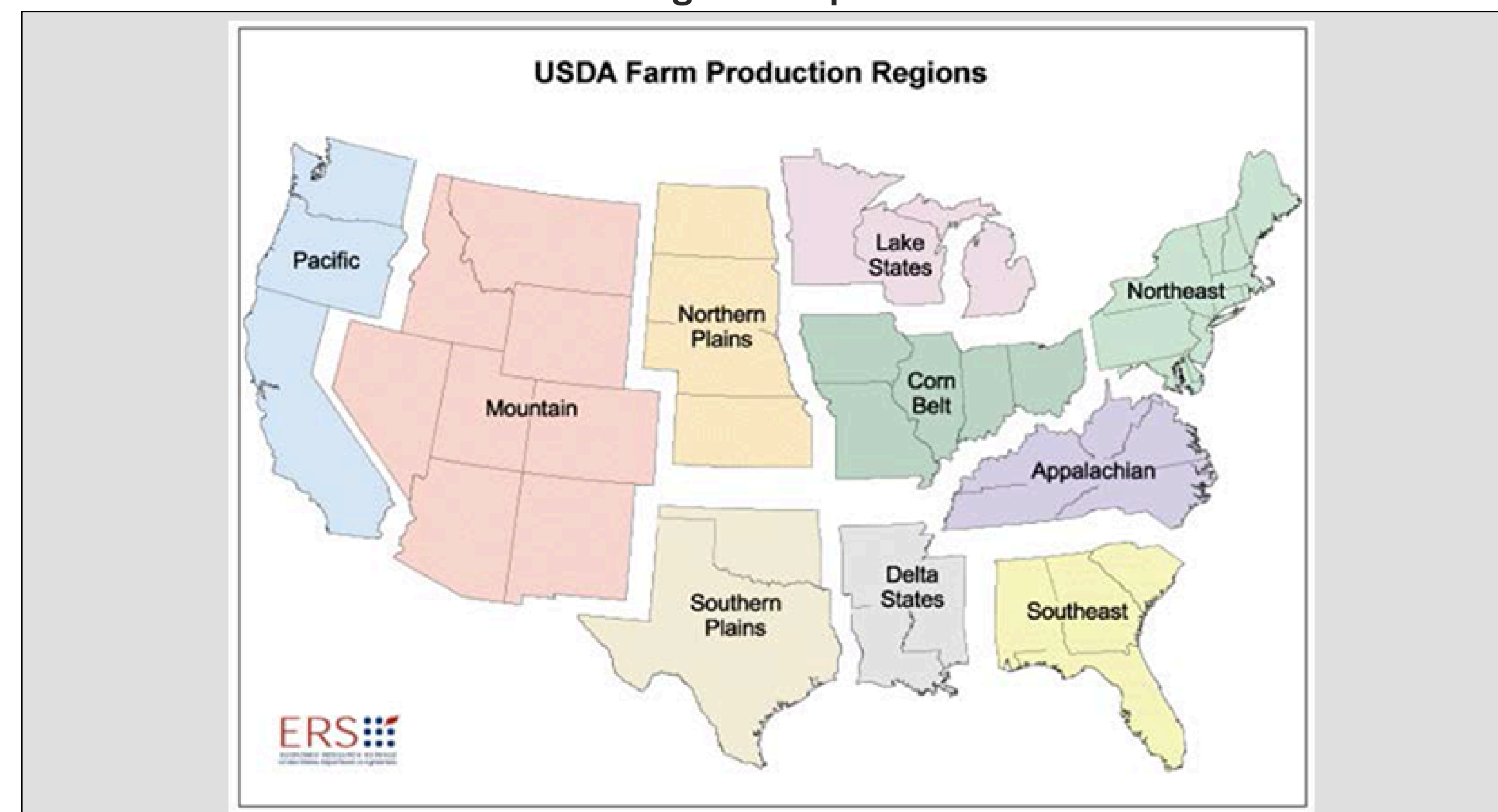
Agricultural operations are highly vulnerable to natural disasters due to dependence on environmental conditions and geographically fixed assets (such as land, buildings, livestock, and equipment). In recent decades, the frequency and intensity of natural disasters have increased, placing additional strain on agricultural systems and emergency response capabilities. Natural disasters and severe storms can cause sudden and long-lasting disruptions to agricultural operations, in addition to impacts on farmer, rancher, and farmworker well-being and safety. Climate variability and shifting weather patterns have heightened the need for proactive, systematic disaster preparedness within the agricultural sector.

THE SOLUTION

HVAs are a foundational tool in emergency management and disaster preparedness, providing a structured method to identify natural hazards, evaluate their likelihood, and assess their potential impacts. This approach enables effective allocation of limited resources toward mitigation, preparedness, and response activities that address the highest-risk natural hazards. For agriculture, HVAs support a shift from reactive response to proactive planning by helping farmers and local officials prioritize disaster risks based on measurable factors. This tool is designed to capture both direct on-farm impacts, such as threats to human safety, livestock health, crops, and physical infrastructure, and broader community-level consequences, including disruptions to food systems, labor availability, transportation, utilities, and emergency services. Emphasis is placed on the human impact of disasters, recognizing that agricultural resilience depends on the health, safety, and well-being of farmers, farm families, and farmworkers.

AgriSafe's HVA is intended as a disaster preparedness and planning instrument. Results are meant to inform emergency operations planning, mitigation strategies, training and exercise priorities, and coordination across agricultural and emergency management sectors. Recognizing that natural disaster risks vary widely across the United States, AgriSafe's HVA is organized by USDA regions (see figure 1).

FIGURE 1 - USDA Farm Production Regions Map



The AgriSafe HVA tool applies a risk-based framework that integrates estimates of hazard likelihood with multiple dimensions of disaster impact. Jake Janssen, a Tulane University student pursuing an MPH in Disaster Management, designed the HVA, coding, and formulas. The HVA was inspired by the Kaiser Permanente HVA, which is an industry standard for disaster management. The AgriSafe HVA is a work-in-progress! See Figure 2 for the Incident Log, Figure 3 for a Sample HVA, and Figure 4 for a Sample Data Summary.

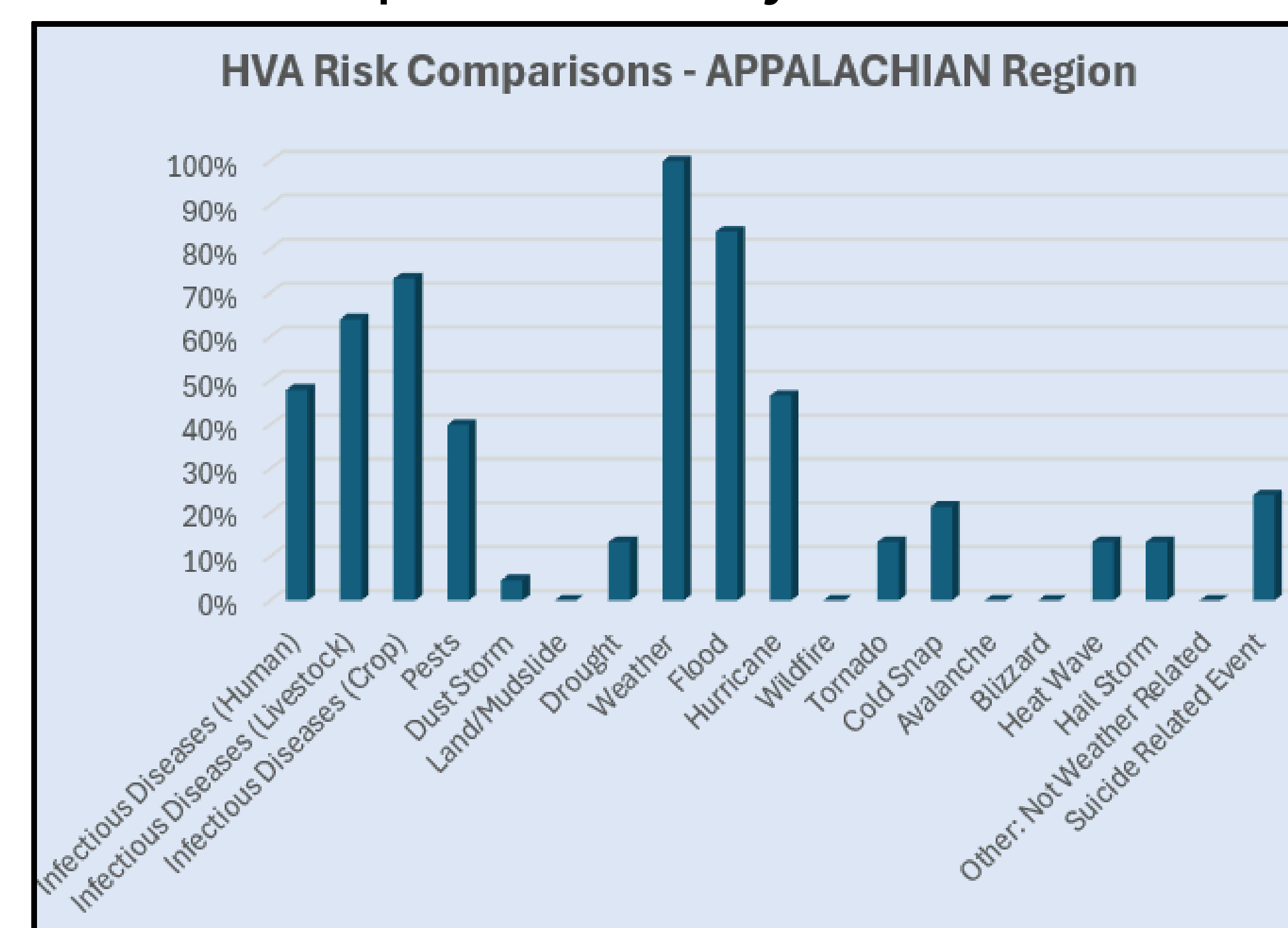
FIGURE 2 - Incident Log

Date (MM/DD/YYYY)	Event Type	Region	State	Address	ICS (Local Or Higher) Involved?	Was AgriSafe Content/ Training/ Personnel Helpful During Event?	Human Impact	Property Impact	Business / Operational Impact	Resource Preparation Prior To Event	Personal Recovery Plan Effectiveness	External Recovery And Response Effectiveness	Event Summary Notes

FIGURE 3 - Sample HVA (not real data)

Event Type	Probability Of Occurring	Event Count	Incident Command Activation	AgriSafe Activation	Severity						Risk	
					Human Impact	Property Impact	Business Impact	Preparedness	Internal Response	External Response		
Score System	0 - N/A 1 - Low 2 - Medium 3 - High	Number Of Logged Events	Number of times local ICS or higher was involved	% of AgriSafe involvement seen?	0 - N/A 1 - Low 2 - Medium 3 - High	0 - N/A 1 - Low 2 - Medium 3 - High	0 - N/A 1 - Low 2 - Medium 3 - High	0 - N/A 1 - Low 2 - Medium 3 - High	0 - N/A 1 - Low 2 - Medium 3 - High	0 - N/A 1 - Low 2 - Medium 3 - High	≤100%	
Infectious Diseases (Human)		2	4	0	10%	2	0	2	1	2	0	48%
Infectious Diseases (Livestock)		2	6	0	0%	1	0	3	1	2	0	64%
Infectious Diseases (Crop)		1	10	0	0%	1	0	3	2	2	0	73%
Pests		2	2	0	0%	1	2	3	2	2	0	40%
Dust Storm		1	0	0	0%	1	0	1	1	1	0	5%
Land/Mudslide		0	0	0	0%	1	2	2	1	1	0	0%
Drought		2	0	0	0%	1	1	2	2	2	0	13%
Weather		3	10	6	50%	2	2	2	2	2	3	76%
Flood		2	5	2	50%	2	2	3	1	2	2	84%
Hurricane		1	2	1	25%	2	2	3	1	1	2	47%
Wildfire		0	0	0	25%	1	2	2	1	1	1	0%
Tornado		1	1	0	0%	1	2	2	2	2	1	13%
Cold Snap		1	3	0	15%	2	1	1	2	2	1	21%
Avalanche		0	0	0	0%	0	0	1	1	1	0	0%
Blizzard		0	0	0	0%	1	2	1	1	1	2	0%
Heat Wave		1	1	0	25%	2	1	1	1	2	1	13%
Hail Storm		1	1	0	0%	1	2	1	2	1	1	13%
Other: Not Weather Related		0	0	0	0%	0	0	0	0	0	0	0%
Suicide Related Event		1	2	0	25%	2	0	1	1	0	0	24%

FIGURE 4 - Sample Data Summary



Miscellaneous Notes

- *Human Impact* = Direct injury or illness; exposures; fatalities
- *Property Impact* = Infrastructure; supplies and equipment; transportation resources; damaged buildings
- *Business Impact* = Loss of revenue; worker shortages; interruption of services
- *Standard formula for an HVA*: Probability x (Impact - Preparedness/Response) = Risk
- In the incident log, use all pertinent data from the start to finish of a disaster.

The AgriSafe HVA spreadsheet is pre-calculated to transfer the incident log data to the proper regional HVA sheet, adjusting the formulations as each log is completed. There is also a total combined HVA, that includes data from all of the regions. AgriSafe is currently deciding on how to collect responses.

How to use this HVA

For the best results, form a multi-disciplinary and cross-organizational team to fill out the HVA. However, an extension agent well versed in disaster/incident response may fill it out solo.

Suggested steps: Complete a yearly HVA. Analyze and determine the top risks. Review what can feasibly be done to minimize those risks (i.e., infrastructure improvements, purchasing equipment, planning, training, collaboration with other organizations, etc.). Create preparedness plans, drill plans, and/or mitigations plans.



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Join AgriSafe's Natural Disaster Response Team Initiative! Scan the QR code and fill out the form to note your interest in joining a national network of topic experts who can be called on to provide PSA's and advice in times of need.

Questions? Email lsiegel@agrisafe.org or info@agrisafe.org