

## **Economic Impact Analysis of Foot and Mouth Disease in the Texas High Plains**

Amy Hagerman, Levan Elbakidze, Bruce McCarl, Linda Highfield  
Texas A&M University, Foreign Animal and Zoonotic Disease (FAZD) Center

### **Project Scope:**

Foot and Mouth Disease (FMD) constitutes a significant threat to the US food supply and the welfare of producers and consumers. This project is oriented toward a consideration of how vulnerable we are and what types of actions can be undertaken to mitigate that vulnerability. The work pursues this orientation by examining the effects of a Foot and Mouth Disease (FMD) outbreak in the Texas High Plains highly concentrated animal feeding region along with the effectiveness of various disease management strategies. The evaluation uses a combination of economic and epidemic modeling.

### **Recent Progress:**

Epidemic simulations have been done by FAZD team members for 4 introduction sites (large feedlot, backgrounder feedlot, large grazing operation, backyard herd) and 16 mitigation strategies made up of combinations of early or late detection, ring or targeted vaccination, adequate or inadequate vaccination supplies, and regular or enhanced surveillance. Each of these 64 scenarios was simulated one hundred times and the results were used to calculate economic costs. Initial economic results indicate epidemic costs up to \$1 billion in local cattle industry losses and what can be done about mitigation.

### **Relevance to Research Areas:**

The work is relevant to several HS-STEM research areas. The project has direct relevance to the "Social, Behavioral and Economic Sciences" area since the study is focused on the economic implications of a major biosecurity event in a critical US region and the effects of management alternatives. Such work identifies vulnerability and develops approaches that can be used in other settings. The work also addresses "Food and Agricultural Security" by addressing vulnerability and the consequences of response measure alternatives. In addition, the project addresses "Emergency Preparedness and Response" both through its response option focus and also through the development of tools to evaluate or simulate strategy effectiveness. Finally, "Risk and Decision Sciences" is addressed in that the project is developing stochastic outcomes and then using risk tools like stochastic dominance to evaluate effectiveness.

### **Publications:**

- (1) Elbakidze, L., L. Highfield, M. Ward, B. McCarl, B. Norby. "Mitigation strategies for FMD introduction in highly concentrated animal feeding regions." Working Paper.
- (2) Ward, M.A., B. Norby, B.A. McCarl, L. Elbakidze, R. Srinivasan, L. Highfield, S. Lonergan, and J.H. Jacobs, "The High Plains Project Report," FAZD Report, 2007.

### **Future Plans:**

The project is now proceeding toward evaluating broader vulnerability looking at wider spread events and more national market based impacts. Plans are to look at vulnerability across outbreaks in the dairy and feedlot industries for multiple locations plus evaluate a broader set of pre and post event disease management/preparedness options.