The Extension Service and Rural/Frontier Disaster Planning, Response, and Recovery

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The Extension Service and Rural/Frontier Disaster Planning, Response, and Recovery

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Abstract: The purpose of the study reported here was to (a) determine the role of Extension in disaster response, (b) identify the information needs, and (c) disseminate education and training modules through the EDEN. Extension staff should know their county’s emergency plan and the role identified for Extension. Extension staff should attend local emergency management meetings, be knowledgeable of local and state resources, and redirect citizen calls to agencies. Extension has a primary responsibility for providing the public with educational materials congruent with Extension's program areas. Topics were identified for disaster-related educational materials and new materials were developed.

Introduction

During the spring of 2009, North Dakota experienced unprecedented river and overland flooding in eight rural/frontier counties: Barnes, Emmons, Grant, LaMoure, Mchenry, Mercer, Ransom, and Sioux. NDSU Extension Service staff were inundated with request from citizens for flood-related
education materials and questions about who people should contact for other emergency services and resources. While some educational materials and information were available to help Extension staff respond to questions, it was often found that citizen requests could not be fulfilled due to the limited number of topics for which flood-related educational materials had been developed. Staff often had to search beyond Extension's own library of materials to try to find answers. Additionally, Extension staff often experienced role confusion about the appropriate role of Extension in a flood-related disaster and the role of other county and state response agencies.

The goal of the study reported here was to assess the disaster response experience of Extension Service personnel in the rural/frontier counties, to identify gaps in the existing disaster training program, to clarify enable NDSU Extension role in emergency planning, and to prepare Extension staff to better respond to the distinct needs of rural citizens.

**Literature Review**

Preparing and responding to natural disasters requires government entities and volunteer response organizations to work together to meet the safety and subsistence needs of citizens. In the U.S., the responsibility for planning at the national level for emergencies caused by natural disaster, terrorism, and made-made catastrophes lies with FEMA and the U.S. Department of Homeland Security (Spencer, 2011). The Red Cross and thousands of volunteers and first responders, such as police, firefighters, and medical response personnel, are involved in emergency preparedness. Governmental agencies and volunteer organizations work together to form comprehensive emergency management plans that assure the adequate protection of the public in the event of emergencies. According to Spencer, "emergency preparedness refers to actions which can and should be performed prior to an emergency" (2011). Emergency preparedness includes (a) meeting and coordination of efforts between response agencies, (b) writing emergency plans and procedures, (c) training and conducting emergency drills, and (d) positioning materials and supplies for use during emergencies. Spencer described emergency response as the "actions taken in response to an actual, ongoing event."

Floods are the most common natural disaster and the most costly in terms of human hardship and economic loss. Wisner, Blaikie, Connon, and Davis (1994) suggested that floods are a normal and essential component of both agricultural and ecological systems as they provide the basis for the regeneration of crops, plant and aquatic life, and of livelihoods derived from them. In the second half of the twentieth century, flooding was the most common type of natural disaster reported around the globe. Annually, floods impact more people (55% of reported disaster related deaths from 1986-1995) and causes more economic lose than any other disaster occurrence.

The effects of flooding can be local, affecting a neighborhood or community, or very large, affecting entire river basins and multiple states. According to the United States Geological Survey (2007), over 75% of declared federal disasters in the U.S. are related to floods. The National Weather Service (2011) reported that floods, more than any other hazards, result in the highest loss of property damage and crop damage. Between flash flooding and river flooding, river flooding results in the highest losses. In 2010, river flooding accounted for nearly $3.1 billion in property damage and an additional $1.1 billion in crop damage (National Weather Service, 2011).

Responding to flooding events places a strain on emergency response
resources at the state and local government levels. This is especially true in rural and frontier areas where populations are sparse and geographically dispersed and emergency response resources are limited. Rural areas are home to 65 million Americans and the site of most of the country's farms, agricultural food handling and processing businesses, and numerous power facilities. According to the Office of Rural Health Policy (2002), "a lack of emergency-related resources in rural areas may compromise rural readiness for future emergencies" (p. 1).

Rural areas are often believed to be at a low risk when considering emergency planning. The feeling of relative safety brought on by the belief that rural areas are at a lower risk may reduce rural communities' sense of urgency and limit preparation and responsiveness when faced with the most common costly natural threat: flooding. The Office of Rural Health and Policy believes that rural communities must be actively included in local, state, and federal efforts to strengthen emergency preparedness. If not, "they may remain bystanders to their own fate. Effective emergency preparedness and mitigation efforts demand consensus and involvement from all stakeholders, including rural providers" (p. 1).

Miller (2008) observed that "small communities and rural areas have a strong tradition of volunteerism and social participation" (p. 272). Rural residents tend to be closely connected socially. Information and assistance flow readily because the residents are connected through repeated interactions through family, acquaintances, and overlapping organizational memberships. According to Miller, "repeated interactions within a small community also facilitate the coordination of people. Even in unforeseen events, skills and resources availability in the community can quickly match needs" (p. 272). Emergency response planners in rural areas should capitalize on these capabilities when developing disaster preparedness and mitigation programs.

Tierney, Lindell, and Perry (2001) stated that disaster research in the United States developed using a case study method, which would select a particular catastrophic event, identify the consequences of the disaster, and then consider the human and organizational response to those consequences. Ritchie and MacDonald (2010) indicated that issues of preparedness, response, recovery, and resilience are becoming more and more important from an evaluative standpoint than ever before as policy-making bodies push for greater transparency and accountability.

During disaster events, rural residents rely on the Extension for information about how to prepare their homes and businesses for natural disasters, how to mitigate disaster impacts, and how to restore their homes and business after an event. Historically, the role of Extension in the formal emergency management and planning process varied from county to county. Because residents in the counties had long-term contacts with Extension for educational information, the county Extension office was frequently the first contact for finding information about disaster preparedness, mitigation, and recovery.

(2007) concluded that Extension plays a significant role in community resilience, risk reduction, and minimizing losses in disaster events. Boteler provided a literature review on disaster preparedness and response and advocated for adopting a sustainable hazard mitigation perspective in the United States.

The North Dakota flooding that took place in 2009 required the mobilization of county, state, and federal emergency management teams, the Red Cross, and multiple volunteer response organizations into the flood-stricken counties. The local population, unaccustomed to the array of organizations involved, often, as in the past, used the county Extension office as a source of first contact for all of their flood-related questions and needs. Extension staff struggled with the ambiguity of the primary roles of agencies and organizations deployed to the county and found that they did not have the resources to answer some of residents' requests for flood-related educational materials.

**Purpose of Study**

The purpose of the study reported here was to determine the training and information needs of county Extension staff to respond to the distinct needs of rural/frontier counties by expanding disaster response training and to clarify the role of county Extension staff in emergency management planning and disaster response.

The following study questions guided the study.

1. To what extent were county Extension staff prepared to respond to citizen requests for services during the flood disaster of 2009?

2. What should be the role of county Extension in disaster planning and response in relation to other disaster response agencies serving rural/frontier counties?

3. What are the gaps in the existing disaster relief training and information resources available to Extension staff and citizens in rural/frontier counties?

**Methodology**

The study used multiple data gathering and analysis techniques to answer the study questions. All data gathering protocols were approved by the Institutional Review Board. In the first phase of the study, a survey was developed to identify behaviors and actions that contributed to the success or failure of Extension staff in the flooding situations. The researcher used the answers to the questions to identify themes. Two face-to-face, group interviews were conducted to validate the findings of the survey. Following the group interviews, a survey was sent to all county Extension offices statewide to determine whether Extension personnel were involved in their county Emergency Management plan and what role they had in the plan. This was followed by a meeting with Voluntary Organizations Active in Disaster (VOAD) to gain the feedback and perspective of the roles of other response agencies.

**Data Gathering Protocol**

The survey asked the respondents to provide information about several flood-related topics. The response rate for the survey was 75% (18 of 24 responded). The topics are listed in Table 1. For each topic, the respondents were asked the following questions.
What questions did you receive about this topic that you were able to answer?

What information resources did you use to provide information to your community members?

What questions did you receive about this topic that you were unable to answer?

What questions did you receive from individuals/groups that were not among your typical target audiences?

After the survey data were analyzed, two face-to-face, group interviews were conducted to validate the findings. Extension agents and support staff from the rural/frontier counties were invited to participate at one of two sites (n = 24). Survey data results were categorized into topics and sent to the interviewees prior to the interview meeting.

<table>
<thead>
<tr>
<th>Survey Topics</th>
<th>Other topics: (respondent provided topics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building, maintaining, and disposing of dikes</td>
<td></td>
</tr>
<tr>
<td>Maintaining Communications</td>
<td></td>
</tr>
<tr>
<td>Protecting fresh water supplies, sewage, and electrical systems</td>
<td></td>
</tr>
<tr>
<td>Re-occupying homes and businesses</td>
<td></td>
</tr>
<tr>
<td>Managing livestock and containing waste</td>
<td>Collaborating with city, county, and tribal government</td>
</tr>
<tr>
<td>Responding to transportation issues</td>
<td>Managing volunteers</td>
</tr>
<tr>
<td>Evacuating vulnerable individuals, elderly, &amp; pets</td>
<td>Restoring flood damaged land and property</td>
</tr>
<tr>
<td>Providing access to Personal hygiene and care facilities</td>
<td></td>
</tr>
</tbody>
</table>

The nominal group technique was used to allow individuals to respond to the first three interview questions. The fourth set of interview questions was asked and discussed in a large group setting. The interview questions included the following.

1. What is not on the list of survey responses that should be there? What is missing?

2. Information was readily available for which of the survey topics?

3. Information was difficult to locate for which survey topics? Information was not available for which survey topics?

4. What is Extension’s responsibility during a flood disaster? What activities and questions should Extension handle during a flood? What activities and questions should other organizations and agencies handle during a flood? Why? What are the names of those
The survey data were further crafted into training topics. Data relating to the perceived role of Extension in disaster response were recorded to inform further discussions of Extension's role.

**Role Clarification**

Following the group interviews, a survey was sent to all county Extension offices statewide to determine whether Extension personnel were involved in their county emergency management plan and, if so, what role they had in the plan. Next, to gain the perspective of other response agencies, input was sought at a meeting of the Voluntary Organizations Active in Disaster (VOAD). The topic areas identified by the survey were shared, and topics for which other organizations had primary control of services were identified. Following the discussions, the list of information topics and role of Extension were further revised.

The final list of information topics and the roles of Extension were used to develop training modules and to make the modules available for quick access by webinar, written format, and/or the Extension website. The final steps in the project included the training of Extension staff.

**Discussion of Findings**

**Extension's Role in Emergency Response**

Survey results showed that 53% of the county Extension offices ($n = 41$) had a defined role in the county's emergency management plan. In 47% of the responding counties, Extension was a member of the Emergency Management Board. Respondents participating in emergency planning reported the primary roles of Extension in counties where Extension is involved in emergency planning as follows:

- Provide educational information and materials (Just-in-Time approach).
- Organize information and notify the public about how to get information and where to go for referrals.
- Hold regular conference calls to field needs and generate uniform methods of distributing information.
- Listen: people come with unmet needs and Extension steers them in the right direction to meet their need.
- Collaborate with North Dakota disaster agencies to develop responses and identified needs.

Table 2 provides a listing of the educational material topics for which Extension has a primary role and the topics/issues that are the primarily responsibility of other response agencies.

It was determined that county Extension staff should establish a relationship with county emergency planning personnel and keep current on county issues and needs. Staff should attend emergency planning meetings, as appropriate, and know Extension's role in the emergency management plan. Even if the Extension office is not a formal member of the Emergency Management Board, staff should report identified issues/needs to county emergency planners. When a disaster occurs,
Extension should collaborate with other agencies to address emerging needs in the county, and continue to work with ongoing recovery needs.

**Table 2.**
Educational Information Topics and Materials by Primary Responsible Agency

<table>
<thead>
<tr>
<th>Extension</th>
<th>Other Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean-up topics</td>
<td>Disaster Communications</td>
</tr>
<tr>
<td>Livestock &amp; crop issues</td>
<td>Volunteer mobilization</td>
</tr>
<tr>
<td>Food Safety</td>
<td>Governance &amp; public offices</td>
</tr>
<tr>
<td>Pesticide &amp; chemical safety</td>
<td>Evacuees &amp; human services</td>
</tr>
<tr>
<td>Electrical safety</td>
<td>Dikes &amp; sandbagging</td>
</tr>
<tr>
<td>Water quality</td>
<td>Dead livestock disposal</td>
</tr>
<tr>
<td>Septic &amp; sewage</td>
<td></td>
</tr>
<tr>
<td>Sandbagging safety</td>
<td></td>
</tr>
<tr>
<td>Pet safety &amp; care</td>
<td></td>
</tr>
<tr>
<td>Finance and insurance</td>
<td></td>
</tr>
</tbody>
</table>

1Note: Dead livestock disposal requires cooperation from the State Department of Agriculture, State Health Department, and the Extension Service.

Within the Extension organization, county staff should provide feedback to Extension specialists about unmet needs so that new programs/materials can be developed. Foremost, county Extension offices should educate the public about resources available and guide them to the appropriate support agencies.

**Extension Information Needs and Training Topics**

Given the specified roles of Extension in emergency response and recovery, the list of educational information and training topics was further developed using the data collected from the interviews, surveys, and meetings with other response agencies. Tables 3 - 6 list the training topics and subtopics, some in preparedness and others in response and recovery. The list was used to determine if (a) materials were currently available on the NDSU Extension website, (b) materials existed on other state Extension websites or the Extension Disaster Education Network (EDEN) website, or (c) new materials needed to be developed.

**Table 3.**
Extension Educational Information and Material Needs and Training Topics/Issues for Clean-up and Food Safety

<table>
<thead>
<tr>
<th>Training Topic</th>
<th>Subtopics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home and Business clean-up</td>
<td>Mold</td>
</tr>
<tr>
<td></td>
<td>Carpet and floors</td>
</tr>
<tr>
<td></td>
<td>Drying homes</td>
</tr>
<tr>
<td></td>
<td>Business cleanup</td>
</tr>
<tr>
<td></td>
<td>Cleaning supplies</td>
</tr>
</tbody>
</table>
Cleaning basement walls  
Disinfecting soiled clothes  
Debris removal from fields and farmsteads  
Fuel oil leaks  

| Food safety | Cookware  
Handling of food  
Loss of refrigeration and food quality |

### Table 4.

Extension Educational Information and Material Needs and Training Topics/Subtopics for Livestock and Crop Issues and Pesticide and Chemical Safety

<table>
<thead>
<tr>
<th>Training Topic</th>
<th>Subtopics</th>
</tr>
</thead>
</table>
| Livestock & crop               | Feeding contaminated feed to livestock  
Wet or Molding hay  
Grain issues  
Wet silage piles  
Feed for stranded animals  
How to evacuate livestock  
Hay storage  
Alternative feed for livestock  
Lack of feed for animals, who can help  
Livestock assistance program  
Livestock loss reimbursement  
Documenting livestock loss  
Carcass removal and disposal  
Disease protection  
Treat or inspect animals standing in water.  
Funding and replacement of damaged fences  
Manure getting washed out of containment system |
| Pesticide and chemical safety   | Disaster preparations  
Safety of home to move back in  
Pesticide storage and safety  
Wet pesticides  
Disposing of chemicals  
Wet lawn/garden chemical and fertilizer  
Storing damaged pesticides  
Chemicals contaminated by flooding |

### Table 5.

Extension Educational Information and Material Needs and Training Topics/Subtopics for Electrical Safety, Water Quality, Septic/sewage, and Sandbagging and Dikes
<table>
<thead>
<tr>
<th><strong>Topic</strong></th>
<th><strong>Subtopics</strong></th>
</tr>
</thead>
</table>
| **Electrical**    | Houses and outbuildings being flooded, electrical underwater Shut off electrical - when to do it? How?  
| **safety**        | What to do with irrigation pivots underwater  
|                   | Electrical safety - going in to houses and barns  
|                   | When can we go back into homes  
|                   | Health risks - what are they  
|                   | Keep/reuse electrical appliances  
|                   | Irrigation systems underwater                                                                                                                |
| **Water**         | Reduce water usage Well water contamination  
| **quality**       | Cleaning flooded wells  
|                   | Water conservation  
|                   | Water quality  
|                   | Water testing  
|                   | How to disinfect/chlorinate contaminated water                                                                                               |
| **Septic**        | Sewer failure Plugging septic systems  
| **/sewage**       | Sewage back-up in home  
|                   | Waste water containment  
|                   | How to "rig" waste water disposal so it doesn't go down the drain                                                                             |
| **Sandbagging**   | How to build a sandbag dike How to fill sandbags  
| **and dikes**     | Where to get sandbags  
|                   | How to get volunteers to help with sandbagging  
|                   | Location of sandbagging operations.  
|                   | Personal injury prevention  
|                   | Disposing of sandbags  
|                   | How to build and maintain permanent dikes                                                                                                      |
| **Table 6.**      |                                                                                                                                               |
| **Extension**     | Educational Information and Material Needs and Training Topics/Subtopics for Post-flood Recovery and Other Topics                             |
| **Training**      |                                                                                                                                               |
| **Topic**         | **Subtopics**                                                                                                                                 |
| **Post-flood**    | Post-flood machine maintenance Is my garden produce safe to eat  
| **Recovery**      | Water invaded yards and fields  
|                   | Debris disposal  
|                   | Health of flooded trees and shrubs  
|                   | Pet safety & care  
|                   | Finance and Insurance  
|                   | Disposing of contaminated batteries  
|                   | Missing property  
|                   | Missing propane tank  
|                   | Chemical tank floated away  
|                   | Clean up fuel oil  
|                   | Submerged fuel storage tanks  

New materials were developed for topics listed in Tables 3 through 6 for which existing educational materials could not be found. The state Extension specialists and the Agricultural Communications Department collaborated on the development of new Web-based videos. Examples of topics for which materials were developed include Sandbag Safety, How to Build a Sandbag, Plugging Home Drains, How to use Generators, Sump Pump Tips, and Using a Moisture Meter. Extension worked with the State Department of Agriculture and State Extension Veterinarian to develop protocol for removing and disposing of dead animals. All educational and training materials were uploaded to the Extension Disaster Education Network (EDEN) website.

For Employee Only training programs were developed by state Extension specialists and other agencies for the following areas: Family Preparedness, Ready Business, Family Disaster Supplies Kit, Food Safety at Volunteer Feeding Sites, and Entering a Flooded Home. In addition, public service announcements and radio scripts were developed for Resiliency, Food Safety, and Talking to Kids about Disasters. A special website was developed for Extension staff to share their tips on specific issues such as handling laundry in a city with no water/sewer; pet care and evacuation with no Humane Society or related organization; and protocol for locating people in high risk rural areas.

**Train Extension Staff**

The final step in the Rural/Frontier Disaster Response Program was to train Extension staff on the use of the new disaster resources. A webinar was hosted to showcase new website resources, answer questions, and get suggestions for any areas that may need further development. Next, a Speed Programming session on Disaster Response was held at the Extension Fall Conference. Presenters included several Extension staff involved in developing disaster response resources, including New Disaster Resources on the Web, Financial Recovery Toolkit, Family Preparedness and Ready Business Training, Strengthening Community, Agro-security Planning, and Extension's Roles in Emergency Management Plans. All educational and training materials were uploaded to the NDSU Extension website <http://www.ag.ndsu.edu/extension/> and shared with the EDEN <http://eden.lsu.edu>.

Following the training, an evaluation survey was sent to those who completed the training. All Extension staff responding to the survey indicated that the training met their needs and that they knew where to find disaster education resources on the new website.

**Conclusion**

The North Dakota Emergency Management Association (2011) defined Emergency Management as "a comprehensive effort coordinating a wide
range of public safety and awareness programs to ensure that a high level of preparedness, mitigation, response and recovery will be maintained for all known hazards." Continuous assessment, planning, training, and exercising are undertaken involving public agencies and the public sector. In doing this, a partnership with a good working relationship is formed with local emergency response agencies, such as fire, law enforcement, public works, volunteer agencies, public health, and emergency medical services. These joint events bring about an awareness of each other's capabilities and limitations.

The NDSU Extension Service is one of many public agency that plays an important role in rural communities during natural disaster events by providing educational materials to help residents cope with disaster related issues and problems. The materials developed as a result of this project have already been used widely by Extension and other emergency response agencies. It is interesting to note that, while NDSU Extension has been working with disaster response for several years, the general public may not know that the information they use originated with Extension. For example, the North Dakota Department of Emergency Service (2011) website <http://www.nd.gov/des/> has made available 30 flood-related informational materials that were developed by Extension.

In the spring and summer of 2011, North Dakota experienced another record-breaking flood season. The research completed after the 2009 floods provided a wealth of information that led to the development of many resources identified as important for flood and disaster recovery. These tools are now being tested. Rural and frontier counties, along with three major urban counties, experienced major flooding in the spring and summer of 2011. The process used to develop new tools proved to be a success. Extension agents in counties affected in 2009 are sharing tips and tools with those responding to the recent flood events. Using multiple delivery modes to disseminate materials has provided instant access. The last tool developed was a droid-based application that allows citizens to record needed information, photos, and voice descriptions of disaster incidents. Other delivery modes include traditional publications (paper and web-based), YouTube educational clips, and emerging App technology. Technology makes it possible for every state to share the best of its resources with anyone, in any state, using EDEN (Koch, 1999).

Recent disaster conditions in western North Dakota and Minot, North Dakota, brought many citizens to realize the significance of having a county Extension presence. New audiences are emerging from the prompt service provided during the flooding. Citizens value having a trusted source of educational information and facts to aid them in disaster response and recovery. Extension provides a link to many agencies and organizations in every county.

It is important to note that the materials identified in the study reported here are specifically designed to assist in a flood-related disaster in North Dakota and may not be appropriate for states in other climates and regions or for other types of natural disasters. Each state Extension should take care to identify and create resources that are appropriate to the unique needs of the state.

**Acknowledgments**

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**References**

Boteler, F. E. (2007). Building disaster-resilient families, communities, and


