# Community-engaged Research and Human-centered Design for Tackling Post-disaster Food and Nutrition Insecurity



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Background	<b>Methodological Approach</b>	<b>Participant Selection</b>
<ul> <li>Food security after disasters</li> <li>Food insecurity in the aftermath of disasters affects over <u>44 million Americans</u>.</li> <li><u>Children, single mothers, and Black and Hispanic communities</u> are being disproportionately impacted.</li> <li>After a disaster, households face challenges that influence their food consumption leading to <u>adverse health and wellbeing outcomes</u> in the <u>short-term and long-term</u>.</li> <li>Food access, preparation, preservation, and consumption depend on different factors: <u>health</u> considerations; <u>cultural</u> preferences; <u>technical infrastructure</u> (food preservation and preparation methods); <u>financial resources; knowledge</u>.</li> <li>The role of organizations</li> <li>Organizations from different sectors help households recover their ability to access, preserve, prepare, and consume suitable and appropriate foods. However, smaller community-based organizations often lack the data tools and resources to effectively support these efforts, including access to</li> <li>a) real-time, accurate spatial and socio-economic data before a disaster strikes to identify vulnerable populations, and b) communication tools that enable collaboration among providers and</li> <li>Goal of project</li> <li>Present a research process combining community-engaged research with human-centered design to create a tool tailored to the needs of local organizations, addressing the complex dimensions of post-disaster food insecurity.</li> </ul>	<ul> <li>Community-engaged Research</li> <li>Collaborations between scholars and community members or organizations to understand or address issues that impact a community</li> <li>Input by those most impacted by the issue to validate initial hypotheses from literature</li> <li>Human-centered design (HCD)</li> <li>Problem-solving approach that puts real people at the center of the design process to address users' actual needs, preferences, and challenges</li> <li>Non-linear, iterative process that includes</li> <li>Discovery - empathizing with the user to understand their needs</li> <li>Ideation - researchers generate a wide range of ideas and solutions based on insights from the discovery phase</li> <li>Development - prototyping, and testing directly with the user</li> <li>Implementation final product/tool is deployed for user (E. Chen et al., 2021; Göttgens &amp; Oertelt-Prigione, 2021; Müller et al., 2024)</li> </ul>	<ul> <li>Participant selection <ol> <li>Definition of actor types:</li> <li>Users: In a disaster context, different actors will use the tool to identify needs and coordinate help to increase food security but may not necessarily benefit from resulting food security themselves</li> <li>Beneficiaries: served by the users, e.g., citizens, nonprofit clients</li> <li>Selection of Key Informants:</li> <li>Disaster organizations (e.g., county emergency MGMT)</li> <li>Food organizations (e.g., food pantries, grocery stores)</li> </ol></li></ul>

# **Research & Design Process**

1. Initial Key Informant (User) Interviews

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- 24 interviews with representatives from 23 different organizations:
  - What do they do to ensure a reliable supply of food? What's their disaster timeline?
  - Preparatory actions for storms in general and response procedures right after and several weeks/months after disaster
  - Information (and sources) they currently use in making decisions
  - **Needed information** to be better prepared in the future
  - Preferred method and format for receiving and sharing various types of information

## 2. Workshops

- Brainstorming sessions as well as mapping activities
- **Presentation of results** of our initial interviews
- Participants **discuss three topics** essential to building the tool and a qualitative model 'What are the **factors that limit a household's access to food** during the first two weeks after a hurricane?'



- Compilation of information from initial interviews and workshops to create complementary tools
- Scorecard showcasing key data (such as poverty rates, vehicle access) for county or subcounty geographic areas (Figure 3);
- **Interactive map**, including the location of grocery stores and roads that are prone to flooding (Figure 4);
- Dashboard with menu of adjustable interventions to help end users understand effects of interventions (alone and in combination with one another) on the number of households without a sufficient food supply in an area (Figure 4).

### 4. Feedback Interviews

- 13 interviews with key informants
  - Demonstration of prototypes on Zoom and inquiry about use of tools for disaster planning and response, missing components that should be included





## **Discussion & Implications**



**Different Perspectives on Food Security:** Making a Tool Relevant and Usable





- Which of these factors are still limiting a household's access to food a month or more after the hurricane?'
- 'What should be done to **eliminate these barriers?**'
- **Brainstorming** in small groups and **summary of ideas** on Post-It boards (Figure 1)
- **Mapping**: locations of organizations' operation, areas that were most impacted by Hurricane Florence, and other relevant information (Figure 2)





Revision of prototypes to accommodate key informants' feedback



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ability	0%	2018	2019	2020	2021	202
ard	SNAP recipients	12%	14%	15%	11%	19
	Living below poverty level	5%	6%	12%	10%	16
	No access to vehicle	4%	6%	7%	5%	10
	Diet-related disease burden (e.g., heart disease)	12%	10%	6%	5%	99
	Mobility limitations	20%	18%	12%	10%	15

2022	North Carolina	Pender County	New Hanover County	
SNAP recipients	15%	11%	19% 16%	
Living below poverty level	12%	10%		
No access to vehicle	7%	5%	10%	
Diet-related disease burden (e.g., heart disease)	6%	5%	9% 15%	
Mobility limitations	12%	10%		

Supporting the Non-profit Sector: **Accessible Tools for Better Collaboration** 



Lack of Empirical Data on Disaster Food



Figure 1. Brainstorming exercise, identifying challenges and solutions

Figure 2. Mapping exercise, highlighting critical locations for disaster MGMT Figure 4. Interactive map and Dashboard

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## References

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