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Mapping Networks, Resources, Gaps and Vulnerabilities in Middlesex County's Emergency Food System During an Emergency

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01. Introduction

In the last decade, Middlesex County experienced a series of emergency events including three major storms: Superstorm Sandy (October 29-30, 2012), Tropical Storm Ida (September 1-3, 2021), Tropical Storm Henri (August 22-23, 2021), as well as the Covid-19 pandemic (March 2020-present). These events put the emergency food system under extreme pressure with increased demand that created disruptions in aggregation, distribution, and resources, highlighting the system's gaps and vulnerabilities. They also showcased the importance and strengths of the emergency food system during emergencies. Food pantries faced a variety of stresses including, but not limited to flooding, power outages, road closures, delivery problems, and supply chain issues. To manage, emergency food system participants heavily relied on their networks which were an asset during times of crisis.

The 2022-2023 Ralph W. Voorhees Public Service Fellows worked with REPLENISH, the Middlesex County Food Bank, to better understand the networks, resources, gaps, and vulnerabilities in the County's emergency food system. REPLENISH is working with County staff on the County's strategic master plan, *Destination 2040*, to identify vulnerabilities in the emergency food system during natural disasters and public health emergencies. This report provides REPLENISH with baseline information to assist with the planning effort. Our objective was to better understand how the emergency food system works during a crisis. We sought to identify networks and points of strength as well as areas to be strengthened to improve resiliency during an emergency. The following questions guided our research design, findings, and recommendations:

1. Who do emergency food actors network with, and what is their relationship with municipal county, and state governments?
2. What emergency plans do they have in place?
3. What challenges did they face and relationships did they form during recent environmental and public health emergencies?
4. What do they need to strengthen to prepare for future emergencies?

To answer these questions, we used archival data such as news reports of the storms and pandemic, conducted non-confidential, semi-structured interviews with food banks, pantries, and local government officials, and visited food pantries and REPLENISH. Food banks and food pantries are part of the “emergency” food system. Though this system provides food to people in emergencies, it has become a formal system of food provision for many. And yet, volunteers and staff run most of the local food distribution organizations in what are often the equivalent of full-time positions. These organizations are critical lifelines during natural and public health emergencies. Historically they have been part of a semi-informal public private governance system. Because of their critical role, especially during emergencies, there is a need to understand how food pantries and food banks are affected during emergencies to ensure that people can access and receive food in a crisis.

This report first reviews literature about the emergency food system, resilience of the emergency food system, and how it functions in a crisis. Next, we discuss our research design. The findings of the report focus on the shock, response, and recovery of the emergency food system in Middlesex County during natural disasters and a public health crisis. Next, we discuss resources that are important for food pantries during an emergency including networks, communication, refrigeration, freezers, and generators, volunteers, and transportation. We conclude with recommendations for how the emergency food system can increase resiliency.

02. Literature Review

The Emergency Food System

The emergency food system is an institutionalized system of public-private partnerships, including important stakeholders like government organizations, individual corporations, non-profit organizations, and volunteers, who are involved in the process of aggregating and distributing food and non-food goods and services (Rosenthal and Newman, 2018). During the 1980s to 1990s, as the welfare state began to dismantle and food insecurity increased in the United States, volunteers and community- and faith-based organizations assumed more and more responsibility for providing food to insecure households in their communities (Nestle and Guttmacher, 1992). A well-structured food aggregation and distribution system emerged that included food banks, food pantries, soup kitchens, schools, non-profit organizations, corporations, farmers, and volunteers, among other actors (Arnold, 2004). The state and federal governments provided aid in the form of The Emergency Food Assistance Program (TEFAP) and State Food Purchase Program (SFPP).

During a natural disaster the United States Department of Agriculture (USDA) Food and Nutrition Service provides nutrition assistance to state and local governments and nonprofit organizations. USDA foods can be served to people in shelters during a disaster, and state agencies can implement a Disaster Supplemental Nutrition Assistance Program (D-SNAP) if retail stores are open in an affected area (FNS Disaster Assistance 2023). Government aid increased during the Covid 19 pandemic. The federal government initiated the March 2020 Family First Coronavirus Act which gave \$400 million to food banks. The Federal Coronavirus Aid, Relief, and Economic Security Act (CARES) gave \$200 million dollars towards the TEFAP program, amongst other aid (Middlesex County Emergency Food System Covid 19 Pandemic, April 2021).

The Emergency Food System and Resiliency

The livelihoods of hundreds of millions of people depend on an efficient, resilient food system (OECD, 2021). The food system is a web of activities and processes that affect nutrition and health (FAO, 2022). The concept of the food system goes beyond just

providing food to the hungry; it involves the process before and after food consumption, from input supply to agriculture-farming, raising, and harvesting to processing, preservation, transportation, distribution, and final disposal (IFPRI, 2022). During times of crisis, the food system's resilience is tested, and several factors, including market closure, lockdown, transportation/delivery barriers, etc., can disrupt access to food. Disasters and pandemics directly influence food access, both in the long-and-short term period, leading to health and malnutrition risks from poor and healthy eating habits, which directly impacts quality of life (Kakei et al. 2021). As natural disasters and health emergencies are difficult to predict and even prevent, there is a need to strengthen the resiliency of not only the food system but the emergency food system.

Resilience as a concept is difficult to measure (Béné 2020). In classic ecological literature on resilience, it is defined as the ability to adapt to change. Merriman (1885) explained resilience as the ability of an entity to withstand impact, and maintain equilibrium, while Holling (1973) defined resilience to be an ecosystem's ability to manage change and still exist in its natural state. According to Amendom and Turnwine (2008), resilience is the ability of an individual, social group, and system to withstand catastrophic events, while maintaining normal functions without losing its fundamental authenticity or identity. The need for adequate food system resiliency cannot be over-emphasized. Tendal et al (2015) captured food system resilience as an entity that tries to eradicate the weaknesses in the food systems while building capacities to withstand future uncertainties. Food system resilience was viewed as a component to maintain a steady food supply and security amidst unforeseen contingencies.

With regard to the emergency food system, resilience is having the capacity or ability to depend on social, human and financial capital in order to respond to a sudden shock (flood, pandemic) or stressor (flooded roads, supply/demand issues) (Béné 2020). Béné (2020) also differentiates and stresses the difference between resilience as an outcome and *resilience capacities* as the inputs that allow for resilience to occur, which can include access to social networks and other social capital. Planning for emergencies goes beyond just ensuring physical infrastructures like roads, buildings, and bridges are redesigned, but also involves conscious, sustainable efforts at social infrastructures which include networks, communities, and relationships that help sustain people during these periods. It is also important to note

that given the myriad of actors involved in the emergency food system, each actor may have a different response to a shock or stressor than another. For example, during the Covid-19 pandemic, retailers experienced shifts in supply which led to hoarding and panic buying of food and non-food supplies. Hege et al (2021) concur that during a crisis emergency food providers experience increased surges in the demand for food and relief materials, a decline in food donations, limitations in food supply chains, and fewer volunteers to help around.

The Emergency Food System, Natural Disasters and the Covid-19 Pandemic

Literature on food systems approaches in the wake of emergencies including natural disasters and the Covid-19 pandemic highlight a variety of responses to shocks and stressors. Paci-Green and Berardi (2015) studied the western region of Washington State, a region threatened by earthquakes and tsunamis. In addition to creating a food resilience strategy, their research stresses the importance of regional food production and diversifying sources of food to increase the resilience of a community's food system. Zeuli and Nijhuis (2017) examined five US cities (Los Angeles, New Orleans, Madison, Portland, and New York City) and their food response to natural disasters, including Hurricane Sandy. The report shares five major findings from their analysis of those cities. Cities should conduct food systems resilience assessments to better understand vulnerabilities in the food system, and that food systems should be incorporated into existing and future resilience plans. The report also finds that public-private networks are needed to help communities recover after an emergency event occurs. Government agencies can communicate with the private sector to help food systems restore equilibrium after an emergency. Government can provide capital for food businesses to reopen, while private food businesses can help donate food and other resources to a community.

Some cities learned from past experiences with storms but still struggled with food access post-disaster. In New Orleans, a study conducted by Professor Chelsea Singleton after Tropical Storm Ida found that while sites were set up with access to food in the wake of the storm in low-income and communities of color, the emergency food system still had trouble with communicating to residents on how to access food, increasing food distribution, as well

as the ability of government agencies to collect data on how the emergency food system functioned during the crisis (Gladow, 2022).

The Covid-19 pandemic caused unprecedented challenges for the emergency food system and affected food operations across food banks and pantries nationwide (UNSDP, 2019). Some states declined food items from the general public and instead requested funds to purchase and package foods items themselves. In addition, food rescue operations were temporarily halted and residents could no longer choose their own foods and received prepacked food boxes (Larison et al, 2021). Results from a survey sent out during the pandemic showed that 44% of low-income adults were food insecure and that many of those households also faced challenges getting essential household items and paying bills (Wolfson and Leung, 2020). One study explored the emergency food system in two Montana pantries during the Covid-19 pandemic and found that the pantries quickly changed operations during the pandemic to provide more nutritious food. They switched from a client-choice model to prepackaged boxes and found that the same percentage of their clients liked both and that about 75% of them felt they had the right amount of food with the boxes (Larison et al, 2021). They also found that food procurement, food distribution preparation, and food distribution were interrupted by COVID.

Aita et al (2020) examined the impact of Covid-19 on the emergency food system in Middlesex County, New Jersey. The emergency food system changed its practices during the Covid-19 pandemic by increasing aggregation and distribution, working with a limited number of staff and volunteers, and modifying operation and communication procedures for food distribution. They found five obstacles that may affect pantries during future emergencies: limited options to obtain food, significant increase in clients, poor infrastructure for food delivery, increased responsibility for pantry staff and volunteers, and application of safety procedures and precautions. They recommended that pantries and their networks could reach out to more vulnerable populations, increase communications and partnerships, and use social media for outreach.

The pandemic and weather-related emergencies exposed emergency food system vulnerabilities including supply and labor shortages, food waste, and safety in distributing food. However, actors within the emergency food system can be part of a social network with the ability to influence and increase resilience capabilities. Rather than food pantries

relying only on food banks for food and information, the emergency suggests a need to create a wider network for pantries, perhaps comprised of state, grassroots, and citizen groups and private organizations (Glaros et al., 2021). Pinagali, Alinovi and Sutton (2005) similarly find that food system resilience should be based on strengthening diversity, rebuilding local institutions and networks, reinforcing local knowledge and focusing on farmers' ability to adapt and reorganize. The ability of the emergency food system to withstand shocks and stressors from emergency situations will rely on a system that emphasizes local food system networks, a diversity of actors within that network with decision-making capabilities, a multi-scalar approach by government that takes into account how food security affects everyone from households to regional and national economies (Glaros et al., 2021).

03. Research Design

To better understand how Middlesex County’s emergency food system functions during an emergency, we conducted 13 non-confidential semi-structured interviews with pantries and local government officials in Middlesex County. Interviews were conducted over Zoom and lasted approximately 45-minutes. The interview questions were formulated with the aid of REPLENISH staff. We asked respondents which emergency situations they experienced, the challenges that they faced, whether or not the organization had any emergency plans in place, the steps they took once the emergency occurred, communication with clients, how they accessed and distributed food, who they reached out to for help, and how they provided support to others. REPLENISH provided the research team with an initial list of pantries and local government officials to contact for interviews. The research team then also reached out to an additional set of pantries they found by utilizing REPLENISH’s online pantry directory that partner with their organization.

Figure 1. Pantries and local government officials interviewed

Organization	Representative	Municipality
Food Pantry		
Community Presbyterian Church	Denise Wilkins	Edison, NJ
Edison Housing Authority	April Mobley	Edison, NJ
Elijah's Promise	Michelle Wilson	New Brunswick, NJ
Middlesex Borough Elks Food Pantry	Jane Conner	Middlesex, NJ
Middlesex County College	Amanda Lyons	Middlesex, NJ
New Life Pantry	Kristen Tabert	Helmetta, NJ
North Brunswick Food Pantry	Kathy Aruta	North Brunswick, NJ
Rutgers Food Pantry	Kerri Willson	New Brunswick, NJ
Sayreville Care & Share Food Bank	Sue Paul	Sayreville, NJ
Unity Square	Jennifer Hinton	New Brunswick, NJ
Local Government		
Office of Aging & Disabled Services	Laila Caune	New Brunswick, NJ
Middlesex County Health Department and COAD	John Ferguson	North Brunswick, NJ
REPLENISH	Jennifer Apostol	New Brunswick, NJ

Interviews were conducted from September through December 2022. We also visited REPLENISH to gain a better understanding of the food bank’s operations and met with staff. We visited some pantries to see how they worked. We used archival data, including news reports and previous Voorhees Fellow reports to supplement our understanding of the emergency food system.

Figure 2. Site visit to REPLENISH



04. Findings

This section begins with a discussion of the shock response and recovery of the emergency food system during two natural disasters and the Covid-19 pandemic. When an emergency occurs, there is an initial short “shock” period, followed by a response, and then a longer period of recovery. Pantries responded differently to natural disasters than they did to the pandemic. Not all storms affected all pantries in the same way. Hurricane Sandy hit New Jersey on October 29, 2012, becoming one of the most catastrophic hurricanes in the state. It caused 12 deaths in New Jersey and \$36.8 billion in damages (“Superstorm,” 2022). Hundreds of thousands of homes were destroyed (State of New Jersey, 2015). Tropical Storm Henri was downgraded from a hurricane before it hit New Jersey, but the state received heavy rain and flash flooding. Cranberry and Jamesburg, towns in Middlesex County, received 8.91 and 7.96 inches of rain. Homes were devastated and many roads flooded, requiring residents to be rescued by boat (“Central,” 2021). Tropical Storm Ida hit Middlesex County in early September 2021. Severe flooding damaged homes, businesses, and roadways. President Biden signed a major disaster declaration, approving funding for the damages; Middlesex County was one of the twelve NJ counties approved to receive federal assistance (“Hurricane,” 2022). Hundreds of residents were affected by the flooding, and 25 people in the state died from the flooding (Mueller, 2022). During Covid-19, restaurants, schools, and other public facilities were shut down, greatly reducing the flow of food and other supplies to food banks and pantries. The shutdown also had broad economic impact including inflation which increased the cost of food and other goods. There is a varied nature of the emergencies and reactions to them. The following sections describe the shock, response and recovery of pantries during a crisis and accounts for the difference between storms and the pandemic.

Shock

The immediate shock rendered by a storm is short in duration. Food access and distribution is hindered by flooding, road closures, loss of power, and fallen trees.

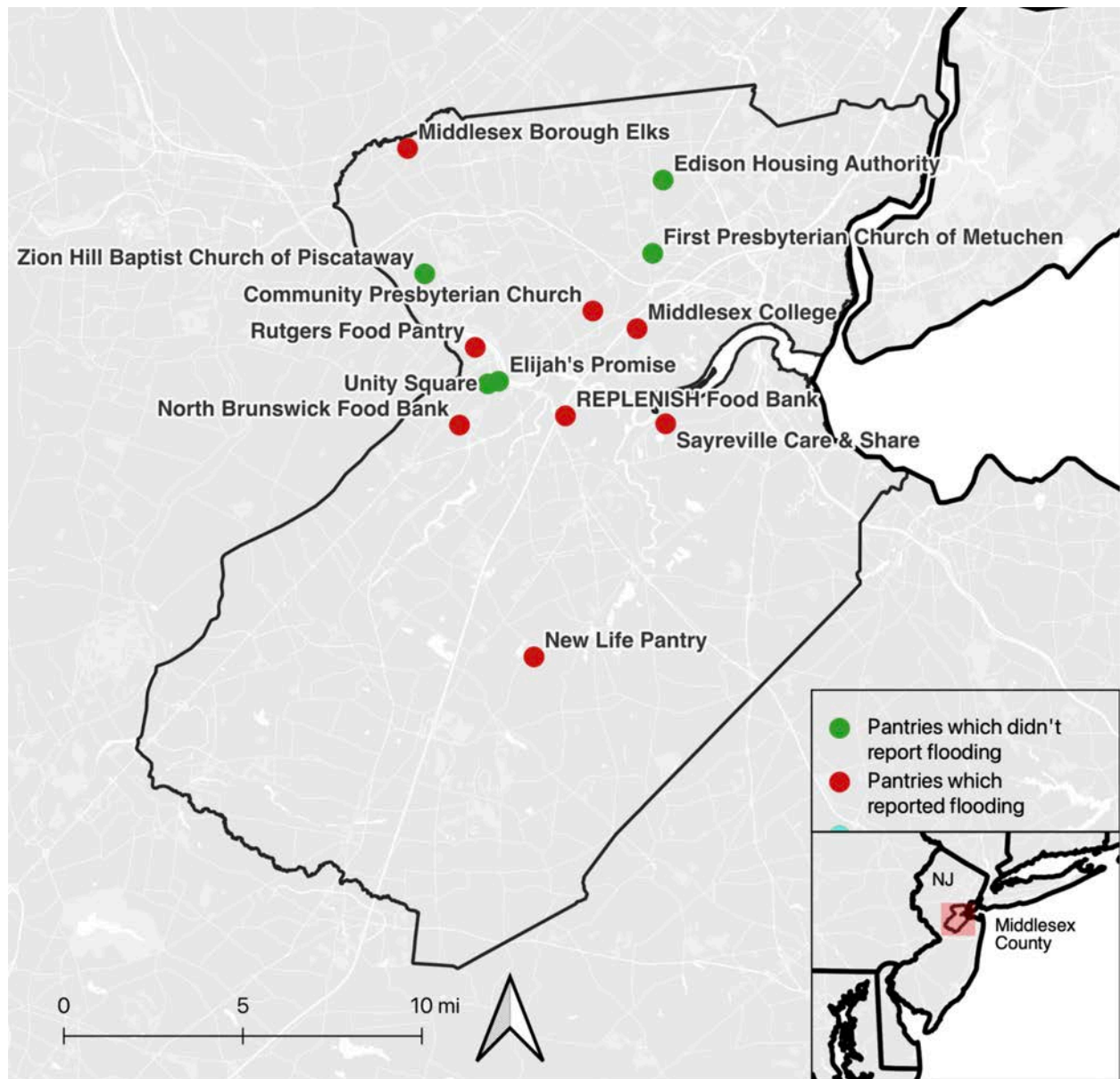
Superstorm Sandy

In Middlesex County, many residents dealt with power outages, water shortages, flooding, and downed trees after Superstorm Sandy. The County experienced a loss of power for 7-days following the storm and a lack of food was the main reason 211 received phone calls for weeks after the storm. The Borough of Sayreville received over \$5.5 million dollars in FEMA public assistance and the Borough of Jamesburg ranked high on the Community Hardship Index for the hardest hit towns by the Superstorm (Halpin). NJ's Office of Emergency Management reported that water shortages in New Brunswick, Milltown, New Brunswick area hospitals and Rutgers University's campuses after the water treatment plant lost power (Attrino 2021). Most of South Brunswick was without power; Perth Amboy's marina was destroyed.

Tropical Storms Henri and Ida

Flooding was the main issue in the County during Tropical Storm Henri. In the aftermath of Tropical Storm Ida many roads were closed due to flooding and fallen wires and trees. South Brunswick was declared a State of Emergency. Some pantries had to relocate because of flooding. The North Brunswick Food Pantry was located in the basement of their municipal building and had to be relocated to the senior center because of flooding during Tropical Storm Ida. They lost their food, freezer and space. Their new space has built-in refrigeration and freezer space but there is not enough space for all the food. REPLENISH helped them purchase a new freezer. The Rutgers University food pantry was also flooded during Tropical Storm Ida. They relocated and moved back to their original space after 6-weeks. Many pantries do not have backup generators.

Figure 3. Pantries interviewed that did and did not report flooding



Covid-19 Pandemic

Officials had been notifying people of the Covid-19 pandemic before the shutdown occurred in March 2020. The immediate shock of the pandemic was the inability to be in close contact with people. There were also disruptions in the supply chain which affected food access. Volunteers could not come help and pantries had few staff members. Many pantries shifted to a pre-packed bag model and distributed food outside.

Response

The second stage of the reaction to an emergency is referred to as the response, and it involves short-term actions taken to address the immediate needs of the food pantry and its patrons. Some of the responses to storms and the pandemic were similar. During both crises (storms and the pandemic) pantries shifted to a pre-packed bag model of food distribution. The New Life Pantry initially responded to the Covid-19 pandemic by pre-boxing food and letting clients set up appointments to come and pick them up.

Food delivery became an important method of food access and distribution during storms and the pandemic. This was important during the pandemic when people were social distancing and during the storms when there were road closures due to flooding and fallen trees. The Office of Aging & Disabled Services provided food deliveries to people. The Community Presbyterian Church Food Pantry served Hurricane Ida victims who were in motels by making deliveries to them. They were closed from March 2020 to June 2020 as they did not have knowledge about how the Covid-19 virus could spread. They had patrons wait outside the building in a line and come into the foyer one at a time. They were allowed to choose what foods they wanted. The client and the pantry workers had to wear masks. REPLENISH delivered food to pantries during Hurricanes Henri and Ida. During the pandemic, they did drive-by food deliveries and erected tents outside to distribute food to abide by social distancing guidelines. Some pantries also relied on first responders to help them with food delivery. In Sayreville, the police picked up and delivered pre-packed bags of food to clients from the Sayreville Care and Share Food Pantry.

Mobile food pantries were another way people gained access to food after emergency situations. The Rutgers Food Pantry was flooded during Hurricane Ida and had to relocate for six weeks. They collaborated with the Rutgers student center to distribute bagged food to students. They introduced a mobile food pantry during the pandemic as students could not go to grocery stores and did not want to get on the buses. Elijah's Promise, a meal provider, responded to Hurricane Ida with a temporary food truck. A permanent food truck was later launched during the Covid-19 pandemic as they saw that people could not get to them.

Figure 4. Elijah's Promise mobile food pantry



Pantries associated with a governmental agency or part of a larger organization were better equipped to respond to an emergency. These pantries had access to support, resources, and information. The Middlesex Elks Lodge provided people and pets with food. The pantry was contacted by the Town's emergency services department before a storm and followed their directions for emergency preparedness. The pandemic led to a sixty percent increase in the number of people who depended on them, and they had to pack bags with food and send them to people. The North Brunswick Food Pantry did not have an emergency plan in place prior to Covid-19. They coordinated their initial response with the Mayor, and they tried to give out food to whoever needed it, even though they only serve North Brunswick residents. A few months into the pandemic, their emergency plan consisted of providing goods only to North Brunswick residents and requiring ID. They also implemented a hotline to enable delivery to clients in the response phase, but were unable

to keep up with the demand. They changed their delivery model and only did it for people who could not leave their homes.

Smaller pantries that were not part of a network or organization had a difficult time communicating with clients, distributing food, and providing food access. The North Brunswick Food Pantry had difficulty letting clients know where to find them after they were flooded. They relied on word of mouth and physically put staff in locations to let people know where to reach them. The Middlesex Elks Lodge was also limited in their networks with other pantries and food banks and believe a network of pantries would be helpful.

One of the main responses to each emergency was to try and accommodate the increase in demand. Each emergency, especially the Covid-19 pandemic, produced a significant increase in the number of people served. In August 2019, Elijah's Promise, a soup kitchen in New Brunswick, served 8,000 meals a month. By August 2022, they served 35,000 meals each month.

During the earlier part of the pandemic the Middlesex College shifted to remote operation restricting campus access to essential workers. This safety precaution limited the capacity for volunteers, so Community Resource Coordinator Amanda Lyons (the only college employee dedicated to the pantry) managed all pantry activity - requests, packing, organizing deliveries, mailing gift cards, in addition to managing the Chromebook Loaner program, Student Emergency Grant, and student referrals to partner agencies. In the

beginning, she did some deliveries, and then she started utilizing the LogistiCare delivery system for students without transportation. Students with access to transportation made weekly appointments to pick up bags of food that she pre-packed. When the need overwhelmed her capacity to pack for pantry

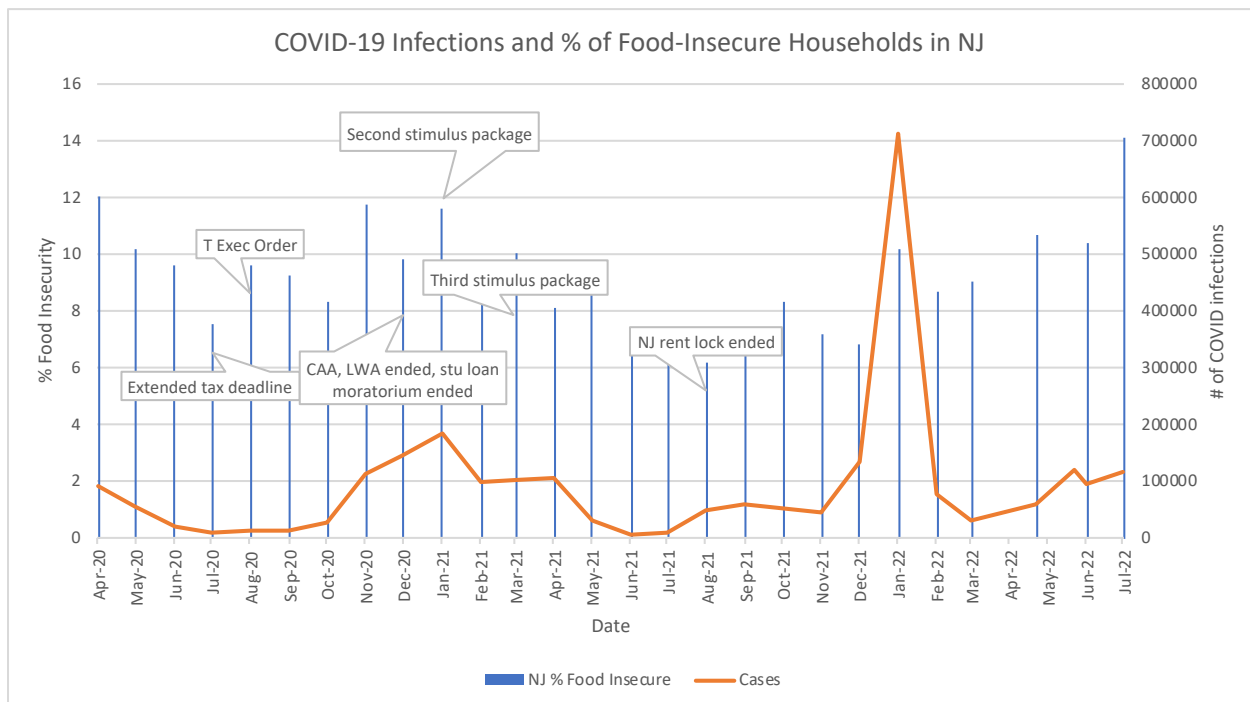
Figure 5. Serving hot meals at Elijah's Promise



pick-ups and the LogistiCare deliveries, she set up a referral system to connect students in need of delivery with local pantries within the Replenish network that were also utilizing the LogistiCare delivery system. That really helped the students who lacked transportation and has been missed since it ended. The Unity Square Community Center in New Brunswick did not consistently distribute food to clients until the Covid-19 pandemic when the need grew significantly. Since November 2021, they have served 200-300 people per week. The Edison Housing Authority visited REPLENISH multiple times per week to maintain the pantry's stock during the Covid-19 pandemic as more patrons relied on them.

State and federal government policy responses to the pandemic affected food insecure households in New Jersey. Figure 3 shows the relationship between policy decisions, food insecure households and Covid-19 infections in New Jersey from April 2020 to July 2022. The blue bars represent the percentage of food-insecure households and the orange line represents the number of Covid-19 cases per month. Covid-19 infection numbers were relatively low from April 2020 to November 2021. There was a spike in the number of infections in December 2021 and January 2022 and the percentage of food-insecure households ended upward – contrary to its downward trend before the Covid-19 spike. The number of food insecure households also increased significantly after federal and state policy initiatives ended.

Figure 6. State and Federal Policy Decisions, Food Insecure Households and Covid-19 Infections in



Recovery

The final stage in addressing an emergency is called recovery, and it focuses on a long-term response, aiming to bring food pantry operations back to a state of equilibrium. This long-term response had some pantries revert back to their pre-Covid-19 distribution model and create emergency plans. The New Life Pantry has gone back to a client choice model, where clients are able to come in and choose which foods they would like. They now have a complete emergency plan in place written in a manual. The North Brunswick Food Pantry has an emergency plan in place after experiencing the pandemic and Hurricane Ida, where they will only serve township residents and require identification in order to obtain food. They continue to pre-pack bags and distribute them to clients outside. Clients drive up and pick up a bag of food. There are also tables set up where clients are able to choose extra items to add to their bag.

Figure 7. Food distribution at the North Brunswick Food Pantry



The Community Presbyterian Church Food Pantry no longer requires clients or pantry workers to be masked, and a couple of clients are allowed into the foyer at once to pick up food. They are still delivering food to people at their homes or the motels in which they have relocated. The Unity Square Community Center was not impacted by the hurricanes. They will rely on the emergency plan devised by their parent organization, Catholic Charities, who will inform them about any potential need to evacuate or relocate. They have landlines installed to communicate in the event that the power goes out. Signs will be posted around the community to inform patrons of the services being offered. They have a method in place for food distributions which involves opening up the pantry doors to patrons on Tuesdays and Fridays, and allowing them to choose the foods they would like to take. The Rutgers Food Pantry will also depend on the directives received and emergency plan established by Rutgers University after experiencing both the pandemic and flooding due to Hurricane Ida.

As a long-term response, some pantries have carried on initiatives they began in response to the pandemic and/or hurricanes including greater food distribution and digitizing client information. Elijah's Promise has doubled the meals they provide via the food truck that they started due to Hurricane Ida and use it as a means to connect their patrons with their services. They have reorganized their professional workforce in multiple ways in order to meet their increased client population. They have designated people to just serve patrons food, and have hired more chefs, while reducing the number of social service providers they have. The Office of Aging & Disabled Services affected by the pandemic and Hurricane Sandy compiled a resource that lists their clients' contact information digitally so that it can be accessed from anywhere, as opposed to their previous hard documentation. They also provide their clients flyers on emergency readiness via email to keep them informed. Their communications are mainly digital and plan to rely on a telephone chain if they experience a power outage. The Edison Housing Authority is continuing the bagged food distribution model they established during the pandemic and plans to rely on their texting system to reach clients.

05. Resources

Resources provide food pantries with supplies, support, or aid and are affected by shock, response, and recovery. Resources include networks, methods of communication as well as various types of capital including but not limited to refrigeration, storage and space, staffing, transportation, and support services. Almost all food pantries experienced a lack of resources during an emergency.

Several gaps and/or vulnerabilities in resources were identified that should be addressed to improve food bank resiliency especially during an emergency. We define a gap as an interruption in the continuity of service from food banks to patrons due to the lack of a resource critical to operations – for example, backup generators, personnel to make deliveries when patrons cannot travel to food pantries, etc. We define a vulnerability as the degree to which the food distribution system, or part of it, may react adversely during the occurrence of a hazardous event – for example, supply routes being blocked by snowstorms or flooding, losing one’s stock of food or paper files because of flooding, losing frozen goods because of a lack of electricity, etc. The following sections describe each of the resources as well as the gaps/vulnerabilities of these resources.

Figure 8. Resources used by food pantries

Food Pantry	Social Media	Delivery	Refrigeration	Volunteers
Community Presbyterian Church	X	Occasionally	X	X
Edison Housing Authority	Uses text msg			
Elijah's Promise	X	Mobile food pantry	X	X
Middlesex Borough Elks Food Pantry	X		Shared	X
Middlesex County College	X	During COVID	Only freezer	X
Office of Aging & Disabled Services		X	?	X
New Life Pantry	X		X	X
North Brunswick Food Pantry	X		X	X
Rutgers Food Pantry	X	Mobile food pantry	X	X
Sayreville Care & Share Food Bank	X	Only for seniors in Housing Authority		X
Unity Square	X		X	X

connections with the New Brunswick and Edison mayors. The Sayreville Care and Share Food Pantry is located within the Sayreville government Office on Aging. The Sayreville Police Department directed people in need to the pantry and helped distribute food. North Brunswick Township helped the North Brunswick Food Pantry relocate to the Senior Center after their pantry flooded during Hurricane Ida. When Elijah's Promise was unable to obtain masks during the pandemic, the Middlesex County commissioner personally came and delivered masks to them. The police and fire departments also helped Elijah's Promise when they needed assistance.

Community organizations also provided pantries with assistance during emergencies by distributing food, financial assistance, sharing food, information, and resources. A Lutheran Church helped the Sayreville Care and Share Food Pantry distribute fresh produce. The pantry did not have access to a vehicle, so the Rotary Club helped transport

Social Connections and Networks
Re-establishing social connections and services is a part of community resilience during and after a disaster (Campanella 2006). Social connections and networks play a strong role in how a social system responds to a crisis. People in a network are connected by interactions that can be categorized as bridging and bonding ties (Putnam 2000). Bridging ties give people in one network access to resources and opportunities in another network, while bonding ties are the strong, localized relationships that exist between family members, friends, and neighbors (Newman and Dale 2005; Putnam 2000).

food from donors to the pantry. The Rotary Club also provided the pantry with financial support, by donating gift cards and installing new pantry shelves and blinds. The Edison Housing Authority relies on the Middlesex Mobile Family Success Center to visit them each month and assist with various needs, such as bringing in food/non-food items, distributing food to clients, and informing clients about the resources available. The Optical Outlet provided the Edison Housing Authority with free eyeglasses to give clients.

The Edison Housing Authority also partners with local banks to educate clients about home ownership. Robert Wood Johnson (RWJ) and St. Peter's University hospitals helped Unity Square Community Center distribute non-food products, such as masks, hand sanitizer, and informative flyers on Covid-19. These hospitals also provide free ophthalmology screenings to clients at the New Life Pantry.

Food pantries created short-term partnerships with schools and local restaurants to receive food. New Life Pantry participated in the Sustain and Serve program where

restaurants cook and deliver hot meals to the pantry to be distributed to clients. The North Brunswick Food Pantry receives donations from schools in the Township. The Community Presbyterian Church Food Pantry has a partnership with a Wawa location in Edison where they pick up a couple bags of food each week. Local restaurants call the Unity Square Community Center and inform them about surplus food which the pantry would then distribute to its clients.

Sustain and Serve

New Jersey's Sustain and Serve program provides non-profit organizations with grant funding to buy meals from NJ based restaurants that have been affected by Covid-19 pandemic and distribute meals to community members in need.

Pantries located within colleges, such as the Rutgers Food Pantry and Middlesex College Food Pantry, also used their networks. The Rutgers Food Pantry is connected with REPLENISH and the Community Food Bank of New Jersey (CFBNJ), as well as the Feeding New Brunswick network. The Rutgers Food Pantry also has a strong relationship with the food pantry in Highland Park. To address the non-food needs of students, the Rutgers Food Pantry has formed a partnership with the Rutgers Office of Dean of Students.

Regional coalitions of food pantries have also been resourceful during emergency situations and afterwards. Some pantries are members of the Metuchen-Edison Assistance League (MEAL) Coalition, a network of pantries in Metuchen and Edison. The Community Presbyterian Church Food Pantry mentioned that the pantries involved meet every other month to talk and exchange resources with one another. The Feeding New Brunswick network also connects several pantries with one another. For instance, the Unity Square Food Pantry is able to serve its clients pork because of donations from the Adventist Church. Larger pantries also serve as food sources for smaller community organizations. Elijah's Promise provides Immaculate Church with food that they can distribute to their patrons.

Community organizations have their own coalitions that include government agencies allowing them to share resources and information. REPLENISH is a part of the Middlesex County Community Organizations Active in Disaster (COAD), and includes health and human services organizations, the Office of Aging & Disabled Services, the Salvation Army, the Red Cross, the Catholic Charities and other groups equipped to respond to a disaster.

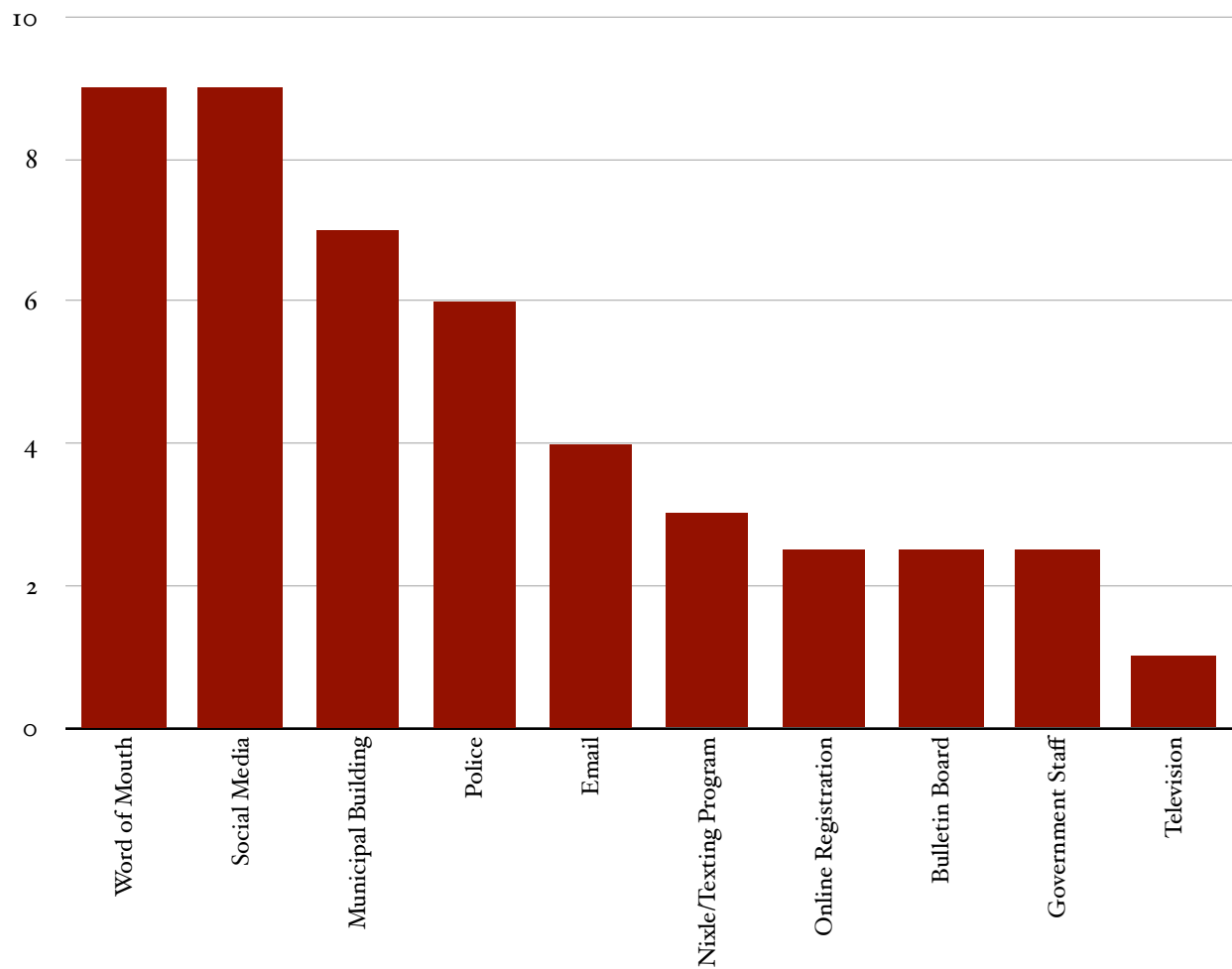
Figure 10. Type of connections each food pantry has with food banks, governmental entities, and formal networks

Food Pantry	Connected to REPLENISH	Connected to CFBNY	Connected to government organization	Connected to a formal network
Community Presbyterian Church	Picks up food		Works with the Mayor's Office	Member of MEAL
Edison Housing Authority	Picks up food		Government Housing Authority	Member of MEAL
Elijah's Promise	Picks up food	Partner	Works with the local government and police department	
Middlesex Borough Elks Food Pantry	Picks up food		Connected to Middlesex County Office of Emergency Management	Member of COAD
Middlesex County College	Picks up food			Member of MEAL
Office of Aging & Disabled Services			Government Department	
New Life Pantry	Picks up food	Picks up food		
North Brunswick Food Pantry	Does not pick up food, just uses Jennifer Apostol	Partner	Works with emergency management and local government	
Rutgers Food Pantry	Picks up food	Picks up food		Member of Feeding New Brunswick
Sayreville Care and Share Food Bank			Part of the Office of Aging and aided by the police department	
Unity Square	Picks up food	Partner	Works with local government	Member of Feeding New Brunswick

Communication

Communication methods were drastically altered during emergencies. During Hurricane Sandy, power lines were down, the Internet was unavailable, and cell phones could not be charged. The lack of power led to difficulties in communication both among staff/volunteers at the food pantries as well as between food pantries and clients. REPLENISH stated that it was difficult to obtain information. Food pantries often share resources and items with each other if they have extra. With a lack of communication, resource sharing became limited as food pantries were not able to communicate with one another about their excess food and non-food items.

Figure II. Communication methods used by pantries



Some patrons do not speak or understand English which makes it important to be culturally and linguistically aware when sending out messages to clients. During emergencies, it can be difficult to communicate in person with clients especially if they have dietary and other needs. Elijah’s Promise communicates in English and Spanish and has started putting information out in Arabic as well.

Different forms of communication proved essential for food pantry operations during the storms and Covid-19. Pantries communicate through word of mouth, social media, municipal buildings, and police. They also use email, texting, bulletin boards and over time have increased their use of online platforms, such as Facebook. Communication during storms was primarily through word of mouth, municipal offices/police, and landlines. Social

media and other forums that relied on the internet and battery charge were not typically utilized. Communication during Covid-19 relied heavily on social media and online forums.

Word-of-mouth was the most widely used form of communication. Nine out of eleven pantries explicitly mentioned their reliance on word-of-mouth. When multiple food pantries congregate together in common locations such as during food pickup days at REPLENISH, pantries can exchange information about future events or status updates. Food pantry clients also used word-of-mouth to let others know where to find food. Unity Square reported that after clients picked-up the bags of extra food from them, they would tell their friends and family where they were able to access food. This strategy helped clients have a steady supply of food. Elijah's Promise stated they have good word-of-mouth which helps increase turnout to their various events including serving people through their mobile pantry. New Life Pantry stated that word-of-mouth is their primary form of communication. When new clients came to the New Life Pantry, it was due to another person telling the client about the pantry 7 out of 10 times. Community Presbyterian Church reported word-of-mouth was key for their operation. When they reopened from Covid-19 closure in June 2020, clients were having difficulty finding out about their reopening. However, once people started stopping by the church and noticing that the pantry was open, they would spread word to others increasing client traffic. Unity Square often had restaurants calling them for donations of excess foods, which they would put out for people to grab and go. When people came to pick up the food, Unity Square would verbally share information to let people know about any updates.

Pantries have also turned to sharing information through word-of-mouth because many clients do not utilize social media, do not have access to the internet, and may not be familiar with how to use the internet. Middlesex Elks Lodge reported that clients lacking social media were informed of updates through word-of-mouth. Sayreville Care and Share are surprised that more clients do not come to their food bank despite their posts on Facebook. Pantries have begun to not only recognize the importance of needing strong word-of-mouth communication to fill in this gap but actively encouraging staff/volunteers to help alleviate this gap. Middlesex Food pantry reported that one of the key duties for an employee is to spread information through word-of-mouth and improve communication channels. New Life Pantry also recognized this gap in social media access as many people

have cell phones but don't have social media. They invested time in a texting program instead which let clients know about hours that the food pantry operated in addition to food and item availability on certain days. This texting program helped to circumnavigate the social media gap among clients. The Edison Housing Authority also relies on a texting program to communicate with clients.

Some pantries utilized email to stay in contact with clients. Unity Square allowed emails and calls from clients requesting food. REPLENISH communicates material with other food pantries through email so the pantries can share the information with their clients. The Office of Aging & Disabled Services sends out emails to direct service clients and senior meal program participants regarding information such as emergency preparedness and alternative options to meal delivery. They also receive emails from clients for referral to their sites. Some pantries created an online registry to collect emails from clients using their pantry. Rutgers Food Pantry has a student sign-in process where students share their email address to get verified. This helps them to create a registry list to which the pantry sends emails out regarding emergencies and share information. Middlesex College also uses a registry system to send emails out to students regarding food availability and even non-food items such as rentals or student life.

Edison Housing Authority allows clients to register their phone number in a database called *Textemall*. This service allows texts or voicemails to be sent to clients, and the Edison Housing Authority used it to give clients information about upcoming events.

Hard and Soft Resources

Refrigeration, Freezers, and Power Generators

Some pantries have refrigeration and freezers to store perishable and frozen food and when there is a power outage those items can spoil if not distributed quickly or if they experience flooding. The North Brunswick Food Pantry lost 15 thousand pounds of food

Figure 12. Refrigeration at the North Brunswick Food Pantry



when Tropical Storm Ida hit and their pantry was flooded. They have refrigerators and freezers at their new temporary location at the Senior Center. Most pantries do not have a back-up generator in the event the power goes out. REPLENISH utilized cold food trucks during the pandemic to store fresh food. For pantries that have the capacity to have a back-up generator, access to funding to purchase a generator might prevent food/communication loss that comes with a power outage during an emergency.

Volunteers

Volunteer availability fluctuates throughout the year which can make it difficult to operate a pantry especially in times of crisis. When student volunteers graduate high school, they may no longer be available to help at the food pantry. Middlesex College Food Pantry Community Resource Coordinator Amanda Lyons works with student volunteers and mentioned their availability changes throughout the year as school schedules and other commitments change.

Figure 13. Volunteers serving food at Elijah's Promise



When long time volunteers or staff leave a food pantry, they take with them institutional knowledge. Some pantries have elderly volunteers. At the height of the pandemic many of these volunteers could not serve at the food pantry for fear of contracting the virus. It can also be difficult for elderly volunteers to do heavy lifting.

Transportation

Access to transportation can be difficult for pantries and clients especially during an emergency when roads might be closed or flooded. Some pantries have access to vehicles to pick-up food. Some volunteers use their own vehicles and gas to pick up food from the food bank and other places. During an emergency, food pantries relied on delivery to reach their clients. One pantry delivered extra food to clients before the storm. Most food pantries do not have the capacity to do deliveries themselves. Some food pantries asked police to make deliveries. During the pandemic, many food pantries utilized Logisticare (now Modivcare) to schedule food delivery to clients who could not leave their homes.

Figure 14. Bags of food waiting to be delivered by pantry volunteers to homebound seniors



06. Recommendations

Proactive emergency planning may alleviate disturbances in food pantry operations that occur upon shock. The following are general recommendations that may create resiliency in the emergency food system:

Send out Communications Before an Emergency

Pantry staff and volunteers can keep track of potential emergencies through news and other media outlets and allow them to prepare. Communication between organizations in a pantry's network during this time can facilitate sharing of information and resources. Pantries can send out information via social media or text messages before there is a storm. The Unity Square Community Center is a part of the Catholic Diocese of Metuchen, which requires them to have an emergency plan in place. The Catholic Charities has emergency supplies on hand and will work with Unity Square to determine whether they should evacuate. For example, if there is a power outage, they would post signs around the community informing them what resources are available. Using Google Translate to messages more accessible to non-English speaking clients could help bridge the gap.

If possible, pantries can also set up an alternative distribution area before a storm where people can access food. If possible, food can also be moved to that location and information shared with clients on where to access food after the event.

Expanding communication to social media forums can be useful to attract younger populations to volunteer. Food pantries could create a program with the Rutgers Communications School (SC&I) and get students credit for partnering with a local food pantry. Some individuals might not know how to use social media or how to get a message out to their clients. Some social media platforms can be complicated to set up an account. Younger volunteers who may be savvy with social media can help.

Texting Systems

Some pantries used texting systems to communicate with clients. The Edison Housing Authority food pantry uses *Textemall* to share updates and events. Some

municipalities have Nixle which sends out text and email alerts to residents about emergencies who sign up for the program.

Establish a Point Person

Some pantries suggested a point person to turn to in an emergency. Having one person that everyone knows to contact would make it less stressful for food pantries during an emergency. This person would have access to information, resources, and provide direction.

Create a Connection to REPLENISH

One food pantry was not familiar with what REPLENISH offered and another did not know the terms of obtaining food from the food bank. Food pantries should have a better understanding of the role of REPLENISH in the emergency food system in Middlesex County.

Delivery for Vulnerable Populations

Vulnerable populations, such elderly people, have limited access to transit and cannot leave their homes. During the early days of the Covid-19 pandemic, many elderly residents were homebound. Some became trapped in their homes during flooding. One pantry provided extra meals in advance to seniors if they knew a storm was coming.

Volunteer Procurement

To encourage and retain younger volunteers, food pantries should reach out to the administration at local high schools, colleges, girl and boy scout programs, and youth service organizations. Although students cannot commit to volunteering for more than a few years due to graduation and other circumstances, establishing a connection with administration can provide a steady flow of volunteers. Pairing an experienced volunteer with a younger one can create a mentor system and an environment where the younger volunteer feels involved and part of a team which can increase one's willingness to stay at the food pantry. Volunteering opportunities can also be posted on websites with high-volume traffic such as VolunteerMatch.com.

Personalized Food

Some clients may require foods that meet their dietary needs/preferences. Clients may be diabetic, require gluten-free foods, and have allergies (nuts, soy, eggs, etc.). They may also have doctor-prescribed diets, such as no added sugars or foods high in carbohydrates. Clients may also require culture-specific foods, such as halal-only meats, vegan foods, or do not eat root vegetables. The lack of personalized food became much more prevalent during the pandemic as food pantries gave out pre-packed bags of food. Allowing clients to have some access to choices in food is important for health reasons as well as dignity in the process of accepting food from a pantry. This can be done by taking phone orders or placing a survey in each bag of pre-packed food to ask preferences. This would also reduce food waste so clients are not throwing away food they do not want.

Create and Strengthen Networks

Strengthening existing networks and creating new ones would be useful for food pantries to better manage emergencies with government-related organizations as well as other food pantries, hospitals, and other organizations. REPLENISH can create a document of all of the pantries in Middlesex County so that pantries are aware of ones near them and can contact them. The North Brunswick Food Pantry director feels that communication between pantries should be encouraged, as she only corresponds with REPLENISH and the Community Food Bank of New Jersey. Knowing what other pantries are doing in response to an emergency and other information such as excess food would be helpful.

Workshops and Trainings

Pantries might benefit from various workshops and trainings to fill in the gaps in knowledge and skills that can improve operations, such as:

Grant Writing

Several food pantries reported relying on grants to obtain the items they need. The Middlesex Elks Lodge depends on grants to purchase the items they serve their patrons. The Community Presbyterian Church Food Pantry mentioned being unable to secure a grant through Housing and Urban Development Department. In partnership with other community organizations and institutions REPLENISH could host a workshop on grant

writing. The Middlesex College Food Pantry mentioned that they were looking for someone who could help with writing grants.

Succession Planning

Many pantries are run by volunteers. The institutional knowledge that accompanies running a pantry is held by one or two individuals. When that person leaves it can be detrimental to a pantry's operations. The North Brunswick Food Pantry does not have a succession plan written out. The Director, Kathy Aruta, said retiring would not pose a big problem as the people under her are well-informed on the pantry's operations. They do not have a volunteer shortage; most volunteers have been there for a long time and know how to do things. The Unity Square Community Center does not have a succession plan. Whenever a worker leaves, there is usually someone else who is able to pick up and keep it going. The resilience of a food bank increases with a succession plan. If critical information is missing and the people who "make it all work" are not present, the resiliency of a food bank drops substantially. Having access to contacts, networks, and understanding of daily operations can be difficult to learn and having a plan in place can make transition of leadership easier.

Transportation and Delivery Coordination

Food delivery services were critical source of food access during an emergency. Some food pantries were unfamiliar with delivery services. Having knowledge of food delivery programs and services would be helpful.

Resource Creation

Several pantries expressed needs that could be fulfilled via resources provided by the County. The New Life Pantry mentioned that having a sheet with the contact information of federal/local social service programs that they could direct clients to during referrals would be helpful. The North Brunswick Food Pantry echoed this need as they mentioned that many clients struggle with completing the required forms to obtain food stamps. There is also a fear to go to social services as many clients are undocumented. The Middlesex Elks Lodge emphasized that language barriers existed between the pantry and their clients. Pantries can create flyers in multiple languages to better reach their clients. Most clients of the North Brunswick Food Pantry are not social media users. Many people came to the

municipal building and were then redirected to the pantry despite posting communication on social media platforms. The North Brunswick Food Pantry reported losing all records during Hurricane Ida. Letting pantries know about the different record keeping systems that are online would be helpful to prevent data loss and access to information.

07. Conclusion

We interviewed Middlesex County emergency food providers to better understand the strengths and vulnerabilities within the emergency food system during an emergency. We found that pantries responded differently during storms and the pandemic. Short-term actions included longer distribution hours, bags of food, accommodating increase in demand, and making food deliveries. Long-term actions included going back to a client choice model of food distribution, and creating emergency plans. Networks were found to be a key source of strength during all emergencies to access and distribute food as well as information. Based on our findings, we recommended strengthening food pantry networks, methods of communication, as well creating emergency and succession plans to increase food pantry resilience during an emergency.

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09. Appendix

In Helmetta, Railroad Avenue, John Place, John Street and Willow Street were evacuated due to severe flooding. Monroe Township also experienced lots of flooding and road closures. The following roads were closed in the Township (Makin 2021):

- Route 33 East and West bound at Bentley Road (near Applegarth Road)
- Applegarth Road from Federal Road to Route 33
- Spotswood Englishtown Road between Mount Mills and Rue roads
- Perrineville Road (Federal Road to Route 33)
- Texas Road at the municipal boarder into Old Bridge
- Englishtown Road from Union Hill Road into Englishtown
- Forsgate Drive at Half Acre Road into Jamesburg
- Grace Hill Road Bridge by Little Brook Lane
- Old Church Road at Union Valley Road and Union Hill Road
- Daniel Road at the bridge into Spotswood
- Old Forge Road at the bridge into Helmetta
- Helmetta Road (Bordentown Turnpike and Lincoln Blvd.)

In South Brunswick, road closures were reported at Route 1 southbound at Promenade Boulevard, Route 130 southbound near Georges Road and Herrod Boulevard and Deans Rhode Hall Road to Georges Road. In Milltown, Washington Avenue was flooded (Makin 2021). In South Brunswick, Deans Rhodesia Hall Road was closed between Route 535 and Fresh Ponds Road. The areas of Kendall Park and Monmouth Junction had heavy flooding. The following roads also experienced flooding and road closures: Route 1, Oakey Drive, Hawthorne Road and Shelly Road, Route 130, Major Road and Blackhorse Lane, Mapleton Road and Raymond Road, Route 1 between Ridge Road and Route 522, and Route 130 at the North Brunswick border, Route 1 in both directions between Promenade Boulevard and Ridge Road, Route 130 in both directions between Distribution Way and Davidsons Mill Road, New Road by Route 27, Route 1 at Raymond Road, and Route 1 near the Oakdale Mobile Home Park ((Salvadore 2021; Amato 2021). In New Brunswick, Route 18 was closed due to flooding. In East Brunswick, Main Street, River Road and Old Matawan

Road were closed because of flooding. In North Brunswick, the following roads were closed: Georges Road and Milltown Road, Jersey Avenue from Huron Road to Corporate Road, Georges Road and Second Avenue, Georges Road and Pardun Road, Fillmore Drive and Wood Avenue, Livingston Avenue, Axel Avenue at Poplar Avenue, Carlisle and Ute roads, Platte Avenue and Seneca Road, Sherman and Williamson roads, Hoover Drive and Lovell Place, Roosevelt Avenue, and Farrington Boulevard and Hoover Drive (Amato 2021). In Helmetta, Lake Avenue was closed due to a fallen tree (Amato 2021). In Jamesburg, Forsgate Drive was closed by Gatzmer Avenue and Perrineville Road. Washington Avenue between Moetz Drive and Main Street was closed in Milltown. There were multiple road closures in Monroe Township including “Rue Road, Texas Road at the bridge into Old Bridge, Englishtown Road at Union Hill Road, Union Hill Road at the Manalapan border, and Route 33 in both directions between Perrineville Road and Applegarth Road” (Amato 2021). The map depicts where flooding occurred in Middlesex County. This list is not comprehensive.

Figure 15. Roads flooded in western part of Middlesex County

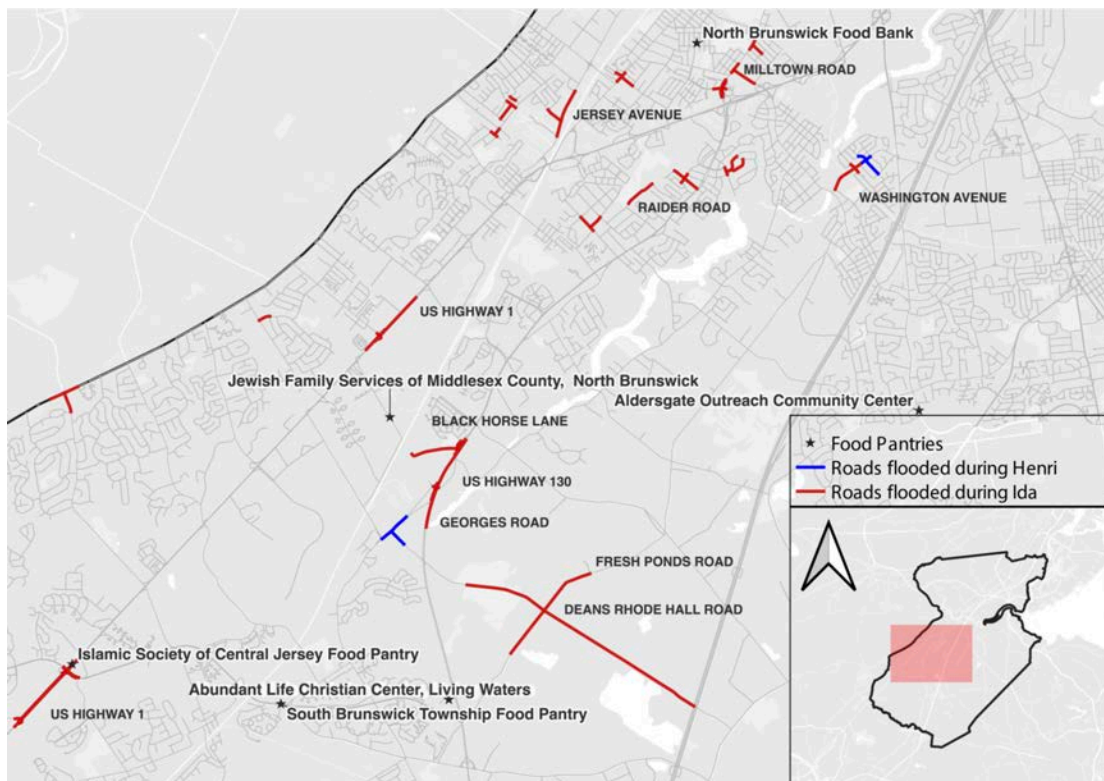


Figure 16. Roads flooded in southern part of Middlesex County

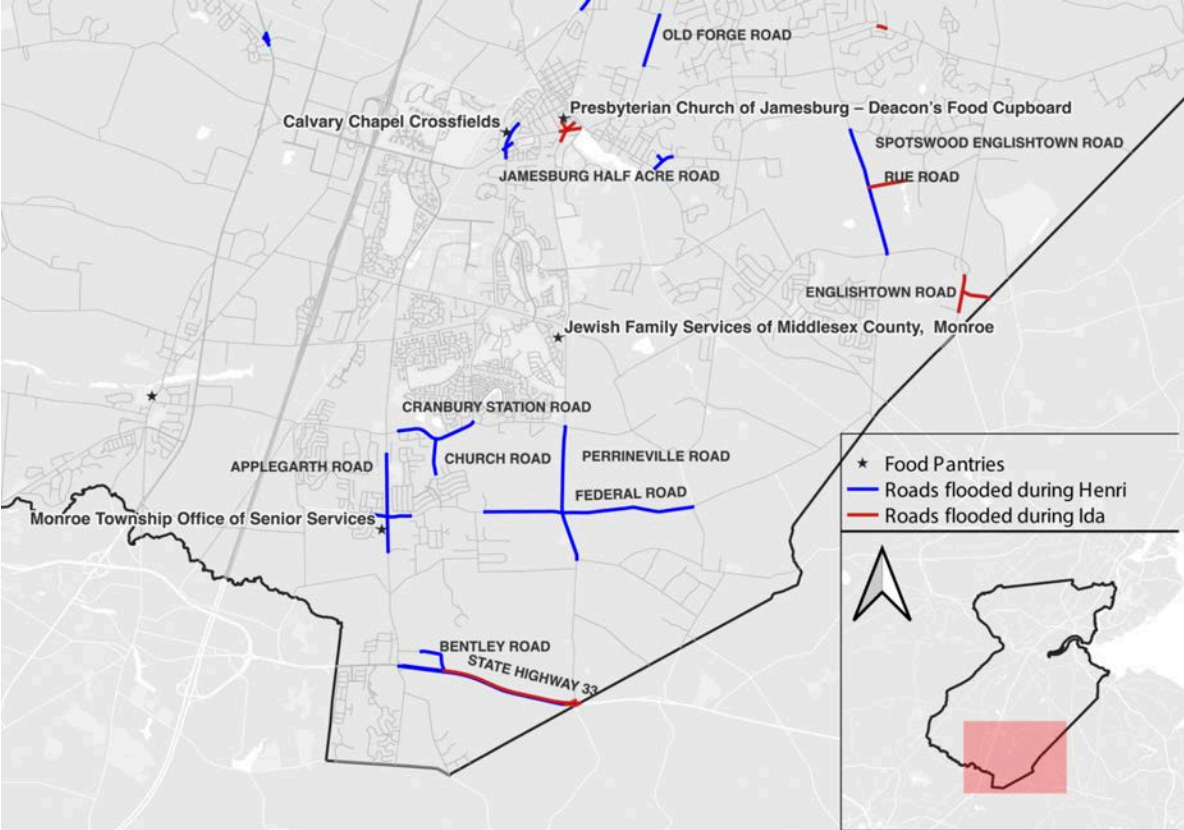


Figure 17. Roads flooded in southeast part of Middlesex County

