Understanding The Connections Between Cross-Sector Collaboration And Service Delivery For Charitable Organizations Using Mixed Methods

UNDERSTANDING THE CONNECTIONS BETWEEN CROSS-SECTOR COLLABORATION AND SERVICE DELIVERY FOR CHARITABLE ORGANIZATIONS USING MIXED METHODS

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Abstract

Two of the most pressing challenges in the world today are food and water access. Charitable organizations frequently use cross-sector collaboration to address food and water access. Cross-sector collaboration is grounded in knowledge, relationships, communication, action, and trust, which cultivate innovation and resilience. However, very few studies have discussed the connections between collaboration, service delivery, and perceptions. Using a convergent design of mixed methods, this thesis examined how cross-sector collaboration enhances service delivery and resilience in charitable organizations. Specifically, the project is guided by three research questions: (1) What communication practices support effective cross-sector collaborations for impactful service delivery for charitable organizations in the food and water sectors?, (2) Which drinking water perceptions and behaviors can predict favorable views on water safety?, and (3) In what ways do the themes from the interview data describing staff observations on collaboration at charitable organizations complement the quantitative results about water safety perceptions reported on the surveys from Ccorca households?

Chapter Three examines the contextual factors of collaboration for charitable service delivery. Semi-structured interviews were conducted with Vermont Everyone Eats (VEE) and 33 Buckets to examine the first research question. Thematic analysis of thirty-eight semi-structured interviews revealed two primary themes of collaboration that improved service delivery. The relationship between these factors is discussed, including how they complement each other. In practice, nonprofits and charitable organizations can expand their relationships, increase their knowledge, and reach more people with cross-sector collaboration.

Chapter Four examines the relationship between drinking water perceptions/behaviors and households' views on water safety. Likert scale survey data from forty-three households in Ccorca, Peru were analyzed with frequency distributions and crosstabs with Chi-square tests. The results revealed two perceptions and one behavior that supported positive views on drinking water safety. In practice, these findings can help nonprofits focus their efforts on training and evaluating usage patterns to expand their impact.

Chapter Five examines the mixed interpretation of these findings to understand how cross-sector collaboration complements service delivery perceptions. It was concluded that network growth, sharing knowledge, and trust improved service delivery and perceptions of the service. Theoretical and practical contributions resulting from this thesis are discussed in the final chapter. This research added meaningful contributions to the community development sector on how collaboration helps charitable organizations better serve their communities and theorizes how service delivery perceptions are affected by collaboration. By understanding how cross-sector collaboration enhances service delivery and resilience, organizations will be able to focus on the factors that enhance collaboration to improve the outcomes for their partner communities.

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Chapter 1: Introduction

Safe water systems (Caputo et al., 2022) and local food systems (Ollove & Hamdi, 2021) are vital to individual and community health; however, around the globe, these systems are also vulnerable to a wide range of environmental, built, and human factors (Calder et al., 2021). For example, climate change, population growth, and urbanization threaten water access and quality for people living in villages in the Peruvian Andes (Bowling et al., 2021). Meanwhile, economic and workforce distress due Covid-19 pandemic increased food insecurity in Vermont from about ten percent to nearly thirty percent (VEE & SEVCA, 2020). One region struggles for clean water access and the other struggles to maintain food access; both need meaningful solutions to solve these complex, public problems.

Collaboration has been hailed as the best approach to managing complex, public problems (Bryson et al., 2006), and it has been defined as assembling all the stakeholders to explore concerns and come to a mutual agreement on a solution "that [goes] beyond their own limited vision of what is possible", despite different points of view (Gray, 1989, p. 5). Cross-sector collaboration specifically engages stakeholders across the nonprofit, business, government, and civil sectors to develop a shared understanding of complex, public problems (Bryson et al., 2015; Selsky & Parker, 2005) in fields related to economic development and poverty alleviation (Tello-Rozas, 2016), education (Ordonez-Ponce & Clarke, 2020), public health (Koschmann et al., 2012), and the environment (O'Mahony & Bechky, 2008). While cross-sector collaboration is a useful practice for solving complex, public problems, scholars have yet to explore the practices that support cross-sector collaboration and the impact of cross-sector collaboration on charitable organization's service delivery in the areas of water and food access.

This thesis explores how two different charitable organizations engage in cross-sector collaboration to improve water and food access in two different regions of the world. Specifically, this research asks, what communication practices support effective cross-sector collaborations in the areas of food and water security? Which drinking water perceptions and behaviors can predict favorable views on water safety? How do cross-sector collaborations impact public perceptions of water accessibility solutions?

To explore these questions, the author explored the practices and experiences associated with two charitable organizations, Vermont Everyone Eats (VEE) and 33 Buckets, that engaged in cross-sector collaboration to develop and implement innovative solutions to food and water security issues. For the context of this study, VEE used cross-sector collaboration to improve Vermonter's food access during the Covid-19 pandemic. VEE is a Covid-19 pandemic emergency response program that contracted with local restaurants from 2020 to 2023 to prepare nutritious meals using locally produced ingredients (VEE, 2022). These prepared meals were distributed via community hubs to Vermonters experiencing food insecurity due to the pandemic (VEE, 2021). The author also examined how a second charitable organization, 33 Buckets, a registered nonprofit focused on implementing sustainable water systems and clean water access (33 Buckets, 2021b). The author examines this organization's efforts to bring chlorinated water systems to rural areas of Peru. The organization maintains chlorinated treatment systems in six villages in the Ccorca district to ensure safe drinking water access (33 Buckets, 2022c). This thesis considers the charitable structure of both organizations, it does not attempt to compare them directly to each other. 33 Buckets is a 501(c)(3) nonprofit, while VEE is an emergency response program to Covid-19, funded by FEMA, and housed within the Southeastern Vermont Community Action (SEVCA) program.

To better understand how 33 Buckets and VEE each implement cross-sector collaboration to help them carry out their missions and enhance the resilience of charitable organizations, the author completed two studies represented in two analysis chapters within this thesis:

In Chapter 3, the author analyzed qualitative interview data to identify and describe the factors that 33 Buckets and VEE contribute to effective cross-sector collaborations. Drawing on the DOI theory (Rogers, 2003) and communication theory of resilience (Buzzanell, 2010), the author argues that 33 Buckets and VEE built and maintained communication networks and knowledge sharing to improve their organizations' innovation, resilience, and service delivery. This research is valuable because the results could help these charitable organizations, as well as others, understand how to better collaborate across sectors as they continue to advance food and water access.

In Chapter 4, the author analyzes quantitative survey data to examine public perceptions of water safety. This study focuses solely on the communities in Ccorca, Peru served by 33 Buckets. Drawing on factors from rational models that predict individual behaviors based on their beliefs, the author argues households in Ccorca perceive the tap water to be safe for consumption and they do not perceive themselves to be susceptible to risks from drinking the tap water. Significant perceptions affecting these views were water accessibility and availability, , while significant behaviors affecting water safety views were drinking the tap water and the occurrence of water shortages. In the context of this thesis, it is important to understand how people in Ccorca perceive their water quality and safety before making assumptions about how the communities' collaboration with 33 Buckets affects such perceptions. The author concludes by applying the findings across both studies to discuss how 33 Buckets' collaboration with the community may affect water service delivery and the resilience of the water system. Overall, this research will help identify factors of collaboration that affect clean water access, such that organizations like 33 Buckets may better serve the people in Ccorca and elsewhere.

This thesis ends with a discussion of the results represented in both analysis chapters. While there is some research on how cross-sector collaboration enhances nonprofit resilience, this research will bring a new discussion to the community development sector on how cross-sector collaboration helps charitable organizations be resilient and better serve their communities. This is imperative because "growing social, political, and economic uncertainties have shown that organizational resilience is becoming increasingly important for [charitable] organizations" (Waerder et al., 2021, p. 672). By understanding how cross-sector collaboration enhances service delivery and resilience, organizations will be able to focus on the factors that enhance collaboration and improve their connections to communities.

Literature Review

As the global population continues to grow, vital resources like water and food have become increasingly scarce due to factors like increased consumption, urbanization, and climate change (UN, 2021). The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) (2017) estimate there are still 2.1 billion people that do not have access to safe drinking water globally. Meanwhile, the Food and Agriculture Organization (FAO) reported that food insecurity and malnutrition are moving backward in terms of global progress (FAO et al., 2022). The 2022 report on the global state of food security and nutrition estimated that over 680 million people struggle with food access and predict that 670 million will remain food insecure in 2030, an evaluation that has not changed since 2015 (FAO, 2022). In this section, the author presents the issues associated with water scarcity and food insecurity, followed with an overview of the theory used in this thesis. The author concludes with a discussion of cross-sector collaboration.

Water Scarcity and its Health Implications

Water scarcity indicates there is not enough water, either due to high demand or decreasing quantity and/or quality of water (UN, n.d.). Factors like population growth, urbanization, and climate change are putting additional stress on water availability (Gevera et al., 2022; Bowling et al., 2021; Ghaffoor et al., 2021). Water scarcity is prevalent across the globe. For example, a case study in Kenya has demonstrated that water is unavailable for three months of the year (Orimbo et al., 2020). Similar findings have been reported across the globe in low-income countries such as El Salvador (Caputo et al., 2022), Pakistan (Ghaffoor et al., 2021), and Ghana (Ainuson, 2010).

Rural areas are particularly vulnerable compared to urban areas (Hernandez-Vasquez et al., 2021). For example, Bowling et al. (2021) found that farmers in the Arequipa region of Peru have suffered from water scarcity since increasing development and climate change are drying the natural springs. This is a concern throughout the Peruvian Andes, as glaciers, which have been a main water source during the dry season (Viviroli et al., 2011), are melting and reducing water flow (Racoviteanu et al. 2007;

Silverio and Jaquet 2012). Additionally, Hernandez-Vasquez et al. (2021) reported that Peru has some of the lowest access to safe drinking water in Latin America. Only 52% of Peruvian households had access to safe drinking water in 2018, and the poorest households have demonstrated decreasing access over the last decade (Hernandez-Vasquez et al., 2021).

Water safety is important because unsafe water has been identified as a leading cause of death in many low-income countries due to consumption, poor sanitation, and unhygienic practices, which lead to illnesses like diarrhea, typhoid, polio, and malaria (Caputo et al., 2022). While the U.N. declared safe access to clean drinking water a human right in 2010 (Hernandez-Vasquez et al., 2021; Garcia et al., 2018), many people in low-income countries are still facing water insecurity and have reduced access to safe drinking water, which is also affecting local hygiene and sanitation (Ghaffoor et al., 2021). Therefore, water scarcity is affecting the health and well-being of billions of people (Jepson et al., 2017). Poor access to safe drinking water is linked to water-borne illnesses (Caputo et al., 2022; McGuinness et al., 2020; Kuberan et al., 2015). The largest factor contributing to water contamination is poor sanitation related to deficiencies in water treatment and/or distribution systems (Ghaffoor et al., 2021; Ligon & Bartram, 2016). For example, it was identified that 88% of diarrhea cases in Pakistan are due to poor water, sanitation, and hygiene (WASH) conditions (Ghaffoor et al., 2021). To further demonstrate the severity of this problem, it was found that 90% of deaths related to diarrhea in India are caused by unsatisfactory WASH practices (Kuberan et al., 2015). Additionally, the WHO reported that the most common illness from drinking unsafe water is diarrhea, with poor WASH conditions accounting for 88% of cases (Garcia et al., 2018). Children are particularly vulnerable to water-borne illnesses, and the WHO estimates 1.5 million children die every year from diarrhea in low-income countries (Garcia et al., 2018). Diarrhea is a leading cause of death for children in low and middle-income countries due to poor water quality from contamination (McGuinness et al. 2020). Additionally, poor WASH conditions have been attributed to childhood stunting and children being underweight (Ghaffoor et al., 2021).

Unsafe drinking water leads to a slew of health problems, and people in low-income countries are particularly vulnerable. Fortunately, numerous studies indicate clean water can help manage and prevent waterborne diseases and illnesses (Garcia et al., 2018; Kuberan et al., 2015). Therefore, it is important to understand how nonprofits, public agencies, and local governments could collaborate to improve the situation.

Food Insecurity and its Health Implications

Food insecurity has been defined as the lack of access to food to sustain an active and healthy lifestyle (Nord & Prell, 2007). The United States Department of Agriculture (USDA, 2022c) has split food insecurity into low and very low ratings, dividing those with reduced nutrition from those with reduced food intake. Households struggling with low or very low food security may have anxiety about food, limited access to nutrient-dense foods, and/or reduce their overall food intake (Nord & Prell, 2007).

The Food and Agriculture Organization (FAO) (2022) reported that food insecurity is rising across the globe because of intensifying conflict, climate change, economic instability, and the inflation of food costs. The 2022 annual report predicts that "growing inequalities will continue to challenge food security and nutrition" (FAO et al., 2022, p. 129). The Covid-19 pandemic further stressed food resources due to supply chain interruptions, international trade restrictions, and unstable income sources (Calder et al., 2021; Laborde et al., 2020). Food insecurity is not limited to low-income countries; many communities in wealthy nations also struggle with food access, particularly during the Covid-19 pandemic. For instance, Vermont's food insecurity nearly tripled as a result of the Covid-19 pandemic (Niles et al., 2020c). The organizations estimated that before the pandemic, about one in ten Vermonters struggled with food insecurity. Unfortunately, in the first month of the pandemic, that number increased to about 27% (Niles et al., 2020a). Niles et al. (2020a) found that due to job disruptions and other factors associated with the pandemic, Vermonters did not have money to buy nutritious food and admitted to reducing portion sizes or skipping meals altogether, and most households were not participating in any traditional food assistance programs. Furthermore, those that lost employment during the pandemic were particularly vulnerable to food insecurity (Niles et al., 2020b). Niles et al. (2020b) found that job disruption led to increased food insecurity for almost 32% of households by July 2020 and the pandemic further stressed already vulnerable households. The FAO (2022) had hoped that food security would improve after the peak of the pandemic, but they found that world hunger rose in 2021. This is concerning because individuals that are food insecure lack essential nutrients (Barrett, 2010), meaning that food insecurity leads to poor health outcomes (Olson, 1999) and reduced mental health (Polsky & Gilmour, 2020; Gundersen & Zilia, 2015). The most direct way to alleviate “the health consequences associated with food insecurity is to reduce food insecurity" (Gundersen & Zilia, 2015, p. 1836).

There are a variety of models and organizations engaged in feeding programs throughout the United States, such as charitable organizations, government-funded programs, faith-based organizations, and volunteer-driven organizations (O'Brien et al., 2022). However, these programs are seeing various levels of success. One of the main drawbacks associated with existing feeding programs in the U.S. is that despite food insecurity impacting people from different socioeconomic statuses, especially during the Covid-19 pandemic (Laborde et al., 2020; Niles et al., 2020a), many programs required households to meet and periodically recertify economic eligibility (Gundersen, 2015). It is important to look at innovative approaches to feeding programs that can feed people regardless of socioeconomic status. This thesis seeks to understand how charitable organizations could improve food access through innovative programming and cross-sector collaboration.

Implementing Change and Adopting Innovation

Reducing food insecurity and increasing water access will require implementing changes across geographical scales. Charitable organizations are trying to implement such changes in the communities they serve, but implementing change is not easy to do, because it requires behavior change and the adoption of new ideas (Boyle & Holben, 2012).

Increased knowledge of health risks, and the perceptions that the risks outweigh any cost or inconvenience, encourage people to adopt clean water innovations (McGuinness et al., 2020). Individual psychology and perceptions of risk Sanitation behaviors and decision-making about WASH practices (Daniel et al., 2022). Psychological factors of risk, attitude, and norms reinforce the behavior of whether or not a household treats their drinking water. Boyle and Holben (2012) argue that to change

WASH practices and thereby improve health outcomes related to water safety, change agents must first understand an individual’s or group’s beliefs and goals.

The health belief model (HBM) is a valuable framework for analyzing behavior change based on the perception of health risk (Boyle & Holben, 2012). The concepts of motivation and behavior change are central to the HBM framework (Rosenstock, 1974a,b). The HBM assumes an individual’s actions generate a balance of positive and negative values where positive values encourage further action, and negative ones discourage the behaviors. Regarding one’s health, diseases are negatively valued, and it is expected that an individual will change their daily behaviors to minimize the risk of contracting disease unless doing so puts them at greater risk of negative consequences (Rosenstock 1974a). In the context of this thesis, the first tenet of the HBM (perceived susceptibility of risk) is useful for exploring water safety perceptions in Ccorca because it is known that risk perception of water quality is a common factor in the successful adoption of household water treatment (Daniel, 2021; Rosenstock 1974a). The author uses the first construct of the HBM to analyze the ways that people’s health beliefs in Ccorca affect their perception of drinking water safety.

Diffusion of innovation (DOI) is another theory commonly used to analyze behavior change associated with the adoption of an innovative behavior or product (Boyle & Holben, 2012). The theory, which originated in 1962, is based on a communication process, called diffusion, to bring about social change by sharing messaging about new ideas, practices, or objects, which are collectively called innovations (Rogers, 2003). Greater diffusion and adoption of innovations are assumed if an individual perceives the innovation to be advantageous (Liu et al., 2017; Rogers, 2003).

In addition to explaining behavioral change, DOI theory provides guidance on how to influence the adoption of a new innovation through problem recognition, research, development, marketing, delivery, and diffusion (Rogers, 2003). For instance, a charitable organization can either recognize a problem or respond to a high-priority social problem dictated by an agenda-setting process. Communication plays a key role in developing and adopting innovations (Liu et al., 2017; Rogers, 2003). By exchanging information with other collaborators, the charitable organization can recognize the needs and wants of a social group and develop ideas that are expected to meet the established needs (Rogers, 2003). Once the product or service is developed, the organization needs to diffuse the innovation to potential adopters. The diffusion process shares the messaging of the innovation, and the community will either choose to adopt the behavior change or not based on their knowledge, attitudes, and engagement with the innovation. Most people will not adopt an innovation unless they see it as more advantageous than their existing method (to treat water, etc.) or product (Rogers, 2003).

Researchers have started to investigate how collaboration connects to innovation and resilience (Cankar et al., 2013). Thus, I brought together the communication theory of resilience (Buzzanell, 2010) and DOI theory (Rogers, 2003) to determine how collaboration affects the ability of charitable organizations to provide services.

Cross-sector Collaboration

Cross-sector collaboration is an effective practice for defining complex problems, such as food and water security, and developing and implementing meaningful solutions.

Cross-sector collaboration has been researched and defined in many ways across a variety of disciplines. Gray (1989) defined collaboration in a seminal article as, "The constructive management of differences" (Kramer, 1990, p. 545). Since then, the definition has narrowed to focus on the links (Cankar & Petkovsek, 2013; Bryson et al., 2006), networks (Cankar & Petkovsek, 2013; Bryson et al., 2006), partnerships (Zhong et al., 2008), and multilevel systems (Bryson et al., 2015). Authors may use different language, but they are describing the same phenomenon in which collaboration is coming together with other people outside of an organization to share knowledge, exchange ideas, and solve problems that one cannot solve on their own (Cankar & Petkovsek, 2013; Bryson et al., 2006; Linden, 2002).

Collaborative partnerships may be initiated by government actors, business leaders, nonprofit organizations, local communities, and/or the public (Bryson et al., 2006). During collaboration, two or more of these organizations come together and share resources, knowledge, financial capital, materials, and/or personnel, each striving to gain mutual benefit from the partnership (Cankar & Petkovsek, 2013). Bryson (2006) argued that organizations engage in collaboration with other organizations because "they cannot get what they want without collaborating" (p. 45) or because collaboration is assumed to be the best approach. Since it is becoming more common for governments to pursue cross-sector collaboration as a method to manage public problems (Bryson et al., 2015), and since widespread change and impact are not possible without scaling solutions (Atwell et al., 2009), it reinforces the connection between communication and collaboration, and the intertwined relationships of an organization's resiliency and innovativeness in this thesis. Importantly, it is the combined action of collaboration, not just the connections, that ultimately addresses public problems (Koschmann et al., 2012) by expanding the resources available to organizations (Forrer et al., 2014). Additionally, there is evidence that collaborative partnerships offer more effective, efficient, and equitable decision-making (Buffardi et al., 2012).

Critics indicate the collaborations may hinder the level of service that nonprofits give to their communities when government agendas dominate (da Costa, 2019). Others criticize that government interventions could disempower local communities when partners fail to achieve their goals (Assies, 2004). When individuals and groups have different communication styles and personal values, the challenges can be managed with effective communication (Linden, 2002). Gray (1989) argues that conflicts are neither "good" nor "bad", but rather an opportunity to pursue open-minded exploration of the concerns to arise at a mutual agreement.

Cross-sector collaborations are most successful when the participants are inclusive and transparent, engage in dialogue, and are open to a shift of power and equity (Zhong et al., 2008). Trust in collaborative partnerships like these has been shown to improve when there is transparent communication between the actors (Coleman et al., 2017). To improve outcomes, power issues must be addressed. In addition to working with local nonprofits and businesses, engaging community stakeholders in decisions is beneficial (Jalba et al., 2014; Ainuson, 2010). Community engagement allows the community to take ownership of their knowledge and make informed decisions (Furlong & Tippett, 2013).

Cross-Sector Collaboration for Food Access

Charitable organizations have been trying to improve food access through collaborative efforts. Bazerghi et al. (2016) were the first to research the role of food banks in improving food access. The authors found that many food banks are not able to meet the quantity or nutritional demand of those in need. Unfortunately, people often turn to food banks during times of food crisis (Ollove & Hamdi, 2021), and many rely solely on food banks and similar programs, even though they are not designed to be someone's only source of food (Bazerghi et al., 2016). Worse, the food banks were overwhelmed by demand due to Covid-19 and struggled to distribute food during shelter-in-place restrictions (Ollove & Hamdi, 2021).

An alternative to food banks was implemented by Fresh Approach, a food access organization in California, where the organization pivoted during Covid-19 to collaborate with local farmers to bring food to those struggling with food insecurity (Ollove & Hamdi, 2021). The organization used a hub-and-spoke model of farms and nonprofits, where each hub distributed food in its existing network (Ollove & Hamdi, 2021). The model is similar to the community hubs that VEE used to expand the impact across the state. There are similarities between the VEE hub structure and the food hubs discussed by Conner et al. (2019), who indicated that food hubs are a collaboration between local food producers and buyers. The authors reported that food hubs gave producers centralized drop-off points and provided facilities and storage while allowing for greater variety and lower costs for buyers.

The need for cross-sector collaboration to address the complex problem of food security issues was highlighted by Harmann et al. (2011). Cross-sector collaborations arise from hub structures by encouraging food producers to maintain and use their own communication network (Haggans & Yuan, 2021), though these collaborations will also require the participation of government actors, private firms, nonprofits, and others in the value chain to tackle the interrelated problems of food security and public health (Stuckler & Nestle, 2012; Harmann et al., 2011).

Cross-Sector Collaboration for Safe Water Access

Water management in Peru has historically been left to the local communities (Assies, 2004). Unfortunately, this strategy has not been successful, as shown by the fact that the country has a record of being one of the worst regarding safe drinking water in Latin America (Hernandez-Vasquez et al., 2021). In 2018, only about 52% of households had access to safe drinking water, and the poorest households were showing a decline in access (Hernandez-Vasquez et al., 2021). Some authors have recommended cross-sector collaboration as a method to improve water access and delivery (Lima et al., 2021; Jalba et al., 2014; Lee, 2010).

The water sector has started using cross-sector collaboration as an approach to expand the development and management of public infrastructure (Ameyaw & Chan, 2013a). It is often expected by the public that governments provide clean water (Francis et al., 2015), but this is not feasible if the government is unable to finance large infrastructure projects that are typical of clean water systems (Awang et al., 2020). Another obstacle arises when the public loses trust in their government to provide safe water (Daniel et al., 2022). To change the narrative, some government agencies, like one in Punjab, India, have partnered with private organizations to bring safe drinking water to their communities (Ravindra et al., 2020). Advocates have argued that collaboration in the water sector would expand skills, and experience, and improve efficiency, while providing needed capital for the infrastructure to extend the water supply (Ameyaw & Chan, 2013a).

Involving the community, in addition to local nonprofits and businesses, in cross-sector collaborations is essential to the long-term success of water quality interventions because cultural factors and community preferences play a role (Francis et al., 2015). For example, a study in India found that many factors affect whether a community will adopt a new water system, including personal perceptions and preferences, convenience and availability of water, and resistance to change (McGuinness et al., 2020). The authors suggested that identifying these barriers through community collaboration can help achieve better adoption of the water system.

Purpose Statement and Research Questions

This thesis is a mixed methods study that will address the collaboration practices of charitable organizations to the extent that they affect service delivery and resilience for partner communities. I use a convergent mixed methods design, a type of design in which qualitative and quantitative data are collected and analyzed separately and then merged during interpretation (Cresswell & Plano Clark, 2018). The reason for collecting both quantitative and qualitative data is to complement the two forms of data to bring greater insight into collaborative practices than would be obtained from either type of data separately.

First, the qualitative study will consider how cross-sector collaboration affects service delivery for charitable organizations. Semi-structured interviews will explore the factors of collaboration for VEE and 33 Buckets, two charitable organizations serving people in Vermont and Peru, respectively. Specifically, I ask, (1) How do communication, innovation, and cross-sector collaboration relate? (2) How does cross-sector collaboration improve innovation, resilience, and service delivery outcomes for charitable organizations?

On the other hand, the quantitative study used a Likert scale of water perceptions and behaviors survey to apply the first tenet of the HBM to predict household evaluation of drinking water safety in two villages in Ccorca, Peru. Specifically, I ask, (1) In which ways do individual or societal health beliefs affect the way people in Ccorca perceive water is safe to drink? (2) Do the same factors predict health satisfaction? The findings from the two studies will be merged during the final discussion to discuss the extent to which the collaborative themes complement the drinking water safety perceptions in Ccorca. Recommendations will be made to express how charitable organizations can further improve collaboration and water access in Peru. In particular, I aim to answer, (1) How do cross-sector collaborations impact public perceptions of water accessibility solutions? (2) To what extent do themes from the interview data reporting collaboration views of staff and volunteers at charitable organizations complement the quantitative results about water safety perceptions reported on the drinking water surveys from households in Ccorca?

Collaboration has been hailed as the best approach to managing public problems because these partnerships improve public value and resilience (Bryson et al., 2006). This thesis explores how cross-sector collaboration improves service delivery and resilience by considering two organizations dedicated to making an impact. The first is Vermont Everyone Eats (VEE), which has improved access to food for Vermonters during the

Covid-19 pandemic. The other is 33 Buckets, a water access nonprofit working to bring chlorinated water systems to rural areas of Peru.

VEE is a Covid-19 response program that contracts with local restaurants to prepare nutritious meals using locally produced ingredients (VEE, 2022). These prepared meals are distributed via community hubs to Vermonters experiencing food insecurity due to the pandemic. Next, the registered nonprofit 33 Buckets has been working to implement sustainable water systems in Peru (33 Buckets, 2021b). The organization is maintaining chlorinated treatment systems in six villages in the Ccorca district to ensure safe drinking water access (33 Buckets, 2022c).

Even though this thesis considers the charitable structure of both organizations, it does not attempt to compare them directly to each other. 33 Buckets is a 501(c)(3) nonprofit, while VEE is an emergency response program to Covid-19, funded by FEMA, and housed within the Southeastern Vermont Community Action (SEVCA) program. In partnership with these organizations, this thesis examines how cross-sector collaboration enhances service delivery and resilience in charitable organizations using a convergent design of mixed methods.

The qualitative study applies the DOI and communication resilience theories to understand how 33 Buckets and VEE each implement cross-sector collaboration to help them carry out their missions and enhance their resilience. The executive director of 33 Buckets said, “Collaboration is the biggest barrier to [the] success of these water access projects.” This study takes advantage of the opportunity to explore how cross-sector collaboration can help charitable organizations understand what factors constrain or enhance collaboration. Identifying these factors will help nonprofits understand how to better collaborate across sectors as they continue this work.

On the other hand, the quantitative study focuses on the work that 33 Buckets has been doing in Ccorca. The study is based on the first construct of the health belief model to analyze what factors affect perceptions of drinking water safety. In the context of this thesis, it is important to understand how people in Ccorca perceive their water quality and safety before making assumptions about how the communities' collaboration with 33 Buckets affects such perceptions. I will conclude by applying the findings across both studies to discuss how 33 Buckets' collaboration with the community may affect water service delivery and the resilience of the water system. Overall, this research will help identify factors of collaboration that affect clean water access, such that organizations like 33 Buckets may better serve the people in Ccorca and elsewhere.

While there is some research on how collaboration enhances charitable organization resilience, this research will bring a new discussion to the community development sector on how collaboration helps charitable organizations better serve their communities. By understanding how cross-sector collaboration enhances service delivery and resilience, organizations will be able to focus on the factors that enhance collaboration and improve their connections to communities.

Chapter 2: Methods

Mixed methods are useful for data collection because qualitative and quantitative each offer different perspectives, which together may provide a more complete understanding of a research topic (McGuinness et al., 2020; Sandelowski, 2014). When a mixed methods study uses a convergent design with different samples, meaning quantitative and qualitative data are gathered and analyzed separately, but then the findings are merged during interpretation, the results can be synthesized to understand how they complement each other to gain a complete picture of a phenomenon (Clark & Ivankova, 2015).

This study used mixed methods with a convergent design to examine how collaboration impacts service delivery for charitable organizations. Qualitative interviews were completed with members of two organizations in different charitable sectors (food security and water access). Quantitative surveys were conducted by staff from the water access nonprofit. For information and a timeline regarding data collection and analysis see Table 1.

Guided by the research questions, these data were analyzed independently. The findings from each dataset were then merged during interpretation. This investigation resulted in three analysis chapters. The first analysis chapter (Chapter Three) focused on factors affecting cross-sector collaboration at two charitable organizations. The second analysis chapter (Chapter Four) focused on household views on drinking water safety based on reported perceptions and behaviors. The final analysis chapter (Chapter Five) focused on the mixed interpretation of the results to understand how cross-sector collaboration affects service delivery and its views by the community. For information about analysis chapters and their relevant datasets, see Table 2. Before discussing the results of this study, this chapter will provide details about the participants and methods for data collection and analysis.

Research Paradigms and Worldviews

Before diving into the specific methods used, it is common in mixed methods research to discuss the foundational assumptions on which this research is based (Onwuegbuzie & Leech, 2005). Because values are the foundation for ethical decisions, they guide the direction of the research (Cresswell & Plano Clark, 2018). In the end, these foundational assumptions affect the application of the research findings (Ponterotto et al., 2013).

The approach to this thesis was a dialectical perspective crossing a transformative paradigm with a constructive one, where it is recognized that everyone is living their own reality, and they are entitled to their thoughts, opinions, and feelings (Yoon & Lubienski, 2018). However, it is also acknowledged that each perspective is multifaceted, based on different backgrounds and social and cultural factors that influence individual actions and decisions (Greene, 2008).

Table 1: A Mixed Methods Convergent Design of Collaboration in Charitable Organizations and Service Perceptions

Timeline	Procedures		Products	Timeline	Procedures		Products
Fall 2021	Other UVM researchers select 12 VEE taskforce members for interviews; UVM researchers conduct semi-structured interviews.	qual data collection	Transcripts on VEE's formation and operation as a Covid-19 response	December 2020	33 Buckets selects 43 households in Ccorca villages to conduct surveys. Survey measures perceptions and behaviors of drinking water	QUAN data collection	Numerical item scores for 10 perceptions and 9 behaviors related to drinking water (during Covid-19)
Winter 2021-2022	Thematic analysis of VEE task force interviews	qual data analysis	Codes and themes	Winter 2023	Enter numerical item scores into SPSS.	QUAN data compilation and cleaning	Digital data for analysis
Spring 2023 CDAE 335	UVM graduate students select 20 VEE hub leaders for interviews; Grad students conduct semi-structured interviews.	qual data collection	Transcripts on VEE's formation and operation as a Covid-19 response		Analysis with Frequency counts, Crosstabs with chi-square test	QUAN data analysis	Frequency tables, crosstab tables

Note. Table continued on the next page.

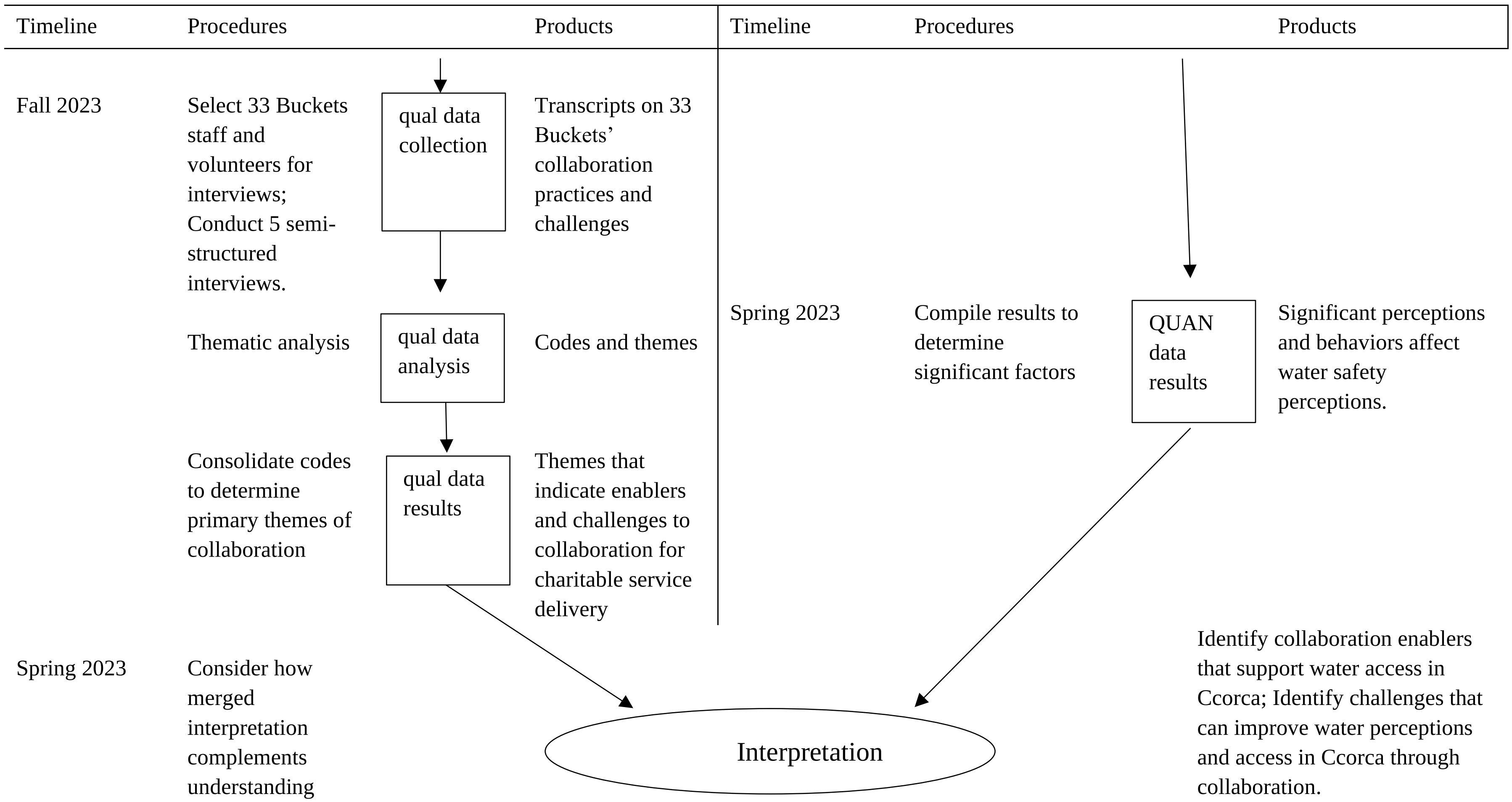
Timeline
Procedures
Products
Timeline
Procedures
Products
Fall 2023
Select 33 Buckets staff and volunteers for interviews; Conduct 5 semi-structured interviews.
qual data collection
Transcripts on 33 Buckets' collaboration practices and challenges
Thematic analysis
qual data analysis
Codes and themes
Consolidate codes to determine primary themes of collaboration
qual data results
Themes that indicate enablers and challenges to collaboration for charitable service delivery
Spring 2023
Compile results to determine significant factors
QUAN data results
Significant perceptions and behaviors affect water safety perceptions.
Spring 2023
Consider how merged interpretation complements understanding
Interpretation
Identify collaboration enablers that support water access in Ccorca; Identify challenges that can improve water perceptions and access in Ccorca through collaboration.

Table 2: Data Implementation Matrix

Dimension of Conceptual Framework	Research Question	Data Source	Sample	Data Analysis	Aim
Contextual factors of collaboration	How does cross-sector collaboration impact service delivery for charitable organizations?	Interview transcripts from charitable organization staff and volunteers	VEE taskforce members and hub leaders, and 33 Buckets staff and volunteers	Thematic analysis	To determine what factors enable or challenge collaboration for charitable organizations, and how that affects overall service delivery
Perceived susceptibility to illness from drinking water	What is the relationship between drinking water perceptions/ behaviors and perceptions of water safety in Ccorca?	Likert scale survey responses on the perceptions of and behaviors around drinking water	Households in Ccorca	Frequency counts and crosstabs with Chi-square	To evaluate whether households in Ccorca perceive themselves to be at risk from drinking the tap water
Collaboration affects perceptions of water and service delivery	To what extent do the themes from the interview data complement the survey responses?	Mixing of the data during interpretation		Concept mapping of major themes and significant variables from each study to identify those common to both and expand upon the meaning	To determine how collaboration complements drinking water service delivery and safety perceptions in Ccorca

Qualitative Interviews

Semi-structured interviews explored how cross-sector collaboration affects two charitable organizations' ability to deliver sustainable services, like drinking water or food. First, I analyzed transcripts from semi-structured interviews previously conducted by faculty and students affiliated with the University of Vermont Food Systems and Community Development and Applied Economics graduate programs. Later, I also interviewed five staff members associated with 33 Buckets about their collaboration, innovation, and resilience using a semi-structured interview protocol.

Vermont Everyone Eats

VEE Organizational Context

VEE was founded in 2020, during the early days of the Covid-19 pandemic. The organization was founded on a three-pillar approach to "stimulate restaurants, feed Vermonters, and support local farms and food producers" (VEE & SEVCA, 2020, p. 1). The founding task force members took advantage of their existing connections to brainstorm ways that would help the local restaurant businesses stay afloat when many were shutting their doors, while also feeding Vermonters that were suddenly finding themselves food insecure after losing their jobs due to the pandemic (Niles et al., 2020a).

Some unique features of the program are that there were no eligibility requirements except for participants self-identifying that they had been negatively affected by the pandemic. Furthermore, participating restaurants were reimbursed $10 for every meal served and they were required to source at least 10% of their ingredients from local farms and food producers (VEE, 2020). The majority of restaurants exceeded this minimum requirement of locally sourced ingredients.

SEVCA oversees and provides administrative support to the program and established a statewide task force and community hub operating structure. The task force oversees the community hubs with experience from anti-hunger and economic development nonprofits, and state government sectors in emergency response, agriculture, human services, and economic development.

The community hubs act as regional organizers, managers, and fiscal agents by recruiting restaurants, distributing meals, and connecting food producers with participating restaurants. The program was funded by the Federal Emergency Management Agency (FEMA) and the Vermont Agency of Commerce and Community Development (VEE & SEVCA, 2020).

VEE Interview Participants

Anne Massie, a previous graduate student in the Food Systems program at UVM, observed the VEE task force meetings and invited its 22 members to participate in interviews regarding the program. The task force members that were 18 years of age or older were sent three email invitations over the course of one month, which introduced the project and informed participants of their rights regarding participation. Thirteen task force members replied indicating interest and they scheduled an interview time. The participants are listed in Table 3, taking care to avoid detailed descriptions of the participants and their work to prevent re-identification among such a small group, therefore all respondent names were changed (Pascale et al., 2022).

Next, a similar process was followed by students enrolled in CDAE 335 Qualitative Mixed Methods at UVM during the Spring 2022 semester. The students selected 20 VEE hub leaders, constructed an interview protocol as a class, and conducted interviews in pairs. The complete protocol is attached in Appendix A. The interviews were recorded and transcribed and then made available to me for thematic analysis. To help veil the participants' identities, the participants were grouped by region, following Figure 1. If a hub served more than one region, the corresponding participants were grouped according to the hub's founding location.

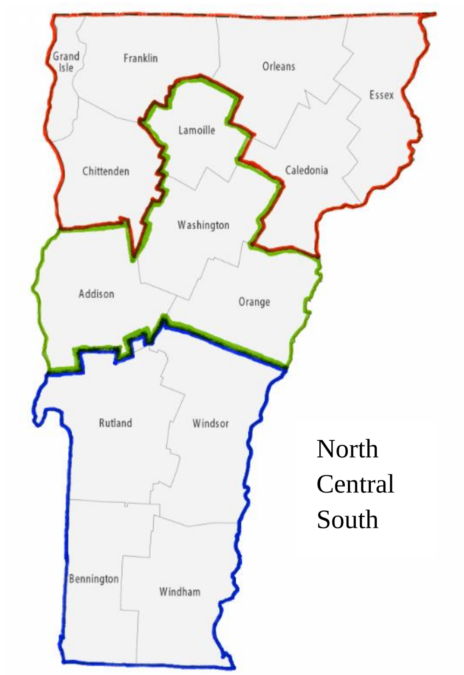

Figure 1: VEE Community Hub Participants Location Groups

Table 3: VEE Interview Participants

VEE Context	Sector or Region	Pseudonym
Task Force	Non-profit Sector	Bjork
		Cher
		Courtney
		Dolly
		Grace
		Karen
		Peggy
		Ziggy
	State Government	Beck
		Buffy
		Joni
		Neil
		Tom
Community Hubs	North	Emily
		Bjork
		Jane
		Joanne
		Justin
		Miela
		Nic
		Remi
	Central	Arlene
		Collin
		Zeynep
	South	Laura
		Monica
		Nadine
		Naomi
		Natalie
		Roxanne
		Toni
		Vera
		Ziggy

VEE Interview Materials and Collection

With guidance from Dr. Sarah N. Heiss, Anne Massie formulated a semi-structured interview protocol with eleven open-ended questions based on themes from the literature and the first six months of ethnographic observations. This interview format includes a list of standard open-ended questions but allows for flexibility with probing questions that emerge from the discussion and participants' perspectives (Denny & Weckesser, 2022). The semi-structured interviews were conducted by Anne Massie between November and December of 2021, and they varied from 32 to 57 minutes with an average duration of 46 minutes. Altogether, the VEE task force interviews generated 120 pages of transcription. The interviews were audio recorded to review the transcripts for accuracy and edit them as needed. One member of the task force was interviewed twice to clarify, confirm, and elaborate on some of their responses.

The protocol asked the participating task force members questions related to communication, collaboration, resilience, and innovation. The complete protocol for these interviews is attached in Appendix A, and includes questions such as,

> *1. I noticed on the VEE website and news media repeating the same words: VEE is innovative and effective. Do you agree with this evaluation?*
> *PROBE: (If agree): Tell me about how it was innovative or effective.*
> *Alternative: (If they don't agree) How would you describe the VEE program?*
> *PROBE: (If they don't agree) What parts of VEE were effective? Which weren't?*
>
> *2. What was it about the task force or the way it operated that allowed it to support such an innovative and effective program?*

The interviews were transcribed by a third-party audio transcription service, Scribie.com. The transcripts were reviewed for accuracy and made available to me for thematic analysis with open, axial, and selective coding strategies (McGuinness et al., 2020).

33 Buckets

33 Buckets Organizational Context

The water access nonprofit 33 Buckets was founded in 2015 following a school project at Arizona State University that designed a clean water solution for a girls' college in rural Bangladesh (33 Buckets, 2022c). Since then, 33 Buckets has partnered with 15 communities in Peru and the Caribbean. Lately, the organization has focused its recent efforts on the rural areas surrounding Cusco, Peru.

The nonprofit has one full-time staff member that acts as the executive director but otherwise relies on volunteers, most of whom are engineering students or professionals. Many of these students are affiliated with the EPICS program at Arizona State University, which allows them to practice "design-based learning and social entrepreneurship" in a real-world context (33 Buckets, 2021). The students work on projects like sensor prototypes and a water quality data collection network.

The organization was founded on the principles that long-term impact and community empowerment happen through a human-centered approach and local partnerships (33 Buckets, 2021). The human-centered approach means they work to connect with and understand the local community members' needs, desires, and way of life, and they design specific solutions for each community based on those. The local partnerships with nonprofits and the government enable the organization to work toward establishing water security for the Ccorca district, meaning the community has enough clean water (33 Buckets, 2022c). Fortunately, the local government has invested in drinking water reservoirs with chlorine water treatment for many of these villages, allowing 33 Buckets to focus on the system mechanics, water treatment methods, training, and education.

33 Buckets Interview Participants

The executive director of 33 Buckets agreed the organization could use some help with data analysis and research, and he provided a list of volunteers that had agreed to participate in the interview process. Upon receiving the list, each person was sent an introductory email describing the research study, its purpose, objectives, and risks associated with participation. Five had emailed back to indicate interest and were sent a consent form. Upon return of the form, an online interview was scheduled. The participants' names, pseudonyms, and roles were omitted to prevent re-identifying the participants in such a small group (Pascale et al., 2022).

33 Buckets Interview Materials and Collection

An interview protocol was prepared with guidance from Dr. Sarah N. Heiss with nine primary questions about the organizations' collaboration, innovation, and resilience. The open-ended questions were based on themes from the literature but allowed for flexible probing questions to emerge from the discussion (Denny & Weckesser, 2022). Examples of questions are included below, and the entire protocol is included in Appendix A.

> *2. Describe how 33 Buckets collaborates.*
> *Prompts: Why do you work together? What types of projects do you work on together? When did the collaboration start? Who is involved in the collaboration? Are there other organizations involved?*
>
> *4. I'd like you to think back to the beginning of the collaboration between the Ccorca communities and 33 Buckets. How did 33 Buckets come to work with these communities?*

Prompts: What was the timeline for meeting and working? Why did you decide to work together? Who or what prompted the collaboration? How did your partnership form? Was it a formal or informal process?

The interviews were conducted via Microsoft (MS) Teams by me in August and September of 2022, and lasted between 36 and 46 minutes, with an average duration of 41 minutes. The interviews were recorded to review them later for accuracy and transcribed automatically by MS Teams, resulting in 53 pages of transcription. After the analysis was completed, the interviewees were asked to confirm the main themes.

Qualitative Interview Analysis

Altogether 38 interviews were conducted with VEE, the VEE community hubs, and 33 Buckets. The transcripts were analyzed with thematic analysis, an iterative and continuous method of processing, reducing, and explaining the data to identify recurring themes (Braun & Clarke, 2006). The interview transcripts were repeatedly coded using open coding, axial coding, and selective coding procedures until no new codes or themes emerged (McGuinness et al., 2020).

Qualitative methods were chosen for this aspect of my thesis because they are proven to be effective in exploring complex topics (Francis et al., 2015), and help researchers look at the whole system of lived experiences (Lindlof & Taylor, 2019). Overall, these methods allow researchers to study problems that affect real people while giving individuals the freedom to express their traditions and culture (Lindlof & Taylor, 2019).

Finally, the executive director of 33 Buckets assembled a list of staff members that might agree to be interviewed. Each staff member on the list was sent an introductory letter describing the research project, the purpose of the interview, and outlining the efforts to keep their identities confidential. Those that were interested then contacted me and were given an informed consent form. Upon returning the form, I scheduled a convenient time for an online interview to occur over Microsoft Teams.

I conducted the interviews using an interview protocol consisting of twelve main questions, as shown in Appendix A. These questions were followed by related probing questions to ensure complete details were included in the interviews. The interviews were automatically transcribed by Microsoft Teams, and then thematically coded using Nvivo version 1.6.1 (1137) using the same open and axial coding process.

Once all of the interviews were open-coded, those codes were condensed into common categories with axial coding. Then, those categories were grouped by themes found in the collaboration literature, such as communication, trust, impact, and innovation. Finally, through selective coding, salient quotes were selected during the analysis to demonstrate the meaningful findings.

Quantitative Surveys

The second study of this thesis analyzed Likert scale surveys provided by 33 Buckets. The organization conducted the surveys in two villages across the Ccorca district in December 2020. The questions asked households to rank their agreement level to statements related to perceptions and behaviors related to their family's health, community drinking water, and WASH practices.

Survey Participants

The surveys were conducted in two villages in the Ccorca district in December 2020. Purposeful sampling was used to understand the drinking water perceptions and behaviors of those that reside in the villages (Torres-Slimming et al., 2019). Staff and volunteers associated with 33 Buckets went door-to-door to speak with available household members. To account for the families that worked during the day, they also traveled to the agricultural fields to speak with families there. In total, 43 households were surveyed, 20 from Village One and 23 from Village Two, as shown in Figure 2. They administered the survey to the head of the household, but when that was not possible another available family member could take the survey on behalf of the household.

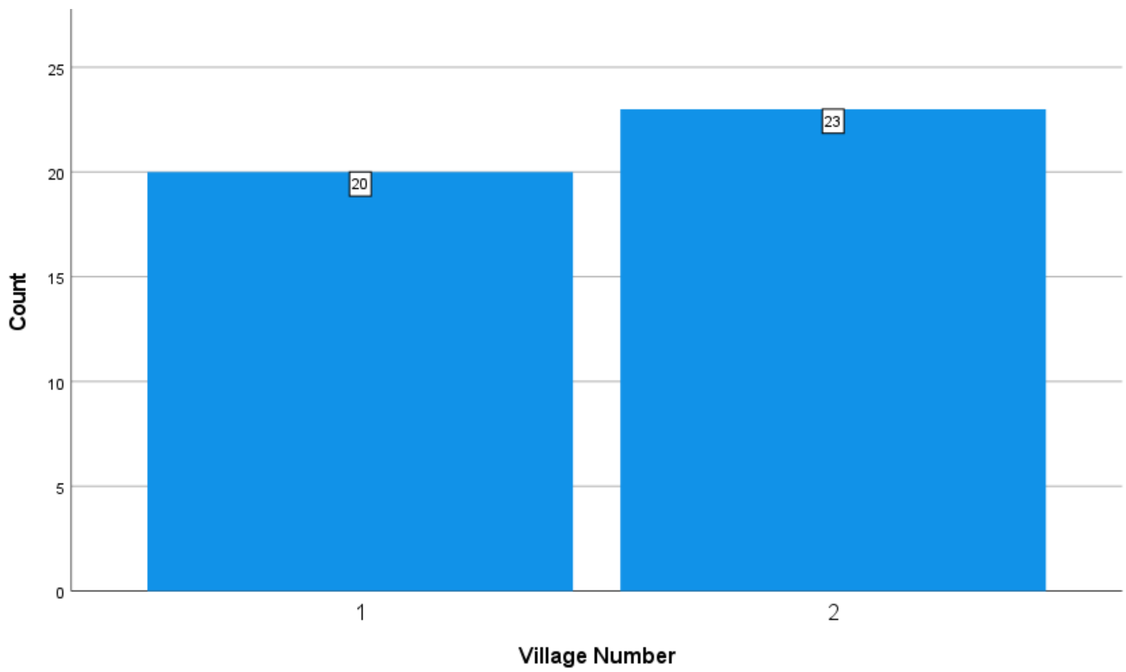

Figure 2: Survey Participants by Village

Survey Materials and Data Collection

Multi-part surveys were used to evaluate the perception of risk from drinking the tap water among the population in Ccorca, Peru. The surveys were conducted in Spanish and measured the perceptions and behaviors associated with drinking water in the villages. The surveys and responses were then translated using Google Translate.

The surveys were created by 33 Buckets staff and volunteers. The first part included demographic data such as age, number of family members, and employment status.

The second portion of the survey asked open-ended questions about water access and quality, however since these responses were recorded in Spanish, they were not included for analysis in this thesis. The third and fourth parts of the survey were the focus of the data analysis in this thesis and asked participants to rank perceptions and behaviors related to their drinking water. Specifically, the third part of the survey asked households to rate their perceptions of health and water quality using Likert scales from one, strongly disagree (*mu yen desacuerdo)* to five, strongly agree (*muy de acuerdo*). Finally, the fourth part of the survey asked households to rank their behaviors related to drinking water on a scale from one, never (*nunca*), to four, often (*amenudo*). Complete copies of the survey questions in Spanish and English are attached in Appendix B.

Survey Analysis

Once the data was collected, compiled, and identifying information was removed, the PDF files were sent to the author for digitization, cleaning, and processing of the data. Likert scale responses were entered into SPSS version 28.0.0.0 (190) and then recoded to binary measures for analysis as shown in Table 4. The variables were named as shown in Table 5.

Table 4: Recoding Strategy for Independent Variables

Variable Type	No (0)	Yes (1)
Perception (five-part Likert scale)	Strongly Disagree Disagree Neutral	Agree Strongly Agree
Behaviors (four-part Likert scale)	Never Rarely	Sometimes Often

Table 5: Survey Variables Measuring Perceptions and Behaviors

Variable Type	Survey Question	Variable Name[c]	Measurement
Dependent Variables	Part 3, #2	Water_Safe	Ordinal
	Part 3, #1	Health_Satisfactory	Ordinal
Independent Variables:			
Part 1[a]	1	Age	Scale
Demographics	2	Gender	Nominal
		Male	Binary
	3	Family Size	Scale
		Village	Nominal
		VillageNumber	Nominal
	5	Working_Binary	Binary
Part 3	3	Taste_Flavor	Ordinal
Perceptions		Flavor_Binary	Binary
	4	Health_correlation	Ordinal
		HealthCorr_Binary	Binary
	5	Accessible	Ordinal
		Accessible_Binary	Binary
	6	Availability	Ordinal
		Availability_Binary	Binary
	7	HomeTapWater	Ordinal
		Convenient_Binary	Binary
	8	Handwashing	Ordinal
		Handwashing_Binary	Binary
	9	Boiling_Safe	Ordinal
		BoilSafe_Binary	Binary
	10	Visual	Ordinal
		Visual_Binary	Binary
Part 4[b]	1	Purchase_Water	Ordinal
Behaviors			
		Purchase_Binary	Binary
	2	DrinkTapWater	Ordinal

Variable Type	Survey Question	Variable Name[c]	Measurement
Part 4[b]		DrinkTapWater_Binary	Binary
Behaviors continued	4*	BoilTapWater	Ordinal
		BoilTapWater_Binary	Binary
	5	Illness	Ordinal
		Illness_Binary	Binary
	6	WashBeforeCook	Ordinal
		WashBeforeCook_Binary	Binary
	7	WashAfterToilet	Ordinal
		WashAfterToilet_Binary	Binary
	8	Water_Shortage	Ordinal
		Shortage_Binary	Binary
	9	Chlorine_Presence	Ordinal
		ChlorinePresence_Binary	Binary
	10	Filter	Ordinal
		Filter_Binary	Binary

Notes. [a]Question number 4 of Part 1 listed the family members' ages and was omitted from the dataset.
[b]Question number 3 of Part 4 was omitted due to a lack of clarity in the respondents' interpretation.
[c]Indented variables were recoded from the original listed above it with no indent.

Survey Analysis

The survey results from all 43 households were evaluated in SPSS version 28.0.0.0 (190) with frequency distributions and crosstabs with Chi-square tests.Univariate statistics were conducted to demonstrate the frequency distributions for the ordinal outcome variables *Water Safety Perceptions* and *Family Health Satisfaction* (Kuberan et al., 2015). A frequency distribution is useful in revealing the popular views and behaviors of a sample (Ghaffoor et al., 2021). Next, the two dependent variables were cross-tabulated with each independent variable alongside a Chi-square test (Geremew et al., 2019), which is useful to determine if they were correlated (Daniel, 2021).

Ethics Statement

Since qualitative research has been described as the researcher inserting themselves into the subjects' lives (Berg & Lune, 2012), the protocols for this research were reviewed by the institutional review board (IRB) at the University of Vermont (UVM), and both studies were found to be exempt.

The qualitative study was granted an IRB exemption because it does not meet the regulatory definition of research according to 45 CFR 46.102(d). That is because the intent was to assess a specific program based on its collaboration and provide suggestions for improvement. However, to protect participants to the fullest extent, those that took part in the 33 Buckets semi-structured interviews received an informed consent form before participation. While it was impossible to shield the identities of the participants from the researchers, the interviewee identities have been kept confidential for the duration of the research study and will be destroyed upon the defense of this thesis, as recommended by Berg and Lune (2012). To help protect participants' identities, pseudonyms were assigned, and defining characteristics (i.e. position titles, etc.) were generalized to the fullest extent possible to help eliminate identifying information.

Next, the quantitative study was also determined to be exempt from review in accordance with 45 CFR 46.102(d) since 33 Buckets was collecting the data in Peru regardless of my study. The only caveat was that the identities of the individuals surveyed by 33 Buckets were to remain anonymous to myself and the research team. This was accomplished by striking the names and any contact information from the surveys before I received them. While conducting surveys in Peru, 33 Buckets considered those participants that agreed to take the survey to be providing consent (Orimbo et al., 2020).

Mixing the Results during Interpretation

Once the results were analyzed for both studies independently, I synthesized and analyzed the two studies with mixed methods to interpret the findings more deeply. I began with a concept map of the themes from the qualitative collaboration study then added the significant variables from the quantitative drinking water study. Next, I conceptualized the cause and effect of the themes and variables and illustrated them with arrows on a simplified concept map of the factors connecting both studies. Finally, I identified the themes that had at least two corresponding effects for further mixed methods examination using a joint display, shown in Chapter Five.

Chapter 3: Cross-Sector Collaboration, Communication, and Resilience: A Qualitative Study of Charitable Organizations' Service Delivery Focused on Water and Food Systems

Abstract

Food and water security are becoming increasingly concerning due to climate change, population growth, and the Covid-19 pandemic. Cross-sector collaboration is key to effective solutions. Drawing on diffusion of innovation and the communication theory of resilience, this article explores how communication, innovation, resilience, and service delivery are related to cross-sector collaborations addressing food and water security. Based on thematic analysis of 37 semi-structured interviews, the authors argue that cross-sector collaboration supports innovation, resilience, and service delivery for charitable organizations. Specifically, knowledge sharing, transparency, and networking are important for successful cross-sector collaborations. Theoretical and practical implications focus on how public administration practitioners can use collaboration and communication to address the complex issues surrounding water and food security in their communities.

Introduction

Cross-sector collaborations are public administration strategies that have been hailed as the best approach for solving the world's most complex problems (Koschmann et al., 2012; Bryson et al., 2006; Linden, 2002). In this article, cross-sector collaboration is defined as the coming together of people from multiple independent organizations to work toward an interdependent goal that one organization could not solve on its own (adopted from similar definitions by Cankar & Petkovšek, 2013 and Bryson et al., 2006).

Effective cross-sector collaboration relies on communication (Koschmann et al., 2012). As such, communication theories are valuable lenses through which to view cross-sector collaborations. Communication includes practices that people and organizations use to share meaning, increase understanding, and coordinate actions; it can include spoken, written, and typed messages, as well as images and body language (Putnam & Mumby, 2013).

In addition to facilitating resource and knowledge sharing, cross-sector collaboration has been linked to increased innovation (Cankar et al., 2013; Beckett & Hyland, 2011) and resilience (Amankwah et al., 2022; Bryson et al., 2006, 2015). Diffusion of Innovation (Rogers, 2003) is a well-applied theory in academic and professional spheres, that describes the communication processes needed to identify a problem, as well as to develop and share a meaningful solution (Lee et al., 2020; Liu et al., 2017; Beckett & Hyland, 2011). Diffusion theory (Rogers, 2003) argues that cross-sector collaboration is important to developing and diffusing meaningful, innovative solutions.

Buzzanell's (2010) communication theory of resilience (CTR) posits that people and organizations can build and maintain their collaborations through ongoing communication practices. These networks then support innovation and resilience during times of hardship. When combined, these theories provide a unique framework to analyze systems' change, adaptation, and innovation (Atwell, 2009).

This research applied the concepts of communication, collaboration, innovation, and resilience to the charitable sectors working toward water and food security. Water and food security sustain life and support the overall health and well-being of communities (Calder et al., 2021). Food and water security indicate a person has enough affordable food or water to meet their needs (adopted from similar definitions by USDA, 2022b and WHO & UNICEF, 2021b). Unfortunately, food and water security are two of the most pressing challenges around the world (Wutich & Brewis, 2014). About 768 million people globally are estimated to struggle with food security (FAO et al., 2022) and two billion people still lack safe drinking water (WHO & UNICEF, 2021a). At current levels of progress, the world is not expected to meet the sustainable development goals of zero hunger and clean water for everyone by 2030 (United Nations [UN], n.d.). It is projected that 670 million people will still be experiencing hunger in 2030 (FAO et al., 2022) and 1.6 billion will still be without safe drinking water at home (WHO & UNICEF, 2021b).

Food security is an increasingly concerning issue around the world due to increasing costs, drought, and unemployment (Barrett, 2010). Communities with intermittent food security often correlate with higher poverty levels (Barett, 2010).

According to a joint report with numerous health and food organizations, the prevalence of undernourished people has worsened in the last decade (FAO et al., 2022).

Similarly, poor water security has been attributed to urban development, climate change, water pollution, and increasing water demand (Caputo et al., 2022). The majority of people lacking even basic drinking water services primarily live in rural areas and low-income countries (Hernandez-Vasquez et al., 2021).

This research seeks to understand how cross-sector collaborations can address food and water security, as well as the factors that support effective collaboration. Specifically, it asks, (1) How do communication, cross-sector collaboration, innovation, resilience, and service delivery relate to each other? (2) How does cross-sector collaboration improve innovation, resilience, and service delivery outcomes for charitable organizations?

Drawing on interviews with two charitable organizations participating in cross-sector collaborations, this research finds that communication is the foundation of cross-sector collaboration that supports innovative and resilient approaches to water and food security. Results contribute to academic and professional understanding of collaborative practices in the community development sector and support the efforts of organizations seeking to build and maintain effective collaborations across sectors to improve their service delivery. After reviewing the relevant literature and research methods, primary themes arising from the thematic analysis are discussed, as well as key takeaways and suggestions for professionals and further research.

Literature Review

In the following section, we introduce the concepts shown in Figure 3 to demonstrate that these behaviors inform our approach to studying the relationship between communication, cross-sector collaboration, innovation, resilience, and service delivery.

Cross-Sector Collaboration

Cross-sector collaborations include individuals from independent disciplines or sectors coming together to share knowledge, exchange ideas, and solve problems that one organization cannot solve on its own (Cankar & Petkovšek, 2013; Bryson et al., 2006). Specific individual and group behaviors related to communication (e.g Koschmann et al., 2012), relationships (e.g. O'Mahony & Bechky, 2008), collective knowledge (e.g. Forrer et al., 2014), and trust (e.g. Bryson et al., 2006, 2015), can enhance the ability to collaborate across sectors.

Working together, each collaborator offers different viewpoints on the nature of a problem (Heiss et al., 2020). Ultimately, this can lead to the development and implementation of multidimensional solutions (Heiss et al., 2020). In addition to supporting more comprehensive problem identification and solution innovation, cross-sector collaboration can make implementation more sustainable.

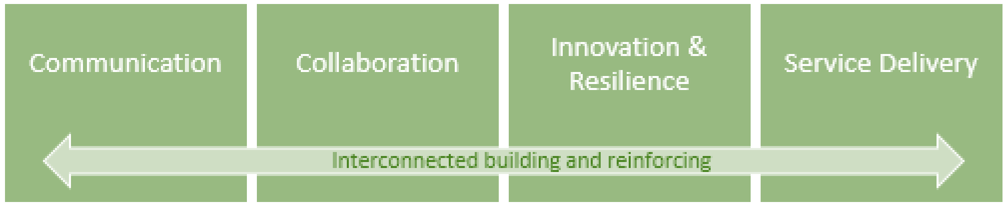

Figure 3: Relationship between Communication, Collaboration, and their Outcomes

Cross-sector collaboration is beneficial to both the food and water sectors. Many of the short- and long-term activities designed to support improved food access require collaboration since a single organization cannot solve a complex global issue like this alone (Selsky & Parker, 2005; Rittel & Webber, 1973). Likewise, humans experience water scarcity in similar ways (Wutich & Brewis, 2014). The food and water sectors are intricately linked, as disruptions to one ultimately affect the other (Calder et al., 2021).

Communication has been shown to increase meaningful interactions between actors in a collaborative partnership by creating and maintaining shared meaning between them (Koschmann et al., 2012). It includes practices that increase understanding and coordinate actions, as well as spoken, written, or typed messages, images, and body language (Putnam & Mumby, 2013). Koschmann et al. (2012) argued that these communication processes can improve the actions and impacts associated with cross-sector collaborations.

Another essential element to the success of cross-sector collaborations is building relationships (Linden, 2002) through inclusive interactions that generate meaningful participation between actors (Koschmann et al., 20120. Close relationships not only improve successful outcomes but also improve innovation (Tello-Rozas, 2016) and resilience by maintaining and using communication networks (Buzzanell, 2010).

Cross-sector collaborations have been shown to improve collective knowledge (Ordonez-Ponce & Clarke, 2020; Koschmann et al., 2012). One advantage of these partnerships is that some partners may have invaluable "local knowledge" (Forrer et al., 2014, p. 44). Another is improved innovations that arise when sharing individual knowledge with others during research and development projects (Beckett & Hyland, 2011). The concepts of knowledge, new ideas, and learning are intertwined with innovation and resilience. For instance, being able to reflect and reorganize after a setback is an important aspect of cross-sector collaboration because it improves resilience (Bryson et al., 2006). Bryson et al. (2015) discuss that continuous learning and reassessment are important for cross-sector collaboration because it is impossible to anticipate and know everything that the collaborators will need to know to achieve their goals when they first set an end goal.

Likewise, adaptability has been praised for improving resilience (Lee et al., 2020; Kamrath, 2018). Through the process of learning and reflection, people can think of alternative or new ways to adapt to a changing situation (Scharp et al., 2019). Bouek (2018) points out, however, that an organization's ability to adapt is limited by its network. Nevertheless, boundary-spanning agents who work across organizations can help groups adapt (Beckett & Hyland, 2011) and change their network structure (Koschmann et al., 2012).

Trust

In addition to good communication and committed relationships, trust is essential for the collaborative process (da Costa, 2019). Interviews in Brazil revealed existing relationships generate trust between government and nonprofit collaboratives (da Costa, 2019). Furthermore, collaborative partners can build trust by sharing knowledge and resources (Bryson et al., 2015). Similarly, Bryson et al. (2015) analyzed seven cross-sector collaboration frameworks and revealed that trust is a major component in four of them. One of which revealed that if cross-sector collaborations are built on existing relationships, then there is stronger trust to enable coordination (Bryson et al., 2006). Likewise, community members tend to trust organizations that are already embedded in a community (Lee et al., 2020).

Innovation and Resilience Theory

While collaboration is useful, how the process relates to innovation and resilience has yet to be researched. This project theorizes that communication is a foundational component of collaboration (Koschmann et al., 2020), and the authors argue that these build toward and are reinforced by innovation, resilience, and improved service delivery, as shown in Figure 3 above.

While diffusion of innovation theory and communication have been linked to resilience, this theory has rarely been explored in relation to the communication theory of resilience (CTR; Buzzanell, 2023). Unlike other theories of resilience, which focus on material or environmental experiences or outcomes, the CTR situates resilience as a socially constructed experience and outcome. Humans use language to identify, cope with, make decisions about, and move forward from hardships. The CTR recognizes five types of communication that support resilience. In this study, the focus is on maintaining and using communication networks (Buzzanell, 2010). This type of communication leverages existing relationships and develops new ones (Amankwah et al., 2022) to take advantage of inter-organizational social relations (Buzzanell, 2010). Building and maintaining communication networks has been studied in food system resilience contexts. Daigle and Heiss (2020) found that communication networking was valuable

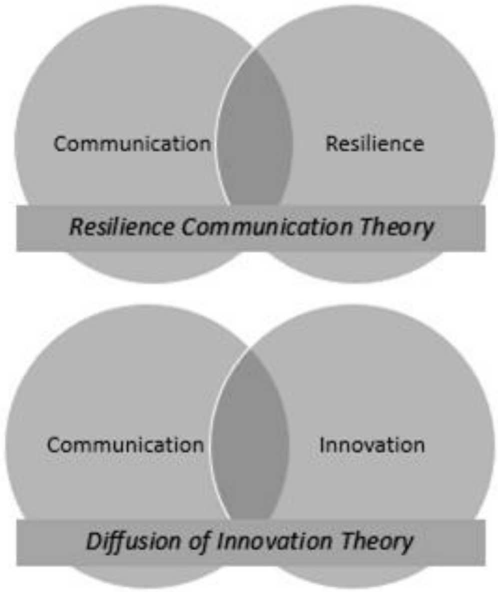

Figure 4: Current Research has Focused on Innovation and Resilience as Separate Ideologies

for improving women farmers' resilience. Similarly, developing relationships and a shared understanding eased challenges in food system collaborations (Heiss et al., 2020).

It is important to note that some authors have already connected resilience theory and diffusion of innovation theory. For example, Atwell et al. (2009) studied the two theories by looking at attitudes toward perennial plantings in the midwestern United States and remarked that the findings contribute to understanding how systems change with adaptation and innovation. For instance, they noticed that the farmers had trouble implementing the changes when they were not compatible with their existing priorities, and they concluded that the successful adoption of these new practices relies on sociocultural changes and collaborative learning.

Effective cross-sector collaborations, resilience, diffusion of innovation, and communication are connected tangentially in the extant literature; however, the relationship among these concepts has not been directly connected to the communication discipline's leading resilience theory Buzzanell's (2010) CTR. Nor have these concepts been explored in relation to the charitable sector of food and water systems.

Communication, Innovation, and Resilience

In addition to attitudes, communication practices contribute to the diffusion of innovation and resilience. Communication theories provide a nice lens for understanding the practices that support partnerships aimed at fostering innovation and resilience. For instance, building cross-sector collaborations by maintaining and using communication networks (Buzzanell, 2010) can provide support and resources when trying new ideas (Lee et al., 2020), known as innovations (Rogers, 2003). The diffusion of innovation theory (Rogers, 2003) describes that the innovation itself, communication within and among social networks, and the passage of time affect how quickly or slowly an innovation is adopted. An innovation is more likely to diffuse quickly if an individual deems it advantageous, compatible with their social values and needs, and simple to understand and use; and if they can try it on a limited basis before committing, and they are ablecan others results and benefits (Rogers, 2003). The diffusion of innovation theory has been connected to resilience by way of attitudes and communication practices.

Study Context

Food and water are necessities for human survival. Unfortunately, resource scarcity of food and water is becoming more limited due to factors like climate change and built systems that cannot keep up with population growth (Wutich & Brewis, 2014).

Wutich and Brewis (2014) argued that “food and water shortages are two of the greatest challenges facing humans in the coming century” (p. 444). By using transdisciplinary and collaborative approaches, these impending challenges can be adequately addressed. Researchers have shown that transdisciplinary and collaborative approaches that include stakeholders are effective at addressing the intersecting social, material, and built systems surrounding food and water security (Albrecht et al., 2018; Heiss et al., 2020).

This study examines how Vermont Everyone Eats (VEE) and 33 Buckets use partnerships for community support and development. First, the VEE program brought together a slew of collaborators, such as Southeastern Vermont Community Action (SEVCA), the state legislature, FEMA, local farmers, restaurants, and community hubs, to provide emergency food aid to Vermonters struggling to obtain enough food during the Covid-19 pandemic (Vermont Everyone Eats, 2022). The program improves productivity in the agriculture and food service sectors by requiring their partner restaurants to create meals sourced with at least ten percent of local foods (Haggans & Yuan, 2021). This improved productivity ripples across Vermont through the three pillars of VEE. For example, when the organization came together and formed partnerships, and shared their values and mission, the benefits rippled along the local food supply chain (Conner et al., 2014). Those authors found that Vermonters utilizing the program increased restaurant demand, which in turn increased demand for locally farmed foods. Then, as their nutrition increased, their labor productivity improved, and they were able to spend money that would have been spent on food in local markets for other goods.

Similarly, 33 Buckets was able to sustain its operations by collaborating across sectors, with partners like Arizona State University (ASU), Universidad San Ignacio de

Loyola (USIL), the nonprofit Sustainable Development Studies (SDS), as well as partnering with the mayor of the Ccorca district and the surrounding villages (33 Buckets, 2021). 33 Buckets has dedicated itself to short-term interventions that provide immediate assistance to the improvement of water treatment systems in these villages, as well as long-term interventions such as spreading WASH education to children. The hope is that the children will bring this education home and eventually advance the community's capacity for WASH knowledge and overall health (Gherardelli, 2017).

Overall, it is clear from the literature that communication, trust, relationships, knowledge, innovation, and resilience are the main conditions affecting cross-sector collaboration. However, it is not yet common for collaboration researchers to connect Rogers' diffusion of innovation theory with Buzzanell's communication theory of resilience, especially when it comes to charitable organizations. The authors theorized that communication, collaboration, innovation, resilience, and service delivery are interconnected, and build upon and reinforce each other. In an effort to prove that communication and collaboration are building blocks for innovation and resilience, and also that these reinforce communication and collaboration, the authors conducted and analyzed semi-structured interviews, to answer our research questions. Specifically, it was asked, (1) How do communication, innovation, and cross-sector collaboration relate? (2) How does cross-sector collaboration improve innovation, resilience, and service delivery outcomes for charitable organizations?

Factors from the literature that are related to or are influenced by cross-sector collaboration were connected in a conceptual model. This led to the formation of a conceptual model consisting of factors that affect collaboration, innovation, and resilience, as shown in Figure 5, on the next page. The authors wanted to investigate whether semi-structured interviews would reflect our theory that innovation, resilience, and service delivery are built upon good communication and collaboration, but that they are all interconnected and reinforce each other.

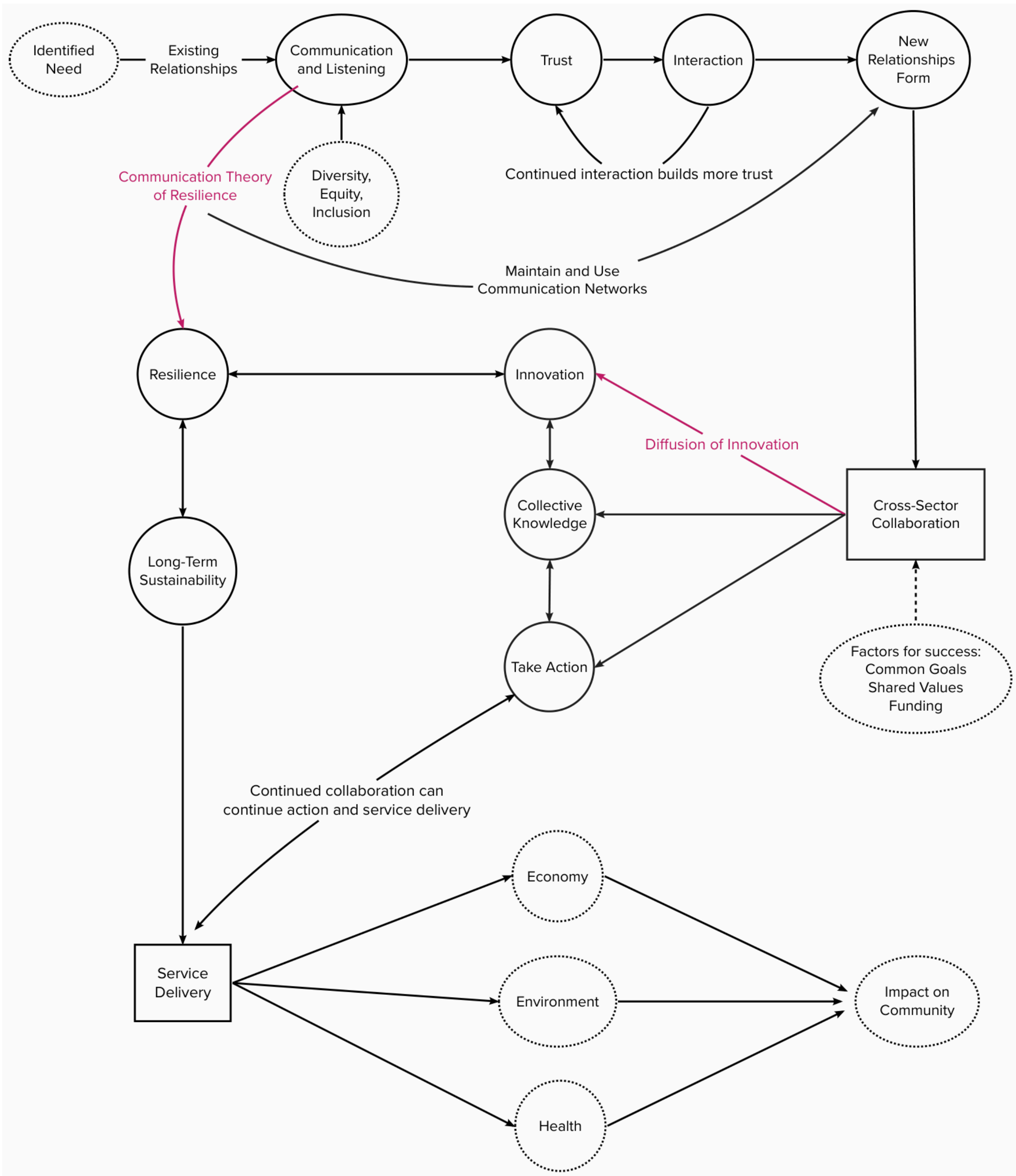

Figure 5: Relating Factors and Outcomes of Cross-Sector Collaboration

This study interviewed three groups between November 2021 and September 2022. The first two were associated with VEE, the task force members and the community hub leaders, while the third group consisted of staff and volunteers from 33 Buckets. First, Anne Massie conducted the VEE task force interviews between November and December of 2021 as part of her graduate studies in Food Systems. The interview protocol was developed with guidance from Dr. Sarah N. Heiss of the Community Development and Applied Economics (CDAE) department at the University of Vermont (UVM) and asked questions related to communication, collaboration, resilience, and innovation. She interviewed twelve task force members for an average of 46 minutes each and the transcription was 120 pages.

Second, interviews with VEE community hub leaders were conducted during the Spring of 2022 by graduate students enrolled in CDAE 335, Qualitative Research Methods at UVM taught by Dr. Sarah N. Heiss. The students selected 20 VEE hub leaders, constructed an interview protocol as a class, and conducted semi-structured interviews in pairs. The interviews asked questions related to the operations of the community hubs and lessons learned. On average the interviews lasted about 42 minutes and generated 485 pages of transcription.

Third, 33 Buckets helped the authors recruit interviewees from the organization and returned a list of those that agreed to be interviewed. An interview protocol for the 33 Buckets interviewees was prepared with guidance from Dr. Sarah N Heiss that included nine primary questions related to the organization's collaboration, innovation, and resilience. Semi-structured interviews were conducted with five staff and volunteers from

33 Buckets using Microsoft Teams. The interviews lasted an average of 41 minutes and were recorded and automatically transcribed by Microsoft Teams resulting in 53 pages of transcripts.

Overall, as shown in Table 1, thirteen interviews were conducted with members of the VEE task force, twenty with VEE community hubs, and five interviews were conducted with staff and volunteers from 33 Buckets. Once compiled, the interview transcripts were imported into NVivo version 1.7.1 (1534).

Then, the lead author used iterative thematic analysis with open, axial, and selective coding procedures to allow for expected and emergent codes to arise from the interviews (McGuinness et al., 2020). The initial round of thematic analysis established codes from the keywords in the interview. For example, if a respondent used the word "resilient" then it was coded as such. The second round of thematic analysis grouped related primary codes. For example, "Speaking Spanish" and "Listening" were both grouped under "Communication". Finally, related and/or similar codes were grouped to identify the main themes.

Table 1: Interviews by Organization

VEE Taskforce Interviews[a]	
State Government	5
Nonprofit Sector	8
VEE Hub Interviews[b]	20
33 Buckets Interviews[c]	5
Total	38

Note. [a]VEE task force interviews were conducted in November and December of 2021 by Anne Massie, Food Systems at UVM
[b]VEE hub interviews were conducted in the Spring of 2022 by students in CDAE 335, Qualitative Research Methods at UVM.

[c]33 Buckets interviews were conducted in September 2022 by Kristin Darby, CDAE at UVM.

Analysis

The authors sought to find out how VEE and 33 Buckets collaborated and to understand how cross-sector collaboration enhanced their service delivery. Additionally, the study wanted to understand how cross-sector collaboration increased innovation and resilience for these charitable organizations. From the research, it was found that communication is an essential component of cross-sector collaboration as it provides transparency and enables charitable organizations to share their impact. Communication can help charitable organizations expand their networks, connect with the people they serve and their partners, and ultimately provide services that meet the needs of the community. Finally, cross-sector collaboration improved service delivery for VEE and 33 Buckets by sharing knowledge and growing their networks, which built a foundation for innovative and resilient solutions.

Growing Networks

Cross-sector collaboration has helped 33 Buckets and VEE maintain and build their networks. Members from both charitable organizations discussed how collaboration allowed them to use existing relationships to expand their network and form new partnerships, which allowed the organizations to serve more people. For example, when the VEE task force was first coming together, Bjork said she used her existing network to hit the ground running,

> "We just knew that we needed to have some key stakeholders at the table to guide this program and navigate all of that complexity, so…I had been sort of

> connecting with people and starting to pitch this idea to them and… as soon as we started talking about shifting into that frame of really designing the program strategically, then the members that were already present really did a great job of identifying who else needed to be in the room to make sure that we didn't duplicate or step on toes or fumble in the program design."

She used her existing connections to bring like-minded people together that would support a program like VEE, and likewise, they brought on some of their existing connections to further grow the task force. The existing connections were a vital piece to starting the task force and organizing the VEE program because, without them, the task force wouldn't have been able to form as easily. Without Bjork's connections, an innovative program like VEE may have never gotten off the ground, and the state of Vermont would not have had as much success feeding hungry people, and raising their resilience, during the height of the Covid-19 pandemic.

Similarly, VEE hub leaders were able to form new connections to better serve their communities. For example, Miela, a VEE hub leader, started new partnerships with organizations in their community that they had not connected with previously. She said, "I think that Everyone Eats definitely pushed us more towards reaching out outside of our organization in order to get things done." By forming these new partnerships, Miela was able to connect with other organizations that could help her organization provide meals to those in need, by operating as a distribution point or connecting them with volunteers to help deliver meals. These new partnerships helped her hub reach more people than the organization could serve alone.

Lastly, team members from 33 Buckets discussed how their partnership with ASU led to connecting with the university, USIL, in Peru. Abby indicated that this was an early partnership that brought the organization to the region. Regarding working in the country, she said, "We've always collaborated with USIL… so that has been from the [beginning] our main collaborator and pretty much our partnerships and our work happened through them." The team members said that the professors from USIL helped introduce them to new partners in the Cusco region, including the mayor of Ccorca, which ultimately turned 33 Buckets' focus to that district to provide clean water services to those in need. Abby continued, saying that these partnerships enable 33 Buckets to do this work.

> "I mean [the partnerships are] the key. The partnerships and the partners are the way in for us to be able to provide these services or improve their services. So I do think that these partnerships are everything when it comes to access because it would be pretty hard for us to go in without them and I don't think we would."

By expanding its collaborative networks, 33 Buckets was able to form new partnerships, which ultimately led to innovative work in Ccorca, and improved water access for more people, which helps the communities become more resilient to illness and disease because they have cleaner drinking water and better hygiene. Without the partnerships with USIL and the mayor, the organization would not have connected with and helped the people in the Ccorca villages. In the end, taking advantage of their existing relationships to expand their networks and form new partnerships enabled VEE and 33 Buckets to provide more support to the communities they served.

Trust

Trust appeared differently across the two charitable organizations. Trust supported collaboration for VEE, while trust for 33 Buckets resulted from and fostered future engagement with end users in Ccorca. VEE discussed how trust helped them grow their networks by providing the foundation for relationships and collaboration. Trust was important in these collaborative networks because each group needed to be able to trust their partners to carry out their responsibilities. Bjork, from SEVCA, stated that new programs and new ideas take a lot of trust. Regarding VEE, he said,

> “This project has been so much about collaboration and trusting partners. That they weren't gonna hide behind anything or not tell the truth. And it's been amazing to see what we were able to build when we could trust each other.”

The foundation of trust lets the people involved in VEE explore new ideas and implement an innovative program aimed at fighting emergency hunger by bringing together restaurants, farmers, and Vermonters. This collaborative process connected people and organizations across the state and grew the program to serve upwards of half a million meals (Haggans & Yuan, 2021), helping Vermonters become more resilient because they had access to nutritious meals.

Next, Ziva and Anthony reported that the work 33 Buckets has done in Ccorca has positively affected the trust of the communities. Caitlin said this is reflected “When we go to the communities, they’re grateful to see us.” The group has seen how the communities’ trust in 33 Buckets resulted in empowering the communities to improve their water access through training and education. Overall, building trust with the communities and with their partners has enabled VEE and 33 Buckets to collaborate across sectors, try innovative programming and technology, and work together for improved community resilience.

Blending Skillsets

Once trust is established, it serves as a platform for new cross-sector collaborations to share skills for mutual benefit. Blending skill sets between partners enabled VEE and 33 Buckets to improve their service delivery by improving collective knowledge. In the end, the partners came together with combined skills to generate more innovative thinking. For example, the team at 33 Buckets agreed that they were able to work with the communities and take advantage of each other's skills, teach each other, and collaborate to answer the communities' questions. Abby particularly emphasized this when she said they share knowledge with the community, "If we are working on a project [we] walk them through the system and [make] sure that it works." But she added that it's a reciprocal relationship, "Sometimes they teach us how to do certain things." Blending skill sets between partners and across sectors strengthened the collaboration because each partner could not accomplish what they needed without the other. This improved the resilience of both the community and 33 Buckets by improving their skillsets and enabling them to tackle future challenges (Kamrath, 2018).

Similarly, the hubs of VEE would come together to share their skills and knowledge to help other hubs succeed. Naomi, a VEE hub leader stated, "Peer sharing really helps all of us. You learn best practices, [and you don't have to] re-create the wheel." Combining skillsets from different regions of the State allowed hubs to build resilience and help other hubs through challenges they had experience handling.

Sharing Knowledge

Both organizations demonstrated that trust in and through collaboration leads to knowledge sharing within collaborations and skills/resource sharing within collaborations. For instance, VEE held virtual meetings for the task force and community hubs, while 33 Buckets tended to invite staff to collaborate in an unstructured and informal format. The VEE task force said their meetings were designed to enhance communication between members across government and nonprofit sectors who are knowledgeable in agriculture, economic development, emergency response, food security, hunger, poverty, and restaurant viability. For instance, Dolly, a task force member representing a local nonprofit, said the online meetings were designed so anyone could ask questions and take advantage of another's knowledge. In doing so, the task force was able to share knowledge with all of the members at once. Furthermore, being intentional about inviting certain members to the meetings to offer their expertise facilitated this process. Peggy, another task force member, also acknowledged the benefit of the task force meetings. She said, "People would talk about their expertise and really provide educational context…and it seemed like 99%, more than the majority of the time, people were good about deferring to the experts in the room." This intricate sharing of knowledge amongst partners is a key aspect of collaboration because it is only by sharing ideas and discussing their advantages and disadvantages that progress can be made.

However, organizations do not have to formalize their means of sharing knowledge to be successful. For instance, the team members from 33 Buckets agreed that their informal, back-and-forth discourse helped them collaborate. Abby said, "It's always been a very casual organization and, in terms of communication and collaboration, has always been pretty unstructured.” She continued by saying, “We're always in contact with each other, whether that's through text, [or] through Slack… it's always been extremely collaborative in the sense that there's always back and forth between most of the ideas.” Furthermore, Caitlin added that impromptu brainstorming is common in the organization. Informal communication allows team members at 33 Buckets to share an idea immediately with the rest of the team. This may have helped them pass along information more quickly than formal, once-weekly meetings would allow, as well as ensuring nothing was forgotten between meetings.

Both organizations also exchanged knowledge with their external partners which helped them accomplish their missions. For example, the 33 Buckets team blended their skillsets to overcome a language barrier. The native language in the villages of Ccorca is Quechua, and some of the locals do not speak Spanish, so the organization hired a local contractor to assist with their operations, including water sampling and help to translate from Spanish to Quechua. Timothy stated that “to be able to converse in Quechua really enables them to open up and be as honest and transparent as they can be with their situation.”

Additionally, 33 Buckets found that listening to the locals’ stories helped the organization identify services that would meet the needs of each community. For example, Caitlin said "We do a lot of listening. We don't go into a community with an idea of what we need to bring to them.” This communication skill helped the nonprofit connect deeper to the community and meet their needs. Timothy, an executive team member, echoed this idea when he said that he asks each community, “Tell us what your perspective is, what your desires and needs are, and let's see if we can create a solution that will benefit you." By entering the community partnership without preconceived ideas of how they could help, 33 Buckets was able to truly understand the villages' unique situations and identify the supports best suited for the circumstances, thus, making a larger impact that better matched what the community needed for their water systems.

Next, Arlene, a VEE hub leader, said that the partners connected and shared new information through transparent communication. She said they “[have] these meetings where [community partners] get to know each other and get to hear each other's stories of like, how is it going with distribution? And who are you seeing that comes to pick up a meal? Or what's going on?” The partners were able to share valuable information with the hub with this kind of open, transparent communication practice that helped them better serve the community. Collin, a hub leader in southern Vermont, added that being open about the challenges enabled the hubs and program leaders to come together and coordinate on addressing the needs of each hub. Problem-solving in this manner, as Collin pointed out, is a highly efficient way to address the needs of the community.

Overall, formal and informal knowledge sharing within cross-sector collaborations is essential to improving service delivery and resilience, as it allows colleagues to share vital information in a timely manner. In addition, listening to the locals and exchanging valuable information with their partners benefitted these charitable organizations by helping them navigate challenges and better meet the needs of the community. While cross-sector collaboration is about more than just sharing ideas and information, it is clear that frequent communication is essential for these organizations to make progress on their goals, supporting our theory that communication is a foundational element of collaboration and innovation.

In summary, cross-sector collaboration has led the partners involved with VEE and with 33 Buckets to share knowledge, openly communicate, and grow their networks to make an impact. The collaborative networks were made possible by building trust and blending skillsets. Overall, cross-sector collaboration led to network growth which encouraged trust-building and sharing of knowledge, which ultimately allowed them to provide greater services to those in need.

Discussion and Conclusion

Theoretical Implications

Thematic coding demonstrated that cross-sector collaboration enhances a charitable organization's ability to deliver sustainable services to its partner communities through knowledge sharing and network growth. Additionally, collaboration improved the ability of these organizations to be innovative and resilient because it led to taking action and building collective knowledge, which enabled the partners to share new ideas and innovate, which further supported their resilience.

The conceptual model being tested (see Figure 5 on page 52) started with a community identifying a need. In Vermont, the state needed hunger support due to Covid-19, and the communities in Ccorca needed improvements to their water systems. Next, this need was expressed to a charitable organization, most commonly through an existing relationship. In the case of VEE, there was no state-wide organization to deal with hunger support, so the leaders came together to form the organization. For 33 Buckets, it was their partnership with USIL that encouraged them to help the villages in Ccorca. These findings concur with Bryson et al. (2006) that existing relationships help demonstrate trustworthiness and legitimacy to key stakeholders.

Then, the organizations brought diversity, equity, and inclusion to their communications. The task force and hub leaders of VEE talked a lot about the low barrier to entry for the program. The only requirement to receive meal assistance was that the community members stated they had been affected by Covid-19; there was no paperwork or income requirements. Furthermore, 33 Buckets focused on listening to the community members' perspectives. These findings agree with Albrecht et al. (2018) who argued that cross-sector collaboration brings diverse voices together to offer new perspectives and incorporate their values into the water-energy-food nexus conversation, which ultimately increased collaborative knowledge.

By encouraging honest and transparent conversation, 33 Buckets found that the community opened up about their situation. Similarly, VEE task force members found that when they matched that openness, it brought to the conversation things like inclusivity, equity, and a willingness to hear from diverse perspectives, and trust was built between the groups. This is important because as Forrer et al. (2014) found, higher levels of trust are associated with greater interaction and collaborative work between the groups. Bryson et al. (2015) elaborated that sharing information and following through on commitments helps build trust between partners, which is an essential component of successful collaboration.

As this work continued, eventually new relationships formed. As Linden (2002) indicated, trust builds strong relationships and encourages collaboration. He says that relationships are essential to collaboration. VEE found that they were able to quickly form trusting relationships because there were enough existing relationships to demonstrate that they could trust the newcomers. Forming new relationships allowed them to create new opportunities for the restaurants by connecting them to local farmers. Additionally, 33 Buckets formed new relationships with the people in the Ccorca villages, built trust with them based on their relationship with the Mayor, and were able to expand their impact.

Next, cross-sector collaboration, paired with other factors for success such as having funding, common goals, and shared values with collaborators, moves the partnership into an innovative state whereby collaborative partners take joint action, build their collective knowledge, and share ideas and innovations. Several VEE task force members talked about how the program was almost intuitive, but no one had done this kind of hunger program before. This goes to show how joint action and sharing ideas can generate innovation. Additionally, 33 Buckets shared how they're constantly reevaluating and making improvements, which is a direct result of their joint action, building their collective knowledge, and coming together to share ideas.

First, these findings agree with Tello-Rozas (2016), who argued that interaction, knowledge exchange, and innovative initiatives led to desired results and long-term sustainability. Furthermore, these findings reflect some of the findings by Helgegren et al. (2020). The authors found that collective action gave the group a shared identity and promoted a sense of teamwork (Helgegren et al., 2020). They concluded that "collective action is crucial for the implementation and long-term operation of community-managed water and wastewater systems" (p. 1040).

While action alone will improve service delivery in the short-term, long-term service delivery is most easily achieved when the partnerships enter into an innovative state that generates new ideas and improves community resilience. This is because being resilient to disturbances better enables the community to have sustainable services over the long term. These findings relate to Rogers' (2003) conclusion that diffusion of innovation encourages the formation of social change programs. Furthermore, it is proposed that innovation connects with the communication theory of resilience because innovations are a method of creating a new normal. Alongside building and maintaining communication networks (and Buzzanell's (2010) other communication processes), creating a new normal builds resilience. Therefore, it makes sense to conclude that innovation builds resilience.

Unfortunately, VEE struggled as an organization to think long-term, mostly because their funding was granted in short-term phases. Many hub leaders indicated it was difficult to plan for the future because they never knew what their funding would look like past the current phase. As of this writing, funding is guaranteed until March 31, 2023, and SEVCA, the task force, and the hubs have started to plan for the future of VEE, but the exact plans are not yet known.

On the other hand, 33 Buckets has focused on the long-term sustainability of its projects in Ccorca. For instance, the organization has communicated with and helped train the local water managers to operate, maintain, and repair the chlorinated water systems, and they've started to shift their materials to be locally sourced. First, training the locals to operate the water systems will ensure the systems can function for years to come, especially as they train new water managers on the systems in the future. These findings relate to those by Ward et al. (2020) that communication helps cross-sector collaborators be innovative and improve their resilience. Second, additional resilience stems from using locally sourced materials for the chlorination systems because the parts will be readily available, at a reasonable cost, when the water managers need them. Therefore, repairs will be easier to get the systems back up and running.

In all, communication was found to improve trust, which encouraged interaction and new relationships, which encouraged cross-sector collaboration. Paired with other factors of success, like having common goals, shared values, and funding, cross-sector collaboration encouraged the groups to take collective action, build their knowledge, and enhance their diffusion of innovations and generation of new ideas. Together, these systems generated greater resilience for charitable organizations, which further supported service delivery.

Practical Implications

These findings suggest that charitable organizations which leverage their existing relationships to form new partnerships and support knowledge-sharing will have more effective cross-sector collaboration than those that do not. Charitable organizations can take advantage of their communication and trust-building to pursue strategic relationships and guide more effective cross-sector collaboration. These results build on existing evidence of the connections between communication, collaboration, innovation, resilience, and service delivery by enhancing the understanding that they are intertwined. The participants emphasized that frequent communication supported these cross-sector collaborations, which supported their ability to be innovative and resilient by enabling the collaborators to try new ideas that would support long-term results and service delivery. By recognizing these concepts build on each other and reinforce the others, this research adds new thinking to innovation and resilience theories.

These results should be considered when charitable organizations are looking to expand their service delivery to more people or a new region. These organizations can benefit from understanding how cross-sector collaboration can expand their relationships, increase their knowledge, and help them serve more people. For instance, charitable organizations can pursue new relationships that enable them to connect to a new or larger network, take advantage of new perspectives and knowledge, and expand their services.

Limitations

This thesis relied on convenience sampling and sampling units that were easily accessible, without theoretical justification for selection, which may limit the data and bias the results. By relying on interviews with staff and volunteers from only two charitable organizations, complete perspectives within charitable food and water organizations were not captured. It would be valuable to expand the sample size to hear additional perspectives because different organizations may offer alternate perspectives that were not captured in this study. Additionally, this thesis considered cross-sector collaboration of two charitable organizations in the food and water sectors, but the landscape for these sectors is much wider. Future work is needed to see how this might play out in other regions with different social, built, and natural environments. Future research might also consider how cross-cultural differences affect the results.

This study asked individuals to recall information regarding the performance of the charitable organization they work or volunteer for, which may bias the results because they may not want to discuss the organization in a poor light. Additional bias may be a result of the interview process since the probing questions were unstructured and could have led the interviewee to distort their responses.

Future Research

This study provided a unique approach to innovation and resilience research, first by applying these concepts to the charitable sector. Second, by combining the well-known theories of diffusion of innovation and communication theory of resilience with collaboration and trust. Since this article is one of the first to present these ideas, opportunities for further research abound in triangulating the results with similar studies.

These organizations demonstrated exemplary communication and experienced good outcomes. It would be interesting to apply the findings to charitable organizations that struggle with communication to see how they improve. Additionally, it would be worthwhile to explore organizations that are experiencing poor service outcomes to see if communication and collaboration can improve their service delivery. These studies might even expand on the interconnectedness between collaboration, service delivery, and resilience.

Finally, although commonalities were found between VEE and 33 Buckets serving different regions, due to the qualitative nature of the study it is not reasonable to generalize these results to broader charitable organizations. Following up this study with quantitative methods is needed to generalize these results.

Conclusion

Overall, cross-sector collaboration helped the charitable organizations expand their networks, act in innovative ways, and improve the resilience of their service delivery. These findings combined innovation and resilience theories and applied them to the collaboration of charitable organizations. Such organizations can take the results and seek out new partnerships which can help them serve new or greater populations, or perhaps that will introduce new ways of thinking about the problem and solutions. By introducing the diffusion of innovation theory and communication theory of resilience in combination with charitable organizations the authors hope to encourage greater interactions within the public and nonprofit sectors to find new ways to provide services to those in need.

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Chapter 4: Predicting Water Safety Perception and Health Satisfaction Based on Drinking Water Perceptions and Behaviors in Ccorca, Peru

Abstract

Global water scarcity is an increasing concern due to factors like climate change, population growth, and urbanization. Numerous nonprofits have focused their efforts on alleviating the global water crisis, but exceptionally rural areas are frequently forgotten in these efforts. 33 Buckets, a water access nonprofit based in Arizona, USA, has been focusing on improving water access in the most rural communities in the Ccorca district of Peru. The authors seek to find out the ways that individual or societal health beliefs affect the way the people in Ccorca perceive water as safe to drink and how these perceptions affect family health satisfaction.

Through univariate frequency analysis and bivariate crosstabs with chi-square testsfrom two rural communities in the Ccorca district of Peru, the authors explore perceptions and behaviors associated with drinking tap water that affect the perception of water safety and health satisfaction using the first tenet of the health belief model as a guiding framework.

The results showed that households generally agree the tap water is safe for drinking and cooking in Ccorca. These findings did not vary across villages or genders, indicating this may be a social belief in the region. The *accessibility* and *availability* of tap water were significant factors when perceiving the water to be safe, which relates to the significant behaviors of *drinking the tap water* and experiencing *water shortages*. Overall, there was no correlation between water safety perceptions and family health satisfaction.

The majority of households in Ccorca agree the water is safe for drinking and cooking, and there appears to be inherent trust in the public water supply and chlorine treatment. This acceptance is encouraging as it may be easier for water access nonprofits in the region to support the communities in their water treatment efforts since they already trust the water system. Furthermore, the communities may be motivated to maintain the systems because they want the water they deem safe to come out of the taps and fear that negative safety ratings may lead to water service interruptions. With increased maintenance and operational knowledge, community members can anticipate better health, which can lift them out of poverty and allow them to live a better life.

Introduction

As of 2020, two billion people worldwide were still struggling to gain access to safe drinking water, as stated in a joint report (2021) by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). Unfortunately, water scarcity is increasing across the globe due to factors like climate change, population growth, and urbanization (Bowling et al., 2021). A 2016 study defined severe water scarcity as withdrawing water at twice the rate of replenishment (Mekonnen & Hoekstra, 2016). The authors concluded that 4 billion people around the world experienced severe water scarcity at least one month out of the year. Unless progress quadruples, the UN and UNICEF joint report predicts the world will not be able to achieve clean water access and safe sanitation for everyone everywhere by 2030, which is the goal established by the sustainable development goal (SDG) number six (UN, n.d.).

A decade-long study found that water access improvements in Peru have not been equally distributed between the wealthy and poor or between rural and urban areas (Hernandez-Vasquez et al., 2021). Rural areas are particularly vulnerable to having poor water access, indicated by the fact that drinking water coverage in these areas globally is only at 60% compared to urban coverage at 86% (WHO & UNICEF, 2021). According to Aleixo et al. (2019), efforts to improve water sources have often left out the most marginalized groups in Brazil, such as those in rural locations and with low socioeconomic status.

Peru is one of the countries in Latin America with the lowest access to clean water (Hernandez-Vasquez et al., 2021). Hernandez-Vasquez et al. (2021) found that as of 2018, only 52% of Peruvian households had access to safe drinking water. Bowling et al. (2021) attributed the low water availability in the country to population growth and climate change. Finally, WHO and UNICEF (2021) concluded that rural areas are one of the populations “most at risk of being left behind” concerning improved water services (p. 4).

Some nonprofits are working to improve water access in the most remote regions of the world, like 33 Buckets in Ccorca, Peru (33 Buckets, 2021). The organization was incorporated as a nonprofit in 2017, but in the years prior, it started as a service project at Arizona State University (ASU) bringing a water filtration system to a girls’ college in Bangladesh (33 Buckets, 2022b). The organization has since connected with professors from the San Ignacio de Loyola University (USIL) in Cusco, Peru, a partnership that has been driving their latest projects in this region, which are designed to improve and maintain chlorinated water systems in collaboration with the local communities.

This study aims to evaluate public perceptions local community members have of their drinking water based on their health beliefs and behaviors. The municipalities of the Cusco region are devoted to expanding water access in rural areas, like Ccorca, by building reservoirs and offering chlorination technology. Unfortunately, the 33 Buckets team has observed maintenance, education, and cost issues preventing the communities from always using the technology. Similarly, other researchers in recent years have found communities struggle to adopt water, sanitation, and hygiene (WASH) practices over the long term (e.g. Martinez et al., 2020; McGuinness et al., 2020; Francis et al., 2015). This is particularly concerning because there are known health risks associated with drinking untreated water and poor sanitation practices (Hernandez-Vasquez et al., 2021). Overall, this study will reveal insights to evaluate the barriers and needs of the Ccorca villages regarding their drinking water, which have been proposed to be vital to expanding WASH access (Ezbakhe et al., 2019).

Recently, McGuinness et al. (2020) have found that inaccurate perception of how water affects health is one of the barriers to adopting water treatment practices. Specifically, the effect of health perceptions on outcomes can be evaluated with the health belief model, which was developed in the 1950s as a result of applied research in the public health sector (Rosenstock, 1974). The model has since been applied to the WASH sector by authors like Rainey and Harding (2005) who used the model to evaluate how solar disinfection practices were perceived in Nepal. This study uses the health belief model as a guiding framework to determine important variables from a bivariate analysis to evaluate the perceptions of drinking water safety and health satisfaction. Specifically, this study asks, in which ways do individual or societal health beliefs affect the way people in Ccorca perceive water is safe to drink? Do the same factors predict health satisfaction? This research is valuable because it expands the understanding of public perception that may constrain water services in the most vulnerable regions.

Literature Review

The amount of available freshwater is decreasing around the world due to factors like climate change, population growth, industrialization, and urbanization (Panhwar et al., 2022). This is concerning, because, as the authors state, “water fulfills domestic, drinking, agricultural, and industrial requirements and makes everything useful for us” (p. 1). Furthermore, when people do not have enough water, their quality of life diminishes since water access is a key component to thriving socially, economically, and environmentally (Lima et al., 2021).

Clean drinking water is essential for good human health (Li & Wu, 2019). A link between poor access to safe drinking water and water-borne illnesses has been frequently cited (Caputo et al., 2022; McGuinness et al., 2020; Kuberan et al., 2015). When community members face water scarcity and have reduced access to safe drinking water, it increases their risk of water-borne illness from drinking untreated water (Ghaffoor et al., 2021). Most frequently it results in diarrhea, to which children are particularly vulnerable, and the WHO estimates 1.5 million children die every year from diarrhea in low-income countries (Garcia et al., 2018). Other authors have agreed, emphasizing that diarrhea is a leading cause of death for children in low and middle-income countries (McGuinness et al. 2020).

Even though there have been tremendous efforts to improve access to drinking water globally, there are still two billion people without access to safe drinking water (WHO & UNICEF, 2021). Worse, Mekonnen & Hoekstra (2016) estimate that up to four billion people struggle with water scarcity at least one month out of the year, where water scarcity means there is not enough water to meet demand, either due to increasing demand or due to decreasing quantity and/or quality of water (UN, n.d.). In agreement, Panhwar et al. (2022) recently stated, “Presently 3.6 billion people, around 50% of the world’s population, [are] residing in water scarcity areas” (p. 5). Overall, the experts agree that current efforts are not enough (WHO & UNICEF, 2021) to meet the sixth sustainable development goal (SDG) of availability and sustainable management of water and sanitation for all by 2030 (UN, n.d.).

Communities in rural areas are especially vulnerable to poor water access (Hernandez-Vasquez et al., 2021; Aleixo et al., 2019). The WHO and UNICEF (2021) joint report indicated that as of 2020, seventy-five percent of people in rural areas lacked safely managed drinking water. The report indicated that Peru has between 50% and 75% coverage. Though, the poorest households in the country demonstrated decreasing water access over the last decade (Hernandez-Vasquez et al., 2021).

A water access nonprofit called 33 Buckets is dedicated to increasing clean water availability in Peru, and it has focused its efforts on the most rural regions, starting with small villages in the district of Ccorca (33 Buckets, 2022b). The organization has partnered with local leaders in these communities to evaluate their existing water systems, offer solutions and guidance that meet the needs of the community, and implement long-term change.

Perceptions of Water Quality

Public perceptions of health and taste related to drinking water are important (e.g. Caputo et al., 2022; Danantes & Donoso, 2021; McGuinness et al., 2020; Workman, 2019; etc.). Many studies have found that people in low-income countries often have the misconception that water safety can be judged by taste, odor, and clarity, known as the organoleptics (e.g. Danantes & Donoso, 2021; Awang et al., 2020; Wright et al., 2012, etc.). Even once they understand that organoleptics do not indicate water quality, it is not enough to convince them to adopt water treatment practices. As Sridhar et al. (2020) found in Nigeria, people generally had a good understanding of personal and environmental hygiene, but only 46% treated their drinking water. Additionally, a study in Kenya found that even though 63% of respondents understood the importance of treating drinking water, only 51% actually treated their drinking water (Orimbo et al., 2020). Daniel et al. (2022) asserted that the reason may be due to individual psychology and perceptions affecting decisions surrounding WASH. The authors argued that perception of risk, as well as personal and social attitudes toward water treatment, strongly influence whether or not a household treats their drinking water. Risk perception of water quality was a common factor in the successful adoption of household water treatment in developing countries (Daniel, 2021).

Residents of low-income communities may have the misconception that water contaminants can be detected by smell, taste, or visual inspection (Stillo et al., 2019). Denantes and Donoso (2021) found that people in Chile perceive water quality based on the organoleptics, such as taste, odor, and clarity, and that this perception of water quality influences their perceived health risk from drinking the water. Likewise, "Respondents [in Lesotho, Africa] overwhelmingly relied on visual inspections to determine if their water was clean" (Workman, 2019, p. 1347).

Trust in drinking water and its safety have also been shown to affect the perception of water quality (e.g. Caputo et al., 2022; Workman, 2019; Francis et al., 2015; Doria, 2010, etc.). In addition to knowledge and misperceptions, mistrust prevents communities from adopting water treatment behaviors (Caputo et al., 2022). For example, most people in southern India trust the drinking water in their village, but not 'outside' water (Francis et al., 2015). Likewise, 93% of adults in Brazil did not drink tap water due to concerns over water safety and taste (Garcia et al., 2018). Mistrust, danger, and safety were also key factors affecting local perceptions of water quality in El Salvador (Caputo et al., 2022). Overall, the authors found the community did not trust the potable water standards, lacked complete knowledge of the relationship between water pollution and the need to treat drinking water, and relied on local customs and beliefs.

Health Beliefs

Many people rely on their health and cultural perceptions to determine if their water is safe to drink, which ultimately affects their perceptions of their health. For instance, found that misconceptions about drinking water affected views on water-related health effects in rural India (McGuinness et al., 2020). Similarly, a South African study found that community members often had the misconception that their water is clean without treatment (Moropeng & Momba, 2020). In addition to perceptions of health, cultural perceptions may affect health beliefs, for example, a study in Nigeria found that the cultural belief that children's stool is harmless led to the spreading of cholera (Orimbo et al., 2020). Inaccurate perceptions of health effects related to drinking water have been recognized to affect households' willingness to adopt new water treatment methods (McGuinness et al., 2020).

The health belief model (HBM) is used to determine how individuals perceive their health risks to explain (health) behaviors (Rosenstock, 1974b). The framework is built on the assumptions that if an individual perceives they are at risk of illness, and that the severity would interfere with their life, then they will make changes to benefit them as long as they perceive the benefits to outweigh the barriers (Rosenstock, 1974a).

The HBM is useful for understanding how individuals' health beliefs affect behavior change in the drinking water sector (e.g. Rainey & Harding, 2005; Clark et al., 1992). The first researchers to use this framework studied the health beliefs of students in Kenya and their use of safe drinking water (Clark et al., 1992). The authors brought the theory over from health education, citing that it can predict health-related actions based on individuals' perception of their health risks. The students were more likely to seek out safe water when they felt the benefits outweighed the extra effort and time to obtain it. Rainey and Harding (2005) adopted the framework for a solar disinfection study to understand the factors that support this type of water treatment adoption. Similar to the findings by Clark et al. (1992), Rainey and Harding (2005) found that participants were more likely to adopt solar disinfection practices if they thought it outweighed the barriers. Unfortunately, most of the households agreed it helped relieve stomach issues, but they did not perceive the benefits of treating water to outweigh the barriers of their workload, culture, and lack of knowledge around WASH. The most recent studies have used the HBM to understand diarrheal disease risks, knowledge, and attitudes (see Kankya et al., 2022), as well as the drowning risks of water transportation of school children in Tanzania (Tengecha et al., 2022).

Few researchers have applied the health belief model to understanding perceptions of drinking water risk in developing countries. This study is using the health belief model to measure individual perceptions of drinking water in Ccorca and how they relate to water quality and health satisfaction. Furthermore, the nonprofit organization partnered with this study, 33 Buckets, had already collected data that aligns well with the theory components, including household health beliefs and behaviors of drinking tap water, and the perceived susceptibility and severity of the risk. Therefore, this model will help answer the research questions, (1) Which health beliefs affect the way people in Ccorca perceive water is safe to drink? (2) Do the same factors predict health satisfaction?

Methods

The Health Belief Model

The HBM is based on the constructs of perception of risk, its severity, perceived benefits and barriers, cues to action, and self-efficacy (Rosenstock, 1974a; Boyle & Holben, 2012). This study used the first construct in the health belief model as a guiding framework to analyze the ways that people's health beliefs in Ccorca affect their perception of risk from drinking water. As mentioned above, the perception of risk from drinking water is partially based on attitudes and social beliefs, trust, and organoleptics.

Data Collection

Some perceptions and behaviors around drinking water were measured with a verbal survey given to one individual per household in two villages in the Ccorca district of Peru, Totora and Cusibamba. Surveys were administered in Spanish to 43 households by the staff of 33 Buckets in December 2020. Perceptions were measured on a Likert scale of agreement ranging from one to five, with one being strongly disagree (*muy en desacuerdo*) and five being strongly agree (*muy de acuerdo*). Behaviors, on the other hand, were measured on a Likert scale of frequency ranging from one to four, with one being never (*nunca*) and four being often (*amenudo*).

Data Analysis

Univariateand bivariate analyses were used to evaluate household perceptions and behaviors regarding drinking water in Ccorca. Variables with p-value <.10 were considered statistically significant. The analysis was conducted using IBM SPSS® Statistics version 28.0.0.0.

First, the perception and behavior variables were recoded from ordinal Likert scales to binary variables, as shown in Table 1. Then, frequency analyses were conducted for each variable, and the frequency tables were examined to choose some that the authors wanted to look at closer with crosstabs. The authors investigated all of the factors with bivariate crosstabs and chi-squared tests except those where all respondents indicated the same response (all yes, or all no). The results were used to predict which drinking water perceptions and behaviors were more likely to affect the perception of drinking water safety and health satisfaction in Ccorca.

Overall, the household perceptions and behaviors regarding drinking water were analyzed to gauge the perception of risk from drinking tap water in Ccorca. The authors evaluated which perception and behavior variables were more likely to increase health satisfaction or improve judgment of water safety. The authors hypothesized that as perceptions of water safety increase, then so would overall health satisfaction. Furthermore, the authors predicted that the drinking water perceptions would align with the behaviors reported by the respondents.

Results

Univariate Analysis

The majority of respondents (88.4%) indicated agreement that the tap water in Ccorca is safe for drinking and cooking. These water safety perceptions were compared against both villages, as shown in Table 3, and confirmed with an independent samples t-test that there is not a significant difference in the water safety perceptions between the villages ($t = 1.405$, $p > .05$). Overall, ninety-five percent of respondents in the first

Table 3: Water Safety Perceptions by Village

		Village 1	Village 2	Total
The water is safe to drink and cook	No	1 2%	4 9%	5 11%
	Yes	19 44%	19 44%	38 88%
	Total	20 47%	23 53%	43 100%

village, and eighty-three percent in the second village indicated they think the water is safe for drinking and cooking.

Next, water safety perception was compared to the gender of respondents, but similar results arose where the majority of respondents, 82% of females and 91% of males, indicated the water was safe to drink. Furthermore, an independent samples t-test confirmed that the variance in water safety perception between males and non-males is not significant ($t = -.852$, $p > .05$). Additionally, frequencies were observed for the rate of family health satisfaction and all of the respondents indicated a rating of neutral or better. The majority of respondents (69.8%) indicated agreement that they are satisfied with the health of their family. A small portion of those surveyed strongly agree (11.6%) or are neutral (18.6%) about their family's health. Overall, the univariate analysis has demonstrated that the majority of households in Ccorca believe the water is safe for drinking and cooking, and those beliefs do not change across villages or genders. Furthermore, those surveyed are fairly satisfied with their family's health.

Bivariate Crosstabs Analysis

Next, a crosstab was conducted between health satisfaction and water safety perception, but there was not a significant association between the two outcomes ($X^2(1) = .007$, $p > .05$). The majority of respondents (88.6%) indicated satisfactory family health and agreement that the water is safe, while only one respondent stated unsatisfactory family health and disbelief that the water is safe.

When looking at chi-square tests and crosstabulations of water safety, the perception variables *accessibility* ($X^2(1) = 5.070$, $p < .05$) and *availability* ($X^2(1) = 3.382$, $p < .10$) of tap water were significant. The former, shown in Table 5 on the next page, demonstrated that most of the respondents (96.4%) were satisfied with the accessibility of tap water and agreed the water was safe. The latter, shown in Table 6 on the next page, showed twenty-five respondents (58%) said water is available when they need it, but eighteen (42%) disagreed. However, the majority in both categories agreed the water was safe.

Table 6: Crosstabulation of Accessibility and Water Safety Perception

			I am satisfied with the accessibility of the potable water		
			No	Yes	Total
The tap water is safe to drink and cook	No	Count	4	1	5
		%	9%	3%	11%
	Yes	Count	11	27	38
		%	26%	63%	89%
Total		Count	15	28	43
		%	35%	65%	100.0%

Table 7: Crosstabulation of Availability and Water Safety Perception

			Is there water available when you need it?		
			No	Yes	Total
The tap water is safe to drink and cook	No	Count	4	1	5
		%	9%	3%	11%
	Yes	Count	14	24	38
		%	33%	56%	88%
	Total	Count	18	25	43
		%	42%	58%	100.0%

Next, the behavior variables that were found to be significant in predicting water safety perception were *drinking tap water* ($X^2(1) = 3.197$, $p < .10$) and *water shortages* ($X^2(1) = 3.699$, $p < .10$). On the other hand, when predicting health satisfaction, there were no significant chi-square tests for perception or behavior variables. The first, shown in Table 8, indicated a close split between those that do and do not drink the tap water.

However, the slight majority of respondents (55%) indicated they drink the tap water and they believe it is safe for drinking and cooking. Surprisingly, a third of respondents did not drink the tap water, but they also believe it to be safe. Additionally, more than half of the respondents (61%) indicated there are water shortages. Of these, 81% did not consider the water shortages to be a reason to doubt the water's safety.

Table 8: Crosstabulation of Drinking Tap Water and Water Safety Perception

		I drink the tap water		
		No	Yes	Total
I think the tap water is safe to drink and cook	No	4	1	5
		10%	2%	12%
	Yes	14	23	37
		33%	55 %	88%
Total		18	24	42
		43%	57%	100.0%

Overall, the crosstabulation analysis with chi-square tests demonstrated the respondents are fairly happy with the accessibility and availability of the tap water, and most of them drink the tap water, but there are concerns about water shortages.

Discussion

This study aimed to use the first tenet of the health belief model (HBM) to determine the relationship between drinking water perceptions/behaviors and household views of water safety and health satisfaction. Theoretical and practical implications are discussed. The authors follow these implications with a discussion of the limitations of the study and suggestions for future research. Finally, suggestions to further improve drinking water access in the region conclude the discussion.

Theoretical Implications

Perceived Risk from Drinking Tap Water

The majority of those surveyed did not perceive themselves to be at risk for waterborne illness, as indicated by high ratings of water safety and health satisfaction. The majority of respondents indicated they believed the tap water to be safe for drinking and cooking, and they were satisfied with their family's health. Furthermore, these beliefs did not change across villages or gender, which may indicate this is a social belief in the region. If so, it may be easier for 33 Buckets to support the communities in continuing chlorination because this type of water treatment is already ongoing and accepted by the community. The community may also be more motivated to maintain the system to sustain the health of their families. By including the concept of social acceptance in drinking water, these findings build on those by Daniel (2021) and Daniel et al. (2022) who found that individual psychology and higher risk perception of water quality encouraged the successful adoption of household water treatment in developing countries. This is an important aspect to consider because water access programs that align with the values of a community are more likely to be adopted and sustained over time (McGuinness et al., 2020).

Perceptions Affecting Water Safety Views

The drinking water perceptions that were found to affect water safety were *accessibility* and *availability*,. First, *accessibility* and *availability* of water were two significant variables in the chi-square test. Water access and availability are often cited as barriers to safe drinking water in low-income countries (Alexio et al., 2019). Alexio et al. (2019) describe "water access" as water being nearby, even if someone has to travel to get it. Overall, the majority of respondents (65%) indicated satisfaction with the accessibility of the drinking water. On the other hand, availability has to do with having water on hand for household consumption (Alexio et al., 2019). Almost 42% of households did not agree that there is tap water available when they need it. This corresponds to the "behavior" variable that identified *water shortages* occurring in the region, where households indicated there are water shortages sometimes (33%) or often (28%). When there are water shortages, obviously there would not be water available or accessible to the community. This may force households to buy water (Awang et al., 2020) or access unsafe water sources (McGuinness et al., 2020). Furthermore, water shortages can limit hygiene practices which can further contaminate the drinking water (Orimbo et al., 2020).

Surprisingly, the results did not indicate that organoleptics, such as taste, odor, and clarity, influenced perceived health risk from drinking the water. This may be due to the approval of the flavor of the tap water in Ccorca, where almost 70% of respondents indicated they were satisfied it. This satisfaction may further demonstrate the inherent trust and acceptance that the villages in Ccorca have toward the water systems.

Behaviors Affecting Water Safety Views

Next, the behaviors that were identified to affect water safety perception were *drinking the tap water* and the occurrence of *water shortages*. First, drinking the tap water was significant in the bivariate crosstab analysis with chi-square; it was found that those who drink the tap water in Ccorca were estimated to strongly agree that the water is safe for drinking and cooking. Specifically, everyone that reported drinking tap water often (23.8%) indicated the water was safe; there were no households that often drink the tap water and do not believe it is safe. Then again, about a third of households in this study reportedly never (35%) drink the tap water, but of those, only three (20%) indicated the water was not safe for drinking or cooking. These findings complicate those by a previous study in Brazil, which demonstrated that a lack of confidence in water safety was a primary driver in adults not drinking the tap water (Garcia et al., 2018).

Interestingly, most of the households that do not drink the tap water are not doing so for safety concerns, but further research is needed to determine the reasoning.

The inherent trust that the locals have in the tap water appears to be uncommon in low-income countries. The majority of respondents in Ccorca indicated satisfaction with the public drinking water, which complements the findings of a study in China where 80% of the respondents were satisfied with the drinking water quality (Wang et al., 2018). Unlike other studies of low-income countries, mistrust, danger, and safety concerns about drinking the tap water (Caputo et al., 2022) are not prevalent in Ccorca. This could be because the chlorine treatment systems are provided by the government and maintained by the communities, but this conflicts with a recent study that demonstrated people in El Salvador did not drink the water treated with chlorine because they believed the treatment chemical was toxic (Caputo et al., 2022). In contrast, there appears to be a sense of trust in the chlorine treatment in Ccorca, even though 83.4% of households in the district often boil the tap water before drinking it. Boiling or filtering the tap water may indicate mistrust in the water after all, like Francis et al. (2015) found in India, or it could be a habit. Future research could investigate the perceptions around chlorine treatment to understand the motivations for people in Ccorca to continue boiling their water.

Additionally, water shortages were found to impact water safety perceptions in Ccorca. This aligns with findings by Alhassan and Kwakwa (2014), who concluded that water shortages from a local dam, the main water supply in Dungu, Ghana, led to longer walks for water and using unsafe water sources as a replacement water supply during the dry season. The authors further concluded that the children and women were most vulnerable to the consequences, such as limited or absent school attendance, loss of time for economic development, safety risks from traveling for water and crossing roads, as well as stress and water-borne illnesses from the unsafe water sources. Few studies have attempted to determine relationships between water shortages, water quality, and health perceptions, but further research could help address this gap.

There were a handful of respondents in Ccorca that were not satisfied with the water quality and indicated it was unsafe for drinking, but only 20% of those people were also unsatisfied with their family's health. This reinforces the finding that trust is a key indicator of water quality perception, which in turn is a strong predictor of perceived health risks from drinking water (Danantes & Donoso, 2021). Overall, those that had greater trust in the safety of the tap water were more likely to be satisfied with their family's health.

Perceptions and Behaviors Affecting Family Health Satisfaction

Next, drinking the tap water in Ccorca was found to significantly affect health perceptions. A crosstabulation demonstrated that it was common for those that drink the tap water to agree their family's health is satisfactory. Interestingly, all of the respondents indicated at least neutral health satisfaction, though the majority agreed they were satisfied with their family's health. It was surprising, though, that the occurrence of diarrhea or other stomach-related illnesses was not a significant predictor of health satisfaction in Ccorca. This may be because only 14% of households surveyed reported more than rare cases. The frequency of occasional or recurrent diarrhea or stomach problems occurred more often in those that drink the tap water, however, it can be difficult to determine whether stomach-related illnesses are due to the drinking water or other factors (Spence & Walters, 2012), and as such households may not associate the drinking water as a risk for these health effects. Alternatively, the majority of these households in Ccorca were drinking chlorinated tap water or bottled water, which may inherently reduce the instances of ill health effects associated with their drinking water.

Overall, the people in Ccorca do not perceive themselves to be at risk for waterborne illness. The motivations for drinking the tap water in Ccorca remain unclear, though may relate to the accessibility, availability, and overall trust mentioned previously. Further research is needed to determine if additional WASH education would aid in households' understanding of the health benefits of water treatment (Francis et al., 2015).

Furthermore, the people in Ccorca generally agree that they have available and accessible water for drinking, cooking, handwashing, and hygiene, and they do not have to spend time going to get it. Instead, they can use that time to go to school or work, care for their family, and live a better life. Additionally, the high rates of trust in the tap water indicate a general acceptance of the chlorinated treatment systems that the government has invested in. This trust may positively affect the local perceptions of water quality (Caputo et al., 2022), and motivate them to keep the systems maintained and operational. The long-term sustainability of these chlorinated water systems relies on maintenance and the sharing of upkeep and operational knowledge. If 33 Buckets can help the communities learn to operate and maintain the chlorinated water systems and create a system to pass that knowledge to the next group of Jass water managers, the communities could see increased health, education, and work opportunities, which could ultimately help lift them out of poverty.

Practical Implications

33 Buckets could use these findings to help focus their outreach in Ccorca. Specifically, the organization might focus its efforts on maintenance and operation training for the Jass water managers. Additionally, 33 Buckets could focus on the long-term sustainability of the water systems by helping the communities in the district create a continuation plan for Jass turnovers. Outside of Ccorca, 33 Buckets could use these findings as a starting point to inform qualitative interview questions and focus groups.

It's been demonstrated that the respondents are fairly happy with the accessibility and availability of the tap water, and most of them drink it, but there are concerns about water shortages. The water sector could investigate patterns of water usage to help the communities in Ccorca optimize their water use to avoid wasting water. Additionally, future studies could investigate the perception, acceptance, and implementation of water recycling in Ccorca.

Next, there is a sense that the communities in the district need increased training on the chlorinated water systems' operation and maintenance. The water sector could help the communities establish a systemic way to pass down knowledge to new Jass members, perhaps with a toolkit, manual, or curriculum training.

Finally, it would be interesting for the water sector to investigate whether other regions demonstrate acceptance and trust in public drinking water as has been shown in Ccorca. If not, the sector could strive to bring about changes that would improve the water quality outlook.

Additionally, the households in the district are fairly satisfied with their family's health, but other unknown factors likely play into these perceptions. The health sector could pursue answers to the unknown phenomena, such as motivations for drinking tap water, which would help identify some of the other factors that may affect household health perceptions. Furthermore, health sector actors may be interested in expanding on these findings by pursuing research related to the other tenets of the health belief model. Finally, the sector could partner with organizations, like 33 Buckets, to study the health implications and satisfaction of drinking water.

Limitations

This study relied on convenience sampling and sampling units that were easily accessible, without theoretical justification for selection, which may limit the data and bias the results. Second, a sample size of 43 households may be too small to make accurate conclusions and generalizations about perceptions of water safety and health satisfaction in the region. It is estimated by 33 Buckets that there are 2500 residents in the district. An online sample size calculator by Raosoft® projected that a sample size of 377 is needed to have a confidence level of 95% with a margin of error of five percent. With a sample size of only 43, the margin of error for this study increases to almost 15% and the confidence level is only about 49%. Finally, because the surveys asked households to discuss sensitive topics related to their health and drinking water, the respondents may have provided inaccurate ratings which would generate response bias in the results.

Future Research

Because the study used data previously collected by 33 Buckets, the variables only allowed analysis and interpretation for the first construct of the health belief model, perception of risk. Testing the construct without the other tenets of the health belief model is a potential limitation of this study. Further research could revisit the villages of Ccorca to implement surveys and focus groups for the remaining constructs.

Furthermore, the literature has emphasized that sociodemographic and socioeconomic factors affect attitudes toward water safety and health perceptions. Unfortunately, this study did not have access to information regarding the respondents' income, education level, or other demographic factors. Revisiting the households to obtain this information through additional survey questions may reveal trends that are unknown at this time. Additionally, the organization may wish to conduct additional surveys with more households in Ccorca and expand to other villages to help improve the understanding of how water safety perceptions vary across the region and validate the findings of this study.

Conclusion

In conclusion, the tap water in Ccorca is perceived as safe for drinking and cooking, although they struggle with water shortages. Specific drinking water perceptions and behaviors relate to water safety perceptions in Ccorca, but the households do not perceive themselves to be at risk from drinking the tap water. The people generally trust the tap water, which may enable water access nonprofits to encourage the maintenance of the chlorinated water systems to preserve the water quality and health that the community has come to know. Overall, Ccorca already has the technology to provide safe water, further work in the region should focus on the social aspects of delivering safe water, including training for the Jass water managers on the operation and maintenance of the systems, and building a continuation toolkit to help pass this valuable knowledge onto the next Jass group.

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Chapter 5: Discussion

The purpose of this thesis was to evaluate how factors of collaboration affect the service delivery of charitable organizations serving partner communities using a convergent parallel mixed methods design. In the qualitative study, semi-structured interviews explored key factors of collaboration for the charitable organizations Vermont Everyone Eats and 33 Buckets. The quantitative study used numerical response data from a Likert scale survey, which was distributed to households in Ccorca, Peru, was used to predict drinking water safety perceptions and household health satisfaction.

Summary of Qualitative Results

First, the qualitative study helped identify factors of collaboration by interviewing staff and volunteers associated with Vermont Everyone Eats and 33 Buckets. Overall, 38 semi-structured interviews were thematically analyzed for emergent codes, and those that were similar were ultimately condensed into qualitative themes. The major themes that arose from the interviews were "sharing knowledge" and "growing networks," both of which are indicative of cross-sector collaboration (Koschmann et al., 2012).

Summary of Quantitative Results

Next, the quantitative study used drinking water perceptions and behaviors to predict judgments of water safety and health satisfaction. Forty-three surveys were reviewed and given a numerical item score for household perceptions and behaviors regarding drinking water, allowing each of the perceptions and behaviors to be compared to the drinking water safety views. The data was analyzed through crosstabulations with chi-square tests. From these hypothesis tests, six significant variables were identified, relating to the common themes of "trust" and "service delivery" (see squares in Figure 6).

In the end, the tap water was estimated to be judged as safe if the respondent liked the flavor of the water and drank the tap water. Additionally, individuals were estimated to be satisfied with their family's health if they drank the tap water, but less satisfied if they thought handwashing was important for their health.

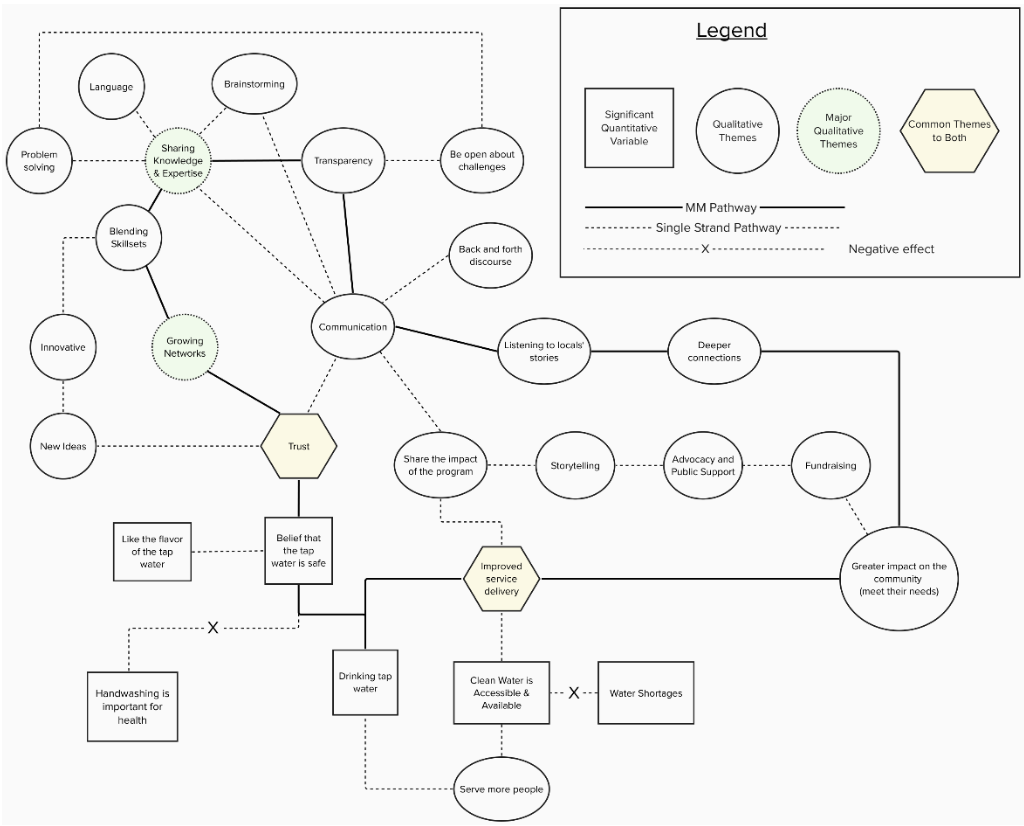

Figure 6: Connecting Major Qualitative Themes and Quantitative Variables

Mixed Interpretation

In this chapter, I briefly synthesize the two studies with a mixed methods way of thinking. The mixed methods pathway (see Figure 6 above) connected four major themes from the qualitative and quantitative studies: "sharing knowledge," "growing networks," "trust," and "improved service delivery." For example, trust was found to be a factor in the household belief that the tap water is safe, and that belief related to improved service delivery. When 33 Buckets improved the drinking water quality, it improved the safety of the water and helped the community realize the tap water is safe to drink, increasing trust between the nonprofit and the local people. Their improved service delivery had a great impact on the community, which was developed through deeper connections, listening, and transparency. Since the themes from the collaboration interviews and the water safety perceptions/behaviors survey in Ccorca highly complement each other, it shows that collaboration is strongly associated with service delivery. That means charitable organizations can improve service delivery outcomes with cross-sector collaboration.

As shown in the joint display (Table 13) on the next four pages, the mixed methods pathway led to the conclusion that growing networks, sharing knowledge, and trust led to improved service delivery for these charitable organizations. A simplified version of the pathway, shown in Figure 7 on page 117, was generated to better highlight the effects associated with the major themes. For instance, "growing networks" are connected with "resilience" (Buzzanell, 2010). This reflects the idea that connecting with others to discuss needs, ideas, and possible solutions, emphasizes that communicating with the locals and other experts resulted in better problem-solving and improved outcomes. Since resilience and innovation are two outcomes associated with improved service delivery, seeing the connections to these themes in the interviews and surveys, and emphasized in the tables above, confirms the theory that communication and collaboration reinforce the resiliency and innovation within charitable organizations, and vice versa.

Table 9: Mixed Methods Meta-Inferences Arising from Common Themes

Theme	Quantitative Results	Qualitative Findings		Mixed Methods Meta-Inferences
	Ccorca Households	VEE	33 Buckets	
Growing Networks	*No data available*	*I think there's opportunities for me to help support this work because I have the relationships with the organizations and some of the business owners in these different communities, so that can help connect the dots and continue to support this work.* - Beck *All that collaborative infrastructure, all that trust building, all that relationship building. Years and years and years. And that really paid off.* - Grace	*So I do think that through creating these stronger partnerships we've been able to have more successful projects… I think that when we create these partnerships [with local nonprofits, schools, and government], they're not because we're pitching a project, but they're coming to us [because we've established this network].* -Abby	Various stakeholders can reach out to existing relationships to expand their collaborative network. This is beneficial because trust-building and stronger relationships can lead to more successful projects.

Note. Quantitative results are presented as Binary Mean ± SD, where a mean closer to 1 is closer to Yes. The table is continued on the next page.

Theme	Quantitative Results	Qualitative Findings		Mixed Methods Meta-Inferences
	Ccorca Households	VEE	33 Buckets	
Sharing Knowledge	*No data available*	*At that moment, I didn't know anything about three squares, but I knew about restaurants, and John [ ] doesn't know anything about restaurants, but he knows about three squares, and so I think we talked a lot about building the Plane as we were flying it, but... each task force member, each of the creation team had a wealth of knowledge that they were pulling from, so we didn't have to waste time researching or trying to figure it out ourselves.* -Karen	*It's always been a very casual organization and in terms of communication and collaboration has always been pretty unstructured. I would say in a good way because we're always just in contact with each other, whether that's through text, [or] through Slack… It's always been extremely collaborative in the sense that there's always back and forth between most of the ideas.* -Abby *I think a big part of us developing our projects is brainstorming off of one another… and kind of just collaborating within our group to understand what the problem is and understand how we can address it.* -Caitlin	Sharing knowledge with other team members means that each person can pull from their expertise and ask others to do the same. This saves time and resources because they do not have to figure it out themselves. Sharing knowledge with a group can help expand everyone's understanding and encourage new ideas to emerge.

Note. Quantitative results are presented as Binary Mean ± SD, where a mean closer to 1 is closer to Yes. The table is continued on the next page.

Theme	Quantitative Results	Qualitative Findings		Mixed Methods Meta-Inferences
	Ccorca Households	Vermont Everyone Eats	33 Buckets	
Trust	Agreement that the tap water is safe for drinking/cooking *0.88* ± *.324* Drinks the tap water *.57* ± *.501*	*This project has been so much about collaboration and trusting partners… that they weren't gonna hide behind anything or not tell the truth. And it's been amazing to see what we were able to build when we could trust each other.* -Bjork *Even though as a group, we had this constellation of people had never been together before, enough of us had worked together enough to have solid relationships already, that then enabled the group to have a level of trust from the get-go. -Cher*	*Trust in the community with regard to the drinking water is sometimes a mixed bag, right? People don't always trust things right away, especially if it tastes like chlorine and sometimes they have that distrust before, like they have that distrust afterwards. But I think certainly I would say, yeah, there's a level of increased trust. I would not say it's absolute. But I think it's certainly increased.* -Anthony	Trust is related to collaboration and service delivery. As trust amongst collaborators improves, so does service delivery. As collaboration and service delivery improve, trust in the water improves, and there is greater agreement that the water is safe, and more people will want to drink the water. Mistrust may affect this cycle.

Note. Quantitative results are presented as Binary Mean ± SD, where a mean closer to 1 is closer to Yes. The table is continued on the next page.

Theme	Quantitative Results	Qualitative Findings		Mixed Methods Meta-Inferences
	Ccorca Households	Vermont Everyone Eats	33 Buckets	
Service Delivery	Accessible drinking water *.65 ± .482* Available drinking water *.58 ± .499* Likeable flavor of the tap water *.70 ± .465* Tap water reaches homes *.98 ± .154*	*I think it was 15,000 meals a week, is what we identified initially, and I think in the peak of [the pandemic], we were up around 40,000 meals a week… VEE just provided one less stress of people's lives… Having a meal on the table is something that lowers their stress level, which hopefully enables them to be more productive, which enables them to get a job, maybe and hold a job. We can help support that through this program. Just from a food security standpoint, that would be huge. We know that… this program is not gonna… solve hunger, but it's helping those who maybe don't qualify for food stamps, and that's kind of been the real beauty of it.* -Beck	*So we've installed, I think it's 5 total systems in Ccorca… it's all pretty nice, but it's up to the local community to manage it, and it's kind of a complex system. So the two things we do are…WASH education... And the other thing we've done is prototyping some systems… [and] what we've noticed is with all the attention that has been paid, these new systems and everything we do actually maintain the proper levels of chlorine in drinking water and we've seen no contamination in these five communities.* -Anthony *We had a lot of discussions this summer about how we can make the most impact?* - Caitlin	The communities are successfully managing the water systems with proper chlorine levels to prevent contamination of the drinking water, which improves overall water access and availability. Improved service delivery reduces stress on those being served and improves their ability to be productive (work or go to school) and earn a living. Greater earnings and job stability can help families lift themselves out of poverty.

Note. Quantitative results are presented as Binary Mean ± SD, where a mean closer to 1 is closer to Yes.

charitable organizations were better able to adapt to the needs of the local communities, thus, improving the services provided and making the community more resilient and more likely to trust in the outcomes. In addition, "sharing knowledge" led to numerous other effects, including being more innovative (Rogers, 2003). This

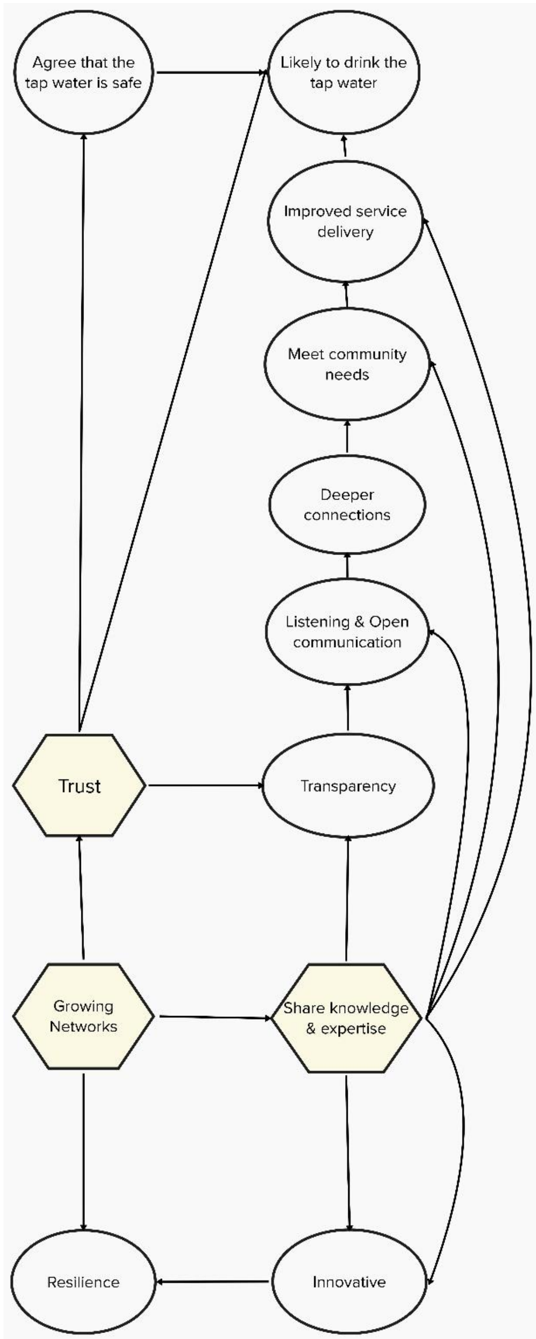

Figure 7: Major Themes and Outcomes of Cross-Sector Collaboration

Chapter 6: Discussion

It was determined through mixed methods that growing networks, sharing knowledge, and trust led to improved service delivery, innovation, and resilience for these charitable organizations. The mixed methods employed in this thesis added value to cross-sector collaboration theory by providing new information: the interviews revealed how different factors affect cross-sector collaboration, while the surveys gave insight into household perspectives of a charitable organization after collaboration. There are four main takeaways after analyzing the data: (1) Growing collaborative networks enhanced trust and improved outcomes for the communities; (2) Sharing knowledge in cross-sector collaborations improved overall understanding of community needs and development of innovative solutions; (3) Trust is an essential component of cross-sector collaborations because it allows for deeper connections between all stakeholders and improves service delivery outcomes; and (4) Service delivery outcomes, including being more innovative and improving resiliency for cross-sector collaborators, occur through network growth, knowledge sharing, and trust.

First, both VEE and 33 Buckets focused on growing their networks to improve their ability to make the greatest impact on the communities being served. These findings align with the argument that most public goods and services are provided through collaborative efforts (Forrer et al., 2014). Various stakeholders (staff, community members, or government agencies) can initiate this collaboration by reaching out to existing or new individuals/groups to expand their networks. For example, staff from VEE reached out to their existing contacts to see who would be willing to join the task force. Additionally, a school principal from Ccorca who had heard about 33 Buckets reached out to the organization when she thought they could help improve water access in another region of Peru. The staff and volunteers interviewed at both charitable organizations indicated that building networks and stronger relationships can lead to more successful projects, which aligns with findings by Tello-Rozas (2016) who had studied a collaboration in Peru that placed the community at the center of the decision-making process. She suggested the project improved the quality of life and empowered the community to become major players in decision-making. Similar results are expected in Ccorca and Vermont. Because both VEE and 33 Buckets took the time to develop close relationships with community members and build trust within the local communities, all parties involved feel comfortable reaching out to the stakeholders, allowing their networks to grow and, ultimately, make a greater impact on the community as a whole.

Next, both organizations prioritized sharing knowledge and expertise with their collaborators. This process uses the strength of networks to generate and share ideas (Tello-Rozas, 2014). Additionally, sharing knowledge with collaborative partners means that each person can pull from their expertise and ask others to do the same. This allows both parties to benefit from the other (Cankar et al., 2013), and they can take advantage of other perspectives (Forrer et al., 2014). As the interviewees pointed out, these collaborative efforts save time and resources because the charitable organizations and the individual communities do not have to solve the problems by themselves. For example, in Ccorca, it is expected that the long-term sustainability of the water systems will improve as the community members increase their knowledge of WASH and the treatment system. Overall, sharing knowledge can expand all stakeholders' understanding and encourage new ideas to emerge.

Third, trust was a central component of both studies, which aligns with findings from previous studies on collaboration that concluded that trust and continuous trust-building are essential components of successful collaboration (Bryson et al., 2006, 2015). In other words, two parties must trust each other, and continue to develop that trust through their collaboration, in order to be willing to share ideas, work together, and make progress. Furthermore, developing existing relationships has been found to build trust between collaborative partners (da Costa, 2019). These conclusions, paired with the fact that trust in governance networks has been found in successful collaborations, (Bryson et al., 2006), support the idea that having trust between all stakeholders is essential for the success of a collaborative project.

The existing relationship between the Ccorca community and their local government had previously established trust, so when the government partnered with 33 Buckets, it likely encouraged quick trust-building with the staff and volunteers. The people in Ccorca show their trust by generally agreeing that the tap water is safe for drinking and cooking.

Additionally, those involved in the VEE task force and community hubs indicated that prior relationships made it easier to collaborate because trust had already been established between those that had worked together previously; they knew they could rely on them. This was true even for the new relationships because when existing task force members brought new people into the group, the task force knew they could trust the referring person and trust of the new member was easier to establish.

It was discovered that trust is reciprocal across every level of service delivery for these charitable organizations, as it impacts communication and collaboration between staff and volunteers, outside partners, and the community. As trust and rapport build across these levels, the stakeholders are more comfortable sharing innovative ideas, and the community, in turn, becomes more trusting of the food or water service. By trusting the service delivery system (and therefore the staff and volunteers of VEE or 33 Buckets), it allows for deeper connections between all stakeholders, increasing communication and collaboration, and ultimately leading to increased resiliency.

Finally, the end goal of every charitable organization is to improve their service delivery for their community partners. Fortunately, collaborations focused on service delivery may be easier to maintain than those with other goals because they require little negotiation (Bryson et al., 2006). Because they have the same end goal in mind of service delivery, there's less conflict between collaborators and therefore the various partners are more likely to maintain the collaboration.

The VEE service delivery ended on March 31, 2023, however when the state was experiencing its most extensive need for food access due to Covid-19, the cross-sector collaboration provided around 25,000 meals a week (VEE, 2023). Formed as an emergency response program to the pandemic, VEE was not intended to be a long-term solution to food security in the state, although task force members and community hub leaders would love to find a way to continue the program.

The service delivery goal for 33 Buckets is to "empower the approximately 2,500 residents of the Ccorca district through improved access to clean water" (33 Buckets, 2021). So far, the organization is succeeding; the communities in Ccorca moderately agree that the tap water is accessible and available, and the systems have been designed so that tap water reaches the majority of homes. However, some community members have complained about water shortages. Furthermore, the water systems that 33 Buckets have designed are technically complex, making it difficult for the people in Ccorca to maintain them without proper training. In an effort to solve these problems, 33 Buckets has been training the Jass water managers and conducting WASH education with the children. They also are installing innovative prototypes in the communities, which allow them to improve the water quality and service delivery (Cankar & Petkovsek, 2013). Ultimately, through training and innovation, the two villages in Ccorca have learned to successfully manage the water systems with proper chlorine levels to prevent contamination of the drinking water. To expand the scale of the impact and encourage widespread and lasting change (Atwell et al., 2009), 33 Buckets should extend their support to other villages across the Ccorca district and beyond.

Interpretation of Findings

These findings from this research indicate that trust, sharing knowledge, and growing networks are needed for collaborative service delivery, which agrees with Bryson et al., (2006). These themes complement and reinforce each other to improve service delivery as trust grows between collaborative partners. For instance, as the people in Ccorca increasingly trust that the tap water is safe, they will drink more of it, increasing the demand for 33 Buckets' services and encouraging the charitable organization to work more closely with the community. In turn, the ongoing work in Ccorca helps 33 Buckets form deep connections between the community members and their staff; that collaboration enhances the stakeholders' trust, which ultimately improves

33 Buckets' ability to meet the needs of the communities in Peru and increases access to and availability of safe drinking water in these rural communities.

My findings are also in agreement with Coleman et al. (2017) in that sharing knowledge encouraged greater brainstorming, communication, and innovation among collaborators, which further improved trust and allowed for meaningful collaboration, as described by Jalba et al. (2014). For instance, by partnering with the mayor and a local contractor, 33 Buckets was able to break down language barriers and encourage transparent communication, which helped the community members feel comfortable sharing the challenges they faced with the water system. Ultimately, in agreement with many of the advantages of cross-sector collaboration outlined by Forrer et al. (2014), transparency helped the charitable organization blend their skillsets and knowledge, build trust, grow their networks, and improve their innovativeness.

Finally, growing their networks enabled 33 Buckets, alongside other stakeholders, to improve their service delivery, increase innovation, and empower the local communities. Improving service delivery for 33 Buckets required a unique, innovative solution that would provide the rural, impoverished communities of Peru better access to clean drinking water. Since access to clean water is associated with poverty alleviation (Ameyaw & Chan, 2013a), by providing these innovative solutions and making drinking water increasingly more accessible and available, it opens doors for the communities to increase education and employment, improves their resilience and gives them the tools needed to lift themselves out of poverty.

Limitations and Opportunities for Future Research

This thesis relied on 38 interviews with and 43 household surveys that were a result of convenience sampling without theoretical justification for selection, which may limit the data and bias the results. It would be valuable to expand the qualitative sample size to hear additional perspectives from different charitable organizations and to consider additional perspectives that were not captured in this study. Future research could pursue interviews with other charitable organizations to determine if they share characteristics of communication and collaboration with VEE and 33 Buckets. Additionally, the quantitative survey sample may be too small to make accurate conclusions about perceptions of water safety and health satisfaction in the Ccorca because 33 Buckets estimates there are 2500 residents in the region. Future research could interview more households in Ccorca and expand to other villages to improve the accuracy of the results, gain a better understanding of how water safety perceptions vary across the region, and aid the generalizability of the findings. Alternatively, researchers could pursue a similar approach in another low-income country to see how the results compare.

The semi-structured interviews in Chapter 3 asked individuals to recall information regarding the performance of the charitable organization they work or volunteer for, which may bias the results because they may not want to discuss the organization in a poor light. Additional bias may be a result of the interview process since the probing questions were unstructured and could have led the interviewee to distort their responses. Further bias may have been introduced in Chapter 4 since the surveys asked households to provide sensitive information regarding their health and water perceptions and behaviors, and some respondents may have provided inaccurate ratings due to fear of judgement.

This thesis considered food and water access with two charitable organizations, but the landscape for these sectors is much wider. This work has wonderful implications for the charitable sectors, but more work is needed to see how this might play out in other regions with different social, built, and natural environments.

Conclusion

Using mixed methods thinking to contemplate the data, I found that sharing knowledge, building trust, and growing collaborative networks are factors that contribute to improved service delivery for charitable organizations. Collaboration supports cross-sector relationships, which can affect local communities' knowledge, attitudes, and perceptions toward charitable services (like increasing access to drinking water and nutritious meals for those in need). As community members, charitable organizations, and governmental bodies innovatively come together to improve service delivery, it simultaneously improves community resilience. These findings may be able to improve outcomes for other charitable organizations, as they would benefit from implementing some of these factors into their own cross-sector collaborations. I am excited to see how VEE and 33 Buckets implement these conclusions to improve food and water access for impoverished communities, in Vermont, Ccorca, and beyond.

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Appendix A: Interview Protocols

VEE Task Force Interview Protocol

Updated November 11, 2021

Introduction:

Hi I'm Anne Massie Graduate Student at UVM. Thank you so much for joining me for this interview.

Today I'm going to ask you a couple of questions about your experiences with VEE. We will end with a set of questions about lessons VEE learned and how we will carry those lessons into the future.

I will be conducting interviews with almost all of the taskforce members. Your experiences are unique and incredibly valuable. Thank you again for agreeing to this interview.

I plan to present the results to the taskforce as a presentation and in a written document. My research team at UVM also plans to publish a few academic papers based on these interviews.

I will use pseudonyms to protect your identity in all of these presentations and papers.

It's very important to me that I represent your opinions and experiences well. May I audio-record this interview to help me remember exactly what you said and how you said it? If at any point, you want me to stop recording, just let me know.

RECORDER ON

Great. Let's get started.

TRANSITION: To start, let's talk about the VEE Program and the taskforce.

1. I noticed on the VEE website and news media repeating the same words: VEE is innovative and effective. Do you agree with this evaluation?

> PROBE: (If agree): Tell me about how it was innovative or effective.
> Alternative: (If the don't agree) How would you describe the VEE program?
> PROBE: (If they don't agree) What parts of VEE were effective? Which weren't?

2. What was it about the <u>taskforce</u> or the way it operated that allowed it to support such an innovative and effective program?

Alternative: Tell me about the taskforce and how it operated.

Probe topics: diversity, creativity, communication patterns, meetings, decision making, history of resilience/innovation, culture of respect/resilience/trust/leadership, money

3. Why did you as a representative of your organization/agency get involved with the Task Force?

ALTERNATIVE: (FOR VEE LEADERSHIP FOLKS) VEE originally started as various grassroots initiatives around the state and then changed form into a state-wide task force. Can you tell me a little bit about *why* the task force was formed?

Probe: Could any one of the organizations involved have been as successful as the taskforce was together? Why or why not?

Topics: Diversity of expertise, complex response to complex problems, resources, transdisciplinary teaming, history of teaming

4. Is there anything else that helped VEE as a program or task force?

Probe topics: state culture, state size, leadership/experience, history of resilience/innovation, culture of respect/resilience/trust, patterns of interaction

TRANSITION: Thank you for telling me about the VEE program and taskforce. Now, I would like to ask you a few questions about the future of Vermont and VEE.

5. We hear the term "new normal" being tossed around these days. What would Vermont's new normal look like if VEE were to continue indefinitely?

Alternative: What parts of VEE should continue?

Probe: VEE impact continued covid-19 pandemic response

Probe: VEE impact in day-to-day life after the pandemic (less hunger, dignity)

Probe: VEE change response to different future crisis (more connected already)

6. What needs to happen to accomplish this new normal for Vermont?

*What could *taskforce members* do to keep VEE services or activities moving forward?

Probe: What could taskforce organizations do together?

Probe: What can taskforce organizations do by themselves?

Probe: How would these things help create a more resilient Vermont?

Topics: new programs or services, new approaches, new knowledge, new networks, communication, funder communication, advocacy, buying/purchasing activities etc

What is *your organization* /agency planning to do to keep VEE services or activities moving forward?

Topics: new programs or services, new approaches, new knowledge, new networks, communication, funder communication, advocacy, buying/purchasing activities etc

Probe: How would these things help create a more resilient Vermont?

What else can be done at the *local- or national-level* could to keep VEE services or activities moving forward?

Topics: state or national policy, collaboration, funding, resilient networks, new normal, identities.

Probe: How would these things help create a more resilient Vermont?

7. You mentioned _________________ as being really important, is there anything else that would need to happen to support this new normal?

Probe: How would these things help create a more resilient Vermont?

Transition- Now we have reached the last set of questions. I would like to transition the topic a bit.

For the remaining part of this interview, I would like to talk about lessons related to resilience.

Let's define resilience as an on-going process that allows us to identify, cope with, and bounce forward from adversity. Bouncing forward means learning from our challenges and becoming stronger moving forward.

With that definition in mind,

8. First, tell me a lesson that was learned *before* March 2020 that helped the taskforce as they created or implemented VEE during the pandemic.

Help: These lessons could be about anything… for example, lessons people learned from past Vermont disasters that they applied to covid pandemic.

how to collaborate, how to get a grant, how to address a crisis, how to be resilient, how to measure success….

For each lesson,

Probe: What was the lesson?

Probe: How was it originally learned?

**Probe: How was that lesson shared with the taskforce?

Probe: How did this lesson make VT more resilient?

9. Do you think the taskforce learned any new lessons during the pandemic? Could you tell me about at least 1 lesson?

Help: These lessons could be about anything… for example, how to collaborate, the nature of a crisis, the nature of resilience, how to get a grant, how to address crisis, how to be resilient. technology?

For each lesson,

Probe: What was the lesson?
Probe: Tell me a story about how the taskforce learned this lesson?
Probe: Tell me a story about how this lesson helped to make Vermont more resilient during the COVID-19 pandemic?

10. All of the lessons you mentioned seemed really important. How will these lessons be captured and carried forward to help future Vermonters?
Probe: USDA pilot proposal
Probe: Vermont Resilience plan
Probe: Statewide Emergency food planning
Probe: Tell me about informal communication

<u>Last question</u>

11. Imagine we were going to make a handbook that included lessons for other communities or future Vermonters. Is there any other information or lessons that you think we should include?
Probe: Where did this lesson come from?
Probe: Tell me a story about how VEE used this information/lesson
Probe: How will these lessons be captured and carried forward to help future Vermonters?

Closing: That's it. Thank you so much for sharing your experiences and thoughts with me.

Before I turn off the audio-recorder, do you have any additional thoughts to add?
[Turn off recording.]

Thank you again for your time. I really appreciate it. I will share the reports with you once I write them up this spring.

VEE Community Hub Interview Protocol

Objective: The goal of this interview is to learn about (1) how this Hub organized its VEE programing, (2) the factors that helped or hindered this hub, and (3) the hubs' plans (if any) for the future.

INTRODUCTION:

1. Hi ________________. Thank you for joining me today.

2. My name is _________________. I am a graduate student in the ____________________ program at UVM.

3. Today I'd like to talk to you about how _____ hub name______ organized itself and its services to offer VEE programing. Also, I'm interested to hear if _____their hub name______ has plans for what they or VEE should do moving forward.

4. As we talk, remember you can stop at anytime or request that we skip a question. Your participation is confidential. We will use a pseudonym to protect your identity in any reports that result from this study.

5. I would like to audio-record and live transcribe the interview to help me include your exact words in my analysis paper. Would it be okay if I turned on the audio-recorder now? (Great – [turn on live transcription and audio-recorder].

[transition] Let's get started. To begin, I have four questions about your hub and how it worked.

1 Every hub is different. Would you be able to tell me a little bit about your hub?

1.1 (If they didn't mention distribution pathways in #1) Describe the main ways your hub distributed food for the VEE program. For example, in-person pickup of individual meals, sent meals to partner organizations, sent meals out to peoples' homes, or other.

2 What are a couple of things that helped ___(hub name)____ as it organized to offer VEE programing?

Potential Examples: Finances and grants, communication, multisector collaboration, existing relationships, prior experience, infrastructure, covid policies, volunteer base, urban-rural, community needs, staffing, worker health, VT culture.

2.1 How did help you organize?

2.2 Is there anything else that comes to mind?

3 What are a couple of things that were challenging for ___(hub name)____as it organized to offer VEE programing?

Potential Examples: Finances and grants, communication, multisector collaboration, existing relationships, prior experience, infrastructure, covid policies, volunteer base, urban-rural, community needs, staffing, worker health, VT culture.

3.1 How did _____ pose a challenge for ___(hub name)____?
3.2 Tell me a story about how a time ______ made it hard for your hub to organize.
3.3 Is there anything else that comes to mind?

4 Is the VEE programing that ___(hub name)____ is offering different from what was happening in your community before the pandemic? If so, how is it different?
4.1 What about your organization has changed? Why? How?
4.2 What about your community changed? How? Why?

[Transition: Thank you for telling me a little bit about your hub and how it organized itself. I would like to change topic for a moment to think about your hub and clients moving forward.]

5 VEE Hubs just found out they will have funding until July 1, 2022. How did you feel when you heard that news?
5.1 Why you felt that way?

6 In general, do you think there should be a VEE-like program after FEMA funding runs out in July?
6.1 If so, what do you think it could look like?
6.2 If not, why not.

7 Now specifically, thinking about ______hub name_________. Does ______hub name_________ have a plan for what it might look like after FEMA funding stops in July?
7.1 If so, tell me about that plan.
7.1.1 What is the plan?
7.1.2 How is this plan similar or different from what you did before the pandemic?
7.1.3 How is this plan shaped by your organization's pandemic experiences?
7.1.4 What will help your organization as it implements this plan?
7.1.5 What will hinder your organization as it implements this this plan?
7.2 If not, why isn't there a plan?
7.2.1 What will happen to your organization?
7.2.2 How was this decision made?
7.2.3 How have your hub's unique features or experiences shaped these plans?

[Transition: Thank you for that input! If you have time, I have two more questions for you about the lessons you learned through your participation in the VEE program.]

8 I am interested in learning about any lessons you or your organization learned while offering the VEE program. VEE is making a Tool Kit and we will likely add the results of our study to that document. Could you tell me about an important lesson you learned that you think should be included in that handbook?

8.1 Why is this lesson important?

8.2 Tell me a story about how you learned this lesson.

9 Is there anything else you think I should include in this Tool Kit to help other communities planning a Everyone Eats-like program?

10 Is there anything else you'd like to tell me before we end the call?

CLOSING DIALOGUE:

11 Thank you so much for completing this interview with me. It was interesting to learn about ____________________.

12 Do you have any questions for me?

13 Thank you again for participating in this interview.

[End call. Stop recording and Stop live transcribe.]

33 Buckets Interview Protocol

Updated August 20, 2022

Objectives:

- To describe how cross-sector collaboration between 33 Buckets and their partners increases clean drinking water access in Peru.
- To identify factors that are essential to cross-sector collaboration in the international development water sector.
- To learn how collaboration influences sustainability in clean water projects.

Introduction:

Hi [name], I'm Kristin Darby. I am a graduate student at the University of Vermont, and I am working with 33 Buckets for my Masters Thesis related to water access in Peru. Today I'm going to ask you a series of questions about your experiences with 33 Buckets, collaboration, and clean water projects.

Is it okay to audio record this conversation? [START RECORDING]

TRANSITION: Thank you for taking the time to participate in this interview. I have a few questions about collaborating with 33 Buckets.

(1) Can you briefly explain your role with 33 Buckets?

(2) Describe how 33 Buckets collaborates?
   a) Why do you work together?
   b) What types of projects do you work on together?
   c) When did the collaboration start?
   d) Who is involved in the collaboration?
   e) Are there other organizations involved?

(3) Zooming in for a second, what do you do at (organization name) and how does that role connect you to your organization's work?

Transition: Now that you've told me a little bit about 33 Buckets' collaboration, I'd like to ask you a few questions about specific parts of the relationship.

(4) I'd like you to think back to the beginning of the collaboration between the Ccorca communities and 33 Buckets. How did 33 Buckets come to work with these communities?
   a) What was the timeline for meeting and working?
   b) Why did you decide to work together?
   c) Who or what prompted the collaboration?
   d) How did your partnership form? Was it a formal or informal process?

(5) How has this collaboration changed access to clean drinking water for these local communities?
    a) What has 33 Buckets contributed to the community?
    b) How do the communities contribute to the collaboration?
    c) How has this collaboration affected trust in the community?
    d) How has this collaboration impacted clean water access in the community?

(6) Tell me a story about a time you collaborated with a community on a chlorine water project.
    a) Do you consider this project to be a [success/challenge]? What made that project so [successful/challenging]?
    b) What were the positive outcomes of this collaborative project?
        i. Community?
        ii. Public Health?
        iii. Environmental?
        iv. Collaborative Relationship?
    c) Were there any undesired outcomes related to this collaborative project?

(7) How has collaboration affected 33 Buckets' innovation?
    a) In water technology?
    b) In implementing water systems?

Transition: My final questions focus on the future:

(8) Looking forward, do you think 33 Buckets will continue to work with these communities? Why or why not? For how long? Why?

    a) If you were to continue working together,
        i. What is going well in the collaboration?
        ii. What do you hope to improve as you continue this collaboration?
        iii. What do you hope to achieve together in the future?
        iv. What would you change moving forward?

    b) If you were not to continue working together, do you have any other ideas on how to accomplish clean water goals in the local communities?

(9) In order to make your projects sustainable over the long-term, what will your organization need to do?

(10) Is there anything else you would like to tell me about your work at 33 Buckets?

Closing: THANK YOU so much for your time today! I'm going to stop recording.

Appendix B: Surveys

Survey of Drinking Water Perceptions (Original Spanish)

Encuesta

Percepción de agua potable

Parte 1:

¿Cuál es tu edad?

Género

¿Cuántas personas conforman tu familia?

¿Cuáles son las edades de los miembros de tu familia?

¿Usted trabaja en la actualidad?

Parte 2:

Por favor escribe sus respuestas, evaluando sobre su salud y el agua en su comunidad.

i. ¿El suministro de agua por grifo llega a su hogar?

   Si non, ¿de dónde saca el agua y qué tan lejos debe caminar?

ii. En caso afirmativo, ¿cuánto paga por mes por el suministro de agua potable? ¿Hay escasez de agua?

iii. ¿Usted piensa que hay un problema en su comunidad con el agua que están tomando ahora? Explique su repuesta.

iv. ¿Cuánto estaría dispuesto a pagar mensualmente por el acceso al agua potable? ¿Qué tan lejos estarías dispuesto a caminar por el agua limpia?

v. ¿Qué le gusta más del agua? (Por ejemplo: calidad, sabor, conveniencia, precio bajo, algo más, o nada).

vi. ¿Qué no le gusta del agua? (Por ejemplo: suciedad, sabor, falta de conveniencia, precio alto, algo más, nada).

Parte 3:

Utilizando la escala indique en qué grado está de acuerdo o en desacuerdo con las siguientes afirmaciones sobre su salud y la del agua de su comunidad. Por favor, responda honestamente ya que sus respuestas son confidenciales.

1 = Muy en desacuerdo 2 = En desacuerdo 3 = Neutral 4 = De acuerdo 5 = Muy de acuerdo

1. Estoy satisfecho con la salud de mi familia.
2. Creo que el agua de grifo es segura para beber y cocinar.
3. Estoy satisfecho con el sabor del agua de grifo.
4. Creo que beber agua limpia es importante para mi salud.
5. Estoy satisfecho con la accesibilidad del agua potable.
6. Siempre hay agua del grifo disponible cuando la necesito.

vii. Es conveniente acceder al agua del grifo de mi casa.

viii. Creo que lavarme las manos es importante para mi salud.

ix. Creo que hervir el agua la hace segura de beber.

x. Creo que el agua luce limpia y es buena para beber.

Parte 4:

Usando la escala a continuación, indique con qué frecuencia realiza las siguientes acciones:

1 = Nunca 2 = Raramente 3 = A veces 4 = A menudo

1. Compro agua embotellada.
2. Bebo el agua de grifo.
3. Yo trato el agua del grifo con clorina (cloro) antes de beberla.
4. Hiervo el agua de grifo antes de bebería.
5. Hay algún caso de diarrea o problemas estomacales en mi familia.
6. Me lavo las manos antes de utilizar alimentos.
7. Me lavo las manos después de usar el baño.
8. Hay escases de agua.
9. Huelo o percibo un sabor a cloro en el agua.
10. Yo filtro el agua antes de dársela a mi familia.

Survey of Drinking Water Perceptions (English Translation)

Part 1: Demographics

What is your age?

Gender:

How many people make up your family?

What are the ages of the members in your family?

Where do you currently work?

Part 2: Open-Ended Questions

Please write your answers, with your opinion about your health and the water in your community.

- Does the tap water supply come to your home? Yes or No?

  If not, where do you get your water from and how far must you walk?

- If so, how much do you pay per month for the drinkable water supply? Is there a water shortage?
- Do you think there is a problem in your community with the water they are drinking now? Explain your answer.
- How much would you be willing to pay monthly for the drinkable water access? How far would you be willing to walk for clean water?
- What would you like most about your water? (For example: quality, taste, convenience, low price, something more or nothing).
- What do you not like about your water? (For example: dirtiness, tastes, lack of convenience, high price, something more, nothing).

Part 3: Perceptions

Using the indicated scale, in what grade do you agree or disagree with the following affirmations about your health and the water in your community? Please respond honestly since your answers are confidential.

1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

- I am satisfied with the health of my family.
- I believe that the tap water is safe to drink and cook with.
- I am satisfied with the tap water taste.

- I believe that drinking clean water is important for my health.
- I am satisfied with the accessibility to drinkable water.
- There is always available tap water when I need it.
- It is convenient to access tap water in my home.
- I believe that washing my hands is important for my health.
- I believe that boiling water makes it safe to drink.
- I believe the water looks clean and is good to drink.

Part 4: Behaviors

Using the next scale, indicate with what frequency you do these following actions:
1 = Never 2 = Rarely 3 = Sometimes 4 = Often

- I buy bottled water.
- I drink the tap water.
- I treat tap water with chlorine before drinking. (Omitted)
- I boil the tap water before drinking.
- There are cases of diarrhea or stomach problems in my family.
- I wash my hands before cooking food.
- I wash my hands after using the bathroom.
- There is a shortage of water.
- I smell or notice a chlorine taste in the water.
- I filter the water before I give it to my family.