



**Food Security Experiences and Challenges During 2022
Flooding in Pakistan**

By Muhammad Ahmad

Master of science in Public Health Nutrition

Faculty of Health Sciences

Oslo Metropolitan University

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Abstrakt på Norsk

Bakgrunn: Klimaendringer utgjør betydelige risikoer for verdens matsikkerhet, og fører til naturkatastrofer som flom. Pakistan, med sine gjentatte flom og fareutsatte miljøer, rangerer som det femte mest berørte landet av klimaendringer globalt. I 2022 opplevde Pakistan tre ganger mer monsunnedbør enn gjennomsnittet, noe som førte til at millioner av pakistanere søkte øyeblikkelig hjelp. Flom ødela fruktbart jordbruksland og reduserte effektiviteten i matproduksjonen. Organiseringen av matforsyningen og distribusjonen etter flom utgjør utfordringer for både ofre og myndigheter ettersom beredskapsorganisasjoner har vanskelig for å opprettholde matsikkerheten for den berørte befolkningen.

Mål: Målet med studien er å utforske erfaringene til hjelpemyndigheter og frontlinjearbeidere med å sikre matsikkerhet under flomkrisen i Pakistan i 2022, med fokus på strategiene som brukes, og utfordringene de står overfor.

Metodikk: Studien følger et kvalitativt forskningsdesign. Ved hjelp av strategisk utvelgning ble det gjennomført åtte semistrukturerte intervjuer med deltakere fra myndighetene og privat sektor som var involvert i å gi hjelp til flommens berørte befolkning gjennomført online. Intervjuene ble utført på urdu, forfatteren utførte oversettelse av intervjutranskripsjonene fra urdu til engelsk og brukte NVivo som analyseverktøy for tematisk analyse. Forfatteren kategoriserte ulike erfaringer knyttet til matlevering og dens utfordringer.

Resultater: Flom i 2022 påvirket det lokale matforsyningsystemet alvorlig, ødela alle eiendeler og matlagre og gjorde befolkningen mattrygg. Under flommene reagerte organisasjoner raskt og benyttet tjenestene sine for å gi mat og nødhjelp til flomofrene. Imidlertid fikk sårbare grupper bare melk og i noen få tilfeller noen kosttilskudd. Et betydelig gap i kommunikasjonen mellom hjelpeorganisasjoner ble identifisert, noe som førte til dårlig styring av hjelpeaktiviteter. Betydelige barrierer dukket opp, inkludert mangel på finansiering og riktige ressurser, dårlig transport og distribusjon, mindre variasjon og vedlikehold av matkvalitet, og begrenset tilgang til stedene der ofrene befant seg.

Konklusjon: Denne studien fremhevet at 2022-flommer utgjorde en betydelig trussel mot matsikkerhet, og hjelpemyndighetene sto overfor utfordringer med å opprettholde konsekvente matforsyninger. Derfor understreker den viktigheten av å styrke kommunikasjonen mellom humanitære interessenter, tilby måltider som er både næringsrike og kulturelt egnet, og sikre åpenhet i matdistribusjonen

Abstract:

Background: Climate change poses significant risks to world food security, with natural disasters like floods. Pakistan, with its frequent floods and hazard-prone environment, ranks as the fifth most affected country globally. In 2022, Pakistan experienced three times more monsoon rainfall than the average, leading millions of Pakistanis to seek immediate aid. Floods destroyed fertile agricultural land and reduced efficiency in food production. The disorganization of food supplies and distribution after floods poses challenges for both victims and authorities as emergency organizations find it difficult to maintain food security for the affected population.

Aim: The aim of the study is to explore the experiences of relief authorities and frontline workers in providing food security during the 2022 flood crisis in Pakistan, focusing on the strategies used, and the challenges faced by them.

Methodology: The study follows a qualitative research design. Using purposive sampling, eight semi-structured interviews with participants from the government and private sector involved in providing help to the affected population were conducted online. Most interviews were conducted in Urdu, the author performed translation of the interview transcripts from Urdu to English and utilized NVivo as an analysis tool for thematic analysis. The author categorized various experiences related to food delivery and its challenges.

Results: The floods of 2022 severely disrupted the local food supply system, destroying all belongings and food storage facilities and making the population food insecure. During the floods, organizations responded quickly and utilized their services to provide food and relief to flood victims. However, vulnerable groups only received milk and, in a few instances, some supplements. A significant gap in communication between relief agencies was identified, which led to poor management of relief activities. Significant barriers emerged, including a lack of funding and proper resources, poor transportation and distribution, less variety and food quality maintenance, and limited access to the sites where victims were located.

Conclusion: This study highlighted that 2022 floods posed a significant threat to food security, and the relief authorities faced challenges in maintaining consistent food supplies. Therefore, it emphasizes the importance of enhancing communication among humanitarian stakeholders, planning meals that are both nutritious and culturally suitable, and ensuring transparency in food distribution.

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List of Abbreviations:

NDMA (Natural disaster management Authority)

PDMA (Provincial disaster management Authority)

PWD (Population Welfare Department of Punjab)

FS (Food Security)

WHO (World Health Organization)

FAO (Food and Agriculture Organization)

UN (United Nations)

CESCR (Committee on Economic, Cultural and Social Rights)

FSC (Food Supply Chain)

WFP (World Food Program)

UNHCR (United Nation High Commissioner for Refugees)

NGO (Non-Governmental Organization)

USDA (United States. Department of Agriculture)

FEMA (Federal Emergency Management)

GOP (Government of Punjab)

SCHR (Steering Committee for Humanitarian Response)

SDG (Sustainable Development Goal)

NCDs (Non-Communicable Diseases)

DFSF (Disaster Food Security Framework)

MNA (Member of National Assembly)

KP (Khyber Pakhtunkhwa)

US (United States of America)

1 Introduction

1.1 Background:

Over the past few decades, the world has increasingly acknowledged the significant risks posed by climate change. This process usually leads to changes in rainfall patterns, rising sea levels, and temperature shifts (Tarmizi, 2019). The influence of climate change on the natural hydrological cycle is obvious (Udayashankara et al., 2016). There is a distinct increase trend in the intensity and damage caused by disastrous events, which is directly related to the consequences of climate change (Coronese et al., 2019) as a result this change in climate is increasing the frequency and severity of these threats of natural disasters (Trut & Kovačević, 2022). Climatic change is causing certain weather and climatic risks to occur more frequently, with greater intensity, across wider regions, and for longer periods of time (EM-DAT., 2023). Moreover, the number of reported natural disasters has doubled over the last two decades, from around 200 to more than 400 every year (UNHCR, 2009).

Natural disasters such as floods are an unavoidable part of human history, and the effects of these floods on humans are not negligible. Flood disasters have been a prevalent danger worldwide since ancient times. Throughout history, floods have been considered to be the most devastating disasters (Kandilioti & Makropoulos, 2012). Unpredictable rain, and melting glaciers due to climate change are a few important reasons connected to subsequent floods in interconnected areas (Ahmad et al., 2022; Derbyshire et al., 2001). Intense rainfall could be one of the reasons for floods leading to significant human casualties or occasionally the collapse of entire civilizations. Floodwater can disturb whole ecosystems, devastate economies, and rapidly descend today's society to a prehistoric form (Angelakis et al., 2020). Undoubtedly, an extreme event has a significant impact on the food security of an entire community (MacNabb & Fletcher, 2019)

Pakistan has been classified as the fifth most impacted country in the world by climate change natural catastrophes due to its regular floods and location in a hazard-prone area, (Eckstein et al., 2019). In terms of natural emergencies, Pakistan experienced 21 major floods on multiple occasions between 1950 and 2014 (Yaqub et al., 2015). In 2022, Pakistan suffered monsoon rainfall that was three times more than the average level. Pakistan had the wettest August on record, with rainfall amounts seven and eight times higher than typical. The Indus River, covering the entire country,

had a significant overflow throughout a vast area of hundreds of square kilometers, while the heavy rainfall also resulted in sudden floods in urban areas once again (WWA, 2022). The floods in 2022 caused almost 6.4 million Pakistanis to need immediate aid. The World Health Organization (WHO) categorized the flooding as a grade 3 emergency, which is its most severe classification (WHO, 2023).

The overmentioned floods resulted in more than half a million livestock deaths and the destruction of agricultural land. It is important to note that the population heavily relied on livestock and agriculture for their food needs, which is what ultimately led to the food crisis. There had been a vast destruction of infrastructure, such as the bridges that were essential for the food supply. It also destroyed storage facilities with a million metric tons of grain, raising a significant risk of an unforeseen food security problem in the country (Iqbal et al., 2022; Qamer et al., 2022).

In states like Pakistan, where the economy is primarily dependent on food and agriculture, there exists a significant link between severe disasters and the state of food security (Ahmad et al., 2023). Floods destroy fertile agricultural land, resulting in reduced agricultural efficiency, decreased food production, rising prices, and changes in general well-being that make it difficult for victims to obtain food (Waseem & Rana, 2023). Approximately 18,000 square kilometers of agricultural area were devastated, resulting in the destruction of around 45% of the cotton crop, which is a significant export for the country in recent 2022 floods in Pakistan. The loss of agricultural crops, equivalent to around US\$2.3 billion, exacerbates the existing food shortages caused by the war in Ukraine and extreme temperatures in the region (WWA, 2022).

During disastrous emergencies, household supplies become insufficient (Golem & Byrd-Bredbenner, 2015). Food security is defined as "*Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life*" (FAO, 1996). The given definition of food security indicates that there are many ways to ensure food security, including planning for adequate relief food supplies, selection of right foods, taking health and nutrition under consideration, offering different types of food assistance, and figuring out the correct measures in line with provisions for compensation and livelihood (FAO, 1996). Natural disasters like floods, put the state and its authorities to ensure an adequate food supply for those unable to provide for themselves (CESCR, 1999).

Studies conducted in Iran and United States investigated experiences and challenges in increasing the efficiency and efficacy of food aid delivery and food security in disasters showed that the disorganization of food supplies and distribution following a disaster leads to numerous issues for both the victims and the authorities (Ainehvand et al., 2019; Calloway et al., 2022; Moghadam et al., 2017). Following an emergency, the relief organizations face the significant challenge of supplying and distributing food and maintain food security for the affected population. Implementing specific measures to meet individual food needs is one of the most important aspects of crisis management (Moghadam et al., 2017).

However, to the best of the author's knowledge, no research has explored the challenges related to food security responses by the relief organizations in response to natural disasters in Pakistan. As one of the most affected countries by climate change (Eckstein et al., 2019), Pakistan has frequently faced floods in past few decades and food security remained a problem during all previous flood episodes (Waseem & Rana, 2023; Yaqub et al., 2015). The previous disasters around the world show that the provision and distribution of food for disaster-affected individuals is a significant challenge within crisis management (Calloway et al., 2022; Moghadam et al., 2017). Therefore, there is the need for an investigation to address concerns related to the availability, provision, and distribution of food. Hence, to provide a better understanding about preparedness with a particular focus on food security from the perspective of relief authorities, as previous research has emphasized their critical role in such situations (Ainehvand et al., 2019; Calloway et al., 2022; Moghadam et al., 2017; Smith & Lawrence, 2018).

1.2 Aim of the Study:

The aim of the study is to investigate and understand the experiences of relief authorities and frontline workers related with provision of food security to the victims of the 2022 flood crisis in Pakistan. This involves exploring the strategies employed, the obstacles encountered, and their influence on the availability, accessibility, and acceptance of food within the impacted communities.

1.3 Research Questions:

- 1) What are perceived impacts of 2022 floods on food security in D.G. Khan District, Pakistan?
- 2) What were the experiences and perspectives of relief authorities and frontline workers when delivering food aid to flood victims?
- 3) What were the primary obstacles that relief authorities encountered in ensuring food security during the response?

1.4 Literature Review

This section of the study will present the relevant research regarding the experiences and obstacles encountered by relief authorities in ensuring food security during natural emergencies. A systematic search was carried out to retrieve the literature from a variety of academic databases, such as PubMed, Google Scholar, Web of Science, and from government and organizational reports. To identify relevant studies, words such as food security, Natural Disaster, relief efforts, and disaster management were employed.

Impacts of Crises on Food Security:

Emergencies can cause food insecurity by disrupting societal systems, restricting access to food, depriving individuals of sufficient food, and shifting people preferences towards less expensive, less nutritious foods (Laborde et al., 2020). Israel and Briones (2012) explained that natural emergencies destroy farm supply routes, and negative consequences could lead to indirect and negative outcomes for agriculture (Israel & Briones, 2012). In regard to this, Lin et al. (2022) found that a decrease in agricultural productivity has an adverse effect on food production, leading to a reduction in both supply and availability of food, restricting people's ability to get proper food (Lin et al., 2022). Responding to previous statement, a study revealed that disruptions in food production hinder low-income households' ability to maintain an appropriate diet, potentially compromising the quality of nutrition within the household (Reddy et al., 2019).

Furthermore, a study mentioned that natural disasters cause extensive damage to infrastructure, resulting in the loss of stored food and low food stocks cause a high level of food insecurity in the affected regions (Matemilola, 2017). However, the effects of disasters extend beyond the food supply chains and infrastructural damage to other sectors, impacting the victims' physical and psychological health. A study found an impact of displacement on food security, and it shows a substantial and positive correlation between the number of relocations an individual undertook and food insecurity (Clay et al., 2018). In regard to this, a study mentioned that the emotional and psychological changes brought on by displacement may have an impact on maternal and childcare practices (Kiess et al., 2017). Moreover, it shows that humanitarian crises will have both short- and long-term effects on the nutritional status of vulnerable groups, such as children, pregnant women, and people with chronic illnesses (Kiess et al., 2017). Furthermore, a combination of

environmental and socioeconomic issues caused by disasters leads to food insecurity and impacts the population's well-being (Akrofi et al., 2012).

1.4.1 Overall Challenges while Ensuring Food Security:

A review of articles mentioned that blended foods and the flours are highly vulnerable to contamination and deterioration, making them particularly challenging to manage during humanitarian situations (Caniato et al., 2017). One study mentioned that the ineffective distribution system poses a threat to food security, usually during a disastrous situation (Chodur et al., 2018). Moreover, a study observed that there was an absence of a distribution process for urgent food supplies during the Bam earthquake in Iran (Moghadam et al., 2017).

Further studies highlighted the difficulties faced by administrators and managers and in this regards, Moghadam et al., (2017) highlighted the significance of coordinating the administrative procedures among agencies involved with humanitarian actions (Moghadam et al., 2017). Moreover, Scarpin and Silva argued that the regulatory framework of disaster management can pose the primary obstacle to food security (Scarpin & de Oliveira Silva, 2014). Bang et al, (2018) revealed following the flood, the government generally intervenes to offer food and financial support to those affected, but due to corruption, this assistance sometimes does not guarantee a state of food security, resulting in people receiving only a small portion or no assistance at all (Bang et al., 2018). Moreover, a study mentioned that post-flood, food provision is a significant concern, as it is very difficult to ensure food availability for a longer period for the victims (Devi, 2022). In complex emergencies, as highlighted by Stoddard et al., (2006), it is highly challenging for organizations to identify needs (Stoddard et al., 2006). Moreover, a study showed that temporary shelters usually do not have designated spaces for cleaning feeding equipment or making newborn formula (Santaballa Mora, 2018). Additionally, a study noted that, disaster victims face difficulties accessing food due to limited availability and it is often unclear when and where victims will get food (MacNabb & Fletcher, 2019). A study mentioned the problem of inadequate availability of food is a significant obstacle, since it can significantly hinder the efficacy of food emergency operations (Andersson et al., 2012).

1.4.2 Operational Challenges

According to Kinsey et al., (2019), the inadequate allocation of funds and resources for effectively handling emergency circumstances is a major concern (Kinsey et al., 2019). Another study found

that inadequate financial management was an inherent obstacle to coordination and collaboration (Peck et al., 2016).

Some studies on the distribution and allocation of food aid have discovered that due to misallocation, food may not reach the right places, particularly in rural areas (Doocy et al., 2013; Jayne et al., 2002). Moreover, according to a review article, humanitarian agencies frequently struggle to maintain neutrality when responding to complex situations during food assistance, which leads to resource mismanagement (Maxwell et al., 2011). However, a study mentioned having baseline data enhances monitoring and improves preparedness for disasters (Wemette et al., 2018). In regards to previous statement, a review of studies highlighted that not having reliable information about the population at risk is a significant obstacle to ensuring food security for humanitarian agencies (Maxwell et al., 2011). Furthermore, a study shows that an inherent barrier in food aid is the lack of assurance regarding the availability of local food, limiting the capacity to guarantee that food aid aligns with the nutritional requirements and cultural needs of the intended recipients (Prudhon et al., 2018). Nichols et al., (2013) mentioned an important obstacle is the absence of regular nutrition monitoring (Nichols et al., 2013).

Moreover, a lack of trust within relief agencies, communities, and the local government is a challenge and makes it difficult to effectively distribute food, particularly in situations where agencies are unable to directly access victims and must depend on alternative methods (Maxwell et al., 2011). A study identified operational obstacles to establishing an optimal supply network, such as insufficient fuel and transportation availability (Kaluski et al., 2002). Furthermore, a study mentioned that a problem in the field of food assistance is protecting staff and maintaining food security during disasters (Belton et al., 2020). In addition, a study found the primary obstacle hindering the delivery of relief to victims is the extensive geographical affected area (Lozano et al., 2019). One of the study found that handling ethical political decisions in emergency aid efforts is also a huge challenge (Renzaho, 2007). Furthermore, a review article (Moslehi et al., 2022) mentioned multiple challenges that impact the efficiency of assistance distribution in emergency situations, including accountability (Young & Maxwell, 2013), governance (Tranchant et al., 2019), trust (Maxwell et al., 2011), harmonization (Kaluski et al., 2002), neutrality, and impartiality (WFP & UNHCR, 1997).

1.4.3 Utilization Challenges:

Another significant challenge is that the food supplied lacks sufficient nutritional value (Kaluski et al., 2002), making it a major issue in disaster response. As shown by a study, food insecurity among high-risk populations should be considered a significant issue (Clay et al., 2018). Moreover, a study mentioned that in times of disaster, the provision of food typically prioritizes the prevention of micronutrient deficiencies and caloric restriction, which could lead to undernutrition (Clay, Slotter, et al., 2023). Another study showed that transitioning from traditional dietary practices to imported foods poses a significant problem (Ahlgren et al., 2014). In relation to this, a study found a lack of variety in food options for the victims during the Bam earthquake in Iran (Moghadam et al., 2017). A study revealed that food consumption changes in response to natural climatic disturbances and other adverse incidents, such as a decline in food quality (Islam & Ahmed, 2017). Moreover, a study shows that victims of an earthquake that occurred in the eastern Pacific Ocean in Japan who were residing in shelters showed decreased intake of emergency food, weight loss, and gastrointestinal symptoms after one month of living in shelter homes (Inoue et al., 2014). However, a research shows that it is due to easy availability of food and households prioritize their calorie intake over diet variety and quality when food access is at risk (Bank, 2012; Bloem & Darnton-Hill, 2001). Moreover, Ahlgren et al. (2014) show that it is challenging that changes in dietary patterns among the affected population can lead to obesity, diabetes, hypertension, or malnutrition (Ahlgren et al., 2014).

1.4.4 Minimization of Food Insecurity:

One study revealed that enhancing resilience to disruptions reduces disasters negative effects on food security (Smith & Frankenberger, 2018). Another study mentioned the importance of links between households and relief organizations are important factor in the process of recovering and food aid after a disaster (Islam et al., 2011). A study recommended alternative food sources such as gardens, farmers' markets, and community-supported agriculture programs are critical for long-term food security and developing sustainable emergency food supplies and strategies for coastal residents, particularly after natural disasters (Sims-Muhammad, 2012). A study suggested emergency food supply and demand can be enhanced through digitalization, which can serve five main purposes: overseeing resource allocation, improving communication between agencies, collecting and analyzing data, facilitating direct communication with those in need, and supporting

fundraising efforts (Martin et al., 2023). A study argued that engaging individuals facing food insecurity in research initiatives can be helpful for gaining more knowledge, finding solutions to food insecurity, and providing valuable perspectives to guide the actions of both governmental and non-governmental organizations (Lane et al., 2020).

2 Conceptual Framework

2.1 Emergencies and Food security:

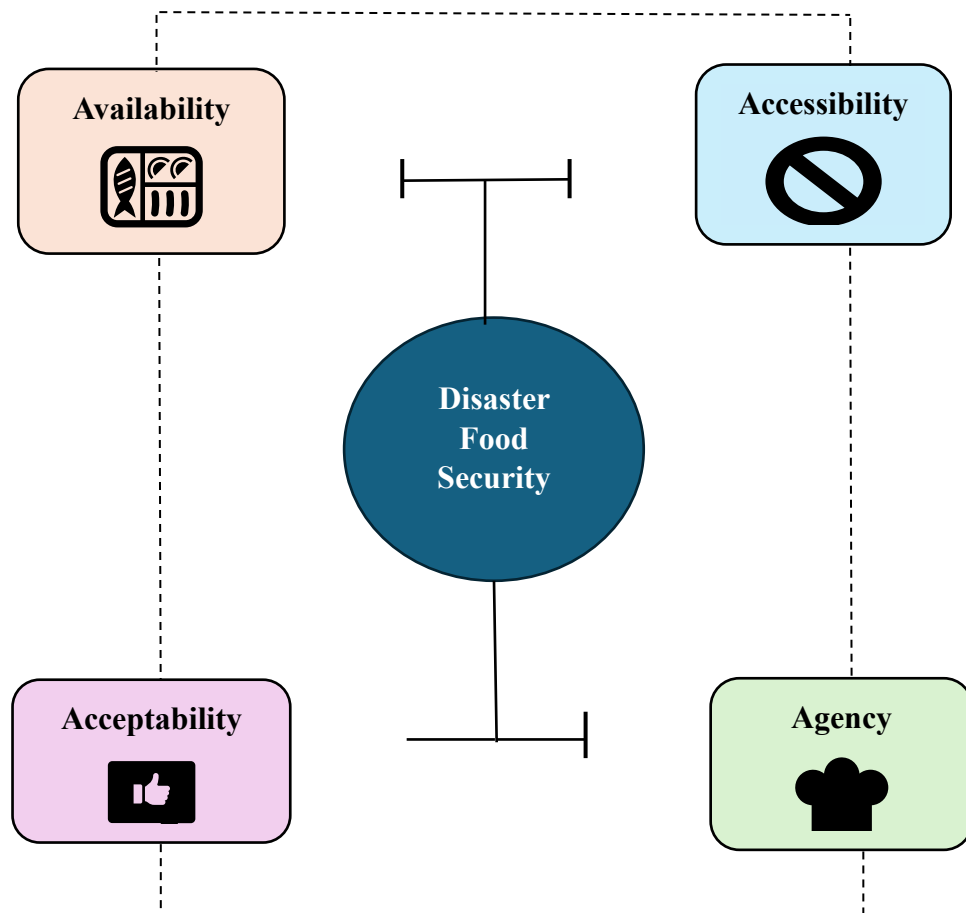
Ensuring food security, as defined in Sustainable Development Goal 2, which aims to eliminate hunger, attain food security, enhance nutrition, and advance sustainable agriculture (UN, 2024), is a crucial goal for governments and non-governmental organizations globally. Disaster food security is defined as "*All people have physical, social, and economic access to sufficient, safe, and nutritious food that can be prepared and stored to meet their dietary needs and food preferences*" (Clay, Koyratty, et al., 2023). Disastrous situations impacts all four pillars of food security: availability, access, consumption, and stability (Laborde et al., 2020). It exacerbates the vulnerabilities of already deprived and unsafe communities, leading to an increase in food insecurity among affected households (Herrera-Fontana et al., 2020). To ensure food security, key areas must be covered, including the availability of sufficient food in appropriate quantities and quality, either through domestic production or imports, and households and individuals having sufficient resources to obtain enough food for a nutritious diet (USDA, 1996). Using conceptual frameworks frequently used in food security research can enhance understanding of these implications and the best possible responses (Devereux et al., 2020).

2.2 Food Security in natural emergencies:

The validated DFSF framework describes all potential obstacles to food security that may be faced during or after a disaster (L. Clay et al., 2023). This framework (figure 1) will enhance our understanding of disaster food security and pinpoint areas where relief agencies should focus their efforts to protect people left vulnerable by future disasters. This approach ensures that communities get the necessary assistance, particularly in the case of supplying food during disasters (Clay, 2023). Following the 2022 flooding, a considerable portion of the population encountered difficulties in obtaining essential food supplies, with nearly one-fourth reporting difficulties in food access and availability (Khan et al., 2024). Availability of food refers to food supply and provision, and it includes disaster nutrition response and food provided as charity; access refers to the ability to purchase and easily obtain it physically (Clay, 2023). Natural disasters can cause disruptions that impede food access, such as social, physical, and economic barriers, difficulties in the supply chain, nutrition assistance, and a shortage of food (Clay, 2023). Acceptability refers to nutritional and dietary requirements and preferences, and these can be based on health-related dietary

requirements, religious, cultural, personal desires, or circumstances (Clay, 2023). Emergency feeding programs do not provide special meals for those with dietary restrictions. Moreover, emergencies pose challenges in delivering adequate nutrition, and addressing the dietary requirements of individuals at risk is a significant concern in disaster management (Fatmah et al., 2021). For disaster plans and response teams, the immediate supply of food that meets nutritional requirements is crucial (Clay, Slotter, et al., 2023). It would ensure that vulnerable individuals receive adequate nutrition during crises and improve dietary consumption during emergencies. DFSF describes the "agency" as having the ability to cook and store food, implying that victims have the necessary equipment and a kitchen and can effectively utilize these resources (Clay, Koyratty, et al., 2023). It is preferable for all components of food security to remain consistent over such times. However, in extreme emergencies, the focus may shift toward addressing basic caloric requirements and safety (Clay, Koyratty, et al., 2023). This kind of framework can provide a deeper understanding of how relief efforts influence the components of food availability, accessibility, and acceptance in communities affected by disasters.

Figure 1 Disaster Food Security Framework



2.3 Previous experiences of alleviating food insecurity during emergencies:

During times of crisis, certain governments and authorities have successfully improved food security by increasing population's food access and availability. Here are some examples of initiatives implemented to enhance food security.

For example, during emergencies in the US, nutritional assistance programs ensured food access by allowing eligible and impacted families to purchase food and drinks from specific food shops (Fleischhacker & Bleich, 2021). Furthermore, in response to COVID emergency assistance, the United States government increased food availability by providing food to NGOs, local restaurants, and food centers (Fleischhacker & Bleich, 2021). During the 2014 flood in northern Bangladesh, NGOs and other government agencies provided direct humanitarian aid to flood-affected households to improve access and availability, and many households became food secure as a result (Smith & Frankenberger, 2018). During COVID-19, the US government created and executed an emergency relief program, collaborating with several food distributors to send fresh food boxes to the families affected by the humanitarian crisis to ensure access and availability to adequate food (USDA, 2021). During Cyclone Sidr in Bangladesh, NGOs established connections with most households in frequently affected areas, and those connections played a crucial role in fulfilling the needs of the local population by providing food and nutritional support during the devastating conditions (Islam & Walkerden, 2015). During hurricanes Harvey in Texas and Maria in Puerto Rico in 2017, FEMA responded to ensure adequate food availability, and actions included using helicopters to distribute food and water to survivors, allocating funds for recovery efforts, and mobilizing health personnel (Barney, 2020). Given the COVID pandemic, the Indonesian authorities' efforts to ensure easy access included maintaining food price stability to prevent sudden price increases and promoting national food production through smallholder agriculture, with a focus on supporting small farmers and increasing production (Darma & Darma, 2020).

3 Methodology

3.1 Study Design:

Qualitative research is a method suitable for developing an in-depth understanding of a phenomenon or event in a natural, real-life context (Aspers & Corte, 2019). In qualitative studies, interviews provide in-depth knowledge of participants' perspectives and experiences on a specific topic (Turner III, 2010). The qualitative paradigm allows participants to freely provide their own explanations about the occurrence of an event of interest, (Austin & Sutton, 2014) such as attitudes, experiences, and behaviors, which are difficult to accurately capture otherwise. Thereby, it is a well-suited design to facilitate the acquisition of information on practical experiences and knowledge from the floods of 2022.

3.2 Setting:

There are four provinces in Pakistan, and almost all the provinces were affected by the 2022 floods, but in this study, Punjab was selected. The reason for selecting Punjab is that it has fertile lands, shares a large part of the country's agriculture (GOP) and therefore a key area for the country food provision. Another reason is that it is the land of five rivers, which means that during times of floods, it remained highly affected among other provinces because of the rivers (PDMA, 2018). Southern Punjab, particularly the D.G. Khan area, was focused on as extreme risks exist in this area because of the district's critical position, which results in flooding from the Indus River and flash flooding due to the Koh-Suleman mountain range during the unpredictable rainy season (PDMA, 2018).

3.3 Sampling and recruitment:

Purposive sampling was employed for the current research to recruit participants, as this process involves identifying and selecting individuals or groups who possess unique knowledge and expertise in a specific event of interest (Palinkas et al., 2015). Purposive sampling in this study effectively acquired varied perspectives from governments and humanitarian organizations directly involved in food response during the 2022 flooding disaster, allowing for a more thorough understanding of obstacles and barriers to efficient food security management in crisis situations. This study also adopted a combination of purposive sampling with snowball sampling (Parker et

al., 2019). This means asking the chosen informants if they know of any other key informants from other relief organizations that might be interesting to include in the study.

Following these criteria the following organizations were selected for the study: The Ministry of Climate Change Pakistan, specifically the Natural Disaster Management Authority (NDMA), The NDMA is Pakistan's primary federal agency and is in charge of all aspects of disaster management operations. NDMA managed the entire disaster management cycle, which includes preparedness, prevention, hazard reduction, aid, and recovery. The Provincial Disaster Management Authority (PDMA) of Punjab was also involved during operations. PDMA Punjab essentially works under NDMA Pakistan at the provincial level, with the same purpose. Moreover, the Population Welfare Department of Punjab (PWD) is a governmental body that collaborates with PDMA Punjab in disaster management, primarily focusing on the welfare of the population. Overall, the National Disaster Management Authority of Pakistan (NDMA), the Provincial Disaster Management Authority of Punjab (PDMA), the Population Welfare Department of Punjab (PWD), a few local NGOs, and local hospitals were reached out to recruit participants. The involvement of participants from government authorities allowed for more insight and knowledge, as well as increased data accuracy. Research included individuals from local non-governmental organizations (NGOs) who were donating their efforts to food assistance programs. The involvement of NGOs was crucial, as they step in during disasters to assist those who are at risk and provide outreach services to socially isolated individuals (Park & Yoon, 2022). The involvement of and health care professionals was necessary due to their critical role during catastrophic situations, often serving as mediators between international and national relief agencies and communities (Nicholls et al., 2015). Health professionals from the public and private sectors who worked in affected areas and interacted with affected individuals were accessed.

Initially, recruiting activities included sending emails and phone calls to appropriate departments and individuals to set up interview sessions. However, most of the participants did not respond to requests for participation, and some expressed reluctance to commit due to time constraints during the initial contact. Therefore, it became unavoidable to use personal contacts for the recruitment of participants; personal connections within these organizations were used to improve the recruiting process. Following this change, personnel from governmental institutions were directly contacted, specifically by phone. This direct contact not only helped clear up any confusion or worries they

may have had but also allowed them to communicate the importance of their participation in the research. This way, we were able to effectively recruit key participants who played critical roles in the flood response activities.

Table 1 Number of participants from different settings

Departments	Positions	
	Field Workers	Administrative Workers
Health Settings	2	0
Disaster Management Organizations	1	2
Non-Profit Organizations	2	1
Total		8

3.4 Data Collection Techniques:

Semi-structured in-depth interviews were used to collect the data. Semi-structured individual interviews provide an approach to collecting deep and valuable knowledge from the participants (DeJonckheere & Vaughn, 2019). To explore the views of interviewees and the nature of their work in the provision of food in the 2022 flooding situation, conducting semi-structure interviews was a convenient method to understand the opinion and experiences as participants have freedom to explain the experience that consequently increases the validity of the study. The interviews were conducted online, as the main research was located in Norway. Moreover, digital interviewing allowed greater variety in the number of informants, as there were no distance constraints or travel expenses for conducting the interviews.

The interview guide was designed to focus on food security and disaster management. The first draft of the interview guide was refined by pilot testing three subjects, resulting in a final version with 21 questions on the following themes: perceptions about floods' impacts on food security and relief efforts, the role of various organizations in fighting hunger, and the challenges encountered during the flood response in 2022. An example of the question that was asked is: You may speak

about your personal experiences providing food for people in need. Probing questions were also asked further. Moreover, they were asked for in-depth details about their experiences, thoughts on this emergency, and perspectives. The table below presents some of the important questions from the interview guide that participants were asked during interviews (complete interview guide is presented in appendix II).

Themes	Example Questions
Perspectives on Relief Efforts	Can you describe what the food situation was like soon after the flood? Can you describe how cooperation with other organizations was during floods?
Response to Flooding of 2022	Could you tell me about the kinds of food that were provided to victims? How long have people received that food? Were you following any guidelines for the quality of food that was provided to victims?
Challenges Encountered	Were there any challenges in ensuring consistent food and water supply? Were there any challenges to meet the food needs of vulnerable groups?

Participants were sent an invitation email link to participate in the online interview, along with the necessary attachments, an ethical clearance number by Sikt, and a declaration of informed consent. The interview guide was sent to the participants a week before the interview to recall forgotten details. Furthermore, signed informed consent forms were obtained from participants prior to the start of the interview. The interview lasted for an average of 55 minutes. The participants were given the opportunity to bring up novel issues that are not included in the interview guide and to clarify any possible answers. Each interview was held in an online Zoom meeting, and only the interviewer and the participant were present during the interview.

3.5 Transcription & Translation:

Interviews were recorded with Nettskjema Diktafone, a mobile application used to record the responses of participants, developed by the University of Oslo. Out of the eight interviews, five were transcribed verbatim and translated from Urdu to English and reviewed many times to assure that both transcriptions and translations were accurate. It was the researcher (who has Urdu as his

mother tongue) who translated the interviews, which were in Urdu, based on the researcher's understanding and proficiency of both languages. The transcriptions were thoroughly studied repeatedly to verify that all important data was correctly collected, and that the information provided by the participants remained unaltered. During the translation process, special care was taken to maintain the original meaning and feeling of the remarks by taking into consideration language subtleties and cultural context.

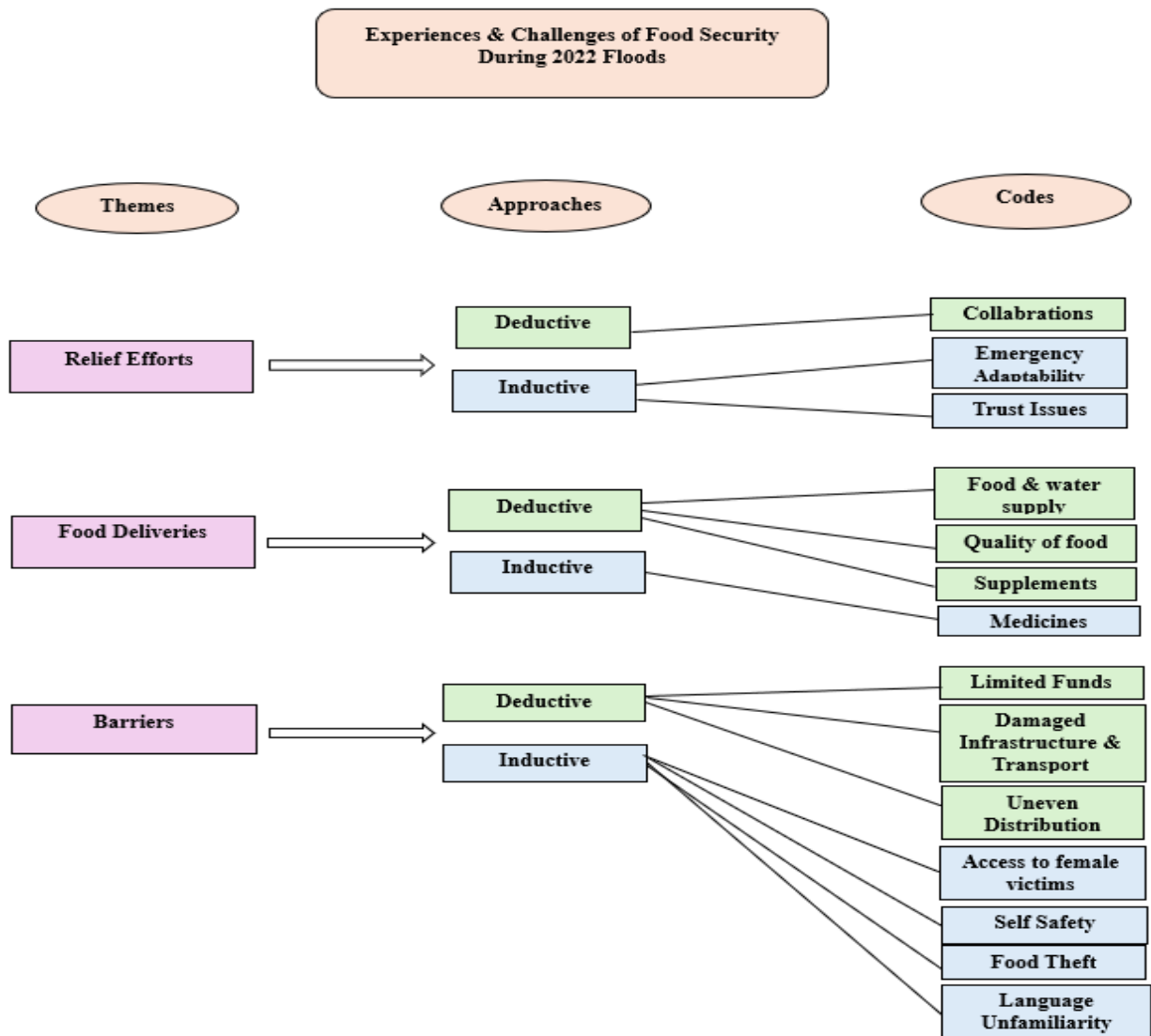
3.6 Analysis:

The well-known and frequently used six-step approach to thematic analysis was used, as defined by Braun and Clarke, to analyze the data (Braun & Clarke, 2006). The six progressing phases include familiarizing yourself with the data, extracting codes from the data, identifying themes, reviewing the themes, specifying and labeling the themes, and finally creating a report based on the themes derived from the data. Following (Braun & Clarke, 2006) recommendations, this study used thematic analysis to highlight important elements of respondents' narratives. NVivo 14 software was used as a tool for analysis as it helped classify the themes. A thorough and extensive coding method was used to ensure the themes were developed properly. Initially, all obtained data was transcribed verbatim and studied thoroughly to gain thorough knowledge and familiarity. Following this phase, the initial codes were generated, with the data being tagged and grouped into brief labels that conveyed the main points of the responses.

Using NVivo, these initial codes were carefully grouped into larger themes based on their interrelationships and overarching patterns. The themes were constantly reviewed and improved to ensure that they appropriately reflected the dataset, with repetitive changes that were required to identify and outline them effectively. The deductive approach involves generating initial codes from the available literature related to the research topic based on the study research questions, and interview questions (Azungah, 2018). The original research questions, which concentrated on the study on specific subjects, served as the primary framework for the data analysis which developed themes such as experience and reflections on relief efforts, the perceived impact of floods on food security, and challenges to achieving food security. By primarily using a deductive approach, the analysis remained well in line with study objectives. These initial codes were complemented with an inductive thematic analysis that served in extracting codes directly from the data, facilitating the emergence of novel ideas (Braun & Clarke, 2012). During this study by using an inductive

approach, the analysis remained open to unexpected themes and ideas that emerged from data collection during the interviews, such as topics like emergency adoptability, cultural barriers, literacy issues, concerns about personal security, and food theft. Therefore, the current study used primarily a deductive approach for analysis, as the research questions served as the basis for theme generation and after data collection, a few new themes emerged, prompting the adoption of an inductive approach.

Figure 2 Themes and basic codes that were generated by deductive and inductive thematic approach.



3.7 Ethical Considerations:

Prior to the interviews, all participants were told about the study's objectives and given a consent form. This form specifically sought their consent to voice recording and the collecting of basic demographic information. Before any interviews began, each participant was required to sign a consent form indicating that they acknowledged and agreed to the terms of participation. Interviewees were also provided with detailed information about the volunteer nature of these interviews. Participants were given sufficient details about the voluntary nature of their participation in the study. They were informed that they could withdraw their participation at any time throughout the interview without consequence. Furthermore, we stressed the confidentiality of the interview data. Measures were taken to guarantee that any material that may identify participants was carefully removed from any transcript or findings. Moreover, ethical approval was obtained from (the knowledge sector's service provider, Norway) Sikt (It is presented in appendix I).

4 Results

This study explored the experiences of relief authorities in providing food security during the 2022 floods in Pakistan, focusing on the strategies used, and the challenges faced by them. This chapter will present the study's findings based on individual, semi-structured interviews. The findings can contribute to our understanding of how relief efforts can improve food availability and accessibility for people while also promoting acceptability to ensure food security during catastrophic events. The chapter starts with a description of the participants, followed by the main findings.

4.1 Sociodemographic Profile of Participants:

The study includes eight participants in total, from different kinds of organizations. There were three interviews conducted with participants from national, provincial, and district-level relief authority members working in different positions. Two of the interviews were conducted with participants from health departments who were working as medical doctors in governmental and private hospitals, respectively, and the rest of the interviews were carried out with members of different local NGOs, including volunteers of NGOs. In total, 4 of the participants were from governmental organizations, and 4 of them were from private institutions. The male participants from the overall sample were (n = 6) from both the private and government sectors, while the female participants were (n = 2) from both the private and government sectors. The participants interviewed were administrators, social workers, and health personnel. All the participants have participated in the response to floods 2022 and all of them have expertise, experience in food assistance during the 2022 floods, and knowledge to cope with these kinds of situations.

Table 2 *Participants descriptions and number of participants from governmental and private organizations.*

Interview	Participants	Gender	Type of Organization	Department	Job Description
1	1	Female	Private	NGO	Program Lead
2	1	Male	Private	NGO	Volunteer
3	1	Male	Private	NGO	Senior member
4	1	Male	Private	Local hospital	Medical officer
5	1	Male	Governmental	PWD	District officer
6	1	Male	Governmental	PDMA	Consultant
7	1	Male	Governmental	Government hospital	Medical officer
8	1	Female	Governmental	NDMA	Managerial position

Note: Interview-derived information appears in italics. We indicate the removal of certain words from a sentence by employing just a couple of dots.

4.2 Perceived Impacts on Food Security:

The interviews with key informants provide a realistic description of the devastating flood's impact on human lives and food security. This natural disaster was described as both severe and far-reaching, affecting many people by destroying their houses, belongings, and, unfortunately, lives. The program leader of a non-profit organization that was involved in humanitarian assistance during the crisis gave a picture of the consequences.

Well, the flood was really bad. I would say no one was prepared for it, and we lost so many lives, belongings, properties, and everything. (Participant 1)

The Insights of participants give a contrast between the pre-disaster normality and the devastation caused by the flood in the impacted areas. Before the flood people lived very typical lives, with easy access to marketplaces and food, which guaranteed a consistent supply of necessities.

However, the devastation caused by the flood was so extensive that everything on its way was destroyed, including food storage facilities, severely disrupting the local food supply system. The population in flooded areas were forced to rely on food and supplies from nearby places because of this terrible event.

Before the flood, everything was normal... food was reaching there from the mainland, but as soon as the flood came, the residential area was destroyed, as were the local stores, shops, and food storage houses, which are usually where the locals used to buy food items, and yes, they don't have any storage so they can store the food that we were providing them. They only have food that comes from nearby cities every week (participant 4).

According to the participants the floods 2022 caused many difficulties for the affected people and relief authorities, but one of the main problems was people's access to food. Due to the flood, the affected areas were cut off from the mainland. This led to disruptions in the supply of food and clean water, making the situation worse for local people, who were already struggling to find something to eat to feed themselves and their families. All their stored food was gone due to the flood. Majority of the local food shops were flooded, and almost all sources of food and drink were destroyed. There was not much left to depend on for their food needs. During an interview with a relief authority member, he explained the situation as follows:

The flood has caused the ways to be disrupted between the other part of the country and this part of the country, which actually has stopped the supply of different kinds of food items for which that particular flood-hit area depends (participant 6).

Interviews revealed that floods also caused a significant increase in food prices, making it more difficult for people to buy food, particularly those with limited financial resources. The floods had already caused significant damage, and food supplies had been cut off, leading prices to increase even further. In an interview with the participant, who works for a nonprofit organization, his views on this issue were:

Due to the flood, the prices of products fluctuated and became costly (participant 2).

According to the interviews the floods damaged local infrastructure, such as roads and bridges, disrupted transportation systems, and made it nearly impossible for relief operations to progress effectively. As food supplies decreased and costs increased, many people found themselves unable

to purchase fundamental necessities. During the first few days of the floods, the situation exacerbated as humanitarian aid could not reach the victims, and the excessive increase in food prices led to hunger and starvation. Participants revealed given the circumstances, they were looking for someone who could help provide them with food so at least they could survive. There was a very strong opinion found regarding this statement, and many participants talked about it during the interviews, as one of the participants who was working there as a medical officer his opinion on this was

They were starving ... they lost their energy, and they need food at the end of the day. But almost all of them were starving with hunger, and they were looking forward to the authorities providing them with ... good food (participant 7).

According to the shared perceptions the floods also had serious consequences for long-term food security, including severe food access difficulties throughout the year. It made an extensive impact on several areas, including prime agricultural lands that supply the local population with food all year. Participants who were working there had these opinions on this.

There were crops in the DG Khan; those were also destroyed by the flood. So, that further exacerbated the situation (participant 6)

There were some remote areas where people were growing their own crops, and some people were storing their own lentils, their own wheat, and their own rice in their houses. But unfortunately, everything was wiped out because of the flood (participant 8)

The findings also give insights into before- and after-flood food security situations. However, there were some contradictions among participants, as some have found that food insecurity is a major issue in Pakistan, with many people struggling to get enough food even under normal circumstances. One participant, whose job is to handle food security related problems during normal and disaster situations, made that statement.

It is important to remember that Pakistan is not just striving to ensure food security; it is dealing with food security challenges even under normal conditions This highlights the enormity of the challenge we face, especially during disasters (participant 5).

These findings also highlight flexible component of Pakistan's food security, as revealed in an interview with one participant. Despite the major challenges of food insecurity in normal conditions, the impacted populations had access to their own agricultural land before floods, and they used to practice self-sufficiency to meet their food needs. These individuals used their own resources to cultivate crops, thereby protecting themselves against changing market prices and the insecurity of outside food supplies. They were able to preserve food year-round due to their organized agricultural operations.

The area was agricultural land, and people used to cultivate their own crops and food. So yeah, they store enough food for their survival. If we talk about the majority of the people, they have good access to food (participant 7)

4.3 Experiences and perspectives on relief efforts

The findings of this study also reveal different kinds of experiences from individuals from various organizations who were actively involved in the flood 2022 and worked there as frontline workers to provide victims with food and necessities. However, it also includes the experiences of individuals who were not directly involved but managed the food security situation through indirect involvement. Reflecting on their experiences, a common theme emerged: a lack of readiness throughout multiple organizations, including the national disaster response authority and local NGOs, in dealing with the flood and the ensuing impact on food insecurity. This opinion was supported by an interview with a worker from a provincial relief body, who honestly stated that none of the bodies involved were fully prepared to handle the magnitude of the situation efficiently.

I will admit that we were not well equipped for that large-scale threat. So this further worsened the situation for all the organizations working there. None of them had anticipated the situation, so they couldn't prepare themselves proactively to encounter this big scale danger (participant 6)

According to the participants, the scale of the impacts was beyond the imagination of many. Another participant, working with a national-level relief authority, shared this sentiment, providing evidence of the flood's unexpected scale.

The magnitude was very strong, and we were not projecting that magnitude (participant 8)

One important finding is the efforts of numerous organizations to minimize the negative impacts of flooding. Each organization worked hard to provide excellent services, including food supplies and medical assistance, as well as victim evacuation to designated safe zones.

I would say that we were involved in so many activities, like evacuating the people to safe areas And we were making sure that they were safe..... They have food. They have water. So these were the activities we were looking after. (participant 8)

The interviews revealed that during times of crisis, not only non-governmental organizations (NGOs) diverged from their main assignments to help with food supply efforts, but governmental organizations designed for other aspects of human welfare also shifted their services to provide food to those affected by the disaster. One of the participants from such kind of organization mentioned the primary role of their organization

The prime focus of our department is to uplift not only individual but family growth and to nourish individuals and even families for healthy growth. We are also covering and enhancing the role of individuals in our society by putting our role towards the development of their mental, health, and social issues (participant 5)

The response to the flood disaster was impressive in its rapidity, a sentiment shared by many relief workers. It was clear that multiple sectors became active to alleviate the consequences of the flooding, demonstrating a quick approach to disaster response. From emergency services and government agencies to non-governmental groups and health professional volunteers, everyone mobilized fast, bringing resources, experience, and manpower to bear on the natural disaster. This reaction comprised of immediate relief measures, such as rescue operations, the provision of emergency food, shelter, and medical care.

An interview with a representative of a local non-governmental group highlighted the immediate efforts implemented by elected political leaders during the initial few days. These leaders displayed a strong sense of responsibility and concern for the well-being of their constituency prior to the arrival of NGOs. Realizing the disaster's immediate threat to life and well-being, they moved rapidly to supply essential food supplies to affected populations.

There are MNAs (members of national assembly) who are political leaders. They started providing food to those people means before our arrival, in which they said that they were providing food in the morning, evening, etc., and then those people ate that food. People were getting two meals a day when we reached there (participant 4)

Furthermore, in an interview with a health professional, it was revealed how quickly actions were taken to ensure medical facilities for the victims.

All the hospitals that were working under the government of Punjab were on high alert, and we were asked to stay ready because wherever there was a need for us the government will ask us to move there and provide our services. So basically, we were asked to set up our gear so that we have enough medication and enough equipment so that we can carry them to remote places. (Participant 7)

In the interview with a government official, who was giving his experience regarding witnessing multiple local and religious NGOs begin working in the impacted areas during the initial days, and this comment also gives insights on the rapidity of response.

I may share my experience. There are many organizations in Pakistan that are working at a domestic level. They are on their way to serve their people, to facilitate their individuals, to facilitate their neighboring individuals, and to facilitate their relatives (participant 5)

4.3.1 Collaboration and Coordination:

The interviews can also provide insight into the collaborations formed by different organizations during the flood in 2022. Almost every organization was reliant on another organization in some way, and this was all done to bring help to those suffering. Most of the participants were satisfied with the collaboration, and this sentiment was shared by many of the participants.

Every NGOs played their role very well and cooperated with other NGOs. Different NGOs were helping each other; for example, one NGO was packing food for our NGO so we could supply it to the victims. I would say every task was going on with the collective help of local NGOs (participant 4).

One of the interviews also revealed that disaster management authorities were getting help from different actors for proper evacuation so people could move to safe zones from the flood-hit areas.

The information was shared by a participant who works in national disaster management, and she closely worked with other actors.

We had, fortunately, the help of the Pakistan Army to evacuate the people from there (participant 8).

During the interview, a government officer raised concerns about the collaboration between governmental institutions and some non-governmental organizations (NGOs). It was additionally stated that some NGOs and government agencies had trust concerns, which has resulted in cases where NGOs attempted to assist affected populations on their own. This method, while well-intended, experienced significant challenges. Operating independently without the cooperation or collaboration of official authorities can lead to logistical issues, such as accessing impacted areas, efficiently mobilizing resources, and avoiding duplication of operations.

Everyone is trying to facilitate it on their own. No one was on their way to collaborate.... they delivered their food; they delivered their other facility on their own. Instead of handing it over to the governmental agencies or to some other national agencies, they feel they are responsible for facilitating it at the end. Although there are some positive factors as well as some negative factors, families get the maximum benefit, and some may ignore it. (participant 5).

4.3.2 Availability of Food During Flood:

4.3.2.1 Food provision for overall population:

According to the interviews carried out in this study, the findings show that, despite numerous challenges, food availability remained quite stable, with several organizations stepping in to ensure a consistent supply of meals. Information provided by participants showed victims received cooked food daily to meet their basic caloric requirements and immediate consumption needs. The participants also mentioned that emergency or immediate foods were distributed amongst them. There were types of foods that were mentioned by participants during interviews that were given to the general population affected by the flood; However, there were some common foods for both general population and vulnerable groups, such as emergency foods and some cooked foods. These are the types of food provided to the victims. However, all the food items that were mentioned by participants are gathered all together and all are based on the common opinions of the participants.

Type 1: Emergency food such as juices, special biscuits, spreads and powdered milk, dry fruits, nuts, breads, butter and jams

Type 2: Cooked foods include Roti and Chapati (Bread), Rice, Biryani (Pakistani Rice), Chicken Curry, cooked veggies, lamb curry, cooked lentils and potato and onion made dishes.

The interviews provided information about the initial stages of disaster response, particularly the meals provided to victims after they were securely moved to camps. In the days after the disaster, the priority was to provide basic yet important food items such as vegetables, chicken, and rice, ensuring that the victims' immediate caloric needs were addressed. A participant from a local non-governmental organization (NGO) revealed his personal experience of participating in this effort by providing cooked meals to victims.

We provide them with vegetables, and it varies from day to day. Chicken and rice were given, mainly chicken, lamb meat, and rice. (Participant 3)

Another participant who worked as a medical doctor in affected areas, whose views on the provision of cooked food were these:

We provided them with nuts and pulses. So that they could get as much protein as possible, we tried our best to provide them with things that could meet their caloric intake (Participant 4)

As disaster relief efforts continued and an increasing number of non-governmental organizations (NGOs) arrived in affected areas, there was a noticeable shift in how food assistance was provided to victims. Interviews with the participants revealed that after the initial days, affected families started receiving bags of food that had been properly packaged to include all the items they needed for them to make and consume meals on their own. A conversation with a representative from an organization provided insight into the composition of these food packs.

We created a package consisting of wheat, rice, pulses, salt, spices, oil, etc., so that they could have food for almost a month. Additionally, we included some biscuits, snacks, water bottles, juices, etc., as instant food. (Participant 2)

The findings from interviews show that each settled camp was provided with food preparation equipment, allowing those affected to make meals based on their personal needs and preferences.

This approach was highlighted by the experiences of a medical professional who actively participated in relief operations.

Every camp that was settled for a family had a stove and a gas cylinder so that they could use (Participant 7)

When asked about the duration of emergency food supplies delivered during the crisis, individuals' responses varied, showing a wide range of experiences and observations. Some participants estimated supply length in weeks, while others reported months, highlighting the diverse nature of relief operations across different places. Despite the wide variety of responses, a consensus formed around three months as the most frequently mentioned period of food supply. This exact timeframe was brought up by two participants who, despite having totally different professional backgrounds, both worked as relief workers in the areas affected.

Nonetheless, the most convincing narrative was offered by an official from the National Disaster Management Authority of Pakistan, who stated the following:

It varied from area to area. It varied depending on the areas that were more affected (Participant 8)

4.3.2.2 Provision of food to Vulnerable groups:

While many relief organizations provided food after the crisis, relief workers were asked about any approaches used to meet the nutritional needs of vulnerable populations, including infants, pregnant and lactating mothers, and patients with NCDs. Unfortunately, none of the participants described preparing meals just for vulnerable groups. However, some of them mentioned the availability of special formula milk for infants and milk for pregnant women, reflecting an understanding of the nutritional needs of these vulnerable groups.

There was nothing special for the vulnerable group. However, our try was that milk should be properly given to pregnant women and children (Participant 4)

Many participants also mentioned medical camps, emphasizing the approach of facilitating vulnerable groups and ensuring that their medical needs should be fulfilled. However, some participants mentioned providing pregnant women with a variety of nutraceutical supplements in

addition to milk, with the goal of supplementing their diets with vital nutrients. A participant from the provincial welfare authority gave the following statement:

We were focusing on especially maternal and child health care, and during visits to particular areas, there were many numbers of individuals having pregnancy in the lactation phase and carrying the child's birth situations..... we are confident in providing the quality needed at the time because multivitamins and some other nutrients, especially iron, folic acid, and zinc-based products, were in abundant amounts in our hands to distribute to the victims (Participant 5)

Although not extensively mentioned by many participants during the relief operations, the food industry provided significant aid in meeting the special nutritional demands of vulnerable populations during flood circumstances. In the interview, one person specifically mentioned this assistance. A medical officer provided insights into the food industry's involvement, describing how they assisted both vulnerable people and relief agencies.

The Nestle tried to help us, and they provided us with formula milk and some supplements for pregnant and newborn babies (Participant 7)

4.3.3 Approaches used and Goals for Future Response:

It was brought up during an interview that organizations involved in disaster relief operations frequently faced critical decisions about job prioritization, such as whether to prioritize giving food to flood victims or evacuating people from areas that were destroyed. A participant in a managerial position at the disaster management authority provided critical insight into this situation. She explained that their organization's perspective was based on a strategy that prioritized people's immediate safety and well-being. Her words regarding this issue were these:

After evacuating them to a safe place, that was our number one priority: they needed to be given food (participant 8).

The participants talk about innovative ways used to ensure the efficient distribution of food to those affected by the flood. Interviews revealed a variety of strategies were used to reach the victims, especially those in rural or badly impacted areas. According to practically all participants in the relief efforts, establishing food distribution centers in affected communities proved to be the most consistently effective and reliable way of delivering food directly to the victims. This strategy

involved establishing centralized areas where flood victims could gather to get meals and food for their families. A relief worker who worked with an NGO shared his views.

We gathered all the people in the school centers for the food. Food was prepared over there. And tables for the meals were also set down over there, and they were given fresh food at school centers. (Participant 3)

One of the interviews also revealed that several strategies are undergoing improvements to achieve better results in the future. In a talk with a representative from the National Disaster Management Authority, she said

We are developing working mechanisms with the NGOs and everyone. And at the same time, we are trying to upgrade the capacity of NDMA. We are consistently trying to get help from the government and from international agencies so we can improve our relationship with the NGOs, and we will be able to provide them further support financially, in terms of resources, and in terms of capacity building. (Participant 8).

4.4 Barriers to ensure Food Security:

The insights gained from interviews with respondents shed light on the key barriers to food security initiatives during Pakistan's disastrous floods in 2022. These obstacles, which both the government and the private sector encountered, had a significant influence on their ability to provide those affected individuals with food. The most reported and overarching barrier was a lack of funding, which participants saw as a significant issue limiting the efficiency of rescue operations. Besides financial limits, relief agency workers highlighted other key difficulties. These included difficulty with ensuring equal distribution of food supplies, moral dilemmas in accessing victims, and logistical challenges related to transporting goods to the affected regions.

4.4.1 Economic Barriers:

Throughout the interviews, almost all participants mentioned finance as a key challenge. The finding was clear: financial limits hindered disaster relief operations, especially ensuring the affected populations' food security. Participants highlighted the challenges in food distribution; nonetheless, they managed to offer food. The supply was obviously limited, while the demand from those in need appeared endless. An NGO worker expressed the problem, stating that the ongoing effort for sufficient funding has a direct impact on their ability to constantly serve suffering people.

We were lacking funds, so we couldn't make it fast or consistently supply them with their needs (Participant 2)

Another participant also felt the same way, and he expressed himself as

Although we have a lot of funding, the number of people and victims was so high that we were not even able to cover all of them (Participant 4)

During an interview, the issue of authorities failing to use funds properly in disaster management operations was raised. Despite receiving aid from international governments, there was still a shortage of important equipment, preventing the emergency response. Mismanagement of resources and finances led to inefficiencies in meeting the requirements of areas devastated by disasters. The concern was particularly expressed by a participant working in the Provincial Disaster Management sector. His comments on this issue were these:

I will admit that the aid we have received from other countries, but I think it was not properly utilized. PDMA itself was not very well equipped for the constant supply of food to the affected population. (Participant 6)

According to an interview response the need for safe and equal distribution of funds and relief food is one of the necessary things on which one should focus and be given proper management during a disastrous situation because, without it, many families remain ignored, and their basic needs are not fulfilled. A participant from a government authority shared his views about the method they can use for the safe and equal distribution of food and funds.

We must have designed some camps in the areas where people may donate their collections or some funds. They must be collected at the national level, and the government may be responsible for their transfer (participant 5).

4.4.2 Transportation and Infrastructure Barriers:

Participants in the interviews frequently highlighted severe challenges in delivering food to flood-affected areas because of significant damage to roads and infrastructure. Many participants described how the usual routes were devastated, with roads flooded and bridges damaged, blocking off connections between areas and isolating communities. Participants also mentioned that this damage forced the use of alternate modes of transportation, such as boats, to navigate the flooded areas to deliver essential food supplies to people on the opposite side, who were experiencing

serious food insecurity. Furthermore, the interviews revealed another dimension of complexity: The few roads that remained accessible led to an overflow of relief efforts by diverse NGOs, resulting in uneven distribution of supplies and leaving many affected areas untouched. The destruction caused by the flood, which wiped away buildings and badly destroyed roads, limited the attempts of several NGOs to reach hardest hit areas. Reduced access to certain locations posed a serious challenge in assuring the availability of food to individuals in need of assistance.

An NGO program leader, commenting on what she witnessed during this difficult time, provided insights into the logistical challenges her organization encountered.

The infrastructure was destroyed. As you know, the floods took away all the roads. So one of the problems was access. We did not have as much access to certain areas as we wanted (Participant 1)

Participants mentioned that the floods had a significant impact on the transportation networks interconnecting regions, and because of them, interprovincial transitory pathways were blocked, limiting the delivery of emergency supplies and aid. The destruction of these increased the challenges encountered by relief workers, particularly in accessing the most severely affected districts. A participant emphasized the difficulties of delivering relief to D.G. Khan, a flood-hit area.

When the flood hit DG Khan, it cut off the transitory pathways between Punjab, KP (Khyber Pakhtunkhwa), and DG Khan, in particular. So, that was basically the major problem in that case, as the cars and trucks couldn't move with the rescue items and the food to the flood-hit area (Participant 6)

4.4.3 Challenges of equal distribution of Relief items:

The study findings emphasize the numerous challenges that relief agencies faced while distributing food products to provide food for individuals impacted by the disaster. Among the key challenges raised by participants was the difficulty in having a fair distribution of food supplies, which is crucial to guaranteeing food security for all victims. Another key problem was determining effective ways to supply food to places where disaster management officials were unable to access due to logistical or physical barriers. Furthermore, the issue of food theft became a major worry, hindering efforts to distribute food equally among the victims. A participant described his personal experience with the issues of food theft during relief operations, emphasizing it as a critical concern.

We were not able to park our food trucks openly as people were too hungry, they were trying to take all the food, so it was not easy for us. For the equal distribution of food (Participant 4)

According to the participants people were seen trying to gather more food than needed, restricting the availability of supplies for others in need, maybe due to fear or desperation. The issue experienced by relief officials in food distribution was a fraudulent attitude demonstrated by a few individuals trying to get as much food as possible for themselves, according to one participant. The act not only raised moral concerns, but it also made it more difficult to provide equitable food security to all affected people.

The individuals were trying to get the most food apart from the others, and a number of individuals were just ignored at the time. We were trying to be managed; we were trying to balance situations, but unfortunately, the supply chains are not supposed to be attractive to meet the individuals needs and deliver it to their doorsteps (Participant 5)

Interviews revealed distribution issues had a major impact on food aid providers since supply chains were disrupted, making them less efficient in certain circumstances. Recognizing the crucial necessity of providing food to affected communities, authorities used other alternatives to overcome these obstacles. One of these approaches included asking for assistance from the Pakistani military to help bring relief to inaccessible areas that would otherwise be impossible to reach. A participant described their experience in these words:

We had faced so many challenges in terms of providing food to some areas where we didn't have access to roads. So we took the help of the Pakistan Army and their helicopters to provide some kind of aid—the maximum aid that we could to them (Participant 8)

Several deficiencies in disaster response activities were identified through interviews with key informants, each with its own type and impact. However, a recurring theme in interviews was the communication between organizations participating in the disaster management process. The informants stated that a lack of clear, timely, and efficient means of communication prevented various organizations' capacity to collaborate effectively. This not only slowed the delivery of necessities to the areas affected, but also resulted in duplication of efforts and resources.

The findings from the interviews showed the participants were continuously saying there was a need for a proper communication platform for different actors so they knew about the activities of other relief agencies and could make a better decision about the needs of the victims. One of the participants and a medical officer stressed having this kind of system, and his views on this issue were these:

There should be a platform where every NGO or organization should make other organizations aware that we are already working there (Participant 4)

4.4.4 Food variety Challenges:

Insights from the interviews also shed light on some of the victims' complaints about the food given during the flood disaster, providing insight into their food preferences. Although the efforts to offer food were broad and well-intentioned, there were instances in which the food delivered did not fit with the victims' expectations, resulting in dissatisfaction among certain participants. A member of an NGO shares his experience on this issue.

We also received bread as funds, but you know that people from villages don't really like eating bread, so it was not a successful idea at all (Participant 3)

Another participant who is working for the Provincial Disaster Management Authority (PDMA) shared his experience related to these preferences. He said:

You know, in Pakistan, people mostly have roti (Pakistani bread). So, they depend on that. So, that was like the basic thing that people had struggled for and repeatedly complained about (Participant 6)

The interviews also revealed that some victims prefer receiving cooked food to raw or undercooked foodstuff. This preference was particularly observed in claims from a medical professional participating in the food provision activities at the camps, where he also ensured that victims received medical care. He said:

The cooked food was preferred by the survivors and the rescued people (Participant 7)

4.4.5 Cultural and literacy Barriers:

The interviews with individuals from different organizations revealed cultural and literacy challenges that hindered attempts to assure food security and offer necessary services all through the time of the flood crisis. One of the challenges mentioned by a participant was the prevalence of unethical actions, such as food bag smuggling, during the crisis. These malpractices, which took advantage of individuals in desperate need of food supplies, revealed a darker side to the situation in which the pressing need for relief provided chances for exploitation. Although this practice was only mentioned by one participant, another barrier that relief authorities faced in their efforts to help flood-affected communities was the difficulty of communicating effectively. This problem was particularly prevalent because many people in the affected regions were illiterate and communicated completely in their own mother language. This linguistic barrier, which was also not extensively reported, was mentioned by a single participant.

I would say language was a barrier we face a lot of difficulty over there (Participant 4)

Participants discussed a notable cultural issue during interviews: local customs and norms around gender relations made it difficult for male relief workers to approach pregnant women to provide extra care, supplements, and medical assistance. A participant highlighted a cultural obstacle, stating that women in the flood-affected regions had little freedom to leave their houses to contribute to their family's basic needs, whether through work or food procurement.

Women and children are not supposed to be in a position to get what they need. Because there are some social barriers and some customary barriers in our society, they are not supposed to go anywhere to get what they need. This is the freedom in the male community they may go anywhere to meet their appropriate (food) needs (Participant 5)

4.4.6 Personal Security Related Issues:

When participants were asked about the challenges they faced during relief activities, personal security concerns came out as an important concern by one participant. Interestingly, one of the participants highlighted a particularly unusual challenge about the sense of fear he and his colleagues felt while carrying out food and medical aid activities. He described an event in which their truck driver was harassed by a hungry crowd, forcing the driver to escape the scene. He related this fear to the victims' emotional stress, which, in situations of desperation, might lead to unexpected and violent behavior.

Crime rates increased, and we were there at our own risk because there was no self-protection at all.... where there's already hunger and people have lost everything, it is very difficult to deal with them there were some problems with their temper issues. So, we were always at risk of fighting with the victims (Participant 4)

4.4.7 Food quality Challenges:

The insights gathered from relief authorities' experiences and perspectives reveal a dedicated effort to ensure food security for flood-affected people, using a variety of food distribution strategies.

Asking participants about the safety and quality guidelines for the delivered food during the disaster was an important part of the interviews, as it shed light on the quality and quantity of the food provided, its conformity with standards of the FAO/WHO directions, and the assurance of adequate amounts of nutrition. However, this question revealed a significant gap among the participants; neither could offer a clear explanation of the presence or application of any food quality guidelines. The absence of any guidelines mentioned by authorities was the most common answer.

However, one of the participants stressed the importance of the devastating situation, emphasizing that in such emergency situations, rigorously following the established guidelines takes second place to the urgent necessity of assuring food supply. She said:

Given the nature of the circumstances, we were not prepared when the flood hit. And so we did not really have a guideline in place. We just had to think of what was essential, what people needed, and try to provide for them as much as we could (Participant 1)

Interestingly, one participant expressed an optimistic attitude about the quality of the food delivered to the victims, stressing the fact that it was all acquired from local markets in the province. There is an authority that keeps a check on the quality of food in these markets, which ensures that the

food supplied in these markets fulfills specific quality standards. The participant indicated little concern over the possibility of the distribution of low-quality food to the victims, considering the control of a recognized body inside the nation trusted with food quality verification.

You can say that the quality of food was not in focus, but there are many other departments that are working for the promotion of food quality, like the Punjab Food Authority. They are regulating their food supply in the province. So we are confident that, of course, it might be some quality-based foods (Participant 5)

However, several relief workers reported a lack of adherence to formal guidelines, notably regarding food quality. A representative from the National Disaster Management Authority (NDMA) addressed this concern, providing insight into the fundamental causes of the problem. She explained this as:

Of course, the quality of food matters. And being a national-level organization, it is very important for us to comply with international standards as well as the WHO's guidelines. sometimes it is not always possible to control the situation on the ground we were conscious of the quality of the food. But then again, you have to be very specific, and sometimes it can be very limiting (Participant 8).

5 Discussion:

5.1 Discussion of Results:

The purpose of this study was to explore insights from the experiences of relief agencies supporting the victims' of 2022 floods in Pakistan with food security. The current study has theoretical importance as, to the best of our knowledge, this is the first research conducted on food security response during emergencies in Pakistan. Furthermore, we gained knowledge about the approaches used by humanitarian organizations in supplying food during floods, and the challenges they face, such as food distribution, communication gaps, lack of resources, and mismanagement, while improving the food security of the flood victims.

5.1.1 Impacts on Food Security:

According to the findings of this study, one of the primary perceived consequences of the flood was the severe disruption of supply chains for vital commodities, such as clean water and food, which occurred in areas isolated from the mainland and led to immediate food insecurity. This finding is in line with a study that has mentioned numerous susceptibilities in supply chains that are susceptible to catastrophic incidents (Clay, 2020). For instance, damage to infrastructure or significant threats from flooding can disrupt transportation and threaten the growing and harvesting processes. Furthermore, abnormal patterns can cause supply and demand fluctuations that affect food purchases and consumption (Clay, 2020). This implies that the food system consists of numerous interconnected, individual components that work together to provide food for the community, and small changes or disturbances in a single component have the potential to negatively impact the entire food system (Neff, 2014).

The findings of our study show that the effects of flood-induced supply disruptions have put populations under severe financial distress and exacerbated food insecurity. The findings align with previous research that emphasized the challenges of food affordability during the COVID-19 pandemic, which affected economic access to food (Clay, Koyratty, et al., 2023). Interestingly, it may seem that different crisis conditions in two distinct countries, the USA and Pakistan, can have a similar impact on financial stability and food accessibility. These findings are also consistent with a report from Pakistan on the 2022 flooding event, which revealed that food price inflation increased in August 2022, reaching its greatest level due to severe disruptions in the supply chain, resulting in a 3–5-fold increase in food item prices (SOHAİL et al., 2023). These findings respond

to the economic aspect of food accessibility from the disaster food security framework. It highlights that emergencies, such as floods, cause major disruptions and induce a spike in food prices, ultimately increasing food insecurity and posing a challenge for relief agencies to improve people's continued access to food.

This study's findings also demonstrated that locals in flood-impacted areas rely on food from their organized agricultural operations, ensuring year-round availability and stability in their food supply. However, the flooding destroyed all their food stores. The loss of these reserves due to flooding exacerbated food insecurity and highlighted the vulnerability of even self-sufficient farming communities to such disasters. These findings align with a study conducted in Bangladesh, which revealed that the affected populations primarily depended on their stored food stocks during floods, but the majority of them experienced food stock loss (Abedin & Khatun, 2019). This study is particularly relevant as it helps draw a good analogy of demographic and socioeconomic factors between both countries. According to a study, natural disasters pose a greater risk to food security in regions or communities that depend extensively on agriculture (Cutter, 2017). Therefore, the extensive reliance on stored agriculture puts individuals at risk, leading to food insecurity in affected areas during the 2022 flooding. These findings also align with a government report from Bangladesh, which states that families in the area frequently face persistent food insecurity due to the loss of food reserves and financial constraints caused by these floods (FPMU, 2016; Parvez et al., 2022).

The results from the current study indicate that the participants shared the perception that the floods have long-term consequences for food security, primarily due to the long-lasting problems with obtaining food. The submersion of prime agricultural lands, which were indispensable for providing year-round food to the local society, had a far-reaching effect. This finding is in line with a study, which demonstrates that floods in South Carolina not only caused direct crop damage but also destroy agricultural land, preventing the resumption of vital subsequent crops such as fruits, vegetables, and wheat for the next season (Cutter, 2017). These disturbances can have a significant impact on wheat and crops, which serve as fundamental food sources, as well as contribute to the regional economy (Cutter, 2017). It is worth noting here that, despite differences in demographic and socioeconomic factors between Pakistan and the US, the outcome of the flood was devastating for both countries. Our findings are also consistent with a Laos study that found floods in the Champhone district significantly impacted the agricultural community by damaging farmlands,

reducing harvests, and ultimately making it harder for people to access food (Soulibouth et al., 2021). Thus, the nation faced increased difficulties in meeting their food needs due to reduced agricultural outputs and ruined land areas.

5.1.2 Response to 2022 Floods:

The current study's findings indicate that during the 2022 floods in Pakistan, various organizations provided daily food to victims, which included both prepared meals and emergency food items. Moreover, they implemented diverse strategies, including meal distribution, to ensure a constant supply and provision of food for the flood victims. This is consistent with a study findings that mentioned variety of methods used during Hurricane Florence 2018 to distribute food and meals, including food boxes, hot meal distribution events, and regular hot meal distribution through mass feeding (Clay, 2020). Another study is also in line with our findings, suggesting that implementing policies and programs that increase food support or guarantee access to food supplies are necessary to reduce food insecurity during the long-term recovery from disasters (Clay et al., 2018). A review of studies also depicts relief efforts during the 2012 Assam floods, when the relief authorities provided affected households with food materials and safe drinking water (Dhami et al., 2020). A study discussed that during the initial response phase, the main goal should be to find the food alternatives that are available as replacements for the victims' preferred foods, such as determining what foods are available through retail and emergency food sources, where to find them, and who can use them (Clay, Slotter, et al., 2023). Providing food aid is a suitable strategy that should not only address immediate needs but also, to the maximum extent feasible, contribute to the restoration of consistent food security (SCHR, 2004). Therefore, communities require food assistance when a natural disaster disrupts their traditional food supply chain, which supports life and aids in the rehabilitation of people's ability to provide for themselves.

During floods in 2022, meal distribution to the community was important because many families lacked food availability and access. In the current study's findings, nearly all participants shared the experiences of establishing centralized gatherings areas (school and hospital grounds) for mass feeding where flood victims could gather to receive meals and food supplies for their families. This action by the relief worker reflects efforts to improve availability of food for victims and aligns with the food availability aspect of the disaster food security framework used in this study. These findings are consistent with a study of Hurricane Florence in 2018 that also included event based

meal provision, where a food truck served hot meals at an event at a church (food gathering at church) (Clay, 2020).

Additionally, there are other significant findings that are relevant to discuss. The present study's findings indicated that specialized formula milk for newborns and milk for pregnant women were the only available special foods for the population at risk. However, a few responses also mentioned the presence of nutraceutical supplements for pregnant women. These findings closely align with the broader goal of nutritional support, particularly in the approach to meeting nutritional requirements after natural disasters, where health workers aim to use a variety of foods to provide balanced meals and meet nutritional needs (Nozue et al., 2014). Calorie-dense food, a concentrated liquid diet, and nutritional supplements were used as meal options for special dietary needs in all feeding centers following the earthquake in Japan (Nozue et al., 2014). While our study findings did not comprehensively address nutritional aspects, they nevertheless highlight that relief organizations possess some awareness of the specific requirements of vulnerable populations. A review article focused on improving nutrition in emergencies highlighted that relief teams, comprising healthcare professionals and nutrition experts, can enhance the quality of meals offered in emergency shelters (Miyagawa et al., 2020).

Although our study did not extensively explore it, however, providing victims with cooking tools and ingredients in relief camps can enable them to prepare their own meals according to their dietary preferences. The shared experiences in current study indicated that the relief initiative also involved availability of food preparation tools, such as cooking equipment, in established camps. This enabled families and individuals to prepare meals that reflected their cultural inclinations and dietary restrictions. This is in line with the report from Nepal on the 2015 earthquake event and recommends that immediate post-emergency relief efforts should include the distribution of basic domestic supplies, including cooking and eating utensils (Raizada et al., 2015). This initiative is a reflection of the "agency" aspect of the disaster food security framework, which emphasizes the importance of having the ability to prepare food during a disaster and properly utilize food resources (Clay, Koyratty, et al., 2023). This will not only address the issue of acceptance but also help reduce food insecurity during disasters (Clay, 2023).

5.1.3 Barriers to ensure Food Security

The results of this current study revealed that one of the primary supply chain risks faced by relief organizations during relief operations was a significant lack of financial resources and physical barriers such as flooded routes, which reduced food availability and access for flood victims throughout the entire operation. These findings respond to the DFSF (Disaster food security framework) concept of food availability, which categorizes food availability as being dependent on factors that temporarily hinder it: firstly, the availability of food through assistance and funding, and secondly, physical barriers, such as water-filled roads or ruined supermarkets (Clay, Koyratty, et al., 2023).

Our findings reveal that a significant challenge in the food security response was the scarcity of relief food, a result of inadequate funding and mismanagement of resources and finances. These inefficiencies hindered the ability of emergency teams to meet the needs of affected populations, leading to inadequate food provisions and increased suffering among those in need. Some previous studies support this finding about the financial aspect of food availability. A study about the Turkish disaster management system emphasizes that agencies responsible for disaster risk reduction activities need strong financial resources, which become inadequate when distributed among several units during the disaster response (Baris, 2009). Another study, which findings support the impact of financial constraints on food availability and aligns with our findings, reveals that during the emergency phase, a lack of financial resources forces relief workers to provide assistance that falls short of international standards, resulting in reduced food supplies and restricting the number of people receiving relief, thereby leaving many in a state of need (Crossley et al., 2021). Therefore, lack of funding has a significant impact on food availability for affected people.

Accessibility of food applies to financial, physical, and social ability to obtain food (Clay, 2023). The results of current research show that the floods in 2022 had significant impacts on the transportation systems connecting different regions. Specifically, the flooding disrupted the interprovincial transit routes (flooded roads), which restricted the distribution of emergency food supplies. Because the food supply chain is heavily reliant on the availability of supporting services and infrastructure. This finding reflects the physical barriers associated with the food availability and accessibility concepts of DFSF (Disaster food security framework). A similar difficulty was

noted during Hurricane Katrina disaster in 2005, the absence of adequate distribution centers nearby restricted the quantity of available resources and lengthened the response time due to transportation problems (Reddy et al., 2016). Another instance related to my finding is from massive floods in Queensland, Australia also revealed the same situation. In this case, the flooding resulted in road and highway closures, isolated villages, and a food shortage in numerous towns, primarily due to transportation obstructions rather than actual food shortages (Smith et al., 2016). Despite having better infrastructure, a contingency plan, and higher resources, Australia and the US struggled to provide affected populations with good access to food. The primary issue in these cases was the disruption of transport routes to the affected areas. Pakistan, with its limited resources and lack of necessary equipment, faced a even more challenging situation. These studies indicates that physical barriers, such as damaged infrastructure and flooded roads, could contribute to reduced food accessibility and availability.

In the current study, one of the main issues highlighted was the challenge of maintaining an equitable distribution of food supplies. The limited number of accessible roads resulted in a surge of relief efforts from organizations, which led to an uneven distribution of supplies and left many areas untouched. In consistency with our study results, another study has mentioned that the independent distribution of relief resources, without proper communication with other authorities, can result in an uneven distribution. (Sheu & Pan, 2015). A study's findings revealed that one of the various reasons for unfair distributions could be the absence of an accountability structure, which led to scandals characterized by unethical and fraudulent behavior by different unofficial relief organizations (Abdullah et al., 2024). The findings of my study highlighted the prevailing situation of scarce availability and poor accessibility to food. This raises concerns about the reasons of the uneven distribution of resources. An investigation into scandals characterized by unethical and fraudulent behavior might give significant insights into the root causes of the aforementioned difficulties. Ensuring adequate food access for all affected individuals without any uncertainty is essential, as inequality during food delivery assistance leads to uneven access.

The current study found the problem of food robbery emerged as a significant worry, preventing the fair distribution of food among the affected individuals. Our findings match the study showing that during emergencies such as Hurricane Katrina and Typhoon Haiyan, stealing and violence, frequently done by desperate individuals, hindered the distribution of relief and resources planned

for all victims (Reddy et al., 2016). This also aligns with a study that suggests a complete lack of resource allocation can result in notable social problems, such as looting and robbery (Fleming et al., 2014). These findings discuss the dimensions of food availability and accessibility within the disaster food security framework.

The current study's outcomes also revealed incidents in which the delivered food failed to meet the victims' expectations, resulting in their discontent. Building upon the findings revealed in the study concerning the disappointment of flood victims with food support during the disaster, the criticality of cultural sensitivity in the provision of food assistance becomes obvious. This is consistent with study findings showing 2011 Japan earthquake victims' discontent with food aid and their desire for more varieties (Inoue et al., 2014). This is also in line with the review suggestions, which indicate that providing culturally familiar foods significantly increases the acceptance of food assistance among stranded evacuees (Dhami et al., 2020). It is crucial to understand that there may be a temporary interruption in the provision of sufficient, nutritionally good meals that fits the dietary requirements and preferences of the disaster-affected victims. This corresponds to the disaster food security framework's concept of acceptability, which states that factors like personal preferences and religious, cultural, or ethical beliefs shape dietary preferences, making them challenging during emergencies due to limited food options (Clay, 2023). However, during the preparedness phase for disasters, it is important that relief agencies plan, considering the acceptability of at-risk populations and enhancing the availability of acceptable food items (Clay, Slotter, et al., 2023).

During emergencies, while prioritizing emergency care, it is also clear that providing nutritional care is crucial for saving lives. Depending on the disaster's nature, duration, and impacted area, the severity of nutritional issues may vary. Typically, the meals provided in emergencies lack proper nutritional balance, with insufficient amounts of nutrients (Inoue et al., 2014). However, it is also essential to consider guidelines when ensuring adequate food intake for vulnerable populations, including pregnant and lactating women, children, and the elderly (Nadjarzadeh et al., 2019).

This study's findings also emphasize the nutritional aspect of emergency food, which plays a crucial role in determining its acceptability within the disaster food security framework. The current study revealed that the urgent need to ensure food supplies led to a lack of adherence to specific food quality guidelines, making it challenging to deliver quality food in a strict manner to flood victims.

This highlights the challenge in upholding food quality to ensure sufficient food during emergency response situations, despite the dedicated efforts of relief agencies. This is in accordance with the findings of another study in rural new south west Wales which demonstrated that relief organizations always encounter difficulties in providing nutritious food due to the scarcity of healthy options (Bortolin et al., 2018). Compared to Pakistan, Australia possesses adequate resources to address issues related to food security. However, providing healthy food options in rural areas has proven to be challenging for them, highlighting the challenge of planning and distributing large amounts of quality food on short notice with limited food options. The situation is also similar to the Tohoku earthquake, when people in emergency shelters had an abundance of unhealthy food and relief teams mishandled precious food (Kishimoto & Noda, 2012). The meals typically provided at food emergency centers often lack adequate nutritional balance, making them insufficient in terms of both quantity and quality (Inoue et al., 2014; Tsuboyama-Kasaoka et al., 2014). Interestingly, in poor regions food provided in emergency situations can also improve the victim's diet. In fact, a study from the flood that occurred in 2022 mentioned that most victims maintained good nutritional status due to their relocation to less flood-affected areas with accessible roads and strong community efforts, which ensured the availability and accessibility of essential food supplies and mitigated the floods' impact on their nutritional well-being (Khan et al., 2024).

5.2 Discussion of Methods

This chapter discusses the validity of this study, that means a reflection on the appropriateness of the research design and if the findings of this study can be trusted. In qualitative research, the concept of trustworthiness is dependent on the transparency of the methods used. In order to determine trustworthiness, Lincoln and Guba proposed the following criteria: credibility, dependability, confirmability, and transferability (Lincoln, 1985)

In qualitative research, the credibility of the study refers to whether the findings are reliable and offering meaningful interpretations (Hanson et al., 2019). The readers' ability to understand and relate to the experiences described in the research determines the credibility of a study. Several approaches have been suggested to enhance credibility, which also include extended involvement, continuous observation, and data collection (Ahmed, 2024; Lincoln, 1985). To enhance the credibility of the current study, we implemented the following strategies: allocating adequate time for data collection, applying the maximum variability in the sample, and including interviews with a diverse range of participants from relevant departments such as food welfare, health, and disaster management. It enabled the collection of thorough, detailed data from the sample. However, the small number of participants interviewed in this study increases the risk of selection bias. The fact that only some kind of participants chose to participate in our study could potentially influence our results, as the sample may not accurately reflect the experiences of other organizations not involved in the study and the broader population.

All the findings are based solely on the experiences of rapid response authority members, without employing data triangulation to gain a broader perspective. The results may not fully capture the complexities. It would have been beneficial to include the documented reports about 2022 floods from national and provincial agencies to validate data through a different approach. It would also be beneficial to have direct interviews with victims of flood 2022 or representatives from victims' groups. Their firsthand statements would have offered insights and clarified the facts of food delivery in a disaster from the beneficiaries' perspective. Interviews with international aid organizations could also be beneficial, as their work with flood victims could provide a broader, neutral, and global perspective. The inability to collect data from multiple sources further restricts the perspective's validity.

Confirmability refers to the degree to which the data accurately reflects the participants' responses and interpretations, without any biases or thoughts from the researcher (Shenton, 2004). The few participants were provided with the opportunity to review the transcription of their interviews and make necessary modifications as needed, and this is in response to concerns about the need for additional information verification (member check) (Cope, 2014). This step is crucial in ensuring that the interpretations properly match their opinions and experiences. During the member checking process, the identification of inaccuracies or misinterpretations may indicate the need for enhancing or modifying data collection methods, such as interview techniques or coding techniques. To enhance confirmability, the analysis followed a well-known and systematic approach as the one described by Broun and Clarke (Braun & Clarke, 2006). During the coding process periodical meetings were held with the supervision and other students to present and discuss the coding process.

In qualitative research, dependability refers to the consistency and stability of the data over time or under similar conditions (Morse, 2015). To strengthen the current study's dependability a same interview guide was used among all participants, and they were asked to refer to the same flooding event. Given that the study took place well after the flooding event, it is possible that short memory and a loss of immediate event recall occurred over time. Given the study's focus on an event that occurred in 2022, participants encountered difficulties recalling their memories and occasionally failed to provide complete and precise details due to forgetting specific information. Hence, the gathered data could miss some crucial information.

Transferability is the extent to which the findings of a research investigation may be transferred and used to understand the same research question in different situations or circumstances (Morse, 2015). This study revealed several themes, including unequal food distribution caused by infrastructure damage, safety concerns for relief workers due to food theft and desperate crowds, and cultural challenges such as difficulties in reaching female victims and trust issues among organizations. Although these findings are specific to this study, they may help manage similar situations in other contexts. Therefore, these themes could be beneficial for understanding other comparable scenarios, thereby increasing the study's transferability.

6 Conclusion

The results of this study provide an understanding of the elements that influence food security during times of natural disasters. This study indicates that the occurrence of natural disasters, such as floods, poses a significant threat to the food security of many people living in disaster-affected areas, leaving them vulnerable to food insecurity.

The importance of food security during disasters is vital, serving as the foundation for survival and resilience for impacted populations. Therefore, it becomes crucial to prioritize and consistently pursue enhanced food security in disaster management initiatives. However, based on the disaster food security framework, there is room for improvement in areas of availability, accessibility, and acceptability. By improving the identified difficulties, we may optimize disaster food security and reduce the effects of crises on victims. This study recommends improving the communication channel for diverse stakeholders engaged in humanitarian efforts, planning nutritious and culturally appropriate meals well, and monitoring the transparency of food distribution.

7 References

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8 Appendices

8.1 Appedix-1- Ethical Approval

10/10/24, 3:18 AM

Vurdering av behandling av personopplysninger - Ref. 752367



Assessment of processing of personal data

Reference number

752367

Assessment type

Standard

Date

17.08.2023

Title

Experiences and challenges of food security during the 2022 flooding: An evaluation of the response of relief authorities in D.G. Khan, Pakistan

Institution responsible for the project

OsloMet – storbyuniversitetet / Fakultet for helsevitenskap / Institutt for naturvitenskapelig helsefag

Project leader

Laura Terragni

Student

Muhammad Ahmad

Project period

01.08.2023 - 31.12.2024

Categories of personal data

General

Legal basis

Consent (General Data Protection Regulation art. 6 nr. 1 a)

The processing of personal data is lawful, so long as it is carried out as stated in the notification form. The legal basis is valid until 31.12.2024.

Notification Form [🔗](#)**Comment****ABOUT OUR ASSESSMENT**

Data Protection Services has an agreement with the institution where you are a student or a researcher. As part of this agreement, we provide guidance so that the processing of personal data in your project is lawful and complies with data protection legislation. We have now assessed that you have legal basis to process the personal data.

FOLLOW YOUR INSTITUTION'S GUIDELINES

You must store, send and secure the collected data in accordance with your institution's guidelines. This means that you must use data processors (and the like) that your institution has an agreement with (i.e. cloud storage, online survey, and video conferencing providers).

Our assessment presupposes that the project will meet the requirements of accuracy (art. 5.1 d), integrity and confidentiality (art. 5.1 f) and security (art. 32) when processing personal data.

NOTIFY CHANGES

If you intend to make changes to the processing of personal data in this project, it may be necessary to notify us. This is done by updating the information registered in the Notification Form. On our website we explain which changes must be notified. Wait until you receive an answer from us before you carry out the changes: <https://sikt.no/en/notify-changes-notification-form>

FOLLOW-UP OF THE PROJECT

We will follow up the progress of the project at the planned end date in order to determine whether the processing of personal data has been concluded.

Good luck with the project!

8.2 Appedix-II- Interview Guide

- i. Could you tell me a bit about your organization?
- ii. What were the services that were provided after the flooding in 2022?
- iii. What was the food situation soon after the flood?
- iv. Were there many people struggling to get food?
- v. Can you provide examples of situations where people struggled to access food?
- vi. What was the overall availability of food after the flood? And how was a regular food supply ensured?
- vii. Could you tell me about the kinds of food that were provided to victims?
- viii. How long have people received that food?
- ix. How was food availability and people access to food before flood?
- x. Were you following any guidelines for the quality of food that was provided to victims?
- xi. Did you have any strategies or any practices for delivery of food to pregnant women, children, elderly and patients?
- xii. Were there any challenges to meet the food needs of special groups (Pregnant women, Children, Elderly and Patients)?
- xiii. Were there any challenges in ensuring a consistent food and water supply?
- xiv. What were the most significant barriers encountered by relief authorities in ensuring food availability and security during the response?
- xv. Can you highlight any lessons learned from dealing with these barriers?
- xvi. Describe the role of government during the 2022 flooding?
- xvii. Did you work with other Organizations? What kind of cooperation did you have with other organizations?
- xviii. In your opinion, was collaboration between the government and non-governmental organizations effective in dealing with the food emergency?
- xix. If not, keep in mind your experiences how it could have made a better impact?
- xx. Did you face any difficulties collaborating with other organizations?
- xxi. How can coordination among all these actors be improved for future lessons?

8.3 Appendix-III- Consent Form

Consent form:

Thank you for agreeing to participate in this interview. I am interviewing you to better understand what the experiences are and challenges you faced related to food supply during floods 2022 in Pakistan. There are no right or wrong answers to any of our questions, I am interested in your own experiences. Participation in this study is voluntary and your decision to participate, or not participate is at will. The interview should take approximately 55 minutes depending on how much information you would like to share. With your permission, I would like to audio record the interview because I don't want to miss any of your comments. All responses will be kept confidential. This means that your responses will be confidential, and I will ensure that any information I include in our report does not identify you as the respondent. You may decline to answer any question or stop the interview at any time and for any reason.

Signature and date