

Raising Resilience Capacities by Building Social Capital in the Disaster Affected Community in China: A Case of Zhuozhou Logistic Park Flooding

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Abstract

Zhuozhou Logistic Park hit by heavy storm and flooding caused by Typhoon Doksuri in 2023 summer, and results in large loss of people death and economic loss. This paper aims to illustrate the resilience capacities and reviews how resilience capacities matter in the response of nature disaster affected communities. Employed community resilience and social capital theories, this study finds the important role of resilience capacities, especially the organization, local knowledge, cooperation, social networks and trust in disaster response process. For strengthen the resilience capacities of community to response disaster, we must format a robust social capital within a community, emphasize the crucial role of social capital in fostering social cohesion and resilience within communities, and highlight the importance of investing in social capital as a strategic approach to community development.

1. Introduction

In the annual report *2023 Disasters in Numbers*¹ from the Centre for Research on the Epidemiology of Disasters (CRED)², in 2023, the Emergency Events Database (EM-DAT) recorded a total of 399 disasters related to natural hazards. These events resulted in 86,473 fatalities and affected 93.1 million people. The economic losses amounted to US\$202.7 billion. according to EM-DAT, the single most catastrophic event of the year 2023 in terms of mortality and economic damage was the earthquake sequence that hit Türkiye and the Syrian Arab Republic in February, with 56,683 reported deaths and damage worth US\$42.9 billion damage. The economic damage is litter difference in other report. The *2024 Climate and Catastrophe Insight*³ says that global natural disasters in 2023 resulted in above-average economic losses totaling \$380 billion, which was driven by significant earthquakes and relentless severe convective storm. Out of the 66 natural catastrophes that caused a billion dollars or more in damages in 2023, 63 of them were caused by weather. Yet only 40 percent of weather and climate related losses were covered by insurance in 2023. When a community damaged by a natural disaster without insurance, the community recovery will be greatly delayed for the community has no enough resources to establish its response ability.

In end of July and early of August 2023, Zhuozhou Logistic Park hit by heavy storm and flooding caused by Typhoon Doksuri, and results in large loss of people death and economic loss. The reason is

1 This report is available at: https://files.emdat.be/reports/2023_EMDAT_report.pdf

2 The Centre for Research on the Epidemiology of Disasters (CRED) have been maintained The Emergency Events Database (EM-DAT) since 1988, which aims to archive significant disasters and support future disaster risk reduction strategies. EM-DAT provides information to support humanitarian action at both the national and international level, enabling rational decision-making in disaster preparedness.

3 The document *2024 Climate and Catastrophe Insight* from Aon is available at: <https://assets.aon.com/-/media/files/aon/reports/2024/climate-and-catastrophe-insights-report.pdf>

mainly because of the weakness of the community resilience capacities. When the community cannot get external help for its recovery, it has to get internal assistance for enhancing its ability. The building of social capital will greatly benefit the community for its disaster response.

2. Xi's Report: The Utmost Importance of Communities for Chinese Style Governance

Chinese President Xi Jinping delivered an important report to the 20th National Congress of the Communist Party of China on October 16, 2022, and wanted to enhancing public safety governance for respond effectively to major natural disasters. President Xi said that we will follow the principles of putting safety first and placing emphasis on prevention, and we will establish an overall safety and emergency response framework. The public safety system will be improved, and we will drive a shift in public safety governance toward a model of prevention. Workplace safety risk controls will be strengthened, and safety supervision in key sectors and areas will be bolstered. We will enhance our capacity for disaster prevention, mitigation, and relief and for responding to and providing support during major public emergencies, and the regional emergency response capacity will be strengthened.

On April 15, 2014, President Xi first proposed the major strategic ideas of the overall national security concept at the first plenary session of the Central National Security Commission. National security is the bedrock of national rejuvenation, and social stability is a prerequisite for building a strong and prosperous China. We must resolutely pursue a holistic approach to national security and promote national security in all areas and stages of the work of the Party and the country, so as to ensure national security and social stability. China will strengthen popular support for national security and social stability, improve the mechanisms for our participation in global security governance, and advance the Peaceful China Initiative to a higher level. With this new security architecture, we will be able to better safeguard China's new pattern of development.

China will improve the social governance system based on collaboration, participation, and shared benefits, so as to make social governance more effective. Primary-level social governance platforms featuring grid-based management, meticulous services, and IT support will be improved to strengthen urban and rural community governance. This will foster a community of social governance in which everyone fulfills their responsibilities and shares in the benefits, so the community development is very meaningful in China's social governance system.

3. Theoretical Review

3.1 Concept of Community

The notion of community suggests positive aspects of society, a 'good thing' that will improve individual well-being. Community has emotional overtones, implying familiarity, social and emotional cohesion, and commitment. Community can be considered as a theoretical concept and a philosophy, such as 'community spirit' or 'connected community'. Alternatively, community may be considered as a practice of engaging and connecting with others for instance 'creating community' or 'building community'. No agreed definition exists of exactly what constitutes a community. It is often used as a substitute term for locality, but community exists well beyond physical places.

Community is a vital dimension in modern society and a key element of social organization. There is no agreed definition, but community always involves meaningful social interactions and a common

interest in a group of any size. Community frequently refers to a shared space or place as a substitute term for locality, but it exists beyond physical places or shared geographic location (Bradshaw 2008). A community is meaningful interactions within agreed structures, procedures, protocols, norms, and conventions that enable contributions to social order as a social institution (Scott 2001). Members of a community share a connection, such as location, interests, background or identity, situations, or experiences. Communities are aggregates of people who share common activities and/or beliefs, and are bound together mainly by affect, loyalty, common values, and/or personal concerns (Brint 2001).

Many different types of community exist. Each type has different characteristics, purpose, membership requirements, and traditions of interactions. Each community institutes accepted arrangements of engaging with other members, establishes customary forms of relationships, and determines particular conventions for interactions and ways of maintaining contact. Researchers, policy makers and practitioners have a clearer understanding of different types of communities if they are systematically and precisely defined, however, few typologies of communities have been published. This is quite surprising given the lack of consensus regarding appropriate definitions, or agreement on categorization.

This study will focus on the Zhuozhou books logistic park which hit by flood in 2023, and according to the notion and types of community, the logistic park is also a community.

3.2 Community resilience

Community resilience refers to a community's capacity 'to absorb disturbance and re-organize into a fully functioning system' (Cutter et al., 2008, p. 599). Owing to the escalating impact of disasters triggered by natural hazards on communities (Cutter, Ash, and Emrich, 2014), the concept is rapidly attracting the attention of policymakers and researchers (Tierney, 2013). Resilient communities are far more capable of responding to and recovering from disasters in a manner that minimizes life and property losses (Cutter et al., 2008; Godschalk, 2003). A burgeoning focus on the topic has fostered discussion on how disaster policies can incorporate the concept of community resilience in all phases of the disaster management cycle: mitigation, preparedness, response, and recovery (Berke, Kartez, and Wenger, 1993; Olwig, 2012; Cutter, Ash, and Emrich, 2014; Twigg, 2015). More specifically, the authors of previous studies in this field have underscored the importance of performing mitigation projects during the recovery process, thereby closing the loop of the disaster cycle (Cutter et al., 2008; Godschalk, 2003; Innocenti and Albritto, 2011; Tierney, 2013; Twigg, 2015). Disaster mitigation includes any actions taken to reduce or eliminate the long-term risks posed by hazards to property and human life before a disaster occurs (Godschalk et al., 1999), such as retrofitting structures, enacting new building codes, creating new land use plans, avoiding new development in vulnerable areas, and educating citizens on disaster preparedness systems (Maskrey, 2011; Drennan, McGowan, and Tiernan, 2016).

Community resilience may be enhanced by integrating disaster mitigation into recovery activities as this lessens the risks and decreases vulnerability to natural hazards (Rose et al., 2007; Tierney, 2013). Affected communities have the opportunity during the recovery process phase not only to return to normal economic and other activities, but also to advance their preparedness levels by learning from experience (Gerber, 2007; Cutter et al., 2008; Cutter, Ash, and Emrich, 2014). Linking mitigation and recovery efforts may break the damage–repair–damage cycle (Rose et al., 2007). For instance, Greenville County in South Carolina commissioned a Flood Task Force after Tropical Storm Jerry

struck in August 1995 to review where and why flooding occurred (FEMA, 2016). The local government identified flood-prone areas and adopted various strategies to diminish the risk throughout the recovery process, such as building floodwalls, elevating residential and commercial structures, and stabilizing stream banks. Consequently, the county was successful in reducing its existing vulnerabilities and improving its capacity to respond to potential flooding.

3.3 Social Capital

In recent years the concept of social capital has gained great currency in discussions of community development, managing transition, and analyzing community dynamics and in network research (e.g. Borgatti and Foster 2003, Leonard and Onyx 2004, Dale and Onyx 2005). The concept can be traced back to Durkheim's emphasis on group life (Portes 1998), and more recently by Putman (2000, p. 20) as "social networks and the norms of reciprocity and trustworthiness that arise from them". Regardless of the debates about the direction of causality and its benefits (Fine 1999), some scholars have pointed out the relationship between social capital and enhanced sustainable community development (e.g. Dale and Onyx 2005, Newman and Dale 2005, 2006, 2008). For the purpose of this research social capital can be described most basically as the features of social organization, such as trust, cultural norms and networks by which communities facilitate action or simply keep themselves going.

A hallmark of social capital is that from its earliest inception the concept has been strongly linked to the ideas of action and application. It is perhaps best defined as an "aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (Bourdieu 1985, p. 248). But it is also argued that social networks are not a natural given – they must be constructed through "investment" strategies that seek to institutionalize group relations and make them a reliable source of benefits (Bourdieu 1983, Portes 1998). Putnam (1993, p. 167) characterizes social capital as features of social organization, such as trust, norms and networks that can improve the resilience of society by facilitating and supporting coordinated actions. In community and economic development, a question that has emerged is whether social capital scholars are always talking about the same things? (Rohe 2004).

4. Case Study: Zhuozhou Logistic Park Flooding in 2023

A heaviest record rainfall in 140 years has caused severe flooding, at least 107 people have died or missing as a result of the Typhoon Doksuri hit Beijing, Tianjin and Hebei Province in summer 2023. Zhuozhou, a city neighboring Beijing with a permanent population of 600,000 people, has become the worst-hit flood region after days of heavy rain which came from the remnants of Typhoon Doksuri in late July 2023. From 8 am on 29th July, 2023 to 11 am on 2nd August, Zhuozhou was hit by heavy rainfall with the average precipitation reaching 355.1 millimeters, according to local officials. As of 10 am Tuesday, a total of 133,913 people from 146 villages in Zhuozhou had been impacted by rainstorms, affecting an area of 225.38 square kilometers.

A widely circulated form on the internet for registering rescue needs shows that many of the stranded people were in urgent need of dry food and water, and medication. Additionally, local communication problems and power outages have hindered cell phone charging, making some stranded individuals unable to maintain contact with others.

Zhuozhou is also an important logistics hub city. There are hundreds of publishing house book warehouses located in the city, and nearly all of them have been flooded. According to media reports, at

least several million books have been affected by the floods. The transshipment warehouses of some logistics groups in Zhuozhou have also been impacted by the flooding.

According to Book China, one of the earliest domestic online book sales platforms, some staff members used sandbags and wooden boards to protect their warehouses in Zhuozhou, but around 4 million books have been damaged by the flood. Employees working at the Book China warehouse shifted some books from the first floor to higher floors, and stacked up sandbags at the entrance, however, floodwaters inundated the first floor within an hour, and employees rushed to take shelter on the fourth floor. It all happened too quickly and they didn't have enough resources to relocate all the books, the employees said.

Netizens, who helped organize the rescue, sent words of encouragement to the company. Many ordered more books, gift cards and other items to extend their support. "I have bought many books on your website, some of which saved me. ... It is time for me to rescue you," said one Weibo user. Another user wrote, "Those who survive big disasters are blessed with good fortune afterward." The company, which mentioned in a statement that the books at its Zhuozhou warehouse were almost its "entire stock", said it will not sell the damaged and contaminated books as it valued its readers' safety more.

China has allocated 110 million yuan (\$15.43m) to support flood prevention and disaster relief work in Beijing, Tianjin, and Hebei, according to the Ministry of Finance and the Ministry of Emergency Management on Tuesday. On Wednesday, the Organization Department of the Communist Party of China (CPC) Central Committee allocated 44 million yuan (\$6.17m) in funds to assist with flood control and disaster relief work in the region.

5. Research Findings

Zhuozhou logistic park is a business community, we can examine its community capacities by measuring its community resilience. Resilience capacities, including organization, local knowledge, social networks, cooperation, trust, and participation were crucial to cope with the disaster in Talcahuano. Despite the destruction, community actions revealed not only the power of people to deal with natural disasters but also the inherent resilience capacity existing in communities.

5.1 Organization

Organization was a crucial resilience capacity. Organization can help people quickly be organized the evacuation after the flood. There are two types of organization, one type is the governmental organization, and one type is autonomy organization. The flood hit the Zhuozhou logistic park suddenly, the government released warning information to the people by sending cellphone message an TV and radio. Without the government conducts on spot organization for relief, the community had the autonomy of evacuating themselves without external help. Book China, one of the earliest domestic online book sales platforms, some staff members used sandbags and wooden boards to protect their warehouses in Zhuozhou, but around 4 million books have been damaged by the flood. Hebei Wensheng Printing Co Ltd, sent online messages for help as the water had flooded to the second floor of the company's office building in Zhuozhou, trapping over 30 staff members. Two days later, rescue teams arrived in Zhuozhou to extract hundreds of people trapped in houses by floodwaters after days of downpours. In Zhuozhou logistic park, the companies spontaneously organized themselves, with employees assuming leadership at all stages. They were responsible for keeping the people safe; they

guided the evacuation process until people were safe. Organizing the security inside the communities was another necessary action undertaken by people in the face of the emergency.

5.2 Local knowledge

The experience and oral tradition were crucial for the survival of people. Earlier getting warning message or noticing dangerous signal is very important for people surviving in a major disaster. People can learn the knowledge from their own experience or has been transmitted from one generation to another. Zhuozhou logistic park is not a region often stroked by typhoon or flood, so people working or living there has no successful experience to flood for next generation. When flood arriving suddenly, the people did not evacuate to safe places but wanted to move books to safe places, and then they were trapped by water, if there is no rescue team arrive immediately and implement rescue measures, the people there maybe killed by the flood. The majority of people relied on the experience from their daily life, on their own beliefs, and ignored this official alarm and continued the evacuation to the hill. If they had not trusted their own experience, it would have been impossible for them to save their lives. People have to update their knowledge about disasters and methods of dealing with disasters.

5.3 Cooperation

Community actions were imbued with solidarity and union which was important in keeping the calm and peace in the middle of the catastrophe. The people in daily life situation suddenly changed into a emergent environment usually have no enough rescue resources and living materials, and have to get external help for them. When people in emergency, they have to get enough water and food, battery and power bank, and warming materials. People have to cooperate with their neighbors which based on the trust. The people in the same neighborhood have to share what they have to help others to get what they need. They were not only crucial for the survival of the community in the first days of the emergency but also united people amidst pain and suffering.

5.4 Social networks

Bonding social networks were predominant during the emergency. This was useful for protecting each other during the days in which there was the risk of mobs and looting in the community. Social networks in disasters have a close relationship with stakeholder theory. As an early scholar on stakeholder, Mitroff (1983) introduce stakeholder theory into crisis management field. Pearson and Mitroff (1993: 50) argue that in crisis management, the manager has to answer three questions about stakeholder: which stakeholders affect crisis management? Which stakeholders are affected by crisis management? And how can the stakeholders be systematically analyzed and anticipated for any crisis? Stakeholders refer to the “large and complex number of individuals, interest groups, and institutions”, which are typically involved in any crisis (Mitroff, 1994: 108; Mitroff et al. 2004: 180). “Stakeholders involve the broad range of internal and external parties who have to cooperate, share crises plans, and participate in the training and the development of organizational capabilities in order to respond to a range of crises” (Mitroff and Anagnos, 2001: 48). “Stakeholders can include customers, suppliers, the competition, employees, middle management, top leadership, unions, government agencies, the media, the natural environment, and even future generations” (Mitroff et al. 2004: 180). Pearson and Mitroff (1993: 58) argue that “the number and diversity of these stakeholders has grown steadily, further complicating the process of crisis management”.

5.5 Trust

Trust among neighbors increased in most of the companies and people because they could get to know each other better having to spend all their time together. An intimate and solidary environment was created and lasted during all this period. People were emotionally involved; they had to expose their vulnerabilities and fears to others to find comfort. Furthermore, the trust in their leaders, both formal and emergent leaders, was also essential for keeping this atmosphere of calm, companion and friendship. Trust is the basic element for the community construction and reducing the transaction costs. There is not only one source of trust, which including moral trust, economic trust, political trust, social trust, and technological trust.

6. Suggestions and Conclusions

The 2023 Typhoon Doksuri and flood hit Zhuozhou logistic park revealed that community resilience plays a crucial role in coping with and recovering from natural disasters. The research also unveiled that most of the capacities activated in Zhuozhou logistic park to cope with the event have a social and intangible nature such as participation, organization, cooperation, social networks, trust, and local knowledge. The socially constructed nature of resilience challenges the tendency to overlook the importance of social resources and to overemphasize physical and economic ones. Therefore, the use of social resources can be essential to save the lives of people. If communities had not activated these social capacities, the story of survival would have been different. The use of social capacities can be especially relevant in the case of natural disasters of great magnitude.

This study provides empirical evidence to support the effectiveness of a disaster mitigation policy in improving community resilience outcomes. The findings have important ramifications for future research. Despite a burgeoning amount of work advocating the incorporation of community resilience in disaster mitigation initiatives (Rose et al., 2007; Cutter et al., 2008; Berke, Smith, and Lyles, 2012; Cutter, Ash, and Emrich, 2014), it is evident that more in-depth assessments of such efforts across state and local government are needed.

One of the prominent conclusions drawn from this study is the significant role that community resilience plays in facilitating various aspects of natural disaster, but how to enhance the community abilities relies on the social capital. Firstly, we must format a robust social capital within a community. It will highlight how networks of trust and cooperation among individuals and groups can lead to increased disaster response ability, such as access and distribute to resources, and form networks in communities. Moreover, social capital acts as a catalyst for disaster response and recovery, as individuals leverage their social connections to mobilize support, seek advice, and collaborate on community behavior.

Secondly, we must emphasize the crucial role of social capital in fostering social cohesion and resilience within communities. Strong social ties create a sense of belonging and solidarity among members, leading to greater social trust, reciprocity, and collective action. This social cohesion, in turn, enhances the community's capacity to address common challenges, mitigate conflicts, and adapt to changes. By promoting inclusivity and social integration, social capital contributes to the well-being and quality of life of community members, fostering a sense of identity and pride.

Thirdly, we must highlight the importance of investing in social capital as a strategic approach to community development. It underscores the need for policymakers, practitioners, and community

leaders to recognize and harness the potential of social networks in driving sustainable development initiatives. By fostering platforms for collaboration, communication, and collective decision-making, stakeholders can empower communities to harness their social capital effectively. This requires fostering a supportive environment that promotes trust-building, social cohesion, and inclusive participation across diverse groups within the community.

Moreover, we must notice the asynchrony between the short-term disaster response and long-term investment of social capital in community. A community often impacted by repeated disasters triggered by natural hazards but social capital investment usually needs decades years. The future research efforts should focus on the long-term bearing of programs on disaster mitigation at the community level. By investigating the relation between the social capital and community resilience outcomes, this study paves the way for the next phase of this research enterprise.