

Enhancing Natural Disaster Resilience through NGO Participation in China

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Abstract

The purpose of this paper is to strengthen natural disaster resilience by providing strategic measures for NGOs to participate in disaster management in China. For the research purpose, this paper used the SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis method to qualitatively analyze the internal and external environmental factors that NGOs face in the disaster management process, in combination with AHP to quantitatively analyze each factor. We suggested strategic measures for NGOs in the disaster management field at the public sector and NGO levels as follows: ① to supplement laws and policies; ② to strengthen supervision and auditing; ③ to emphasize participation enthusiasm; ④ to strengthen promotion; ⑤ to reinforce communication; ⑥ to train professional manpower through various channels; ⑦ to establish cooperative relationships with other actors, and ⑧ to pay attention to the vulnerable.

Key words: natural disaster resilience, NGO participation in China, SWOT analysis, AHP

1. Introduction

According to the Asia-Pacific Disaster Report 2019, nearly half of the 281 natural disasters worldwide occurred in the Asia Pacific region. Eight of the 10 natural disasters with the highest number of fatalities were in the Asia Pacific region (UNESCAP, 2019: 6).

China, located in the Asia-Pacific region, also experienced many floods, and typhoons in 2018, and 130 million people were injured by droughts, hail, earthquakes,

heavy snowfalls, and forest fires, and the direct economic loss was 264.46 billion yuan (Ministry of Emergency Management, PRC, 2019: 29). From these cases, the conflict between people and the natural environment is serious, and natural disasters not only adversely affect the interests of the people, but also poses great threats and challenges to the stability of the nation and society. However, when faced with a natural disaster, it is not possible to do anything, but it is necessary to reduce the adverse factors as much as possible through active disaster

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management.

In modern society, disaster refers to the general term for things that can have destructive effects on human beings and the environment on which they depend (Yang, 2012: 9). Although natural disasters occur in many parts of the world, natural disasters become disasters when people's lives and livelihoods are destroyed because some areas are more susceptible to disasters than others (WMO, 2017)¹⁾. China is one of the most severely affected by natural disasters in the world. Natural disasters are characterized by many types, wide distribution, high frequency of occurrence, and serious losses (Chen, *et. al.*, 2013: 70). Therefore, until natural disasters turn into catastrophic events, we must be prepared to reduce personnel and property damage through disaster management systems. Thereafter, the government plays an irreplaceable role as a subject of disaster management for natural disasters. However, when disasters occur quickly and the destructive power is unexpectedly strong, even when the government cannot respond, the NGO is a major component of society, and is one of the essential capabilities in the disaster management process (Xu & Cui, 2011: 138). From the disaster prevention stage to the disaster recovery stage, relief is difficult and complicated, and a long-term input of large amounts of manpower and supplies is required (Fang, 2015: 1). Therefore, in the disaster management process, disaster vulnerability is improved to reduce existing risks and risks that cause secondary disasters, and to improve disaster preparedness, thereby strengthening the disaster management process. Participation in NGOs can greatly enhance natural disaster resilience and help the affected areas recover to normal production and living as quickly as possible.

NGOs generally have characteristics such as civility and

professionalism. So, before the disaster, they are interested in the survival situation of the vulnerable. NGOs can respond more flexibly than governments in the event of a disaster, as well as assist government functions. In China, the number of NGOs increased after reform and opening. According to information on social organizations published by the Ministry of Civil Affairs (PRC), there are a total of 81.6 million social organizations nationwide by the end of 2018 (China Philanthropy Times, 2019)²⁾. However, NGOs in China have been developing for a short time and have management problems, so they cannot use their power properly when participating in disaster management (Song, 2018: 1-2).

In China, natural disasters occur frequently, and the degree of urbanization across the country exceeds 60%, and the disaster management process is becoming more and more complicated. The complexity of disaster management is not something that an organization can respond to. Therefore, this paper aims to analyze the actual situation of NGOs participating in disaster management, so as to summarize the internal and external environmental factors that NGOs face in the disaster management process: strengths and weaknesses, opportunities and threats. And based on this, the purpose of this paper is to strengthen the natural disaster resilience by providing strategic measures for NGOs to participate in disaster management in China.

II. Theoretical Background

1. Concepts and Types of NGOs

1) Concept of NGO

In 2004, the United Nations defined NGOs as follows:

“A non-governmental organization (NGO) is any non-profit,

1) WMO, <https://public.wmo.int/zh-hans/>. (2020. 04. 21)

2) China Philanthropy Times, https://www.sohu.com/a/326933371_818314. (2019. 10. 29)

voluntary citizens' group which is organized on a local, national or international level. Task-oriented and driven by people with a common interest, non-governmental organizations (NGOs) perform a variety of services and humanitarian functions, bring citizens' concerns to Governments, monitor policies, and encourage political participation at the community level. NGOs provide analysis and expertise, serve as early warning mechanisms and help monitor and implement international agreements (United Nations, 2004; United Nations, <https://outreach.un.org/ngorelations/content/about-us-0> 25 June 2020)³." Currently, many NGOs are mentioned in the society and are considered as an important component in the public management field. However, how to define NGOs in China is a very complex matter, and terms similar to NGOs include Non-profit organization, Civil society organization, and The third sector (Zhang, 2011: 5).

NGOs are organizations that emphasize non-governmentality and exist independently of the government. The NPO is independent of the market, emphasizing the organization's civility, and its members are made up of the general public (Zhang, 2019: 16). These terms are practically no different from the implications of NGOs.

Although the definition of NGOs is widely applied in academia at present, the international community has generally accepted the concept of NGOs proposed by Salamon and Anheier through comprehensive research. NGO was defined as an organization with five characteristics: organization, non-government, non-profit, autonomy, and voluntary participation. The non-governmental and non-profit nature of NGOs are internationally recognized features (Shi, 2016: 15). These five characteristics are slightly different from those in China, as scholars presented them according to their own country. The term commonly used in China is social organization, which includes social groups, funds, and NPOs. NPOs can be called NGOs because they are

independent of the government in the system (Chen & Zhang, 2019: 51). Wang (2004) said that China's NGOs are not for profit, but mainly for public interest. NGO is a formal social organization excluding the party system, and non-government and non-profit are fundamental characteristics of the organization (Wang, 2004: 4).

Research on NGOs in China is mainly focused on disaster management. As a result of reviewing previous studies, Chinese NGOs are non-profit social organizations that are voluntarily formed in the private sector and formally registered with relevant ministries, so members of the organization should act with the same public interest goals.

2) Type of NGO

At present, China has no clear classification criteria for NGOs, the public sector and scholars have classified them according to various criteria as shown in <Table 1>. According to the differences in organizational characteristics, the Ministry of Civil Affairs divided NGOs in China mainly into social organizations, private non-enterprise organizations, and fund groups. Some scholars are classified into Mutual-benefit NGOs and NPOs by reference to international organizational personality standards.

The NGOs in this paper are NGOs in a broad sense that demonstrate civilian competency in the disaster management process and have a spirit of service. Among them, it is a general term that includes social organizations, private non-enterprise organizations, and fund associations. Hereinafter, it is consistently expressed as an NGO.

2. NGOs in China

Prior to reform and opening up, China's NGOs were not independent of the government, but depended on national and political needs. For this reason, most scholars insisted that the full-scale development of NGOs was after

3) United Nations, <https://outreach.un.org/ngorelations/content/about-us-0>. (2020. 6. 25)

Table 1. Classification of Chinese NGOs

Standard of classification	Classification	Secondary classification
Organizational nature	People-run non-enterprise units	Education, health service, cultural undertaking, science and technology, sports enterprise, labor cause, civil affair, social intermediary service, legal service
	Society Group	Academic style, combined, industry type, professional
	Foundation	Foundations that raise money from the public or don't raise money from the public.
Activity area	Economic field	Business services, agriculture and rural development, scientific research, education, health, culture, sport, ecological environment, social service, law, religion, practitioner organization, international organization
	Scientific research field	
	Social undertaking	
	Philanthropy	
	Comprehensive field	
Legal status	Legal NGO	\
	Grass-roots NGO	\
	Quasi-governmental NGO	People's organization, Institutions in transition
International standard	Mutual-benefit NGO	Economic group, social group
	Non-profit organization	People-run non-enterprise units, foundation

※ Source: Shi(2016: 16-17).

the reform and opening up in 1978, and the development of politics and economy gave many opportunities to NGOs in China.

The 4th World Women Conference and NGO Forum was held in Beijing in 1995. At that time, the concept of NGOs first appeared in China. With the 2008 Beijing Olympics and the Great earthquake in Wenchuan, NGOs gradually developed. NGOs are social organizations that exist independently of the government system and have a certain degree of publicity and a certain public service,

but most NGOs in China have a close relationship with the government and are somewhat controlled by the government (Min, *et. al.*, 2018: 220).

Based on Deng's (2004) lecture at Tsinghua University, this study summarized the development stages of Chinese NGOs into five categories as shown in <Table 2>. First, it is the initial stage of development from 1949 to 1966. Second, the stage of development stagnation from 1966 to 1978. Third, the recovery phase from 1978 to 1995. Fourth, it is an active stage of participation from 1995

Table 2. The development stage of Chinese NGOs

Stage	Content
The first stage: 1949-1966	For the needs of political absorption, large-scale people's organizations and a large number of academic and literary social organizations have been established, such as the all China Youth Federation and so on.
The second stage: 1966-1978	Due to the influence of the "Cultural Revolution", the established associations have almost ceased their activities and no new associations have been established.
The third stage: 1978-1995	In order to meet the needs of reform and opening up, a large number of social groups have emerged, especially the development of industry associations and foundations. In 1989, the Chinese government supported the establishment of the largest poverty alleviation NGO in the country.
The fourth stage: 1995-2008	NGOs began to play a new role in social economic and political development. China joined the WTO in 2001, and economic globalization has promoted the development of economic NGOs. In 2008, NGOs played a major role in the Wenchuan earthquake and the Olympic Games.
The fifth stage: 2008 to present	At present, NGOs have been active in various fields of our society, providing public services that society needs. In 2011, the Ministry of Civil Affairs proposed to implement the integrated functions of registration management and business supervisors for NGOs in the charity, social welfare, and social service categories, which is undoubtedly a huge support for the healthy development of NGOs.

※ Source: Revised from Deng(2004: 143).

to 2008 (Deng, 2004: 143). The fifth stage can be summarized as a continuous development stage from 2008 to the present.

3. Disaster Management and NGO

As the natural disaster situation becomes more complex, the concept of disaster management is also improving. Cuny FC (1993) of the University of Wisconsin-Madison Disaster Management Center defined disaster management as “Disaster management is to continuously control disasters or emergencies, and to provide people with a series of activities to avoid disasters or recover from disasters.” Since then, disaster management has been presented in general terms (Lee, *et. al.*, 2014: 24), including all aspects of planning and responding to pre- and post-disaster management activities. In general, disaster management is defined as four steps: prevention/mitigation, preparation, response and recovery (Lee, 2015: 117). From this concept, disaster management emphasized a kind of activity or a kind of behavior. It is a series of activities for comprehensively controlling disasters, recognizing them as manageable, evaluating risks, establishing and implementing preventive and mitigation measures, and responding and recovering (Oh, *et. al.*, 2019: 49-50).

Prior to 1985, in China, NGOs in the field of disaster management were the nature of pro-governmental

associations and societies. Since then, the United Nations General Assembly began the International Decade for Natural Disaster Reduction (IDNDR), and many general NGOs have been established in China. (Guo, *et. al.*, 2011: 13). From 2008, NGOs in China began to play a practical role. Since the Wenchuan Earthquake, there have been many NGOs in China, and have been playing an important role in disaster relief activities (Xiong, 2016: 1). Taken together, the development trend of disaster management in China has continued from the government's initiative to the cooperative response among different actors, and the specific process is shown in <Table 3>.

In modern society, disaster management is a system of unified activities in various sectors. In the process of disaster management, public institutions play an indispensable role as a major provider of public services. However, the multiplicity and complexity of Chinese disasters has led the public to pursue higher quality disaster management. In some ways, NGOs take part in the supply of public services, replacing some of the roles of public institutions (Li & Chen, 2017: 57). In other words, NGOs can use their own advantages to play an important role in disaster education, fundraising, medical assistance, and psychological treatment. This paper summarizes the roles that NGOs can play at each stage by referring to the four stages of disaster management (<Figure 1>).

Table 3. The evolution of China's disaster management model after reform and opening up

Stage	Key feature	Content
From the reform and opening up in 1978 to the outbreak of SARS in 2003	The stage of disaster management with the main task of ensuring the economy	Emphasis is placed on economic construction as the center, linking disaster management to economic construction. NGOs have preliminary development, and most of them have official background.
From SARS in 2003 to before the Wenchuan earthquake in 2008	Government-led emergency management stage	Due to the construction of emergency plans, communication and coordination between the central and local vertical and horizontal departments have been strengthened. NGOs began to actively participate in disaster management, but the effect was not obvious.
After the 2008 Wenchuan Earthquake	Multi-agent participation in Disaster management	The central government has stepped up its comprehensive Coordination role, emphasized the local government's territorial role, and innovated the 'partner assistance model'. Stimulated the innovation ability of local governments, and local governments began to seek normative channels for cooperation with NGOs. NGOs not only actively participate in disaster management, but also become more professional.

※ Source: Zhang(2015: 66-85).

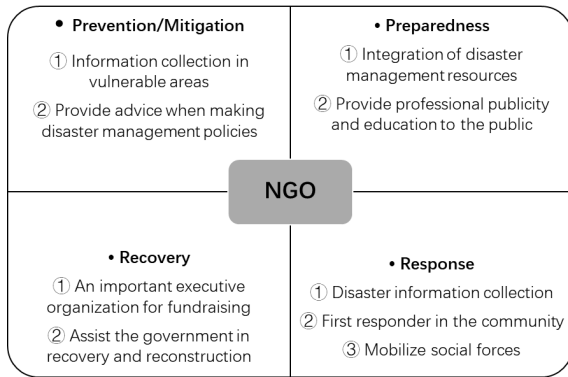


Figure 1. The role of NGOs in disaster management stages

4. NGOs and Resilience

The resilience originated from the Latin *resilio*, which initially began with the concept of mechanics. It is the recovery ability to store potential energy by deforming due to the action of force while the material is not cut or completely deformed. (Li & Zhang, 2018: 39). In the 1970s, resilience was introduced into the field of ecology by American ecologist Holling (Yuan & Zhao, 2016: 84). Since 2000, scholars in areas such as disastry, psychology, and sociology have also started to study resilience. The natural disaster resilience is an important part of the disaster environment research, and through qualitative and quantitative studies on various responses of the environment, economy, and human society after the disaster, the process of change of other victims after the disaster is analyzed. This provides a foundation for more effective prevention and recovery of disasters. (Wan, *et al.*, 2010: 22). Natural disaster resilience responds to disasters on the premise that long-term development will not be damaged when a complex system of social and ecological fusion (This system includes individuals, families, communities, cities, countries, etc.) is exposed to disasters, thereby protecting the lives, daily lives, and infrastructure of residents and recovering after disasters. This ability is persistent and constantly changing (Fei, *et al.*, 2014: 21). Natural disaster resilience is summarized

in one sentence to measure the ability of a system to withstand disasters and recover from disasters (Xie, *et al.*, 2017: 24).

Resilience has some effect on each stage of natural disasters. Traditional research has emphasized post-disaster resilience, but is now rapidly expanding into a broad concept of response, self-reliance, reconstruction, and post-disaster prevention (Kong, *et al.*, 2018: 2). In some areas, there are potential risk factors before disaster strikes, and certain vulnerabilities when humans face them. For example, in the event of a disaster, children, women, the elderly, the disabled and the poor are the most vulnerable in the social system. Because they have little physical resources and social capital, they are the most in need of help (Li, 2017: 15).

Also, the more vulnerable a region is, the more likely it is that the damage will be severe. However, resilience not only determines the actual damage, but can also have a positive impact on the next disaster. Since NGOs are more closely related to local residents, they can ensure that vulnerable groups are not neglected in disaster management. In short, the process of strengthening effective natural disaster resilience requires NGO participation.

5. NGOs and Governance

Governance theory started to happen in the 1990s, but its main contents consisted of three parts. First, it emphasized the diversification of social management capabilities. Second, the government's role has been redistributed. Third, the networking management system was proposed (Zhou, 2018: 180). The rapid development of NGOs and civil society challenges the government's excessive intervention, and actively participates in government-exclusive public services, making the government no longer the only subject of governance, but a part of a diverse governance network (Liu, 2019: 4-5).

From the perspective of Crisisonomy, individuals, organizations, and societies, when a crisis such as a natural disaster or a man-made disaster occurs, attempts to overcome it comprehensively at all levels. In many cases, efforts at the individual level are integrated at the organization level, and efforts at the social level are differentiated into organization level efforts (Lee, 2018: 344-345).

In disaster management, there is a deep interaction between government and NGOs. The government transfers public services to promote the participation of NGOs, and NGOs actually grow from participation, while the quality of government's public services improves, such as the development of NGOs, to promote reform of the government's public service supply system (Kang, 2010: 128). Participation in natural disaster governance by NGOs fills the void of government function. However, for China, the government is still the subject to solve social problems, and enterprises are an important capacity to solve the problems (Niu, 2019: 42). Therefore, in order to maximize the effectiveness of NGOs, it is necessary to participate in multi-disciplinary cooperation.

III. China's Disaster Management Process and NGO Participation

When reviewing the previous studies, most scholars in China now use the 2008 Wenchuan Earthquake as a starting point for research on NGOs' participation in disaster management. Since then, NGOs in China have been playing a unique role in organizing and participating in large scale in the disaster management process.

For example, many NGOs participated in major disasters such as the 2010 Yushu earthquake, the 2012 Beijing rainstorm, the 2013 Ya'an earthquake, the 2014 Ludian

earthquake, the 2016 Lishui landslide in, the 2016 Yancheng tornado attacks, the 2017 Jiuzhaigou earthquake, and the 2018 Shouguang flood. It has become an increasingly essential participatory activist. In this paper, we selected the cases of the participation of NGOs in the event of a flood in the 2008 earthquake of Wenchuan and flooding in Shouguang City, Shandong Province in 2018.

1. 2008 Great Earthquake in Wenchuan

On May 12, 2008, a massive earthquake of 8.0 Richter magnitude occurred in Wenchuan, Sichuan Province, at 14:28 (Beijing Time) (Baidu, 2019)⁴. The great earthquake in Wenchuan occurred simultaneously with the second disaster, such as landslides and collapses, and some cities and towns, such as Beichuan and Wenchuan, were almost in ruins (Yang, 2012: 21). After the earthquake, government agencies intervened promptly to conduct rescue activities, while about 300 NGOs, including Blue Sky Rescue, went to the earthquake-affected areas to help (Xiong, 2016: 14).

On May 13, 2008, the NGO Sichuan Joint Disaster Relief Office was launched with small NGOs such as the Panzhihua City East District Volunteer Association and created a spokesperson system for information disclosure and exchange. The disaster relief office created several departments during the Wenchuan Earthquake to provide services. Within a short time, a large amount of relief supplies were procured and transported to the disaster area. And when the support activities were over, the members of the NGO were waiting back to work (Li, 2019: 57). However, on the day of the establishment of the disaster relief office, there were only 16 full-time volunteers and 40 volunteers. When faced with a major disaster at the time, the cooperation system among NGOs in China was still insufficient, and organizational coordination and organizational mobilization were very limited.

4) Baidu Baike, <https://baike.baidu.com/>. (2019. 11. 09)

On May 14, 2008, Blue Sky Rescue also participated in rescue efforts. Blue Sky Rescue's volunteers helped to transport more than 50 million yuan of relief supplies to the disaster area, settled over 300,000 temporary accommodations and opened public emergency rescue routes (China Youth on Line, 2019)⁵). When Blue Sky Rescue arrived in the disaster area, however, there was a lack of professional rescue equipment, which forced him to rescue with simple tools. As a result, it seems that China's NGOs still had a big difference from the level of professional structure.

According to the Department of Civil Affairs of Sichuan Province, in 2008, most of NGO's organizational members worked in disaster areas such as Wenchuan and Beichuan in each sector. However, many of them pointed out that the status of many NGOs was not recognized by the government. However, NGOs that were not recognized even after the Great Earthquake occurred played an active role in the rescue operation. In particular, NGOs actively acted in the disaster recovery process, and participated in the recovery process through various methods such as building reconciliation and psychological counseling. <Table 4> shows the NGO's participation in the Wenchuan Earthquake.

Table 4. Participation of Chinese NGOs during the Wenchuan Earthquake

Stage	Disaster management stage	Content
2008.05.12. ~ 2008.06.12.	Response	Save lifes, resettlement victims, disaster evaluation and so on
2008.06.12. ~ Complete recovery	Recovery	Pacify the masses, assist the government in post-disaster reconstruction and so on

2. Flooding in Shouguang City, Shandong Province, 2018

In August 2018, Typhoon Rumbia brought heavy rains to Shouguang city in Shandong Province on the 18th and 19th, resulting in flood damage. Related agencies have decided to discharge water to downstream areas for the safety of dams in accordance with national regulations (Baidu, 2019).⁶ After the flood, Shandong Charity Federation coordinated and communicated with the provincial and municipal disaster relief headquarters and civil affairs departments, the city and county charity associations, and the county civil affairs bureau to promote the establishment of the Emergency Disaster Relief Collaboration Platform. Since then, the Emergency Disaster Relief Collaboration Platform has been in constant contact with several charitable funds, including the China Charity Alliance, One Foundation, and the Zhenro Foundation, and has established cooperative relationships to discuss the damage situation and cooperate with each other for rescue activities (Bai & Jia, 2019: 67). The emergency response phase continued for 16 days from August 21 to September 5. On November 6, 2018, the Shandong Charity Federation, the Shenzhen One Foundation Public Welfare Foundation, and the Shandong Social Innovation Development and Research Center signed a strategic partnership agreement between three parties in Shenzhen. Following the three NGOs' cooperation and rescue, they continued to cooperate in depth in areas such as disaster relief, child care and development, charity support and innovation (Social Work Weekly, 2018)⁷). After the flood disaster, NGOs in Shouguang City responded most quickly. For example, NGOs played an important role in stabilizing the order of the disaster, emotional stability of the victims, and

5) China Youth on Line, https://news.cyol.com/hdzt/2019-04/12/content_17987143.htm. (2019. 11. 09)

6) Baidu Baike, <https://baike.baidu.com/>. (2019. 11. 09)

7) Social Work Weekly, <https://www.socialworkweekly.cn/notice/277.html>. (2020. 06. 22)

Table 5. Participation of Chinese NGOs during the Shouguang Flood

Stage	Disaster management stage	Content
After disaster recovery	Prevention/Mitigation	NGO deepens disaster management cooperation with other entities
Before the disaster	Preparedness	NGOs integrated disaster relief materials in advance before the disaster
2018.08.21. ~ 2018.09.05.	Recovery	Monitor the efficiency of the public sector, Release disaster information in real time and so on
2018.09.05. ~ Complete Recovery	Response	Post-disaster psychological intervention for children, Improve environmental hygiene after disaster and so on

preventing the spread of epidemics. When the damage situation was relatively stable, NGOs visited the disaster area and conducted a disaster investigation study, which provided actual information to the government for social activities after the disaster. And while responding to the flood, NGOs monitored the government's disaster management sector through the Internet, and showed a lot of damage to the public through new media such as WeChat.

Although NGOs in China played an active role in the disaster management process, it can be seen that the participation time in the prevention and recovery phases is not long. <Table 5> shows NGO's participation activities related to the flood event in Shouguang City.

IV. Empirical Analysis

1. Set up analytical framework

According to the theory of resilience and governance in disaster management, this paper conducts a SWOT analysis of NGO participation in natural disasters in China, and based on the SWOT analysis, this paper further uses the AHP to objectively evaluate the development environment facing NGOs. Finally, it provides strategic measures for NGOs to participate in natural disaster

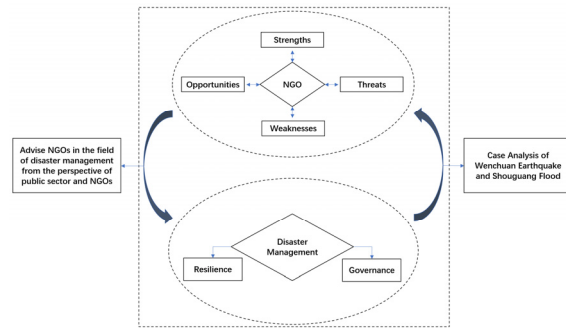


Figure 2. Analytical framework

management at the level of public sectors and NGOs. The specific analysis framework is shown in the <Figure 2>.

2. Measurement Elements and SWOT Model

In this study, through prior research reviews, case analysis, and expert interviews, the internal strengths and weaknesses of NGOs in China when participating in disaster management, and opportunities and threats from the external environment are found and summarized in SWOT analysis (<Table 6>). SWOT analysis is a list of strengths and weaknesses pointed to by analysis of the organization's resources and capabilities, and a list of threats and opportunities recognized by the analysis of the environment. Strategic logic clearly requires that future forms of action should be aligned with strengths and opportunities, and to avoid threats and seek to overcome weaknesses (Goh, 2009: 106). Based on this, it aims to grasp the relative importance of each component through AHP analysis for NGO experts and civil servants who are closely related to NGOs. Finally, it contributes to strengthening natural disaster resilience by providing strategic measures for NGOs in China to participate in disaster management.

Data collection was conducted for 18 days from May 01 to May 18, 2020, and surveyed through consignees and WeChat. 14 of the 20 questionnaires (collection rate 70%) were collected. The demographic and sociological characteristics of AHP survey subjects can be examined

Table 6. SWOT analysis of NGO in the process of disaster management

SWOT	SWOT Factors (Key words)	Reference
Strengths	S1: Simple organizational structure and management methods help to improve participation efficiency (Non-political) S2: Rooted at the grassroots level is conducive to meeting diversified needs (Non-governmental) S3: Organization members from different fields are conducive to professional activities (Professional) S4: Satisfying the public's needs for public welfare while saving the organization's operating costs (Public)	Lu (2013) Liang (2013) Jing (2015) Fang (2015) Wang (2015) Liu (2016) Lu (2017) Li (2017) Lin (2017) Wen & Kong (2018) Wang (2018) Li & Liu (2018) Chen, et. al. (2018) Wen & Gao (2019) Yu (2019)
Weaknesses	W1: Excessive reliance on the government limits organizational development (Independence) W2: Lack of cooperation mechanism between organizations results in lack of integration of resources (Cooperation Mechanism) W3: Lack of formal working mechanism will cause the lack of responsible subjects (Internal Management) W4: Insufficient full-time staff reserves and insufficient training of personnel (Human Resource)	
Opportunities	O1: Social self-government environment provides an atmosphere for people to participate in NGOs (Social self-government environment) O2: Increased social risks require the participation of multiple parties (Social Risk) O3: Transformation of government functions provides development space for NGOs (Government's Delegation of Power) O4: Development of globalization is conducive to international exchanges between NGOs (Development of Globalization)	
Threats	T1: Laws and policies remain at the macro level and cannot protect the rights of NGOs (Law and Policy) T2: Practical government support and insufficient public awareness (Social Support) T3: Organizational external information transparency and information sharing between organizations (Big Data) T4: Ecological environment leads to uncertainty and long-term nature of NGO participation (Complexity of Disaster Management)	

based on gender, final education, affiliation, and position (<Table 7>).

3. AHP Model and Analysis Results

The important analysis of this paper was based on the results of SWOT analysis, and implied 4 factors into 16 factors to run the yaahp 12.4 analysis tool group decision making method program to reach a reasonable conclusion through a scientific process. <Figure 3> shows the AHP

Table 7. Characteristics of AHP survey target

Category	No.
Gender	
Male	12
Female	2
Highest degree	
Bachelor's degree	12
Master's degree	2
Current working organization	
NGO	11
Government agency	2
Hospital	1
Position	
Director	6
Captain	5
Legal entity	1
Director-general	1
Doctor	1

model for NGO participation in disaster management. We tried to maximize the effect of selection and concentration by analyzing the priority of each factor among the strength, weakness, opportunity, and threat factors of the NGO participation environment, and analyzing the priority of the four factors.

As a result of AHP analysis of the upper layer (Criteria), the inconsistency ratio (IR) was found to be significant (0.0035). The relative importance among the SWOT group factors was analyzed in the order of 0.3203 for strengths, 0.3198 for opportunities, 0.2462 for threats, and 0.1137 for weaknesses. Among them, the internal strength and

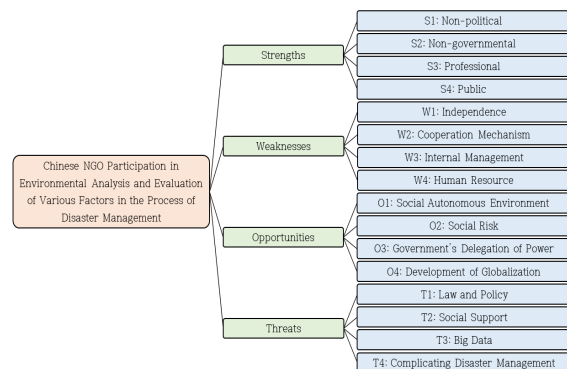


Figure 3. Structure of relative importance measuring model

external opportunities of NGOs showed relatively high importance in disaster management.

AHP analysis of sub-criteria was performed by four factors of the upper SWOT group. For strengths, the inconsistency ratio (IR) was 0.0155, which secured statistical significance. As for the relative importance of the four strengths, the expertise of the NGO (professional) was 0.4678, the highest relative importance, and the non-governmental was 0.2994, the public was 0.1749, and the non-political was 0.0578.

The inconsistency ratio of weaknesses was analyzed to be 0.0106. In the relative importance between weaknesses, the human resource problem of NGO was 0.4025, which was the most important factor. The internal management problem was analyzed in the order of 0.3390, the cooperation mechanism problem in the order of 0.1735, and the independence problem was analyzed as 0.0851, the lowest in relative importance.

The inconsistency ratio of opportunities was 0.0114, which ensured consistency of answers. The importance of each attribute was found to be the highest with social risk of 0.4294. The social autonomous environment was found to be 0.2681, the government's delegation of power was 0.1958, and the development of globalization was 0.1067.

The inconsistency ratio in the threats area is 0.0043, which is very good. As for the relative importance of each variable, social support was found to be the most threatening factor with 0.3362. Next, law and policy were analyzed in order of 0.3234, complicating disaster management in 0.2705, and big data, 0.0699, the lowest in relative importance.

In order to obtain a comprehensive ranking of factors for each group subject to evaluation, the relative importance of the items was synthesized. Based on the importance of layer 2, the importance of each sub-group was multiplied to derive the highest priority of factors for each group

Table 8. Environmental analysis results of Chinese NGOs participating in natural disaster management

SWOT		SWOT Factors				
Criteria	Priorities	Sub-criteria	Local priorities (rank)	Global priorities (rank)		
Strengths	0.3203	S1: Non-political	0.0578	4	0.0185	14
		S2: Non-governmental	0.2994	2	0.0959	3
		S3: Professional	0.4678	1	0.1498	1
		S4: Public	0.1749	3	0.0560	9
IR(Inconsistency Ratio): 0.0155						
Weaknesses	0.1137	W1: Independence	0.0851	4	0.0097	16
		W2: Cooperation mechanism	0.1735	3	0.0197	13
		W3: Internal management	0.3390	2	0.0386	11
		W4: Human resource	0.4025	1	0.0458	10
IR(Inconsistency Ratio): 0.0106						
Opportunities	0.3198	O1: Social autonomous environment	0.2681	2	0.0857	4
		O2: Social risk	0.4294	1	0.1373	2
		O3: Government's delegation of power	0.1958	3	0.0626	8
		O4: Development of globalization	0.1067	4	0.0341	12
IR(Inconsistency Ratio): 0.0114						
Threats	0.2462	T1: Law and policy	0.3234	2	0.0796	6
		T2: Social support	0.3362	1	0.0828	5
		T3: Big data	0.0699	4	0.0172	15
		T4: Complicating disaster management	0.2705	3	0.0666	7
IR(Inconsistency Ratio): 0.0043						

(Kim, *et al.*, 2008: 197). As a result of the analysis, the comprehensive importance was ranked from 1st to 4th by 2 attributes for each strength and opportunity factor of the SWOT group. In terms of strength, the professionalism of NGOs was 0.1498, the non-governmental was 0.0959, in terms of opportunity, the social risk was 0.1373, and the social autonomous was 0.0857 (<Table 8>).

4. Summary

Based on the actual status of Chinese NGOs participating in disaster management and the results of SWOT-AHP analysis, this paper considers that NGOs should focus on

SO strategies (active acceptance strategies of opportunity factors) in the disaster management process. It is to actively demonstrate the strengths of NGOs in the disaster management process and to take advantage of opportunities given in the external environment to demonstrate effective participation capabilities. In the process of participation, however, the weaknesses of the organization itself and threats from the external environment should not be ignored and should be avoided using external means. Therefore, this article suggested a strategic plan to strengthen the resilience of natural disasters in China through NGO participation by analyzing at the level of the public sector and NGOs. The public sector provides good conditions for NGOs' SO strategies by helping them overcome their weaknesses and threats. In the case of Chinese NGOs, the SO strategy makes full use of their strengths and takes advantage of external opportunities to maximize their participation.

First, it is a plan at the public sector level. The public sector should start with the weaknesses and threats of NGOs participating in disaster management. According to the SWOT-AHP analysis results, W4 (Human Resource Issues) and T2 (Social Support) are important factors that restrict NGOs from effectively participating in disaster management activities. Strategic measures can be divided into five as follows. ① The public sector must have a legal basis for NGOs to participate in the disaster management process by continuously supplementing laws and policies for NGOs. ② The public sector must not only supervise the NGO's personnel, capabilities, equipment, organizational management, etc., but also implement a review and evaluation system. ③ The public sector should attach importance to incentives for NGO participation and provide financial and equipment assistance to NGOs that are actively involved in the disaster

management process and perform well. ④ The public sector should improve public awareness of NGOs by disseminating to society that NGOs play an important role in the field of disaster management, and to participate in NGO activities with a large number of talents. ⑤ The public sector must communicate well with NGOs. And professional education and training should be provided to NGOs.

Second, it is an NGO-level plan. According to the SWOT-AHP analysis results, S3 (professionality) and O2 (social risk) are the decisive factors for NGOs to implement SO strategies. As NGOs, in order to seize the opportunity to participate in the disaster management process based on social risks, the expertise of NGOs must continue to be strengthened to be an important force in disaster management. The strategic plan can be divided into three as follows. ① Professional manpower is a very important condition for NGOs to improve their disaster management capabilities. NGOs in China should refer to experts to deliver rich disaster management experiences while maintaining long-term cooperation with sectors with advanced technologies such as emergency management, medical services, universities, and international NGOs. ② As social risks have increased, the traditional disaster management method has moved to governance of cooperation between different actors. Therefore, NGOs in China should form cooperative relationships with other actors based on their expertise. This allows NGOs to reintegrate resources as well as strengthen their disaster response capabilities. ③ In the disaster management process, NGOs should continue to pay attention to the vulnerable. It is arguably the vulnerable class that is most easily affected by social risk. However, NGOs can use their own given organizational goals to engage in professional activities for the vulnerable.

V. Conclusion

This paper proposed important roles in strengthening China's natural disaster resilience through the analysis of the current status of Chinese NGOs participating in disaster management. In this study, we conducted previous research review, case analysis, expert interview, and SWOT-AHP analysis. We analyzed the strengths, weaknesses, opportunities, and threats that NGOs face when participating in the disaster management process, and based on the results, we presented strategic measures for NGO participation.

China suffers a lot of damage every year from the effects of natural disasters. The Chinese government often lacks the ability to cope with increasingly complex natural disasters. The method of disaster management is also gradually moving toward governance, so actors other than the government must participate in the disaster management process cooperatively. After the Great Wenchuan Earthquake in 2008, Chinese NGOs are increasingly participating in natural disasters and playing a unique role. However, China's NGOs are late in their development, and the development environment is not mature, so several problems emerged in the process of participation.

In this paper, the relative importance of each component in the NGO participation environment was derived through empirical analysis. As a result, it was found that NGOs in the field of disaster management in China are at the stage of actively utilizing the organization's expertise (SO strategy) without missing opportunities for participation from social risks. Therefore, this paper suggested strategic measures for NGOs in the disaster management field at the public sector level and NGO level according to the SO strategy as follows; ① Laws and policies on NGOs should be supplemented; ② Supervision and auditing of NGOs should be strengthened; ③ Participation enthusiasm of NGOs should be emphasized; ④ Promotion of NGOs

should be strengthened; ⑤ Communication with NGOs should be strengthened; ⑥ NGOs must cultivate professional manpower through various channels; ⑦ NGOs must establish cooperative relationships with other actors, and ⑧ NGOs must continue to pay attention to the vulnerable.

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