

Training Programs for Risk Reduction of Typhoon Disaster Chains in Southeast Coastal Region of China

CHANG Sheng^{1,2}, WANG Jing-ai^{1,2*}, LEI Yong-deng^{1,2}

¹ School of Geography, Beijing Normal University, Beijing, P.R.China, 100875

² Key Laboratory of Regional Geography, Beijing Normal University, Beijing, P.R.China, 100875

Abstract: In the context of global climate change and rapid socio-economic development of China, the southeast coastal region is becoming the most developed area in China, carrying 16.97% of the total population and 24.64% of China's GDP with less than 5% of the total land territory. However, in the past decade, the southeast coastal region (including Guangdong, Hainan, Fujian, and Zhejiang provinces) suffered great disaster chains including rainstorm, flood, and landslide/debris flow which seriously threaten regional security. As an effective non-engineering measure, disaster mitigation education and training gained more and more attentions. Based on characteristics of the typhoon - flood - landslide/debris flows chains and theory of regional disaster system, two series of training programs for disaster reduction are developed, one is public-oriented program for regional background training according to the features of regional hazard-formative environment, hazards, hazard-affected bodies, and disaster cases. The other is a series of stakeholder-oriented training programs. The content of the program includes: teacher training program based on disaster risk reduction experience popularization and emergency drilling, and cultivation of campus safety culture; training of community disasters correspondents for their daily disaster information management; governmental staffs training contains understanding and exercise of emergency plans, and multi-sectors coordination; volunteer training focuses on emergency rescue knowledge and normalized volunteer services. This training program can be more practical and efficiency by integrating the above two training series. This research could help to improve the national system of disaster reduction training and risk governance. Public risk awareness and response capacity for disaster chains may also be strengthened through this training program to facilitate regional disaster risk reduction and sustainable

development.

Keywords: China, Typhoon disaster chains, Public-oriented, Stakeholder-oriented, Training programs for disaster risk reduction

1 Introduction

In the context of global climate change, the frequency of natural disasters, and the disaster-induced losses both show a rising trend^{[1][2]}. It seems that our human society has entered a period of high growth accompanied by high risk^{[3][4][5]}. In 2005, the hurricane Katrina caused serious storm surges and floods which greatly challenged current emergency management mechanism. The 2011 east Japan earthquake caused extensive tsunami, nuclear failure and other secondary disasters. In general, typhoon disaster chains are caused by strong winds, heavy rain, storm surge, and other secondary disasters such as landslides and debris flows induced by intensive rainfall. There is an urgency to transform our minds from short-term mitigation actions to long-term adaptations when coping with catastrophic disaster chains.

Natural disaster is one of the most uncertain factors which threaten socio-economic sustainable development. Disasters risk reduction has become the common challenges all around the world in the 21st century. As early as in 1960s, researchers began to pay attentions to the importance of disaster education and training in disaster prevention and reduction^[6]. In the late 1990s, the International Decade for Natural Disaster Reduction and the plan of "Hyogo Framework for Action" both attached importance to disaster education and training for disaster risk reduction^[7]. Under the framework of training programs at the community, national, regional and international level, the United Nations International Strategy for Disaster Reduction (UN/ISDR), the World Emergency Relief (WER), and other international disaster relief organizations have been established. Research on disaster risk education and training developed rapidly due to their efforts^{[8][9]}. As two pioneers of disaster management training, Kravitz and

*Corresponding author E-mail: jwang@bnu.edu.cn

This study was jointly supported by National Natural Science Foundation of China (No.41171402) and the State Key Development Program for Basic Research of China (973 project) (No.2012CB955403).

Pluso constructed a series of risk management training programs, including psychological, individual learning projects, leadership styles, and group problem-solving exercises^[10], which emphasizes emergency simulation and role-playing exercises, emergency drilling and evaluation^{[11] [12] [13]}. Keller raised the need for specific, detailed and timely update of disaster reduction training^{[14] [15]}. Specific standards are needed for disaster mitigation training to achieve the standardized implementing effect, and a scenario-based training method was suggested^{[16] [17] [18]}. Some researches of disaster mitigation training have been applied to the national emergency training programs^{[19] [20]}.

China suffered from great typhoon, floods and other catastrophes in the past decades. In recent years, in addition to the engineering projects, more and more attentions are paid to the non-engineering measures such as disaster risk education and training during disaster prevention and mitigation. However, compared with developed countries, China's disaster risk education and training still have a long way to go. Disaster training exploration of social resources and grass-roots communities is not enough. Disaster mitigation trainings especially for high disaster risk areas are insufficient. Confronted with the weaknesses of China's disaster reduction training mechanism, a training model was constructed in this paper for the sake of effectively adapting to the risk of disaster chains and achieving regional sustainable development. The training principles can be illustrated as "people-oriented, focusing on the most needed, fitting to the local conditions, emphasizing training quality evaluation, trying to apply knowledge to practice, and encouraging innovation during training". A series of innovative training methods will be carried out by reforming the training structure, enriching the training contents, and eventually improving the capabilities of regional disaster prevention and mitigation comprehensively. It may facilitate the national training system for disaster reduction and regional risk management.

2 An Overall Design of Training Programs

At the regional scale, the overall training framework for disaster prevention and preparedness relies on two bases, five actions, and two series of training programs (Fig.1). Based on current emergency management system, the training program aims to improve natural disaster risk management and emergency response capabilities, to strengthen the comprehensive disaster

mitigation and capacity-building, to improve disaster prevention both in urban and rural areas, and to enhance the capacity of natural disaster emergency response and reconstruction.

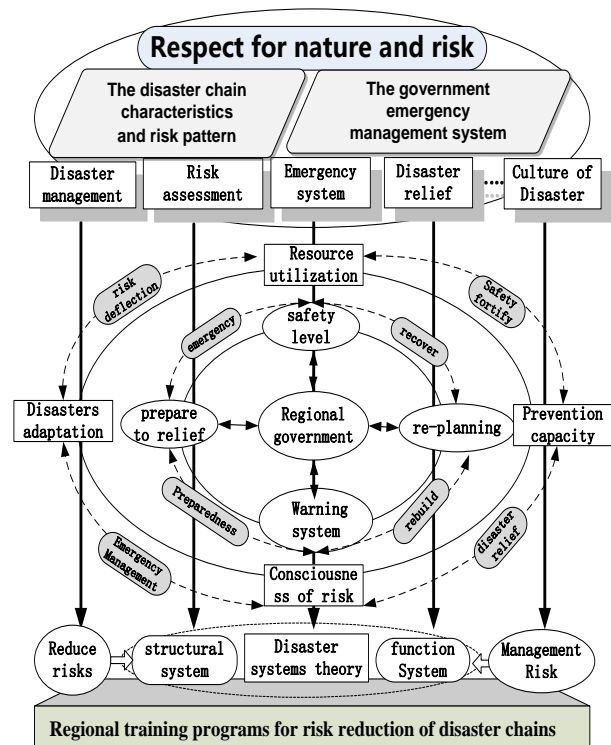


Fig.1 The overall framework of training programs

In time dimension, disaster plans can be divided as the periods of preparedness, emergency response, recovery, and reconstruction. In spatial dimension, based on the characteristics of typhoon disaster chain in China's southeast coastal region, the training aim is to build the space-time training models for disaster prevention and mitigation. Finally, two series of training programs of public-oriented and stakeholder-oriented for disaster reduction are constructed respectively.

3 Public-oriented Training Programs

The training program for the public is based on the theory of regional disaster system (Fig.2).

The training framework for the public consists of four components of hazard-formative environment, hazard, hazard-affected body, and typical disaster cases (Fig.2). The purpose of this program is to give the public a comprehensive understanding of disaster situations in their local region, and the chain effects of typhoon disasters that lead to disaster losses amplification.

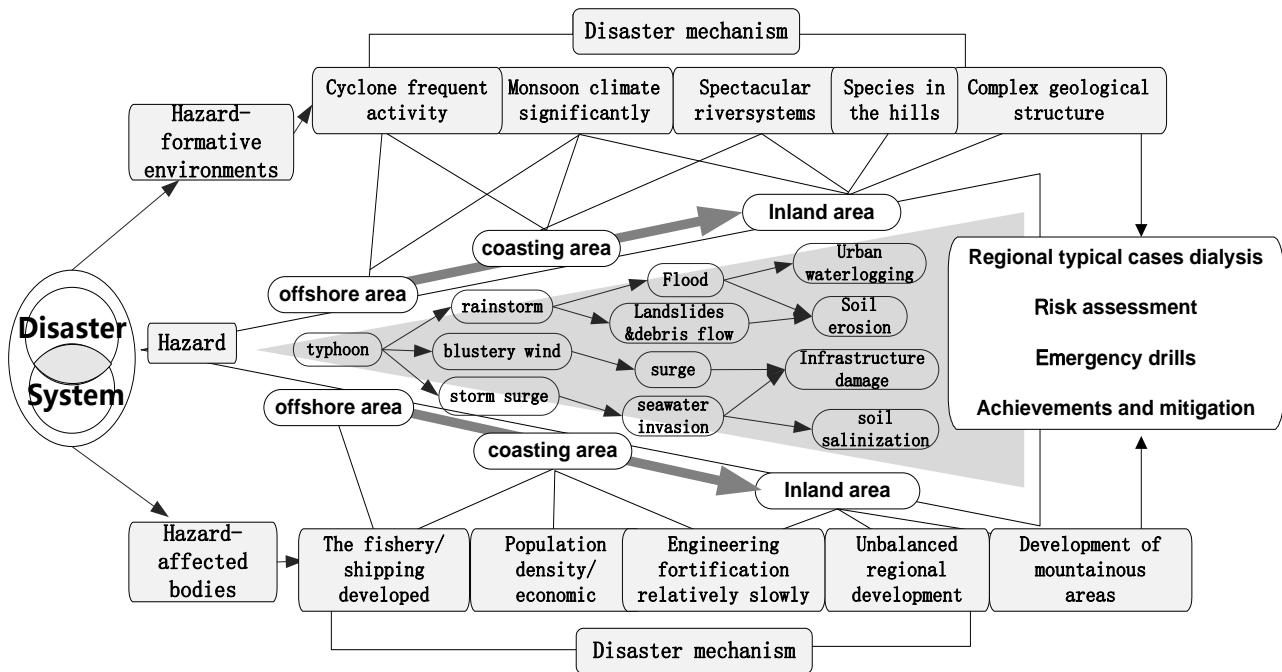


Fig.2 The training framework for the public based on the theory of disaster system

According to the regional characteristics and typical cases, using the printed wall map under an easy-to-read principle, the program aims to improve the ability of self-rescuing and mutual-rescuing for the public in disaster relief. At the same time, the related professional team should be organized through regularly simulated exercises for knowledge propaganda, which especially rely on emergency platform system for desktop drilling. According to the regional characteristics and typical cases, using the printed wall map under an easy-to-read principle, the program aims to improve the ability of self-rescuing and mutual-rescuing for the public in disaster relief. At the same time, the related professional team should be organized through regularly simulated exercises for knowledge propaganda, which especially rely on emergency platform system for desktop drilling.

Through the reflection of typical historic disaster cases, people's disaster risk awareness, disaster reduction knowledge, and basic emergency skills may be improved.

4. Stakeholder-oriented Training Programs

Risk governance to disaster chains needs inter-departments and multi-disciplinary cooperation and coordination. Based on China's current disaster management system, and draw lessons from the successful experience of developed countries, we put forward stakeholder-oriented training plan which covers the governmental staff, the community disaster correspondents, teachers, volunteers, media practitioners,

and medical staff, etc.). Therefore, the training groups can be divided into five categories: the disaster management personnel, the community disaster correspondents, teachers, volunteer team and some other vulnerable groups, which form a comprehensive training system (Fig.3).

Disaster management personnel undertake the mission of commanding and coordinating during emergency response, their performance directly related to the effectiveness of disaster mitigation. It is important to establish and perfect the multi-level and multi-department participation mechanism. It is necessary to build a system of information communication among different disaster management departments, and establish a cross-regional and multi-departments disaster information management system for scientific decision-making. The training for disaster management personnel aims to strengthen comprehensive prevention and defense capacity to natural disasters. It focuses on the organization of regional disaster emergency management and disaster risk management. Furthermore, the training for governmental staff needs to improve their effectiveness of emergency plan implementation, to drive all the related civil servants to participate in disaster emergency and relief work.

School education is a powerful way to disaster risk propaganda. It is important for students' ability cultivation with respect to disaster prevention and mitigation. Training for teachers aims to strengthen their ability of disaster science popularization and education. The training contents may include the prevention and mitigation knowledge for typhoon, flood, debris flow and

landslide disasters, to develop the students' awareness of disaster reduction and their abilities of self-rescuing. What's more, a good cultural atmosphere of disaster risk mitigation may be cultivated in campus. At the same time, an all-round consciousness education system of

"class-school-family" can be constructed in order to realize the goal of "by educating a student, to drive a family, and finally to raise the risk awareness of the whole society".

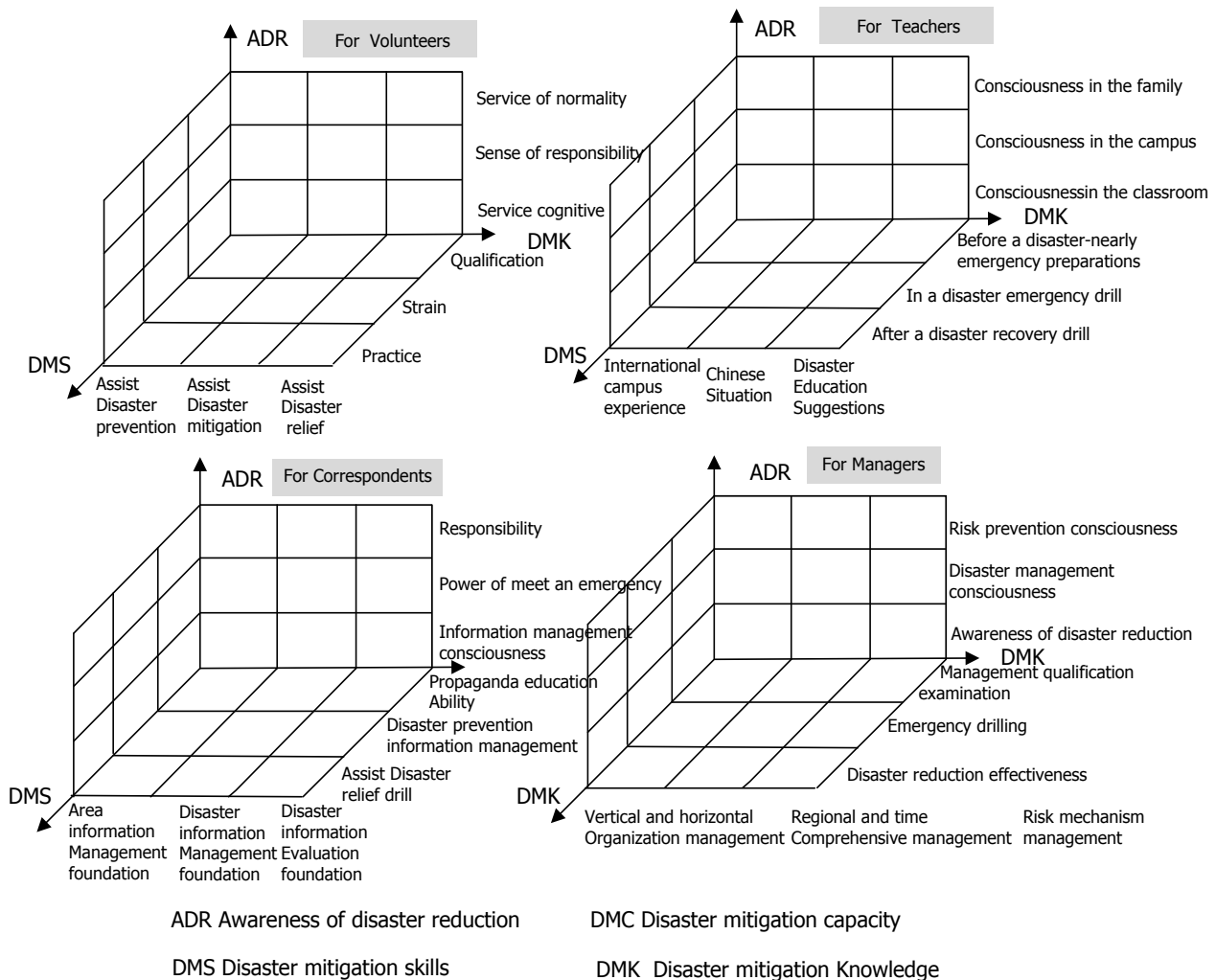


Fig.3 Framework of Stakeholder-oriented Training Programs

As a new force of disaster mitigation, volunteers shoulder the responsibility of assisting in disaster mitigation work of pre-in-post disasters. They often conduct extensive aids to the professional rescue team. So the volunteer training aims to strengthen the capacity of local voluntary works in order to build a professional volunteers team. The training contents include the psychological assistance and professional skills for self-helping during disasters. By training, volunteers may better assist communities' managers to collect and transfer the disaster information, help to maintain public order and to coordinate professional rescue teams to distribute relief items and so on.

The old citizens, the children, and the migrant workers are three vulnerable groups when exposed to disasters, so strengthening their disaster mitigation capacity is an effective way to reduce casualties. The

training facing vulnerable groups pay more attention to basic mitigation knowledge, skills, especially their psychological training, in order to facilitate their comprehensive knowledge and skills in prevention and mitigation work.

5 Conclusion

Based on current situation of China's disaster mitigation system, and learning from foreign advanced training experience, this paper constructs a regional disaster training framework especially for typhoon disaster chains, which makes the training process well-organized. By combining the popularity training for the public with the professional training, it can improve the training pertinence and effectiveness.

On the one hand, the training framework pays attention to the general education for the public and emphasizes the professional education to cultivate talents of disaster prevention and mitigation. On the other hand, it tries to combine disaster mitigation training with international ISO quality standards, and to introduce the new concepts of international disaster mitigation and advanced technology for disaster management. For a sustainable training exercise, the contents should be timely updated according to the new trend of regional disaster situation and socio-economic development.

The training programs in this paper emphasize the education of both knowledge learning and psychological modification in response to disasters. By considering the anxiety, panic, and other psychological symptoms confronted with disasters, our training strategy try to address their emotion regulation, and put the theory of disaster mitigation training into practice. This research could help to improve the national system of disaster reduction training and risk governance. The training programs may strengthen risk awareness and response capacity of the public to disaster chains, and eventually facilitate to integrative disaster risk governance and sustainable development.

References

- [1]CRED. Natural Disasters Trends [DB/OL] www.emdat.be/natural-disasters-trends. 2011-5-21.
- [2]UN/ISDR. Hyogo framework for 2005-2015: Building the resilience of the nations and communities to disasters [DB/OL]. 2012.
- [3]UNISDR. Global assessment report on disaster risk reduction. [EB/OL]. www.unisdr.org/publications .2008.
- [4]UNISDR. Global assessment report on disaster risk reduction. [EB/OL]. www.unisdr.org/publications. 2009.
- [5]UNISDR. Regional analysis on disaster risk reduction (DRR) education in the Asia Pacific region [DB/OL]. www.unisdr.org/files/12081_RegionalAnalysisonDRREducationinthe.pdf. 2009.
- [6]Wisner, Ben. Let Our Children Teach Us! A Review of the Role of Education and Knowledge in Disaster Risk Reduction. India: Books for Change. <http://www.unisdr.org/eng/partner-netw/knowledge-education/docs/Let-our-Children-Teach-Us.pdf>[EB/OL].2006).
- [7]UNISDR: Achieve the millennium development goals [EB/OL].2009.
- [8]Takahiro Tanaka, Daniel Benjamin Abramson, Yoshito Yamazaki. Using GIS in Community Design Charrettes: Lessons From A Japan–U.S. collaboration in Earthquake Recovery and Mitigation Planning for Kobe. *Habitat International*, 2009: 310–318.
- [9]Izadkhah Y O, and Hosseini M. Towards resilient communities in developing countries through education of children for disaster preparedness [J]. *Int. J. Emergency Management*, 2005, 2 (3):138–148.
- [10]Kravitz, J.H. and Pluso, R.G. (1986), “Crisis management training: preparing managers for emergency operations”, in Disbury, H.F. Jr (Ed.), *Challenges and Opportunities: From Now to 2001*, The World Future Society, Bethesda, MD.
- [11]Izadkhah, Y.O., Hosseini, M. (2007), “Disaster preparedness strategy through earthquake education and training of classified target groups”, paper presented at INDM Conference, Tehran, Iran.
- [12]Burton I, Kate R W, White G F. *The environment as hazard*. 2nd ed. New York: The Guilford Press, 1993.
- [13]Davis, I. and Wilkinson, D. (2004), “Workbook for the training of trainers courses to deliver crisis management courses”, Report, Mine Action and Disaster Management Centre, Cranfield University, Cranfield.
- [14]Laurent F.Carrel. Training civil servants for crisis management. *Journal of Contingencies and Crisis Management*, vol.8. 2000(4).
- [15]A..Keller, H.C.Wilson. *Disaster prevention planning and limitation: proceedings of the First conference*. England: TheBritishLibrary, 1990.
- [16]Mahmood Hosseini, Yasamin O. Izadkhah, (2010), "Training emergency managers for earthquake response: challenges and opportunities", *Disaster Prevention and Management*, Vol. 19 Iss: 2 pp. 185 – 198.
- [17]Alexander, D. (2003), “Towards the development of standards in emergency management training and education”, *Disaster Prevention and Management*, Vol. 12 No. 2, pp. 113-23.
- [18]Alexander, D. (2000), “Scenario methodology for teaching principles of emergency management”, *Disaster Prevention and Management*, Vol. 9 No. 2, pp. 89-97.
- [19]Barbat, A.H. (1996), Damage scenarios simulation for seismic risk assessment in urban zones, *Earthquake Spectra*, Vol. 12 No. 3, pp. 371-94.
- [20]Christine Becker. *Disaster Recovery: A Local Government Responsibility*. *Public Management*, 2009(3): 6-12.