香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
PPOL Division of Public Policy 公共政策學部
4th Issue
March 2023
Public Policy BULLETIN

Strengthening Climate Risk Governance in China:
Disaster Risk Management and Climate Change

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Key points

- China's climate risk governance relies heavily on the government sector and centers on conventional disaster prevention.
- A climate change adaptation framework that synthesizes the government, private sector, and community remains unfledged.
- This paper recommends integrating climate risk governance and climate change adaptation into national development strategies, developing a pluralistic disaster risk reduction system, and constructing climate-resilient smart cities.

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Policy Focus

China is among the countries most susceptible to climate risks. Climate risks emerge from interactions involving climate-related hazards, e.g., extreme weather events and gradually escalating environmental changes, with exposure and susceptibility of human and natural systems. Climate risks are systematic and influence all facets of the socio-economic system, requiring an integrated framework encompassing two policy areas. The first is climate risk governance, which can potentially reduce climate risk by incentivizing the behavior of human communities. The second is climate change adaptation, which moderates harm or takes advantage of climate change through adjustment. This bulletin, based on the findings of Qi et al. (2021), shows, however, that China's climate risk governance relies heavily on the government sector and centers on conventional disaster prevention and mitigation efforts. A climate change adaptation framework that synthesizes government, private sector, and community action remains unfledged. This bulletin recommends integrating climate risk governance and climate change adaptation into national development strategies, developing a pluralistic disaster risk-reduction system, and constructing climate-resilient smart cities.

Study Methodology

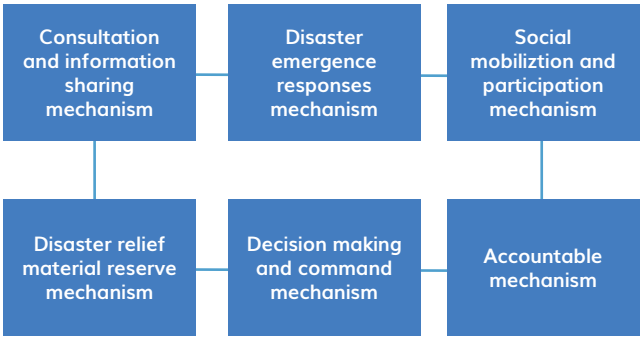
Qi et al. (2021) first examines the meteorological risk governance system and the climate change adaptation system at the national level by focusing on the related agencies' responsibilities, authority, and bureaucratic structures. Second, the paper analyzes climate risk management actions and the climate change adaptation system in China at the city level through three case studies: Beijing's flood in 2012, Zhengzhou's flood in 2021, and Qingdao's "policy bundling" model. Third, the paper offers policy recommendations based on these findings.

Findings and Analysis

Overview of China's climate risk governance system

China's climate risk governance framework was initially fragmented, lacking departmental coordination and interdepartmental collaboration. Nevertheless, in March 2018, the Ministry of Emergency Management (MEM) was established to consolidate the functions of emergency rescue, disaster prevention, disaster mitigation, and disaster relief that were previously scattered across many ministries. Moreover, China has developed an extensive operational framework to enhance inter-departmental communication and coordination. The operational framework has integrated six key mechanisms for tackling extreme meteorological and climatic events and managing disaster risks (see Figure 1). Table 2 summarizes the responsibilities of the core coordinating agencies for disaster risk governance.

Figure 1 Information Sharing and Decision Making in China



Despite remarkable progress, climate risk governance in China remains an emerging concept. The meteorological risk governance system for tackling sudden extreme weather, e.g., typhoons, rainstorms, and heatwaves, and the climate adaptation governance system for managing incremental risks, e.g., sea level rise and droughts, are not yet effectively integrated. Figure 2 diaplays a tree identifying the institutions involved in climate change adaptation. Public participation in risk reduction remains scarce because of insufficient public awareness of meteorological and climatic risk prevention.

Case Study: The 2012.7.21 flood in Beijing

The 2012.7.21 rainstorm in Beijing occurred between July 21 and July 22, 2012. Highways, subways, railways, civil aviation, and other modes of transportation were seriously obstructed. The Beijing Municipal Meteorological Bureau issued multiple early warnings of rainstorms and geological disasters to the public and relevant government units on July 20 and 21. The Flood Control Headquarters also on July 21 raised the flood control emergency response from Level IV to Level II. Heavy precipitation led to severe flooding, affecting 1,602,000 people and causing economic losses of 11.64 billion yuan as well as casualties.

After that 2012.7.21 rainstorm, Beijing reformed its meteorological warning and emergency response systems. For example, the revised Beijing Flood Control Emergency Plan stipulates that, when a red rainfall signal is issued, classes in schools and kindergartens must be suspended, and enterprises and institutions can adjust their schedules. Also, the Beijing Early Warning Information Distribution Center was established to ensure that risk information is communicated effectively and in a timely way. In addition, a special sub-headquarters for road traffic flood control has been created to ensure road safety by carrying out prevention measures and organizing rescue and repair work. The reform has substantially reduced the number of people affected and the economic damage caused by subsequent rainstorms in Beijing.

Case Study: The 2021.7.20 flood in Zhengzhou

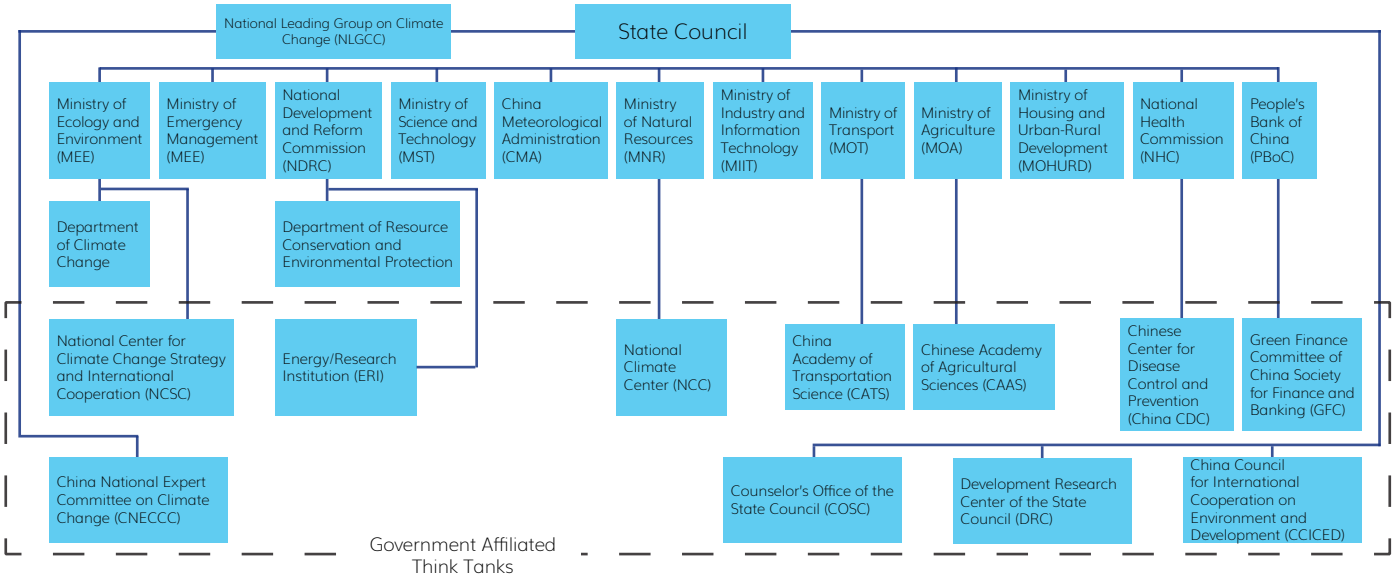
Heavy rain began falling in Zhengzhou on July 17, 2021, and gradually intensified into an extreme regional extreme torrential rain. The earliest weather forecasts regarding the 2021.7.20 rainstorm were delivered on July 17. The Zhengzhou Meteorological Station issued seven red rainstorm signals between July 19 and 21. The Zhengzhou Flood Control and Drought Relief Headquarters upgraded the flood control emergency response from Level IV to Level I on July 20. The deluge caused severe disruptions of power facilities, hospitals, and transportation. The catastrophic floods in the Zhengzhou Subway Line 5 and the Jingguang Road Tunnel led to serious casualties. The direct economic losses were more than 65 billion yuan.

The paper indicates several weaknesses in Zhengzhou city's risk governance system, including inadequate contingency plans for disaster scenarios, poor risk communication with the public, disconnections between meteorological warnings and the activation of emergency responses, limited collaborations between organizations (e.g., between subway companies and transportation authorities), and weak public participation in disaster risk prevention. Also, the unpreparedness revealed that Zhengzhou did not learn from the Beijing experience in

Table 1 Key Institutions for disaster risk governance

Institution	Key Responsibilities
National Committee for Disaster Reduction (NCDR)	• Formulate national guidelines, policies, and plans for disaster reduction • Coordinate major disaster reduction activities • Guide local governments in carrying out disaster reduction work • Promote international exchanges and cooperation in disaster reduction
National Headquarters for Flood and Drought Control (NHFDC)	• Formulate national policies and regulations for flood control and drought relief • Prepare flood control plans for large rivers and water transfer plans across jurisdictions • Keep abreast of national floods, droughts, and disasters, and organize the implementation of flood and drought relief measures • Unify the control and dispatch of water from water conservancy and hydropower facilities, manage floods, organize post-disaster disposal
Forest and Grassland Fire Prevention (NHFGFP)	• Guide the work of forest fire prevention and the fight against serious forest fires nationwide • Coordinate with relevant departments to solve problems in forest fire prevention • Review the implementation of policies, laws, and regulations on forest fire prevention in all regions and departments • Supervise the investigation and handling of forest fire cases and accountability and make decisions on forest fire prevention
Ministry of Emergency Management (MEM)	• Organize the overall national emergency plans and actions • Guide all regions and departments in responding to emergencies, promote the construction of emergency response plan systems, and organize drills • Clarify the division of responsibilities with relevant departments and localities, and establish a coordination and cooperation mechanism

Figure 2 Insitutions involved in climate change adaptation



2012.

Case Study: Climate change adaptation–Qingdao's "policy bundling" model

Qingdao nested climate change adaptation into its sponge city pilot program and low-carbon city pilot program in the last decade. The sponge city pilot in Qingdao started with renovating old communities and urban renewal but contributed to climate change adaptation through the synergistic impacts of water management and infrastructure renovation. On the other hand, the low-carbon city pilot program brought synergistic effects of decarbonization and climate change adaptation to the building of a sustainable and resilient city.

Qingdao's climate adaptation work relied mainly, however, on "policy bundling" that nested climate change adaptation into related policy categories, e.g., low-carbon city pilots and sponge city pilots, rather than on a systematic and targeted strategy. Relevant environment and ecology divisions focused predominantly on pollution control, followed by climate change mitigation. Very little effort has been expended on climate change adaptation becasue of the unsuccessful transfer of climate change adaptation functions from the development and reform commissions to the bureaus of ecology and environment.

Recommendations

As risks caused by climate change are systematic and will affect all facets of the socio-economic system, an integrated approach to risk management is necessary. This section offers policy recommendations.

Incorporating climate risk governance into national development strategies

Domestically, China could build a complete climate risk governance system by merging its disaster risk management and climate adaptation systems as well as by integrating key concepts and strategies into existing laws, plans, and policies for managing climate risk.

Internationally, China could contribute to climate change adaptation and disaster reduction by participating actively in international platforms, e.g., the United Nations Framework Convention on Climate Change (UNFCCC).

Developing a pluralistic disaster reduction system

China could establish an institutional mechanism for cooperation, coordination, and policy learning across sectors and regions, e.g., a multi-sectoral cooperation system led by government agencies that are responsible for emergency management, ecology, environment, and other relevant policy areas.

The country could ecourage partnerships between the public and private sectors as mechanisms for alternative funding, risk assessment, risk analysis, risk management, and risk transfer.

The mechanisms communicating risk information and releasing disaster information to the public could be strengthened to enhance citizens' awareness of and adaptability to climate risks and to guide the public to carry out self-rescue actions in disaster situations.

Building climate-resilient smart cities

The country could utilize emerging technology, e.g., big data and cloud computing, to conduct risk analysis and prediction. In addition, it is essential to improve the existing meteorological observation system, especially in underdeveloped and remote areas. It is also possible to enhance the agility of risk communication through decentralizing the early warning system using emerging technology.

Green Infrastructure (GI) consists of green open spaces that are interwoven with natural and artificial elements. Functions of GI include climate adaptation and disaster prevention and mitigation. China could synthesize GI and other sustainable programs, such as sponge city pilots, urban repair pilots, and ecological restoration.

Chinese cities could re-conceptualize design standards and specifications for buildings and develop integrated platforms, cloud computing service platforms, and eembedded controller systems in buildings to meet the needs of climate-resilient smart cities.

Reference

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