Invited ViewPoint

Flood risk governance: Establishing collaborative mechanism for integrated approach

Mikio Ishiwatari

The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa-shi, Chiba-ken 277-8563, Japan

ABSTRACT

It is widely recognized that an integrated approach is needed to reduce flood risks. Many countries are introducing adaptive and integrated systems of risk management in addition to conventional structural and engineering solutions. This paper aims at proposing approach of strengthening a flood risk governance, in particular, collaborative mechanism. The integrated approach involves a wide range of stakeholders of central and local governments, private sector, academia, local communities engaging in various sectors, such as water resources management, agriculture, forestry, housing, and urban planning. However, establishing a collaborative mechanism among these stakeholders is a challenge. The paper reviews recent studies in flood risk governance and examines practices in Japan. It was found that there is no one-fit-all model in flood risk governance. Local bodies on site, trust with stakeholders, and usage of local knowledge are key in strengthening collaborative mechanism.

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1. Introduction

Flood risk is increasing because of population increases, economic growth, and climate change throughout the world. Developing countries are especially vulnerable to the effects caused by climate change, because their economic, social, and environmental systems directly link to climate change [1]. This paper aims at proposing the approaches of strengthening a flood risk governance, in particular, collaborative mechanism among various organizations concerned. Many countries are introducing adaptive and integrated systems of risk management. The integrated approach involves a wide range of stakeholders of central and local governments, private sector, academia, civil society organizations, and local communities. This approach covers multiple areas of disaster risk reduction, water resources management, agriculture, forestry, housing, urban planning, etc. Establishing a collaborative mechanism among these stakeholders and sectors is a challenge. The paper reviews recent studies in flood risk governance to understand challenges and approaches, and compare these findings with practices in Japan.

2. Increasing flood risk

Recent studies project that flood risk will increase from several times to dozens of times. The population exposed to flood of 100-year return period would increase by 7 to 25 times in 2100 to the one in 2000 because of climate change [2]. Flood risk would increase in south and east Asia regions where population is increasing more rapidly than other regions. Flood risk in countries representing more than 70% of the global population and global gross domestic product would increase more than 500% in population and damage [3]. Arnell and Gosling [4] predict that some 450 million people would live in the areas of doubling flood frequency in 2050.

It is widely recognized that structural measures alone cannot manage increasing flood risk, although conventional structural measures, such as dykes and dams, continue to play a key role of mitigating damage. The integrated approach include land use regulation, infiltration and retarding
facilities in urban areas, non-structural measures, and emergency response in addition to structural measures [5–7]. A conventional flood risk management (FRM) approach, which has been developed based on mainly civil engineering, hydrology, and other related engineering, covers mainly engineering solutions including embankments, dykes, and dams.

More countries are beginning to promote adaptive and integrated systems of FRM [8–11]. Japan started promoting more basin response measures and non-structural measures to complement structural measures in the 2000s [12]. The EU Flood Risk Management Directive 2007/60/EC aims at an active involvement of interested parties in the setting up of FRM plans [13]. The United Kingdom is promoting “Strategic National Framework on Community Resilience” or the “Making Space for Water” programme. The policy of land use planning in England requires considering flood risks in planning process [14,15]. The Netherlands is taking the approach of “Room for the River” programme that expands flood discharge capacity and enhances land use management. Germany revised FRM approach following serious floods in 2003 to cover (1) retention of floodwater, (2) adapted use of flood-prone areas, and (3) response and recovery [16].

Countries and institutions concerned have developed the approaches of integrated water resources management, which has been promoted at the river basin level, for the last decades. Various sectors of water supply, energy, environment, irrigation, flood management, and others are managed in an integrated way by involving a wide range of stakeholders. This approach needs long-term commitment of building institutional capacities and memory [17].

3. Flood risk governance of promoting integrated approach

Becker [18] categorizes six boundaries in implementing an integrated approach: knowledge, practice, priority, scale, institutional histories, and language. Ineffective communication, fragmented responsibilities, and ‘siloed’ thinking are the barriers of collaboration among organizations concerned [19]. For example, China is promoting a sponge city initiative that manages urban water by absorbing and storing rainwater to decrease flood risk, improve water environment and develop water resources. The country faces difficulties in coordinating various organizations in Chinese bureaucratic system [20]. In the Netherlands, synchronizing multiple programs by different organizations is another issue [21]. In Cape Town, South Africa, four key constraints are identified: the domination of a technocratic approach, limited capacities, limited clarification of risk sharing, and political interest for short-term issues [22]. In the US, the politicization of flood management, engaging the public in activities, integrating engineering, law, and social sciences in research activities are challenges [23].

Since various organizations and stakeholders are involved in the integrated approach, governance must be strengthened to operationalize FRM with climate change adaptation measures [24,25]. Flood risk governance determines how flood risk is managed and the costs and benefits of flood management are distributed within society. It is related to the institutional and procedural dimension of resilience [23,26,27]. Francesch-Huidobro [28] suggests based on lessons from programs in Rotterdam and Hong Kong that adaptive FRM needs a consensual and integrated approach by linking and engaging different stakeholders.

There is no one-fit-all model for multi-level collaboration [29]. Also, there is relatively little consensus of the specific arrangements and mechanisms what actors should be involved in five countries: Australia, Canada, Italy, the Netherlands and Sweden, while all countries prefer strong government involvement [30]. Flood risk governance is changing by involving non-governmental actors of civil society and the private sector in decision-making process. Multiple processes help to engage local, regional and national actors at multiple levels [31]. England needs improving funding, combining FRM with spatial planning, promoting insurance, and improving communication with the public to strengthen flood risk governance [32].

Collaboration among various organizations requires (i) proactive policy entrepreneurs, (ii) bridging concepts of visions, water assessment plans and programs, (iii) clear rules of sharing responsibilities, and (iv) the provision of resources of financing and knowledge. Policy entrepreneurs lead collaboration at the local level, and most of them are local government organizations in European practices [33]. Local organizations function on the ground as trusted intermediaries that can support establishing adaptive governance by closing the gaps across levels of governance between communities, businesses, and governments.

Local knowledge contribute to building trust among stakeholders and organizations concerned [31]. Rotterdam case shows that local conditions need to be considered to link different organizations and establish collaborative mechanisms [28]. Intermediaries manage boundaries so that multiple organizations can communicate effectively to implement FRM. The Yorkshire Dales Rivers Trust used intermediary process to implement an integrated approach by involving citizens and local communities in northeast England [18].

Since the methods of establishing integrated FRM has not been established, organizations concerned need to learn flood risk governance. Social learning, which occurs through interactions between actors within social networks and changes understanding within wider societal units, is crucial in transforming risk governance [34]. Practices in the Netherlands and UK show that social learning support collaborative planning [19,35]. Informal learning and actor networks are important and need to be connected with formal policy processes for effective social learning [36]. However, sectoral specialization often becomes a barrier for learning technical innovation and policy that goes beyond the dominant paradigm [37].

Tools and practical approaches have been developed. The “risk governance assessment tool” aims at evaluating risk management performance, and the “social milieu approach” aims at gaining a picture of people involved [27]. “Fit-for-purpose governance framework” is used to evaluate the effectiveness of urban water governance [38].

4. Case in Japan: comparing with practices in other countries

Flood risk Governance in Tsurumigawa river basin in the Tokyo Metropolitan Region, Japan can be regarded as a best practice [39]. Flood disaster became more serious in urban areas in Tokyo and neighboring areas because of urbanization during high economic growth from the 1950s. Since concerned organizations collaborated promoting integrated FRM, the number of inundated houses decreased some 20,000 in the 1950s and 60s to less than 200 in the 1980s in the Tsurumigawa River basin [8,40]. The several areas contributed to strengthening flood risk governance [41]. This section examines these areas by comparing with other countries’ findings mentioned above.

The field office of the national ministry responsible for FRM led in collaboration among a wide range of organizations by establishing a river
bassin committee in the Tsurumigawa River basin in the 1970s. This office is at a good position to collaborate with local leaders, local communities, local government offices, and civil society organizations on the ground (Fig. 1). This is consistent with the findings in other countries that organizations at the local level play important roles in establishing flood risk governance. The national government office played a leading role in Japan, while mainly local governments take this role in other countries. It is important that offices are located on the site to promote an integrated FRM approach, regardless of whether they belong to national or local governments.

Trust and local knowledge were important in strengthening governance in Japan as well. Staff of the office created mutual trusts with the local communities and local government offices. Government engineers have high sense of ethics and responsibility to the public. They used local knowledge and understood needs of local communities. Thus, they could effectively collaborate with other stakeholders based on trust. The office could use science and engineering knowledge by mobilizing academic experts. The office had established a long-term relationship with the experts and researchers through exchanging views on technical issues of river basin.

The personal rotation system of the national ministry between field offices and the Headquarters in Tokyo contributed to strengthening staff’s knowledge. Staff could obtain knowledge of FRM by learning from experience throughout the country when they worked at the Headquarters. They use such knowledge on the ground when they were transferred to the field offices.

5. Conclusion

Literature review shows that there is no one-fit-all model in flood risk governance. From experiences across the world, it was found that local bodies on site, trust with stakeholders, and usage of local knowledge are key in strengthening collaborative mechanism. This is consistence with lessons from the Japanese practice of Tsurumigawa River basin. Integrated approaches are becoming more important as a climate changes, further studies are expected to develop the approaches of strengthening flood risk governance.

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