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Research Article

# Interaction between formal and informal actors in the shadow of policymaking: Case studies of community-based urban pluvial flood risk management in Pearl River Delta cities

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ABSTRACT

Policymakers increasingly integrate urban pluvial flood risk management into multiple strategies, acknowledging that local contexts and the actors involved are crucial. However, the literature on the decision-making processes of community-based pluvial flood risk management sheds little light on how local formal and informal actors relate to each other. This paper contributes to filling this research gap by exploring the interdependency between local authorities and community residents from a multilevel governance perspective. Two cases, based in Pearl River Delta Cities, are analysed to explore actors' interactions locally in the Chinese *Sponge City Program*, a national programme for urban pluvial flood risk management. The comparative study of the two cases leads to four conclusions. First, the *Sponge City Program* at the local level can be viewed as multilevel governance. Second, triggered by the goal set by the national government and the local contexts, local authorities see the benefit of locally integrating the *Sponge City Program* into an integrated and area-specific plan, emphasizing the importance of institutional assertiveness. Third, tensions and synergies exist in the interaction process between local authorities and residents that will have to be recognized and embraced and, where necessary, converted from constraining to enabling factors. Fourth, institutional barriers still dominate locally in the *Sponge City Program* because of a lack of support for cross-boundary cooperation and public participation. To span these boundaries, policymakers should be more open to changing the perspective from 'planning for people' to 'planning with people'.

## 1. Introduction

In recent decades, the interest in urban pluvial flood risk management in cities has increased worldwide due to the threat of climate change and the impacts of urbanization (Mabrouk et al., 2023; Zheng & Huang, 2023). In addressing urban pluvial flooding, different countries adopt various management strategies characterized by a formal government-led, an informal, individualized, flood responsibility or a mix of both. Despite these differences in flood responsibility, these countries show similar developments in terms of flood policymaking. A shift from a generic national strategy with coordinated governments to a locally communicative and integrated approach involving multiple actors can be observed (Driessen et al., 2018; Edelenbos et al., 2017). This shift often provides challenges

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for local practice, such as increasing the pressure on already stretched municipality budgets (Alexander et al., 2016), and difficulties in building consensus among the actors involved (Francesch-Huidobro et al., 2017).

Over the past 40 years, flood risk management in China can be characterized as a formal, government-led response under a top-down policy. This flood policy development has been influenced by spatial planning that foresaw rapid urbanization (Zheng & Huang, 2023). Given the rapid urbanization, spatial planning adopted a highly rational centralized approach with efficient tools for large-scale policy programmes. This centralized approach to flood risk management has been effective in mitigating fluvial and coastal floods. However, analysis of the period from 2008 to 2010 by China's Ministry of Housing and Urban Rural Development (MoHURD) concluded that 62% of the 351 cities surveyed experienced severe urban flooding (Duan et al., 2016). There is an increase in urban flooding, which is less easy to combat with generic measures (Mercier, 2023). As a result, the top-down approach increasingly collides with a complex local context in solving flooding in the urban delta area (Chan et al., 2018, 2021).

To cope with the evolving contextual specificities and complexities of urban pluvial flooding, policy making is partly supplemented by integrated strategies at the local level (Meng et al., 2022). In 2013, the Chinese national government proposed the *Sponge City Program* as a strategy to mitigate the urban pluvial flood risks. Similar to the water management strategies such as *Sustainable Urban Drainage Systems* (SUDS) in the UK, *Low Impact Development* (LID) in New Zealand, *Water Sensitive Urban Design* (WSUD) in Australia, *Green infrastructure* (GI) and *Best Management Practices* (BMPs) in the US, the *Sponge City Program* in China aimed to improve the urban or community's resilience (Avazpour et al., 2023; Yin et al., 2021). This initiative diverges from the traditional use of grey infrastructure, which strongly relies on expanding underground sewage capacity. Instead, it emphasizes non-structural measures such as replacing the pavement with material that absorbs water, installing green roofs or placing a water reservoir in a garden, intended to create buffering capacity and to separate rainwater from sewage (Dai et al., 2018). These above-ground solutions are anticipated to improve urban permeability, retention, storage, purification and drainage systems to recycle approximately 70% of stormwater in urban areas (Nguyen et al., 2019). Additionally, the national government placed the *Sponge City Program* on local authorities' agendas, requiring 20% of a city's urban areas to fulfil the programme's requirement by 2020, and 80% by 2030 (State Council, 2015).

Although the *Sponge City Program* is promoted nationally, local circumstances play a role. For example, the selection of program pilots considers cities' contextual differences (e.g. geography, climate, urban scale). Flood responsibilities are integrated into different local sectors (e.g. planning, landscape, transport.) (State Council, 2015). Apart from the local practices in the pilot cases and the following formal institutional environment build up for policy integration, citizens often team up as local collectives that are increasingly taking action in their community (Francesch-Huidobro et al., 2017). However, what is not addressed is a formal institutional design that acknowledges the possibility of bringing local authorities and local collectives together (Dai et al., 2018; Zevenbergen et al., 2018). Potentially, combining expert knowledge and local knowledge, and the idea of both taking responsibility could be of value, although such a design process can also create tensions during the interaction between local governments and local collectives (Jiang et al., 2018).

Studies to date on the *Sponge City Program* are limited to city-level policies (e.g. Qi et al., 2021; Wang et al., 2022), and are often no more than technical discussions (Li et al., 2016; Zheng & Huang, 2023). What has not yet been addressed is an institutional perspective on the microlevel *Sponge City Program*, and an exploration of how national top-down policy and bottom-up local collectives, and their interdependencies with local authorities, trigger local authorities to develop integrated area-specific strategies (Zevenbergen et al., 2018). This paper adopts an institutional perspective characterized by three crucial aspects. First, the *institutional structure*, i.e. the multilevel structure that conditions the interdependency between actors in the decision-making process; second, the *institutional function*, i.e. the way formal and informal actors function to achieve synergy between the formal and informal worlds; and, third, the *institutional conditions*, i.e. components that enable or constrain actors' interactions in the decision-making process. This leads to two research questions:

- Q1: What institutional roles do actors adopt in community-based urban flood risk management (see Section 2)?
- Q2: What constraining and enabling factors are there in the interaction between formal and informal actors involved in community-based flood risk management (see Sections 3 and 4)?

This research aims to address the need to recognize interdependencies between actors in urban pluvial flood risk management and the link with specific local circumstances. In Northwestern Europe, this interdependency has been recognized and embraced. Local informed and committed actors (e.g. non-governmental organizations, community groups and citizens) are increasingly involved in decision-making in local collectives that take responsibility for their communities (Forrest et al., 2021). The way in which this is done cannot directly be transferred to a Chinese context, but it can be a source of inspiration for how China and those countries, characterized by a strong top-down policy system, a lack of flood policy or a water management system that is yet inadequate, can deal with local flood situations in a more integrated way involving multiple actors. This study takes the Northwestern European perspective as a reference to reflect on the potential of recent developments in the *Sponge City Program*, in the expectation of contributing to the theory and practice of flood risk management.

Section 2 starts by defining local situations with a great diversity of actors and their interests as 'very complex', a condition in which we consider it to be beneficial for the formal and informal worlds to meet to cope with urban pluvial flood risk management. Next, it explains where the formal and the informal meet, requiring a multilevel perspective. Adopting a multilevel perspective, this section then models formal and informal actors' behaviours in integrated planning, shared governance and self-regulation, ending with an argument for recognizing their interdependencies and the enabling and constraining components in the actors' interaction process. We select two community-level cases within the *Sponge City Program* and carry out a qualitative comparative study.

Section 3 summarizes three phases of the ongoing *Sponge City Program*. It also highlights that treating urban pluvial flooding as a

generic problem has proven insufficient to fulfil the recent national government's focus on the community-level in the *Sponge City Program*. Section 4 compares and discusses the *institutional structure* that conditions interdependency in a multilevel structure; the *institutional functions* that actors fulfil within integrated planning, shared governance and self-regulation to achieve synergy between the formal and informal worlds; and the *institutional conditions* that enable or constrain interactions between local authorities and local collectives. In concluding, Sections 5 and 6 reflect on the *Sponge City Program* where we argue for a shift in perspective from 'planning for people' to 'planning with people' in very complex local situations.

## 2. Theoretical framework: a multilevel governance perspective in very complex situations

### 2.1. Defining the 'very complex situation' of flood risk management

Generic flood risk management often reflects top-down linear trajectories with tasks and goals distributed from the national government to local authorities (Zevenbergen et al., 2018). At the local level, community-based urban pluvial flood risk management often relates to a decision-making process in which informal actors (e.g. citizens, societal groups) interact with, or are supported by, formal actors (e.g. local authorities) with the purpose of better understanding and reducing their neighbourhood's pluvial flood risks (Mees et al., 2016). Therefore, rather than a generic government setting, community-based urban pluvial flood risk management involves a context-specific reality and non-linear trajectories that also include responsibilities taken by informal actors. The tension between generic top-down policy and the demand for local-level context-specific strategies is the starting point for this research's analysis of community-based urban pluvial flood risk management. To better position this tension in current academic debates on urban planning, this paper defines community-based urban pluvial flood risk management as a 'very complex' situation. 'Very complex' issues are already well-known in urban planning and discussions are often grounded in contingency theory (Lawrence & Lorsch, 1967; Woodward, 1958) and complexity science (Ackoff, 1974; Christensen, 1985; De Roo, 2003, 2018). In this research, the 'very complex' nature of community-based urban pluvial flood risk management reflects situations that involve considerable uncertainty due to non-linear relationships. Specifically, this uncertainty is not only due to possible urban pluvial flooding, but also due to divergent interests among the formal and informal actors, including their multilevel interdependencies and the strong interdependence with other issues that might seem minor however are very relevant to local actors, such as the shortage of parking bays and the demand for more leisure facilities.

### 2.2. Formal and informal worlds

This research considers the formal world to be the formal decision-making processes within governments. In particular, this research looks into the decision-making processes at the local level where the national government steps back. The informal world refers to the world outside the governmental domain where collectives take bottom-up actions and initiatives to self-realize their wishes and desires (De Roo & Perrone, 2020). This differentiation between the formal and informal worlds reflects two narratives in the literature on urban pluvial flood risk management: 1) the traditional institutional setting responding to flood hazards as a top-down structure from national, regional and urban levels down to the community level. Usually, local authorities, such as municipalities, district or neighbourhood authorities, bear the responsibility for managing pluvial flood risk, often following directives from higher governmental bodies (e.g. Dąbrowski et al., 2021; Francesch-Huidobro et al., 2017); and 2) local flood risk management with an area-specific design that arises from the collective behaviour of local actors rather than sole direct control of local authorities (Newig et al., 2023; Thaler & Levin-Keitel, 2016). For example, citizens are increasingly involved by local authorities in mitigating pluvial flood risks by capturing rainwater on private property, or finding 'smart' solutions that go beyond preventing flooding because these also have a positive effect on other issues, including the quality of the daily environment (Mees et al., 2019). According to the literature, there is an increasing discussion that specifically focuses on the ways that local authorities and local collectives can work together, such as through hierarchical, incentivized and deliberative co-productions (Mees et al., 2016). What has not yet been addressed is the process of interdependence: residents and municipalities who see that they need each other and are willing to take mutual responsibility to work together and take collective action in solving urban floods, often following an area-specific, integrated and collaborative approach.

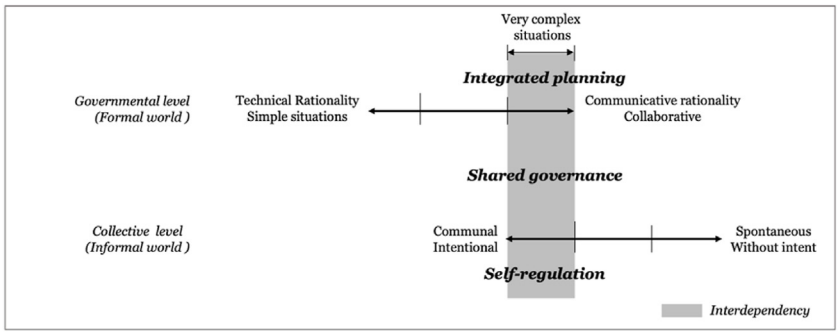


**Fig. 1.** An interdependent multilevel governance perspective (source: adapted from De Roo & Perrone, 2020).

### 2.3. A multilevel perspective

The way the formal and informal worlds come together can be pictured from a multilevel perspective (De Roo & Perrone, 2020) (Fig. 1). The extent of this multilevel perspective however depends on the governance context visible in different countries, socio-economic and institutional differences, the character of floods, the uncertainties of local flooding situations etc. (Driessen et al., 2018; Suykens et al., 2019). Overall, the multi-levelness in flood responsibility can be seen from three perspectives: 1) an *individualized responsibility* (e.g. United States, UK); 2) a *strong role of national government* (e.g. China); and 3) *local governments are open to cooperation with local collectives* (e.g. Northwestern Europe). These three perspectives are underpinned by planning theory.

In the 1950s and 1960s in Northwestern Europe, planning issues were primarily solved by the government through technical planning (Fig. 1). A 'communicative turn' was made in planning theory during the 1990s after severe criticism of the technical-rational approach, e.g. for relying on expertise, neglecting the role of dialogue, and failing to integrate substantive issues with their relevant local context (De Roo et al., 2012). Communicative approaches emphasize the importance of local contexts such as local knowledge and local interests that come to the surface during actors' intersubjective interaction processes (Innes & Booher, 1999). Consequently, to resolve complex urban pluvial flood risks, local authorities are advised to consider the local context in an area-specific approach (De Roo, 2003), which is about a tailor-made approach and participation within a communicative planning perspective. In urban pluvial flood risk management in Northwestern Europe, there is increasing cooperation between formal and informal actors, although the application of communicative planning remains limited. Technical planning is still dominant in most countries (Mees et al., 2019). Nevertheless, there are lessons to be learned from the 'communicative turn' of Northwestern Europe and how its communicative planning context could be integrated into Chinese local urban pluvial flood risk management to develop area-specific strategies.

An area-specific approach involving the local context is viewed as 'integrated planning' in the formal world (Fig. 1). Here, to mitigate local flood risks, policy sectors work together in various ways depending on the different measures required to combat flooding (e.g., land use, transport, urban planning, water) (Uittenbroek et al., 2014). In China, area-specific planning has emerged as an integral policy strategy to achieve environmental ambitions, e.g. energy transitions (Wu et al., 2022) and carbon neutrality (Liu et al., 2022). However, policy integration is hampered by the fact that different sectors often lack a shared understanding of the issues at hand due to adherence to technically oriented paradigms (Chan et al., 2018), the vagueness of governance arrangements (Meng et al., 201) and insufficient inter-sector interaction within a hierarchical structure (Jiang et al., 2018). Consequently, integrated planning remains a challenge in Chinese urban pluvial flood risk management (Zevenbergen et al., 2018). For example, researchers have observed considerable knowledge gaps and a lack of active interaction regarding finance, design standards and institutional coordination across bureaus in sustaining a *Sponge City Program* (Qi et al., 2021). The Sponge Office, the project office consisting of representatives from various municipal or district departments and policy sectors that directs the integration process (e.g. the bureaus of water, urban planning, housing), has been promoted as the coordinator in the integration of the local *Sponge City Program*. However, in the longer term, there is a desire to integrate flood risk management more deeply into spatial planning, and to make it part of a broader neighbourhood perspective, as relying solely on the infrastructure built under the *Sponge City Program* is not always sufficient to minimize the urban flood risk (Meng et al., 2022; Qi et al., 2021).

Integrated, area-specific approaches often involve participation by local collectives from the informal world (Fig. 1). In recent decades, collectives in Northwestern Europe stood up in response to the withdrawal of the government from local affairs and residents' desires to take responsibility for their own communities (Iveson, 2013; Zuidema & De Roo, 2015). These collectives (such as Community Flood Protection Groups) are often composed of educated and knowledgeable residents who organize individuals to step into spheres where the authorities are retreating or absent (Forrest et al., 2021).

The involvement of local collectives leads to another form of governmental intervention, namely 'shared governance' between the governmental and collective levels (De Roo, 2003; Horlings, Roep, & Wellbrock, 2018) (Fig. 1). Shared governance in local urban pluvial flood risk management often occurs when local authorities work as facilitators to embrace the potential of collectives' local flood knowledge and social capital (Seebauer et al., 2019; De Roo & Perrone, 2020). Shared governance in China is often interpreted as collaborative governance between governments and experts, and the social capital provided by citizens. The difference is somewhat subtle, however in urban pluvial flood risk management in China, both the national government and local authorities play a significant role, while civil society is often viewed merely as the recipient (Dai et al., 2018). Nevertheless, residents' diverging interests regarding governmental plans, or tensions resulting from land ownership, have triggered local authorities to cooperate with local collectives (Francesch-Huidobro et al., 2017). This leads to a dilemma when it comes to shared governance in China since the local context and local collectives are not yet recognized or appreciated in the top-down governance setting (Hu et al., 2013). However, local authorities and local collectives will have to reach out to each other in very complex situations in order to benefit from each other in tackling urban pluvial flooding.

Within the local collectives of the informal world, actors' intentional behaviour is often seen as 'self-regulation', in which local collectives set up self-regulating rules to build on their ideas (Fig. 1) (De Roo & Perrone, 2020). Self-regulation in Northwestern Europe often builds on the 'wisdom of the crowds' when residents team up as collectives to develop their plans using their resources and capacities such as media attention, network relations and finance (Edelenbos et al., 2017). This process is characterized by a high degree of freedom (Kjaer & Kooiman, 2003) or collective preference (Rauws, 2016) in shaping the community. In contrast, self-regulation in China as a collective action is often triggered, enabled or constrained by a government's framework. Here, the authorities tend not to notice the benefit of self-regulating behaviours in the decision-making process, and instead tend to slowly take over the local collective's actions (Zhang et al., 2020). Less involved in decision-making, the interests of informal actors are then ignored by the local authorities, leading to tensions because of the inconsistent interests (Francesch-Huidobro et al., 2017). This despite the fact that triggers for residents' self-regulatory behaviours are there in urban pluvial flood risk management stemming from a range of interests such as solving

flooding issues, improving the daily environment, and wanting more leisure and sporting facilities (Qi et al., 2021). Therefore, if local authorities want to solve complex urban pluvial flood issues in the *Sponge City Program*, they should consider not only urban pluvial flooding as such but also informal actors' self-regulatory behaviours and interests.

To summarize, the current situation allows for a recognition of multi-levelness involving both local authorities and local collectives in China. This multi-levelness implies that the very complex situation of urban pluvial flood risk management is strongly intertwined with other issues relevant to locally involved actors with multiple interests. This research seeks to answer the question as to whether this multilevel governance could bridge the gap between the formal and informal world of flood-related measures and exploit the existing interdependencies. Specifically, given their coordinative link with the national authority based on the distribution of responsibility, could local authorities combine their integral plan with the ideas, interests and wishes of local collectives in support of collaborative action? The next step is to discuss this interdependency and the components that facilitate or constrain a multilevel governance process.

### 2.4. Analytical framework: interdependencies and multilevel governance

The interdependence between the levels of decision-making on flooding differs enormously: a) in the coordinative line of government there is usually a unilateral power relationship, which often runs top-down; b) at the local level, municipal departments structured around a central theme are stronger than temporary partnerships that focus on integral themes - including flooding; c) at the neighbourhood level, the complexity of the situation largely determines the way in which local government and community-based collectives relate to each other, in simple situations a unilateral relationship at implementation by the authorities, in very complex situations a reciprocal relationship between the authorities and local collectives that is both strategic and meant to strengthen implementation (Ward et al., 2013). The *Sponge City Program* shows a strong interdependence between national, provincial and municipal governments due to tight coordination. At the neighbourhood level, interdependence between the authorities and local stakeholders can potentially be addressed, but this is not self-evident, and is still easily overlooked (Qi et al., 2021; Zevenbergen et al., 2018).

However, the interdependencies outlined above are fluid. Multilevel governance is intended to achieve synergy, but can also stumble over barriers. Integration should lead to synergy with strong cross-links between different policy fields, but this can just as well become secondary to departmental interests, which can easily erode the urgency around the theme of flooding (Chan et al., 2021). As a policy mechanism, integration should be more strongly linked to the institutional organization in order to achieve successful interdepartmental cooperation (Zevenbergen et al., 2018). Such responsibilities and institutional support in integration processes are often unclear and

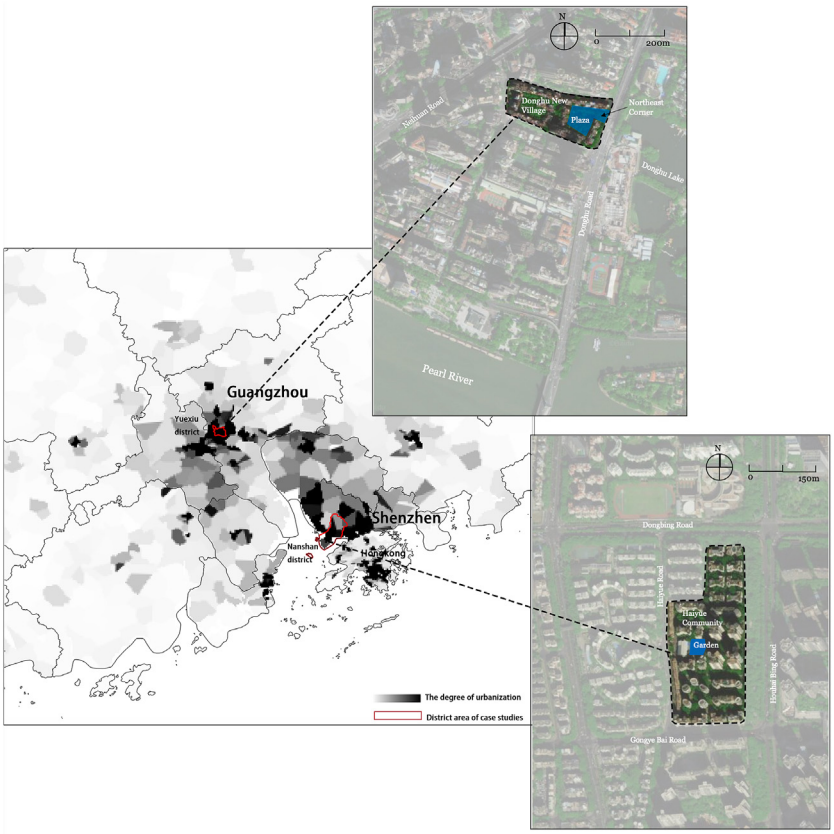


**Fig. 2.** Geographical locations of Donghu New Village in Guangzhou and of Haiyue community in Shenzhen (Source: Author).

limited, easily creating a barrier that hampers the area-specific approach to flood problems (Dai et al., 2018). At the neighbourhood level where the *Sponge City Program* is to be implemented, technically oriented conventions for river or coastal flood risk management prevail and hinder the involvement of informal actors in the area-specific approach (Meng et al., 2022). The lack of informal actors in decision-making can backfire on the process when the result is not embraced, for example when measures have a negative impact on residents, such as rain gardens that appear to attract mosquitoes (Qi et al., 2021).

However, local institutional barriers are not insurmountable. In addition to an integrated approach involving various policy departments, local authorities have the option of involving residents' collectives in tackling urban flooding (Dai et al., 2018; Hegger et al., 2017). This collaboration can even lead to organizational innovations, whereby formal and informal actors adapt their attitudes, conventions and norms, enabling effective interactions between stakeholders (Edelenbos et al., 2017; Pahl-Wostl et al., 2013).

This research is structured around an analytical framework that informs about interdependent relationships between local authorities and local collectives, which can range from integrated planning and shared governance in the formal world to self-regulation in the informal world (Fig. 1). Based on previous research on actors' interactions in flood risk management and multilevel governance (e.g. Edelenbos et al., 2017; Pahl-Wostl et al., 2013, etc.), the following aspects form the core of the analytical framework for the empirical case studies on the *Sponge City Program*:

(1) *Governance in the informal world*: referring to the shared governance and self-regulatory processes of the collective.
(2) *Governance in the formal world*: referring to the formal processes in the interventions of the local authorities, seen from a multiple layered coordinative government structure.
(3) *Interdependency of formal and informal actors:* referring to the process by which local governments and collectives come to a shared understanding, take mutual responsibility and work together in an area-oriented, integrated approach.
(4) *Boundary spanning:* referring to crossing barriers between local authorities, among themselves and with local collectives.

### 2.5. Research methodology

This study used a qualitative comparative approach involving micro-level cases for two reasons. Firstly, comparing cases can provide a contextualized understanding of urban pluvial flood risk management at the local level. Secondly, contextual similarities and differences across the microlevel cases can be used to explain and analyse the process of multilevel governance. The two studied cases, the *Micro-regeneration of Donghu New Village* and the *Communal garden of Haiyue community* (Fig. 2), are located in Guangzhou and Shenzhen, both located in the Pearl River Delta in China. Both Guangzhou and Shenzhen are flood-prone cities and have been selected as pilot or demonstration cities in the *Sponge City Program*. Moreover, both *Donghu New Village* and *Haiyue community* are communities with more than fifteen years of experience of urban pluvial flood issues. However, there are also differences regarding contexts and governance processes, such as the urban development modes of Guangzhou and Shenzhen (historical capital vs. new megacity), that can affect actors' interactions (Dąbrowski et al., 2021), and the collaboration process within the two cases (bottom-up initiative vs. top-down).

An analysis of governmental documents, semi-structured interviews and on-site visits were used to collect empirical data. The interviews were conducted between February and May 2022. Information on the 28 interviewees is provided in Table 1 and Appendix Table 2. During the interview, the interviewees were asked: 1) to indicate which organizations/individuals they had to deal with in the decision-making process. 2) to clarify the roles they as actors represent and play in interacting with others; 3) to illustrate their motivation/interest to participate in the interaction; 4) indicate the cooperation and tensions between actors in the interaction process. All interviews were transcribed and coded using qualitative analysis software ATLAS.ti (v 23). The documents and transcripts were qualitatively analysed using a coding scheme based on the analytical framework in Fig. 1. These are codes that relate to the core elements of the formal and informal governance process mentioned in Section 2.4. This concerns self-regulation, shared governance, integrated planning and constraints. The data obtained in this way were first discussed by the researchers per case in several rounds to gain a shared understanding about how the different elements played a role. Secondly, the data from the two cases were compared, and

**Table 1**
Overview of interviews conducted in the research period and local stakeholders involved in the projects.

| Cases<br>Interviewee information | | Micro-Regeneration of Donghu New Village, Guangzhou | Self-governing Community Garden of Haiyue Community, Shenzhen |
|---|---|---|---|
| Informal actors | Resident groups | Self-regulating groups against the government's plan or developing their own plan. | Twelve residents self-regulating a community garden to enhance the community-built environment. |
| Formal actors | Municipal government | Guangzhou Municipal Sponge Office. | Shenzhen Municipal Bureau of Urban Management Office. |
| | District government | Yuexiu District Construction and Water Affairs Bureau, the project initiator and manager, focused on community renewal. Yuexiu District Sponge Office focuses on the Sponge task. | Nanshan District Bureau's Urban Management Office that focuses on the community garden project. Nanshan District Sponge Office focuses on the Sponge task. |
| Others | | Community Committees, Design Company. | External Commonweal Organization Groups, including. Nature Conservancy, Green Foundations, Shekou Foundation. |
| Number of interviewees | | 16 | 12 |
| Period included | | February 2022–May 2022 | April 2022–May 2022 |

the contextual and situational similarities and differences were discussed in several rounds of discussion, from which a common picture emerged (see discussion in Section 4). Finally, the case comparison resulted in theoretical reflections on the interdependence between local governments and local collectives in the field of flood risk management (see in Sections 5 and 6).

## 3. Case descriptions

### 3.1. The evolution of the Sponge City Program

This section draws on governmental documents and then analyses the policy context alongside the decentralized process of the *Sponge City Program*, revealing a three-phase evolution (Fig. 3). In the initial stage, from 2013 to 2015, the national government opted for an integrated approach at the local level where multiple local sectors (e.g. urban planning, transport, architecture) were expected to be involved (State Council, 2015).

The second phase of the *Sponge City Program* covered 2015 to 2018, with thirty cities selected for local pilot explorations (Fig. 4) in which technological innovation was used and adapted to local circumstances (Zevenbergen et al., 2018). For example, apart from dealing with typical water resource issues in Northern China, in Jinan City sponge-related measures were designed to avoided damage its famous, culturally significant, natural springs (Li et al., 2016; Yin et al., 2021). Given the soil freeze-thaw process in winter, Baicheng City in Northeastern China integrated the wastewater plant construction and drainage pipe regulations in the *Sponge City Program* (Li et al., 2016). Gui'an New District in Southwestern China underscored the high risk of fluvial flooding given its mountainous areas (Qi et al., 2021) (Fig. 4). These practices were in effect no more than explorations of technical measures, and only a few cities took concrete steps towards cooperation among diverse actors. For example, Zhenjiang City in the Yangtze River Delta region has organized thematic meetings to reach formal decision-making with local residents, particularly on issues of the built environment and conflict of interest resolution. In the Pearl River Delta, cities with advanced economic development, such as Shenzhen, have been cooperating with enterprises in their industrial zone (Fig. 4).

The third phase of the *Sponge City Program* began in 2018. Since then, the national government has attempted to promote the *Sponge City Program* at the community level. In April 2022, the Ministry of Housing and Urban-Rural Development (MoHURD) proclaimed the "*Announcement for further promoting Sponge City construction*" which would integrate the *Sponge City Program* into the old neighbourhood renewal projects (Ministry of Housing and Urban-Rural Development, 2022). This community-level *Sponge City Program* is meant to demonstrate that bottom-up initiatives can take responsibility or stand side-by-side with local authorities (Francesch-Huidobro et al., 2017). Therefore, there is a need for local authorities to gain more experience in developing integrated strategies for community-level projects, an aspect that was little explored in the first two phases (Zevenbergen et al., 2018).

### 3.2. Introduction of the two cases

After forty years of rapid urbanization in China, the regeneration of old urban residential communities has become a major focus in spatial planning in the past decade. To improve the living environment of old urban residential communities in the Pearl River Delta, Guangzhou municipalities began a project for the *Micro-regeneration of the old residential community located along the Pearl River* in 2018. Likewise, Shenzhen municipality in 2019 advocated for the *Communal Garden project* with an aim to build 200 community gardens. However well-intentioned this was, it turned out to be a generic approach that did not respond sufficiently to the area-specific circumstances and wishes at the neighbourhood level. Regarding the physical conditions, there were comments about scale variations, construction timelines, public facilities and green areas in the district. In addition, there were divergent interests with regard to financing and land use, and there were (often unfounded) concerns about mosquitoes after heavy rainfall. At the same time, because of the progress of the national *Sponge City Program*, Shenzhen was selected to be among the second batch of pilot cities in 2016, and Guangzhou was ambitious to be one of the Demonstration Cities in 2020. The *Sponge City Program* in the Pearl River Delta is not only related to solving urban pluvial flooding, but also is strongly interdependent with other issues (e.g. community conditions, actors' interests), situations which are considered in this paper as 'very complex' due to their multiple interdependencies. The two community-level cases in Guangzhou and Shenzhen described below are typical cases of a process where multiple actors deal with the complexities

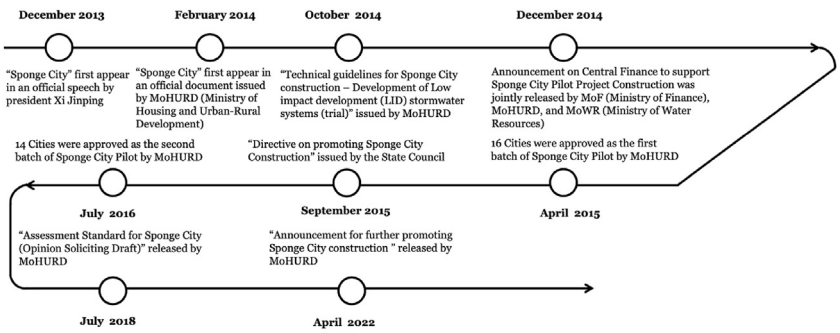


**Fig. 3.** The evolutionary path of *Sponge City Program* (Source: author).

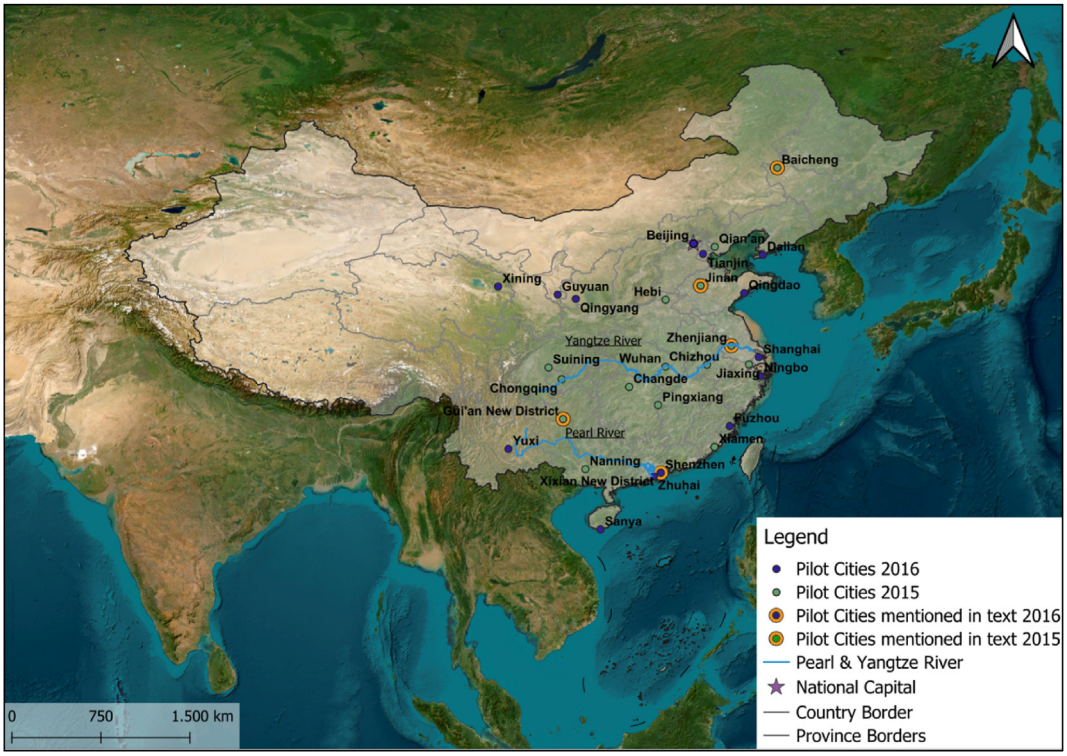


**Fig. 4.** Location of pilot sponge cities and the significant watersheds (Source: Author).

of an area-specific strategy.

The two cases are located in the cities' inner districts: the Yuexiu district of Guangzhou and the Nanshan district of Shenzhen (Fig. 2). These inner districts both feature a high degree of urbanization, relatively aging infrastructure and urban pluvial flooding threat. Both are defined as community-level cases, with a relatively stable population composition, middle-class, well-educated, and a relatively higher percentage of older people actively involved in community affairs. In addition, it also concerns an administratively demarcated area in which only one housing corporation is active.

The first case, the *Micro-regeneration of Donghu New Village* (Fig. 2), was a local *Sponge City Program* initiated by the district-level government. Donghu New Village (around 30,000 $m^2$) is China's first commercial housing estate built in over 40 years. Its eastern square (around 3750 $m^2$) was in poor condition with unkempt green shrubs and waterlogging on rainy days. Some retired residents started to build a new public place (around 500 $m^2$) in the northeast corner of the eastern square for daily leisure activities (Fig. 4). During the project's implementation phase, community residents worried that trees and public space would be reduced in the district government's plan, and took collective action to develop their own plan.

The second case, the *Communal garden of Haiyue community* (around 54,560 $m^2$), is located in the Nanshan district of Shenzhen (Fig. 2). Residents decided to build a communal garden in a neighbourhood's barren vacant lot (around 200 $m^2$), as part of the community square (around 3000 $m^2$), to improve their daily environment. With the help of the local authorities, the urban flooding problems—initially underestimated by community residents—were successfully addressed during the construction of the communal garden.

Both cases are very different and at the same time provide a unique opportunity to study the multilevel governance process in the context of the *Sponge City Program*. An overview of the stakeholders involved in these two cases is presented in Table 1.

### *3.3. Interdependencies in two cases of multilevel governance*

#### *3.3.1. Governance in the informal world*

*Micro-regeneration of Donghu New Village*. Over the past decade, residents were using the eastern square of Donghu New Village less because it had become a rundown public space and was waterlogged on rainy days. In January 2018, some retired residents, supported by a resident with knowledge about construction, started to build a new public place in the northeast corner of the eastern square for daily leisure activities (Fig. 4). This group of residents had established rules, for example how to finance building materials with each other and how to assign the daily cleaning task to those who use the space regularly (see Box 1, interviewee 2). It reflects a typical process of self-regulation, driven by collective bottom-up initiatives rather than external influence.

*Communal garden of Haiyue community*. In May 2018, 12 residents decided to build a communal garden in a vacant barren lot within the neighbourhood. The aim for a communal garden was based on a collective intent to improve their environmental surroundings (see

**Box 1**
Interviewees' intentions in the self-regulation process.

We need a place for the elderly to do activities because there are so many elderly people in our community. Therefore, we built a small space, and took the initiative to look after the hygiene together: whoever arrives first should clean up the place.
—— *Interviewee 2, an educated and knowledgeable individual of the Donghu village resident group.*
We have this communal garden because 12 of us were all interested in planting and also wanted to beautify our community's environment. We set up this project by self-funding 100 yuan per person and set up a weekly agenda.
—— *Interviewee 20, an educated and knowledgeable resident of the Haiyue community's resident group.*

Box 1; interviewee 20). During this process, the residents' group had established some rules such as each person had to bring in 100 yuan (around 14 USD) to start the project, and they scheduled weekly cleaning and maintenance tasks. Therefore, as in the case of Donghu New Village, this project was also driven by a self-regulation process without external support.

### 3.3.2. Governance in the formal world

*Micro-regeneration of Donghu New Village.* In 2018, the micro-regeneration of Donghu New Village was initiated by a district-level government department (Yuexiu District Construction and Water Affairs Bureau) and was one of Guangzhou municipal projects on the *micro-regeneration of the old community along the Pearl River*. While the primary goal of this project was to address community's aging infrastructure and parking shortage, the Yuexiu District Construction and Water Affairs Bureau willingly integrated Sponge-related measures into the renewal process upon seeing the square's pluvial flood issues. In January 2020, the Municipal Sponge Office coordinated by the Yuexiu District Sponge Office became involved in this project because: a) they wanted to meet their annual goal for the *Sponge City Program* (see Box 2, Interviewee 16); and b) they noticed that the water control measures designed by Yuexiu District Construction and Water Affairs Bureau (to control the runoff rate from green spaces) would not cope with the increasing pluvial flooding in the future. Consequently, the process of cooperation between the sectors acquired characteristics of integrated planning, where multiple sectors that had different goals took the pluvial flood issue as a shared responsibility and chose to work across organizational boundaries.

*Communal garden of Haiyue community*. In January 2019, a district-level government department (Nanshan District Bureau's Urban Management Office) became involved in the Haiyue community because it was searching for a pilot for Shenzhen municipal *Communal Garden project*. While the Haiyue community simply took pluvial flooding for granted, the Nanshan District Bureau Urban Management Office intended to go further and solve the flood issue by building a communal Rain Garden. However, there were no governmental guidelines for cross-boundary collaboration between the Nanshan District Bureau's Urban Management Office and the Nanshan District Sponge Office. To simplify the procedure of inter-departmental collaboration, The Nature Conservancy (TNC), was invited as external experts by the Nanshan District Bureau Urban Management Office to provide support in building a community Rain Garden (see Box 2, Interviewee 22). The involvement of different sectors turns this collaboration into integrated planning, which includes not only the community garden to improve the community's built environment, but also integrates sponge-related measures to address the challenges of urban flooding.

### 3.3.3. The interdependency of formal and informal actors

*Micro-regeneration of Donghu New Village*. To reduce the waterlogging resulting from urban pluvial flooding and to solve the shortage of car parking, the district government planned to cut down overgrown trees and build a surface parking area in the northeast corner of the eastern square (Fig. 4) which had already become the new informal public place constructed by retired residents. The district government saw this urban pluvial flooding issue as a technical problem to be dealt with in a generic way. On June 22, 2018, some residents were invited to government roundtable meetings. Their position was marginal, while most residents feared that trees and public space in the community would be reduced. Between July and August 2018, lobbying activities were organized by some well-educated residents to argue against the government's plan. The resistance of residents has made the district authorities reconsider

**Box 2**
Interviewees' observations regarding the shared governance process.

At this stage, the *Sponge City Program* is combined with other projects in a 'piggybacking' way because local authorities do not have the money to set up a *Sponge City Program* on our own. Therefore, when we discovered this project had flooding issues, we got involved by offering some technical advice.
— *Interviewee 16, External expert of Sponge City Office, Yuexiu District, Guangzhou.*
Cooperation between departments also involves risks related to funding, technical support and departmental assessment standards, which is why there is no official interdepartmental collaboration in this project.
— *Interviewee 22, the Sponge Office officer, Nanshan District, Shenzhen.*

their approach to flooding, by now seeing it as an area-specific issue in which the interests of the local collective can also be taken into account. This was done after consultation with residents, which resulted in a better understanding of their interests and the local conditions. This local knowledge was then included in developing a solution that meets multiple needs (see Box 3, Interviewee 8). Rather than cutting down overgrown trees to be replaced by parking lots, the revised plan designated sunken green spaces — areas that use concave shapes to effectively minimize peak runoff and delay flooding — and informally designed public meeting space in the northeast corner of the eastern square was formally integrated in the plan. This process can be interpreted as a step towards shared governance, exemplifying how the district authorities collaborate with collectives to foster a mutual understanding of community interests and urban flood challenges.

*Communal garden of Haiyue community*. During the shared governance process, the actors' diverging interests to solving the pluvial flooding became apparent. These divergent interests led to negotiations involving the district government, community residents and external experts. Eventually, all the stakeholders agreed to a 'learning-by-doing workshop' to build a Rain Garden. In line with the Donghu New Village plans above, this process can also be seen as a move towards shared governance: the community's interest in building a communal garden for planting had pushed the government's ideas to go further in solving the pluvial flooding. After negotiations, it led to an area-oriented collective intention: a planted garden with water absorption measures. Moreover, after seeing the possibility of pluvial flood issues and the potential of the community collective's action, local authorities institutionalized the flood aspects and collective involvement in their municipal guidelines for the garden project: the '*Beautiful Shenzhen Community Building Garden Work Manual (2020)*' (see Box 3, Interviewee 25).

#### 3.3.4. Boundaries spanning

*Micro-regeneration of Donghu New Village.* Institutional barriers mainly occurred during the integrated planning stage between policy sectors and in the process of sharing needs and desires between both parties. While the Yuexiu District Construction and Water Affairs Bureau, as the project manager, took the initiative to integrate the sponge concept into the project, they chose to avoid collaboration with the Yuexiu District Sponge Office even though they knew the Sponge Office's goal for the *Sponge City Program* was relevant. Later, the Sponge Office took the initiative to get involved in the project but these two departments mostly worked independently because of the somewhat fuzzy nature of these entities (see Box 4, Interviewees 1 and 7). Additionally, in the process of sharing needs and desires between both parties, residents expressed great concerns about the implementation of *Sponge City Program* in their community. They feared, unfounded in view of the technical precautions, that sponge-related measures like sunken spaces could lead to mosquito-related issues impacting daily life. A key factor contributing to this resistance was that these informal actors had limited involvement in the initial planning stages, which left them without knowledge of the impact of the technical measures proposed by *Sponge City Program*.

*Communal garden of Haiyue community*. Institutional barriers also occurred in this case during the integrated planning stage between the Nanshan District Bureau's Urban Management Office and the Nanshan District Sponge Office, and local authorities collaborated with community groups during the maintenance stage. As there were no governmental guidelines for cross-boundary collaboration, TNC was invited as an external agency for cross-departmental cooperation. However, the proposal to view urban flooding as very complex means that good and direct cooperation between departments is desirable (see Box 2, Interviewee 22). Furthermore, when local authorities stepped back and the community group assumed responsibility for the maintenance of the communal garden, the community group faced difficulties in obtaining the maintenance funds that were initially assured by the local authorities. Direct and continued communication between the community and local authorities would have been desirable, but the complex application processes associated with multiple sectors involved have eroded the community's initial enthusiasm (see Box 4, Interviewee 23).

## 4. Discussion

The case studies presented here are compared and viewed from the perspective of the ongoing academic debate (see Section 2). Here we continue discussing four insights regarding the interdependencies in two cases of multilevel governance (multilevel governance process, actors' institutional functions, the interdependencies and the institutional barriers).

*First*, at the local level, the *Sponge City Program* can be seen as a multilevel governance process. The policy analysis in Sections 3.1 and

**Box 3**
Governmental role in shared governance.

In the beginning, local authorities were leading the whole project. However, when residents have shared their own interests and plans, local authorities act more like a coordinator to provide a platform for communication between our design company and residents.

—— *Interviewee 8, the project's urban planner*

After this project, we encourage communities to build their gardens with sponge-related measures based on community condition, and set up self-regulating rules for maintaining the community garden by volunteer residents in our project guidelines.

—— *Interviewee 25, the external expert of the Nanshan District Bureau's Urban Management Office*

**Box 4**
Barriers within or between the formal and informal interaction processes.

The District Sponge office and its external experts gave us some policy and technical support but, basically, we work alone because we don't know how to cooperate.
—— *Interviewee 1, Officer of Yuexiu District Construction and Water Affairs Bureau, Guangzhou*
Without a clear role in institutional design by aligning responsibilities for cooperation, these departments are more interested in finishing their task to fulfil their department's objective rather than coordinating the Sponge City goal.
—— *Interviewee 7, Head of Guangzhou Sponge City Office, Guangzhou*
There is no communication pathway for requesting support from the government for our bottom-up initiatives. Even though the government has been involved in our project, applying for government funding is still too complicated for us.
—— *Interviewee 23, Resident, Haiyue community, Nanshan District, Shenzhen*

3.2 identified that the generic policy and the goal set by the national government triggered the local authorities to see the importance and wants to see greater use being made of the interdependent characteristics of the *Sponge City Program* (a finding also identified by Qi et al., 2021). This appears to have been successfully tackled in both cases, albeit for different reasons, which has led to a situation-specific approach to urban flooding at the local level. In these area specific approaches, the local contexts (spatially diverse and heterogeneous conditions) and the different actors' diverging interests (the department's and the residents' multiple objectives), are taken into account. The tension between the generic perspective and area-specific contexts at the case level triggered local authorities to see the benefit of integrating the *Sponge City Program* into a comprehensive area-oriented plan for both neighbourhoods. This area-specific strategy emphasizes the importance of institutional assertiveness involving both formal and informal actors and their multilevel interdependencies (De Roo, 2003; De Roo & Perrone, 2020).

The *second* insight is the actors' institutional functions. The two empirical cases differ in how the actors integrated flooding issues, their positions and the institutional conditions. There was an inside-out process in Donghu New Village in that the urban pluvial flooding issues were primary, from which actors addressed several topics including parking areas and public space. An institutional framework prioritized the governmental task such that informal actors were little involved in the early stage of planning. This set-up led to tension in the implementation process between the residents and the governmental plan. In contrast, an outside-in process took place in Haiyue Community where actors initially wanted to just build a communal garden. It was through this that the urban pluvial flooding issues were revealed, and then further institutionalized in the municipal communal garden project guidelines. An institutional environment was created in this process where actors could offer their competencies and capacities, or learn together, to achieve synergy between the formal and informal worlds (De Roo & Perrone, 2020). These very complex situations in local flood risk management, where multi-level decision-making benefits from interaction and collaboration between formal and informal actors, show the potential for Chinese flood policy makers to be more open to the involvement of informal actors early in the planning process. This means a change in perspective from 'planning for people' to 'planning with people'.

The *third* insight is that local authorities and residents can, depending on the government's framework, synergize. Resonating with the discussion on self-regulation (Kjaer & Kooiman, 2003; Rauws, 2016) or shared governance (De Roo & Perrone, 2020) in Northwestern Europe, we saw that informal conventions can trigger informal actors' collective action in both our cases. The triggers resulting from residents' willingness to take responsibility for their surroundings, and organize through informed and committed residents, are still in the shadow of the formal Chinese planning process. Chinese policymakers should seek to convert these processes from constraining to enabling factors in the *Sponge City Program.* This research adds insight into local authorities' roles as formal institutions in taking advantage of multilevel interdependencies (Zhang et al., 2020). In both cases, not only do the local authorities help residents identify the pluvial flood issues, they also stimulate and institutionalize community residents' varied and informal collective intentions to establish a locally embedded plan. Even if the interests of local authorities and community residents differ and conflicts arise, local authorities do become more active and show adaptive behaviour by changing their goals to reflect the community residents' interests (Edelenbos et al., 2017; Pahl-Wostl et al., 2013). Based on the above analysis, reference has been made here to the synergy that can be achieved at the local level between formal and informal actors: informed and involved residents want to take responsibility for their environment, even if the proposals of the authorities clash with the interests of those involved. The taking of responsibility by citizens can support the authorities in their task. Particularly when local authorities define issues in a context-specific manner, the use of local involvement and local knowledge in formal decision-making leads to interesting outcomes. The research into urban flooding shows that the authorities are better informed about the local situation, respond more inclusively and act collaboratively.

*Fourth*, major institutional barriers remain in the local *Sponge City Program*. In both cases, the integration of local flood policy is still limited due to the lack of an institutional design for interdepartmental cooperation. And while the complexity of the situation requires an integrated approach, the diverging interests of the various departments add to the complexity of the consensus-building process (Jiang et al., 2018). Chinese authorities usually define urban flood-related problems as 'simple' followed by a technical approach, and are insufficiently aware that a multitude of interests quickly leads to 'very complex' situations, which require a completely different approach. Additionally, informal actors are also less involved and less valued in spatial interventions, and yet there is hardly real shared governance. This contrasts somewhat to situations in Northwest Europe where informal actors take the lead in certain circumstances, with the government taking a facilitating role. Although the Chinese institutional context is less inclined to value collective initiatives, this research shows that local authorities were able to adapt their usual attitudes (also noted by Hegger et al., 2017). Although the local

authorities in Donghu New Village and in Haiyue Community adopted different approaches (inside-out vs. outside-in) in addressing urban pluvial flooding, both were open to positioning urban pluvial flooding in a broader picture and stepping in to create a shared understanding of flood issues with local collectives, which is beginning to look like a shared governance approach.

## 5. Policy implications

The above empirical results are not without policy implications. *Firstly*, it appears that the local government and the local community need each other for a good outcome, where the local government can benefit from social capital by increasing community resilience to urban flooding. Through a different perspective on policy making, from 'planning for people' to 'planning with people,' local knowledge, responsibility and commitment can be used. *Secondly*, emphasizing the interdependence between local governments and local collectives is valuable in developing an integrated approach to local flood situations. How best to do this could be elaborated in local guidelines that reflect area-specific circumstances. *Thirdly*, although the above findings on the *Sponge City Program* refer to the context-specific circumstances of cities in the Pearl River Delta, to pay attention to the local context and the interrelationship between flooding and other relevant themes within that context is equally important for other cities in China and elsewhere in the world.

The *Sponge City Program* shows how joint efforts between local authorities and communities can effectively tackle complex urban flood risks. The Sponge City has its origins in China, but its lessons extend all over the world. These lessons not only provide opportunities for developed cities to adopt more resilient and integrated flood risk management strategies, but also provide invaluable insights for fast-growing developing cities, especially those with poorly developed water management systems (Zevenbergen et al., 2018). It underlines the ability of citizens to take responsibility in dealing with such challenges. This realization paves the way for a transition from generic approaches that are developed technically, to approaches in which attention is paid to the local context, and in which tailor-made design and participation go hand in hand to arrive at interventions that match local circumstances.

## 6. Conclusions

This paper offers a perspective on 'very complex' situations, which often arise due to a plurality of (conflicting) interests. It showed how community-based urban pluvial flood risk management can be considered 'very complex' due to a situation that not only relates to possible pluvial flooding but is also strongly intertwined with other issues and multiple interests that are relevant for involved local actors. What adds to the complexity are a multilevel relationship surrounding flood protection and multiple levels of governance, circumstances that can be seen as potentially promising for an integrated approach and shared governance. This paper explores actors' interactions in China's *Sponge City Program* in Guangzhou and Shenzhen in the Pearl River Delta. The analysis of both cases from the *Sponge City Program* shows that both the formal and informal actors assume a technical and generic approach almost as a matter of course, while discovering in the process that complex situations require a tailor-made and situation specific approach with a more active role for informal actors (Q1). In other words, 'one size fits all' is no longer the only way to go for the local *Sponge City Program*, as 'very complex' cases require tailor-made designs, not only spatially but also institutionally (also noted by Driessen et al., 2018). An institutional design is advised to be open to informal actors and to embrace a collective effort in the direction of 'shared governance'. This institutional design also prompts policymakers to adopt an integral strategy in which the flooding issue is seen in its local context and is addressed in conjunction with other issues that are felt to be locally relevant (Q2). The danger is that, flood issues may become secondary to departmental or locally felt interests, which can erode the urgency around the theme of flooding (e.g. Qi et al., 2021). Moreover, this study shows that institutional barriers are still dominant at the local level, such as lacking of support within the government for cross-boundary cooperation and public participation (Q2). This needs to be recognized and, if necessary, preferably altered in such a way that they become enabling rather than constraining. Having said this, we realize that this research into a multi-level perspective of formal and informal interactions between actors is only a first modest step in deepening knowledge about the interdependence between local governments and local collectives in the local planning process.

Urban flood risk management appears to be a fascinating theme for research into interdependencies between formal and informal actors. This paper demonstrates the potential of such research. Questions that arise are, for example, how to see interdependencies in situations characterized by individualized flood responsibility, as is the case under American conditions. Deeper insight is also desirable into the interaction process between formal and informal actors, and how they view their individual roles within the collective and the government level. This can reveal the actual, desirable and potential scope of action of actors and how these relate to mutual dependencies that can be beneficial for urban flood risk management. It is also important to know more about the possibility of getting actors to break with biased positions (technical and top-down), while there is potentially much more to be gained from alternative approaches (shared governance). And then the question naturally arises as to how, under what circumstances, authorities can encourage and facilitate citizen initiatives and their social capital, while recognizing the different roles and responsibilities of actors. And ultimately the question is what is needed to enable the authorities and collectives to arrive at 'smart' solutions that in their integrality go further than just preventing floods.

## CRediT authorship contribution statement

**Zeqiang Pan:** Writing – original draft, Visualization, Validation, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Gert de Roo:** Writing – review & editing, Supervision, Methodology, Formal analysis, Conceptualization. **Emma Puerari:** Writing – review & editing, Supervision, Methodology, Conceptualization.

## Declaration of competing interest

The authors have no competing interests to declare.

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## Appendix

**Table 2**
Semi-structured interview logbook (February 2022-May 2022).

| Code | Date | Interviewees |
|---|---|---|
| 1 | Feb 23, 2022 & Mar 28, 2022 | Senior official, Yuexiu District Construction and Water Affairs Bureau, Guangzhou |
| 2 | Feb 24, 2022 | Resident, an educated and knowledgeable individual of the resident group of Donghu New Village, Guangzhou |
| 3 | Mar 2, 2022 | Urban Planner, Guangzhou Urban Planning & Design Survey Research Institute, Guangzhou |
| 4 | Mar 6, 2022 | Head of Donghu New Village Committee, Baiyun Street Office, Yuexiu District, Guangzhou |
| 5 | Mar 9, 2022 | Senior official, Baiyun Street Office, Yuexiu District, Guangzhou |
| 6 | Mar 9, 2022 | Resident, educated and knowledgeable individual of the lobbying group in Donghu New Village, Guangzhou |
| 7 | Mar 10, 2022 | Head of Guangzhou Sponge City Office, Guangzhou |
| 8 | Mar 10, 2022 | Urban Planner, Guangzhou Urban Planning & Design Survey Research Institute, Guangzhou |
| 9 | Mar 11, 2022 | External expert, Yuexiu District Sponge City Office, Guangzhou |
| 10 | Mar 11, 2022 | Manager involved in the survey of public perceptions regarding *Micro-Regeneration of Donghu New Village*, Guangzhou Kanke Survey Companyy |
| 11 | Mar 12, 2022 | A senior official of Donghu New Village Committee, Baiyun Street Office, Yuexiu District, Guangzhou |
| 12 | April 8, 2022 | Resident, Donghu New Village, Guangzhou |
| 13 | April 8, 2022 | Resident, Donghu New Village, Guangzhou |
| 14 | April 9, 2022 | External expert, Yuexiu District Water Affairs Bureau, Guangzhou |
| 15 | April 26, 2022 | Senior official, Yuexiu District Sponge City Office, Guangzhou |
| 16 | May 11, 2022 | External expert, Yuexiu District Sponge City Office, Guangzhou |
| 17 | Mar 27, 2022 | External expert, Nature Conservancy |
| 18 | April 20, 2022 | Landscape designer, Pumen design company, Shenzhen |
| 19 | April 20, 2022 | Property manager, Haiyue Community office, Shenzhen |
| 20 | April 23, 2022 | Resident, the educated and knowledgeable individual of the resident group, Haiyue community, Nanshan District, Shenzhen |
| 21 | April 24, 2022 | Resident, Haiyue community, Nanshan District, Shenzhen |
| 22 | April 24, 2022 | Senior official, Nanshan District, Sponge City Office, Shenzhen |
| 23 | April 26, 2022 | Resident, Haiyue community, Nanshan District, Shenzhen |
| 24 | April 27, 2022 | Resident, Haiyue community, Nanshan District, Shenzhen |
| 25 | April 28, 2022 | External expert, Green Foundation, Shenzhen |
| 26 | April 28, 2022 | Senior official, Haiyue community office, Shenzhen |
| 27 | April 29, 2022 | Senior official, Nanshan District Bureau's Urban Management Office, Shenzhen |
| 28 | May 10, 2022 | External expert, Shekou Foundation, Nanshan District, Shenzhen |

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